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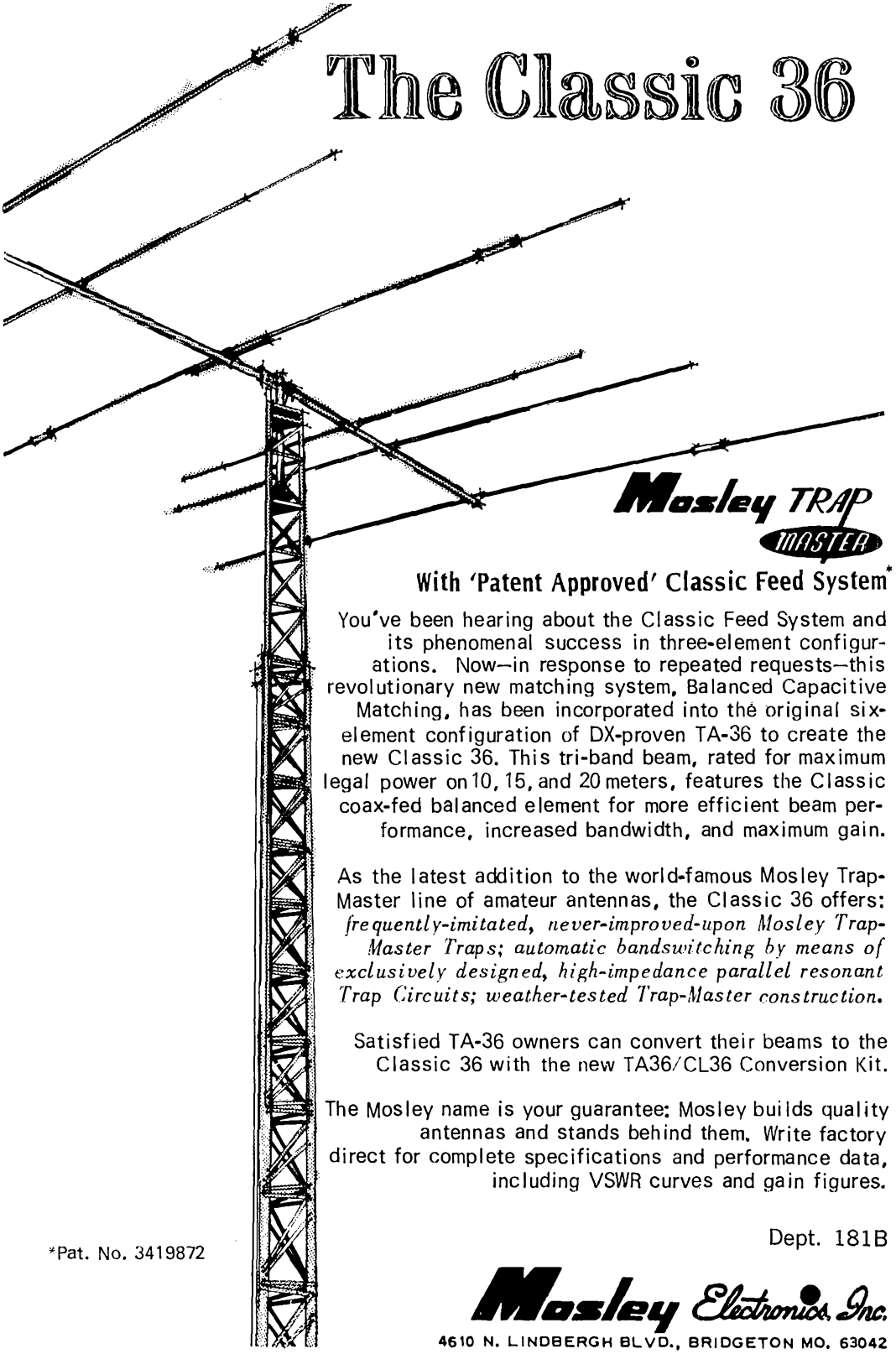
The Classic 36



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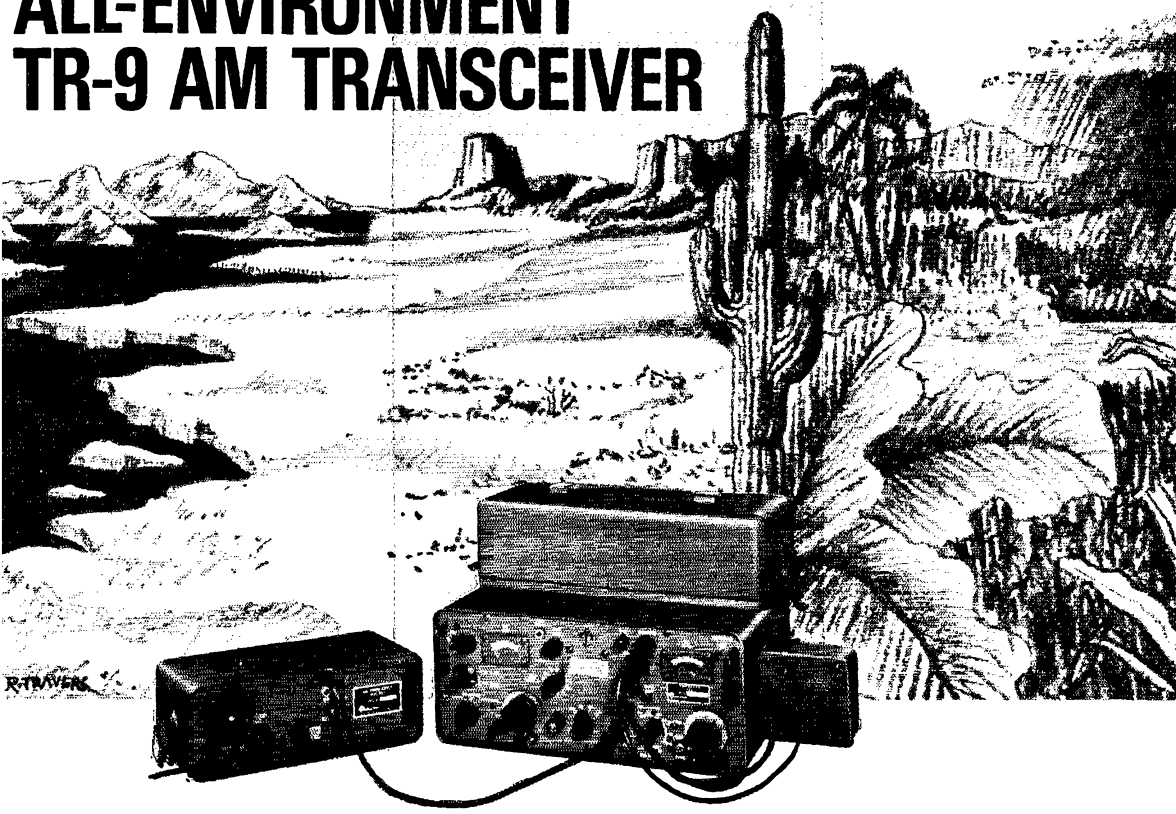

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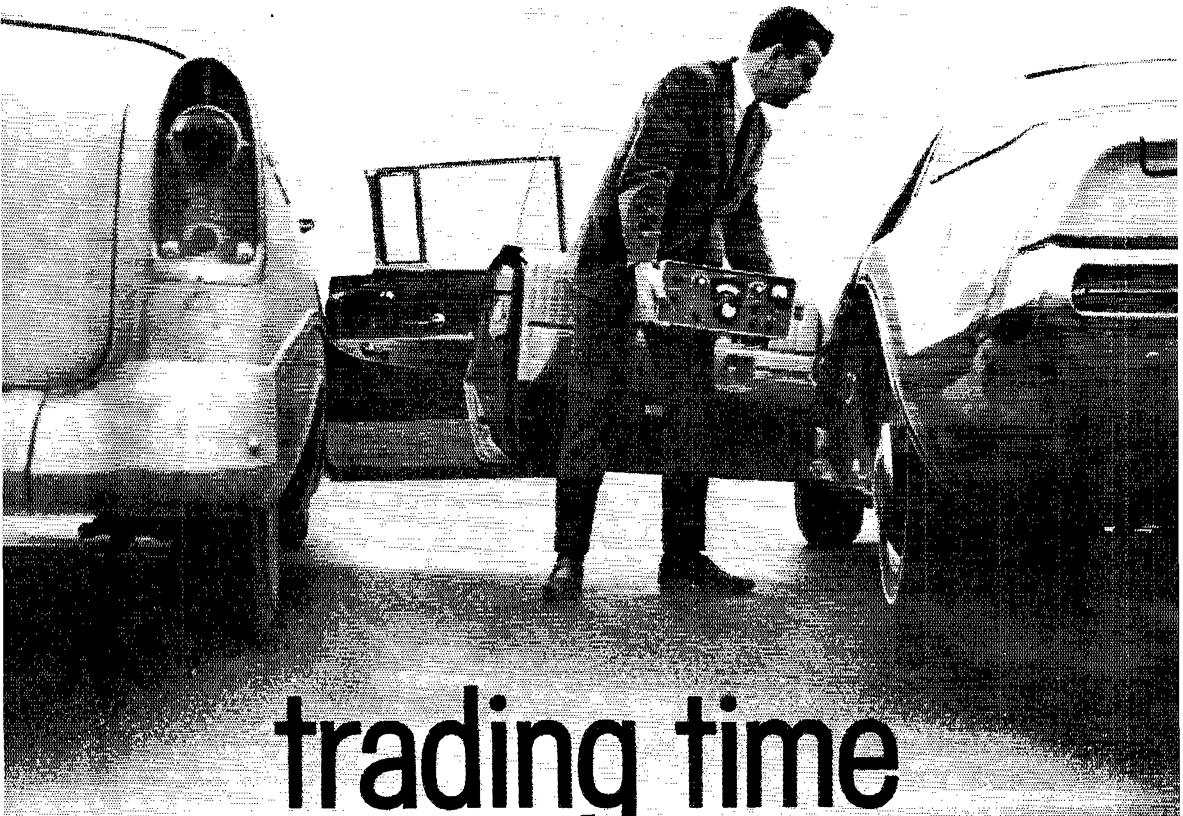

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JUNE 1969

VOLUME LIII NUMBER 6

PUBLISHED MONTHLY, AS ITS OFFICIAL JOURNAL, BY THE AMERICAN RADIO RELAY LEAGUE INC., NEWINGTON, CONN., U. S. A. OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

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OUR COVER

Inspired by a sketch by Ron Hays, our own Ed Collins did this colorful cover. Details on the National Convention begin on page 72. See you there.

—CONTENTS—

The Hammarlund Superpro

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For continuous communications under the most difficult conditions — when the message *must* get through — Hammarlund Superpros have been the mainstay of Armed Forces and Government Agencies around the world!

The world famous Hammarlund SP-600 series Communications Receiver is available in three frequency ranges (10 KHz-540 KHz, 100 KH-29.7 mHz, 0.54 mHz to 54 mHz); single or dual diversity. In cabinet or rack mounted units.

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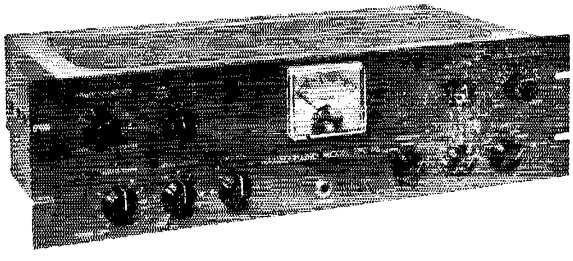

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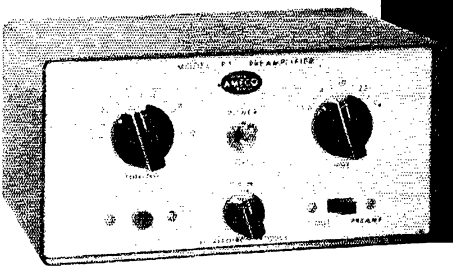

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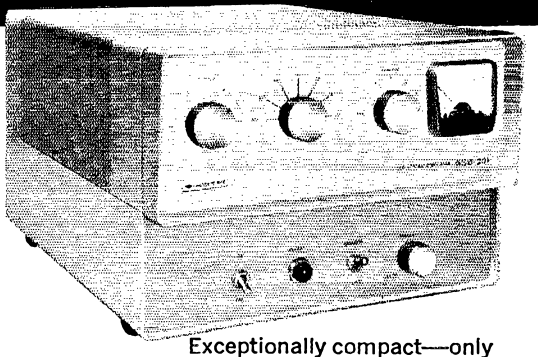

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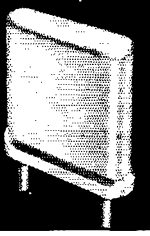

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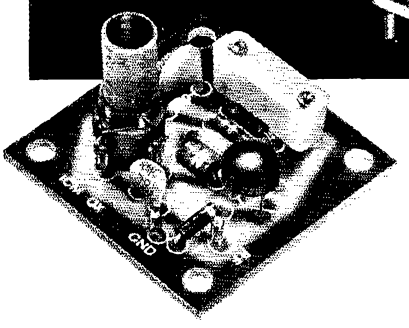

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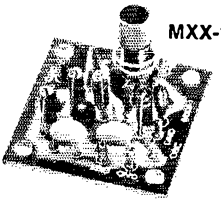

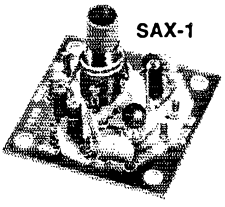

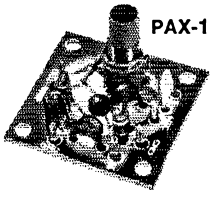

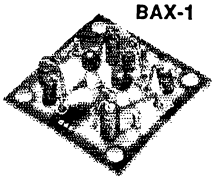

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West Gulf Division

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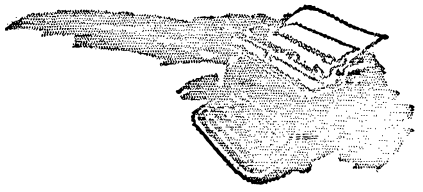
* Member Executive Committee

"It Seems to Us..."



QSL BUREAU

Our incoming mail lately has contained quite a few self-addressed envelopes with notes attached to the effect of "Do I have some QSL cards there waiting to be claimed?" and that means it's again time to explain the ARRL QSL Bureau System, both its headquarters and district operations.

Basically, the ARRL QSL system exists solely to help American and Canadian amateurs in getting their cards from overseas stations. We outnumber the rest of the world in amateur population by such a margin that our QSLs are not of any great value to hams elsewhere who have been on the air any time at all (except perhaps for those of us in the "rare" states and provinces). It's a good bet that few foreign hams would feel it worthwhile to spend the equivalent of eight cents a card QSLing every W or K, VE or VO worked. But with the ARRL Bureau in operation, all the foreign amateurs need do is wrap up their American and Canadian cards in a bundle, once a month or so, and send them to the League headquarters.

At headquarters, the QSL cards are sorted out approximately every ten days and mailed to the volunteer District QSL Managers. Now this is where *you* have to do something — you furnish your own district QSL manager with stamped, self-addressed envelopes. See page 90 for the name and address of your district manager and for his preference between the two standard envelope sizes — the number 10 business envelope, about 4¼ by 9½ inches, or the #50 manila envelope, about 5 by 8 inches. The envelope size is important to Bureau personnel, because the sorting racks or cubby-holes are built for the one size. Also, print your own call letter prominently in the upper left-hand corner of the envelope You may, if you wish, give the district manager additional simple instructions, such as "Mail when full" or "Mail monthly." In the former case, if you have a 6-cent stamp on the envelope, he will mail it when about six cards have accumulated; if 12 cents postage is attached, he'll wait for a dozen cards, etc.

There is an alternative plan in operation at some bureaus which you may use if the manager agrees and you wish to use it; under this system, you may send a dollar to the manager, who agrees to buy, stamp, address and mail a stated number of envelopes to you, notifying you when to remit another buck. This optional plan is of course a little more expensive because you are in effect hiring the manager to do your work for you. Many hams and managers have found it mutually convenient, and there is no objection to this method as an optional one. However, the user of the bureau may always use the original system of sending stamped-self-addressed envelopes to the manager in order to receive his cards.

Bear in mind that the bureau cannot be anywhere near as fast as direct mail. A great many foreign amateurs send their cards through an outgoing bureau operated by their own amateur society. There is a delay perhaps at the amateur's station, until he has enough outgoing cards to send to his bureau; another delay at his bureau until its manager is ready to mail to ARRL (or in some cases direct to your district bureau). Some countries will accept QSLs at "business papers" or "printed matter" rates, and when this is done, the bundles come by slow mail. The cards are usually sorted and mailed at headquarters every ten days or so — another slight delay. If you're really anxious to receive a particular card, you should ask the amateur you've worked to QSL by direct mail — and enclose IRCs or unused stamps of the country concerned to pay for the extra service. (Naturally, a U. S. or Canadian stamp is of little value overseas.)

Another important point — the League attempts to operate only an incoming QSL service. Your outgoing cards can be mailed to the bureaus listed in the "IARU News" column of *QST* each June (see p. 83) and December, and in the *Radio Amateur Call Book*, or direct to the address listed in the *Call Book* for your contact — or to one of the outfits specializing in outgoing cards.

One final point — the District QSL Bureau Personnel are all volunteers, who are giving up a part of their operating time to serve you. They receive no salary or fees — and few compliments! They are one of the hardest-working, most dedicated group of volunteers you will find anywhere. Your patience and active cooperation are essential to keep the system moving smoothly. QST

Actions in regulatory matters and the planning of two new League publications were highlights of the annual meeting of the 1969 ARRL Board of Directors meeting, this year held in New Orleans, La., May 2 and 3. Requests to be made of FCC for changes in the amateur rules include Technician privileges in the entire band 144-148 MHz., plus a new segment 29.5-29.7 MHz.; only a one-year (instead of the present two) wait before taking the Extra exam; multiple speeds for RTTY operation; "grandfathering" holders of the old Amateur Extra First Class ticket; the use of a typewriter for amateur code tests; and making Techs again eligible to apply for and hold a Novice ticket simultaneously. Support was given to current FCC proposals for 7.0-7.1 MHz. maritime mobile operation and (not surprisingly, since they were mm. long ago initiated by ARRL petitions) 28.0-28.5 MHz. F1 for RTTY, plus moving the exclusive c.w. band to 144.0-144.1 MHz.

V.h.f. repeater activities received considerable Board attention, resulting in plans for specific "World Above" column coverage in QST, a section in next year's Handbook, and a brand-new publication devoted strictly to repeater techniques. Also expected to come on the scene is a new basic publication to be designed and written for the age 12-16 group to promote greater growth of the amateur body. To the same end, a program will be undertaken to have an introductory course on amateur radio made part of high school curriculums.

The directors concluded that League affairs now require two Board meetings per year, and have set November 1 as the date of the second 1969 meeting. Additionally they felt it desirable to have strong director representation at our national conventions and authorized their travel to Des Moines with expenses from division administrative budgets. Plans were laid for the formation of an ARRL Foundation to receive gifts (in wills, e.g.), with funds to be used for the general welfare of amateur radio (e.g., scholarships).

Paralleling last year's action in DX, a new 5-Band Worked-All-States award will be made available. W1AW will commence a beacon service on one or more v.h.f. bands and for a test period of 6 months will conduct extra daytime code practice on weekdays (1300 GMT or thereabouts). DXCCers above 250 countries may now submit cards for endorsements in groups of 10 rather than 20. The ICAO alphabet now becomes the standard in ARRL recommendations.

A motion to provide additional phone frequencies to hams outside the 48 States was defeated, but a study of the whole question of suballocations is to be undertaken by the Planning Committee in cooperation with IARU.

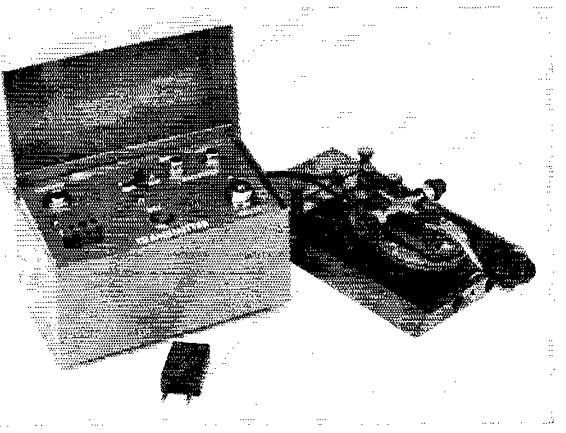
Rocky Mountain Division Director Carl L. Smith, WØBWJ, was unable to continue as a member of the Executive Committee because of additional career duties; Roanoke Division Director Victor C. Clark, W4KFC, was chosen as a member of the Executive Committee. Studies were ordered of a west coast official ARRL station, and of ways of speeding up delivery of QST to members.

The forthcoming international conference on space communications and radioastronomy was a subject of discussion, and the Board voted to replenish the $100,000 appropriation to be used as necessary in the defense of amateur frequencies.

Minutes of the meeting will appear in July QST.

The "QRP 80-40" C.W. Transmitter

BY DOUG DEMAW,* W1CER



The QRP 80-40 transmitter can light a No. 47 lamp to full brilliance when operated from a 13.5-volt supply. It is installed here in its metal recipe-card file box.

SOMETIMES the designer of a QRP transmitter is tempted to cut corners in an effort to minimize cost and circuit complexity. The unfortunate end result of such frugality is all too often manifest in the transmitted signal — chirp, spurious output, harmonics, and hash on the carrier. Many a designer has been sorely disappointed in the efficiency obtained with deceivingly simple rigs — figures which are frequently as low as ten or twenty percent are not uncommon with single-stage transistor transmitters. To avoid most of these unhappy results it is necessary to pay attention to the matters of stabilization, biasing, impedance matching, interstage isolation, and transistor selection.

Getting acquainted with the basic ground rules of solid-state transmitter design is not difficult, and the rewards gleaned from such knowledge can bring satisfying results to the builder. The QRP 80-40 is a fully practical unit, and the design techniques discussed here are applicable regardless of the operating frequency, h.f., v.h.f., or u.h.f.

Circuit Details

Referring to Fig. 1, Q_1 operates as an untuned Pierce oscillator. It operates at low d.c. power level, 100 mw. input. Any fundamental-type crystal from 1000 kHz. to 14 MHz. will oscillate readily when plugged in at Y_1. Keying is accomplished by breaking the emitter return circuit. Shaped keying results from the emitter bias resistor and related bypass capacitors. The note is free of clicks. Output from the oscillator is taken at low impedance to match the input impedance of Q_2, the driver stage. A capacitive divider, C_2 and C_3, provides the desired tap point for the base of Q_2. The 100-ohm resistor, R_3, acts as a parasitic suppressor to help stabilize Q_2. It was added to the circuit after spurious output from Q_2 was observed during key-down conditions. Though R_3 cured the problem, it had little effect on the drive to Q_2. A 0.05-μf. capacitor and a 100-ohm resistor are installed in the 12-volt supply lead between Q_1 and Q_2 to help isolate the two stages. This should be standard practice in any solid-state rig, thus preventing unwanted interstage coupling and the attendant instability it can cause.

A small amount of bias is used on the base of the driver, Q_2, to establish Class B conditions This was done to make it easier to drive than if the stage were operated Class C, and to minimize current drain for that stage during key-up periods. The latter consideration is especially important if dry-battery operation is anticipated. The stage idles at approximately 5 ma. and draws roughly 40 ma. when the key is closed. A low value of inductance is used in the collector r.f. choke, RFC_2, to provide a low value of d.c. resistance in that part of the circuit. (This is desirable because the current drawn by the collector in power amplifier circuits may cause an excessive voltage drop across most standard chokes, such as the 2.5-mh. type.) The low value of inductance is adequate in this type of circuit because of the low collector load impedance — about 150 ohms in Q_2's case. A reactance value of approximately 10 times the collector impedance was selected for use at RFC_2, and this is a good rule of thumb to follow. A 10-ohm emitter-bias resistor is used at Q_2. It is not bypassed so that some degenerative feedback

Low battery drain and compactness are not the only guidelines for QRP transmitters. Unfortunately, many circuits in use permit the radiation of strong harmonics, cause needless TVI, transmit chirpy and clicky signals, and are inefficient in operation. Particular attention has been given to these problems in this design.

* Assistant Technical Editor, *QST*

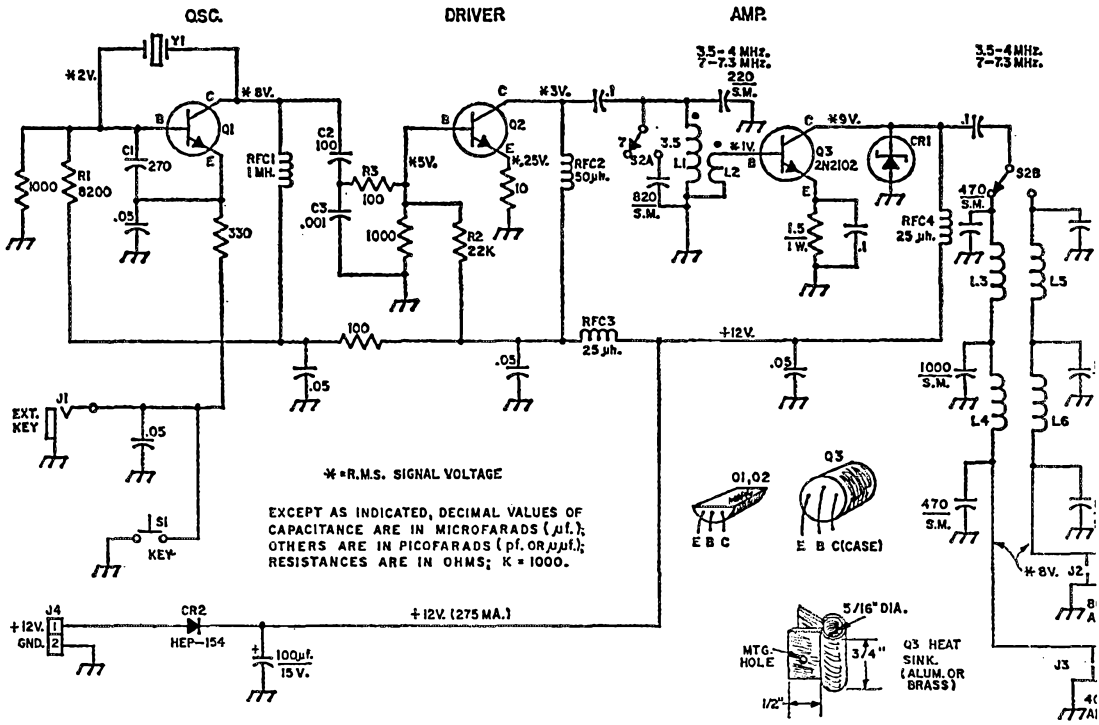


Fig. 1—Schematic diagram of the QRP 80-40. Except as specified, fixed capacitors are low-voltage disk ceramic; polarized capacitors are electrolytic; S.M. = silver mica. Resistors are ½-watt composition. Voltages marked with an asterisk are r.m.s. r.f. (see text).

C_1—Feedback capacitor (value may require changing for best results from transistor used, depending on beta of Q_1).

C_2, C_3—For text discussion.

CR_1—39-volt, 1-watt Zener diode (Sarkes Tarzian VR-39 or equiv.).

CR_2—Silicon, 50 p.r.v. at 2 amperes (Motorola HEP-154 suitable).

J_1—Phone jack, open-circuit type.

J_2, J_3—Phono jack.

J_4—Two-terminal male connector (microphone connector used here).

L_1—2 μh.; 25 turns No. 24 enam. space-wound to occupy entire Amidon T-50-2 toroid core.

L_2—12 turns small-gauge insulated hookup wire wound over entire length of L_1. Wind in same sense as L_1.

L_3, L_4—13 turns No. 20 enam. wire to occupy entire Amidon T-68-2 toroid core (1 μh.).

L_5, L_6—2 μh.; 18 turns No. 20 enam. to occupy entire Amidon T-68-2 toroid core.

Q_1, Q_2—2N2124.

R_1, R_2—Bias resistor. (Value may require modification for best results from transistor used, depending upon beta of Q_1 and Q_2.)

R_3—Parasitic-suppressor resistor. (May be omitted if stable operation of Q_2 exists without it.)

RFC_1—1-mh. r.f. choke (Millen subminiature J300-1000 suitable. James Millen Mfg. Co., 150 Exchange St., Malden, Mass.).

RFC_2—50-μh. r.f. choke (Millen 34300-50).

RFC_3, RFC_4—25-μh. r.f. choke (Millen J-300-25).

S_1—Momentary s.p.s.t. pushbutton switch (Switchcraft 951 suitable).

S_2—D.p.d.t. slide switch.

Y_1—3.5 and 7-MHz. Crystal.

will occur, thus enhancing the stability of the driver stage. The slight loss in stage gain because of the feedback is of no consequence in this instance. A toroidal inductor is used in the collector of Q_2. With S_{2A} in the 7-MHz. position it is tuned to resonance by means of a 220-pf. fixed capacitor. On 80 meters S_{2A} adds an 820-pf. capacitor across L_1 to provide mid-band resonance. Uniform output is available across both bands, and no tuning control is necessary. Since the toroidal inductor is self-shielding, stray interstage coupling is minimized — a further aid to transmitter stability. Output to Q_3 is taken from a link, L_2, wound over L_1 and the toroidal core. Power-lead decoupling is provided by RFC_3 and a 0.05-μf. capacitor. The power output from Q_2 is approximately 100 mw.

An RCA 2N2102 is used in the output stage of the QRP transmitter, at Q_3. A Motorola plastic-cased MPS-UO2 can also be used. Both types produced similar results with the component values shown in Fig. 1. The MPS-UO2 costs 99 cents in single lots, while the 2N2102 nets for $1.13. No matter which transistor is used, a heat sink should be attached to it to prevent damage from excessive heating. Both units were designed for audio applications, but each has an f_T rating of 100 MHz. or greater, making it suitable for

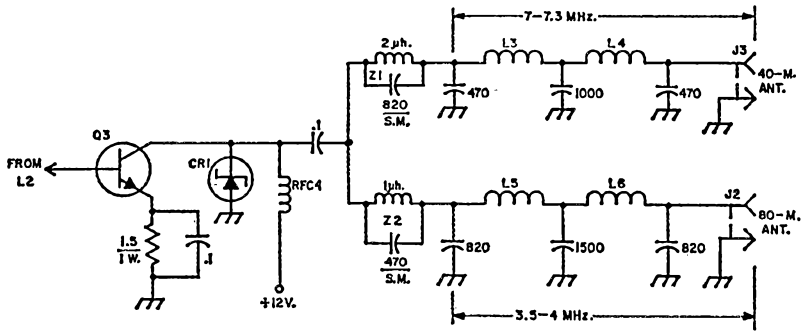
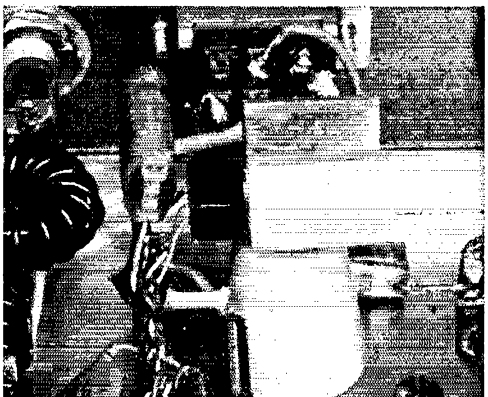


Fig. 2—Suggested method for using antiresonant traps in place of switch S_{2B} in Fig. 1. See text for details.

use at both 3.5 and 7 MHz.[1] Q_1 and Q_2 are also designed for audio use, but since the f_T rating is 100 MHz., the Motorola 2N4124s are ideal in this circuit. They cost 60 cents each.

A 1.5-ohm emitter-bias resistor is used at Q_3 to offer protection against thermal runaway.[2] The stage operates essentially Class C and uses no forward bias on its base. It was necessary to connect a 0.1-μf. bypass capacitor from emitter to ground to clean up a low-frequency oscillation which appeared on the carrier as a hissing sound when the transmitter was keyed. Because of the low collector load impedance for Q_3, approximately 40 ohms, RFC_4 needed to be only 25 μh. to present sufficient reactance at the lowest operating frequency. An iron-core choke was selected to obtain the least amount of d.c. resistance in the collector supply lead. Individual double pi-section tanks are used in the collector of Q_3 to provide maximum harmonic rejection. Band selection is accomplished by the remaining section of S_2 (S_{2B}). Separate antenna connectors are used, J_2 and J_3, to eliminate the need for additional switching in that part of the circuit. If the builder wishes to avoid the use of S_{2B} the circuit of Fig. 2 can be used. It operates on the same principle as a trap antenna, the two anti-resonant tuned traps acting as isolating networks. During 40-meter operation Z_2, resonant at 7.1 MHz., divorces the 80-meter tank from the rest of the circuit. When operating in the 80-meter band Z_1, which is resonant at 3.8 MHz., isolates the 40-meter tank from the output circuit. This method was tried and it worked very well. No noticeable loss in output was detected. The switching arrangement was decided upon only to reduce overall cost of the transmitter. The inductor at Z_1 is merely a duplicate of L_5, and Z_2's inductor is a duplication of L_3. No doubt this technique could be used elsewhere in the circuit to completely eliminate the need for a band switch.

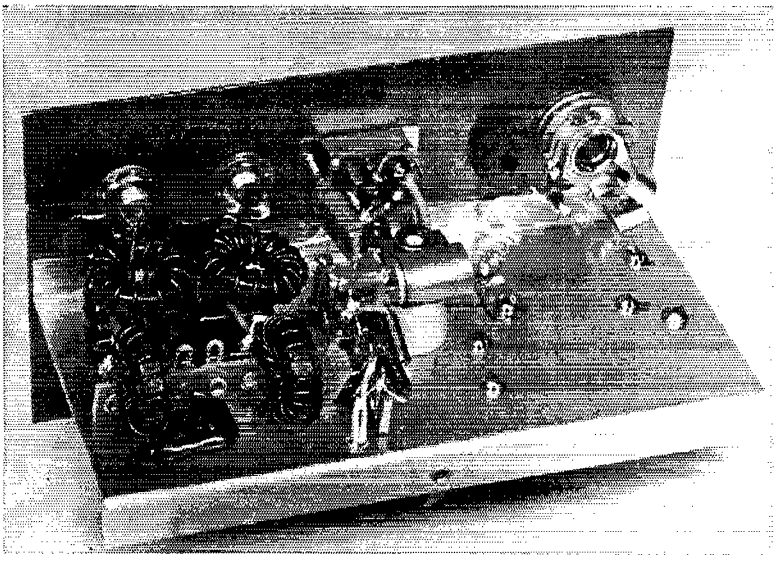
It seemed prudent to include some form of protective circuit at Q_3 to prevent destruction of the p.a. transistor during periods when the antenna s.w.r. was high, or when through error no load was connected to the output of the transmitter. A Zener diode, CR_1, is shown in series with the d.c. at the collector of Q_3. It is rates at 39 volts, 1 watt. It will conduct when the positive half of the r.f. cycle rises to 36 volts or higher, and will also conduct should a d.c. spike of 36 volts or greater ride in on the 12-volt line. Under normal conditions the peak r.f. swing on the collector will not exceed twice the supply voltage value (24 volts), so the Zener diode will not conduct. Too much voltage on the collector will perforate the transistor junction; thus the end result will be a dead short between the elements. Too much heat, on the other hand, will melt the junction and cause an open circuit between the elements. The Zener diode protects against excessive voltage, and the heat sink protects the transistor from thermal damage.



In this photo a Motorola MPS-U02 is used at Q_3. It is bolted to a channel-shaped aluminum heat sink which is mounted on the ceramic pillar.

[1] For use in a.f. and r.f. circuits the transistor f_T rating should be at least ten times higher than the proposed operating frequency for best results, though it is possible (and necessary) at times to depart from this rule of thumb.

[2] Thermal runaway is a destructive condition which occurs in a transistor when the current through its junction reaches a level which generates sufficient heat to raise its temperature above a safe level. The resistance of the semiconductor junction decreases with heat and causes the current to increase even further, resulting in an even greater increase in temperature. The effect is cumulative, hence destruction of the transistor is inevitable.



Looking at the top of the chassis, L_3 and L_4 are at the far left, flanked by L_5 and L_6 to their immediate right. RFC_3 and RFC_4 are mounted on a terminal strip in the center foreground. Q_3 (2N2102) and its heat sink are mounted atop a ceramic post at the center of the chassis. S_2 is visible behind Q_3, mounted on the back side of the panel. J_1 is at the far right. The hole in the rear lip of the chassis is for a sheet-metal screw which holds the chassis to the bottom of the file-box cabinet.

Each p.a. tank is fixed-tuned for the center of its band. No tuning controls are required since uniform output can be expected across each of the bands. The constants have been chosen for a 50-ohm transmitter output impedance, though anything between 30 and 75 ohms can be used as a load without significant loss in output. Silver-mica capacitors are used in the tanks of Q_2 and Q_3 since they are more stable than disk ceramic types. Furthermore, the tolerance on silver micas is closer than that of the disks. This feature will assure accurate mid-band resonance with the inductance values listed. Disk ceramic capacitors can be substituted, but their values should be checked on a capacitance meter before installing them in the circuit. Use only those capacitors whose values are within 10 percent of the values given in Fig. 1. The turns on the toroidal inductors can be spread or compressed slightly to provide a peak in output at the center of the band. Spreading the turns decreases the inductance; compressing them increases it. Collector current for Q_3, with excitation applied, will run between 200 and 230 ma. when a 50-ohm load is connected to the antenna terminal. Since some transistors of a given type number will have different beta values than others, the actual current drawn will vary accordingly.[3] (The higher the beta of a particular transistor, the higher will be the current.) Low current readings will be the result of low base drive to Q_3, low supply voltage, or low beta at Q_3.

A polarity-guarding diode, CR_2, is connected in series with the B-plus from J_4. Should the operator inadvertently cross-polarize the supply voltage the diode will prevent the current from flowing through it. Only plus voltage will pass through CR_2. Supply voltage of the wrong polarity (minus) will destroy the transistors almost immediately. A 100-μf. capacitor bypasses the 12-volt line to help knock down any transients that appear on the supply bus. It also bypasses the battery pack when dry cells are used, thus providing an a.c. ground for the circuit.

[3] The beta rating of most transistors has a very wide tolerance. Generally, no two transistors of a given type will provide the same current gain because of this. Therefore, for a given amount of base drive, different transistors will draw different amounts of collector current, depending upon their individual beta characteristics.

Construction Information

This equipment is housed in a recipe file box which measures $3 \times 3\frac{1}{2} \times 5$ inches. The metal box was obtained at a stationery supply store for 35 cents. A homemade chassis and panel were formed from some aluminum cut from a cookie sheet which was obtained for less than a dollar at a discount store. Copper, brass, or even galvanized furnace ducting can also be used if available. Point-to-point circuit wiring is used in this model, but etched-circuit construction might be more desirable to those who wish a neater layout. Terminal strips are used at various points on the chassis for mounting the component parts. The circuits for Q_1 and Q_2 are built on the bottom of the chassis. Band switch S_2 and the p.a. circuit are above the chassis. This method was used to aid in isolating the p.a. from the rest of the circuit. Q_3 and its heat sink are mounted on a ceramic insulating post, but phenolic or other low-loss materials can be used instead. A short length of $\frac{3}{8}$-inch diameter wooden dowel rod would be a good substitute for the ceramic insulator.

S_1 is a momentary push-button switch. It was installed as an emergency keying device in the event the operator forgot to take the regular key along on a field trip. Since it is somewhat redundant in purpose it can be eliminated.

Coils L_1 through L_6 are wound on Amidon

toroidal cores.[4] Each winding should have its turns equally spaced, and each winding should occupy the entire circumference of the core. L_2 is wound over L_1 and also covers the entire core circumference. The L_1-L_2 assembly is bolted to the chassis by means of a 4-40 × 1-inch screw and flat washer. The covering on the wire used for L_2 insulates the assembly from the chassis and from the metal washer. Tighten the screw only enough to hold the assembly securely in place on the chassis.

Checkout and Operation

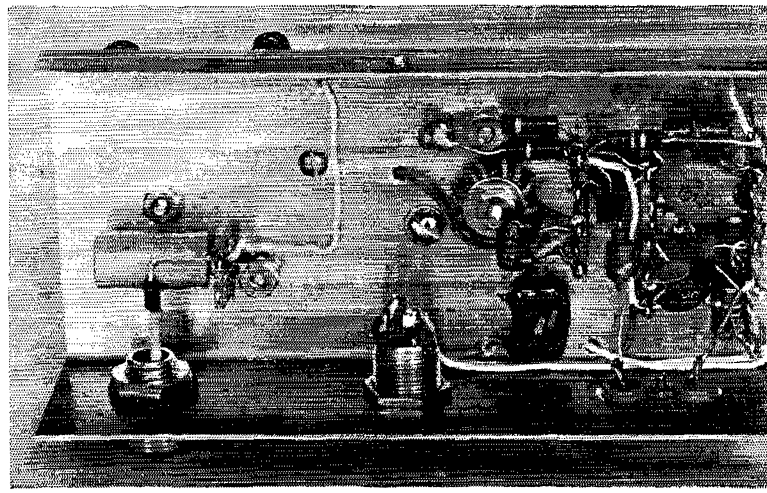
Stage-by-stage testing is recommended for best results. Temporarily disconnect Q_2 and Q_3 by unsoldering their base and collector leads from the circuit. Before doing this, however, it is a good idea to make an ohmmeter check for short circuits in the d.c. line. Using a v.t.v.m., and measuring between the *circuit* side of CR_2 and the chassis, a reading of 8 ohms is typical. Reversing the test prods should provide a reading of approximately 7000 ohms. Severe departures from these readings will indicate that a short circuit or an "open" exists. Next, insert a crystal for straight-thru operation at Y_1, Fig. 1, (Q_2 and Q_3 disconnected) and apply operating voltage to the transmitter. With the key closed the signal should be audible on a receiver tuned to the crystal frequency. Keying should exhibit no clicks, and the c.w. note should be free of hum and chirp. Normal current for the oscillator is between 8 and 10 ma., key down.

After the oscillator is checked out the driver stage can be connected to the circuit. A No. 49 lamp can be used as a load across L_2. With operating voltage applied, and with the key closed, the lamp should light to nearly full brillance. Next, reinstate Q_3 and connect a No. 47 lamp to J_2 or J_3, depending upon the operating frequency. When the transmitter is keyed the dummy should light to normal brilliance, or slightly more. The c.w. note should remain clean throughout all of the tests. If it does not, chances are that instability exists somewhere in the transmitter. Check for defective ground connections or faulty bypass capacitors if this happens. If the foregoing conditions are not met check the points shown on the schematic diagram (marked with an asterisk) for proper r.m.s. r.f. voltage. The readings given were obtained with a Heath v.t.v.m. and a Heath r.f. probe. The probe diode was connected for minus polarity. The voltage readings should provide the clew needed for locating the trouble. Voltage readings and transmitter performance should be the same for both bands. Some crystals — especially older war surplus types — may be somewhat sluggish. If so, the c.w. note may sound chirpy. Good results were obtained with this transmitter when good crystals were used, including many surplus types tried.

The transmitter was checked with a spectrum analyzer to determine its harmonic output level. Happily, the double pi-section tank did what was expected of it. The second harmonic was down 35 db. and the higher-order harmonics were down in excess of 55 db. No spurious output could be found during a search up to 30 MHz. Most transistorized transmitters which employ simple tank circuits have extremely high harmonic output, especially if the tank circuit Q is not high. It is not uncommon to find the 2nd harmonic output down only 10 or 12 decibels from the fundamental. In such equipment the 3rd and 4th harmonics are down only 20 or 25 db. Even though the transmitter is designed for QRP operation, harmonics that strong can invoke the wrath of "big brother" because out-of-band harmonic radiation is almost certain to occur. Even 50 or 100 milliwatts of radiated power can be heard many miles away, especially if an "all-band" antenna is being used.

An oscilloscope check of the keying waveform indicated that it was well shaped and free of clicks. Information on keying oscillograms is

[4] Amidon cores are available from Amidon Associates, 12033 Otsego Street, North Hollywood, Calif. 91607. The T-68-2 sells for 50 cents. The T-50-2 costs 45 cents. Include postage.



In this bottom-chassis view of the transmitter, Q_1, Q_2 and their associated circuits are grouped at the right of the chassis. The components are mounted on terminal strips. *Assembly* L_1L_2 is near the center of the chassis and is held in place by means of a nut, screw, and washer. S_1 is at the lower center, and J_4 is at the far left.

given in Chapter 7 of the *The Radio Amateur's Handbook*, 46th Edition. The measured output from this transmitter was 1.7 watts while using a 50-ohm dummy load. D.c. power input to the last stage is approximately 2.5 watts. At 13.5 volts, which is typical of automotive batteries, 2 watts output was measured while the p.a. ran at 3.2 watts d.c. input. A dry-battery pack consisting of 10 size-D cells (series-connected) should provide plenty of operating time for emergency or field work.

Results and Some Final Thoughts

The transmitter was tested on 7 MHz. while using a center-fed Zepp antenna. Each CQ brought a reply! Among those stations worked during the forenoon were: WN2HTC-589, WA8NVL-559, W2SNW-559, W1GOF-579, and W4ZYT-569. A night-time test on 3.5 MHz. was made while using an end-fed 125-foot wire. The following stations were logged: K4YNJ-579, WA3IYC-569, and WB2KVH-579. These contacts resulted from calling CQ four times. All contacts were made from central Connecticut.

Should the reader be a "gnat-power" enthusiast he can cut the supply voltage to half the specified amount (6 volts). This was tried and the resultant power output was approximately 0.25 watt. Or, the builder can eliminate Q_3 entirely and substitute the two double pi-section tanks for that at L_1. Power output would be on the order of 100 mw. if this were done.

If v.f.o. operation is desired either of the two solid-state v.f.o.s. described in the *Handbook*, followed by an amplifier, 46th Edition, Chapter 6, could be used to excite the transmitter. The socket for Y_1 would become the v.f.o. jack. C_1 would be removed from the circuit, but no other changes should be required. If keying the first stage of the transmitter causes the v.f.o. to chirp because of "pulling," it may be necessary to move the keying line to the emitter of Q_2 to provide further isolation between the keyed stage and the v.f.o.

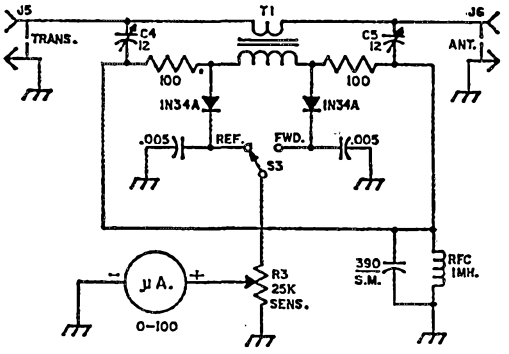


Fig. 3—Schematic diagram of the low-power s.w.r. indicator for use with the QRP transmitter. T_1 uses 50 turns of No. 30 enam. wire over entire Amidon T-68-2 toroid core (secondary winding). The primary winding consists of two turns of No. 20 enam. wire. C_4 and C_5 are ceramic trimmers. S_3 is a s.p.d.t. slide switch. J_5 and J_6 are phono jacks. R_3 is a linear-taper carbon control. Symmetrical layout is necessary, and all leads should be short and direct. Terminate the bridge by a 50-ohm noninductive dummy load during calibration. Adjust C_4 for a null (reflected-power) indication on the meter. Then reverse the bridge terminals (J_5 and J_6) and adjust C_5 for a null indication. Repeat two or three times for best null.

If the reader is a QRO man, but likes to work with transistors, this exciter could be used to drive a sweep-tube linear amplifier operating Class A or Class AB. There is ample output to excite such a stage.

The main consideration in obtaining good results with transmitters in this power class is that an effective antenna be used, and that the s.w.r. be kept as low as possible. A suitable low-power s.w.r. indicator, Fig. 3, was worked out for use with this rig. It is capable of greater than full-scale deflection at the output level of this transmitter. *It is not recommended for transmitters whose power output exceeds 10 watts.* QST

Aluminum Tubing—What Sizes Are Available?

MANY hams like to experiment with antennas but one problem in making antennas using aluminum tubing is knowing what sizes of tubing are available. If you want to build a beam, many questions about tubing sizes, weights, what size tubing fits into what other size, and so forth must be answered. Not only that, but the question of where to obtain the material can be a problem. We did some checking and came up with information that will prove very valuable as a reference for the prospective beam builder.

The following table gives the standard sizes of aluminum tubing that is stocked by most aluminum suppliers or distributors in the United States and Canada. Note that all tubing comes in 12-foot lengths and also that any diameter tubing will fit into the next larger size, if the larger size has a 0.058-inch wall thickness. For example, ⅝-inch tubing has an outside diameter of 0.625 inches and will fit into ¾-inch tubing with a 0.058-inch wall which has an inside diameter of 0.634 inches. Having used quite a bit of this type tubing it is possible to state that 0.009-inch clearance is just right for

6061-T6 (61S-T6) ROUND ALUMINUM TUBE

In 12-Foot Lengths

O. D. Inches	WALL THICKNESS Inches	Stubs Ga.	I. D. Inches	APPROX. WEIGHT Per Foot	Per Length
3/16"	.035	(No. 20)	.117	.019 lbs.	.228 lbs.
	.049	(No. 18)	.089	.025 lbs.	.330 lbs.
1/4"	.035	(No. 20)	.180	.027 lbs.	.324 lbs.
	.049	(No. 18)	.152	.036 lbs.	.432 lbs.
	.058	(No. 17)	.134	.041 lbs.	.492 lbs.
5/16"	.035	(No. 20)	.242	.036 lbs.	.432 lbs.
	.049	(No. 18)	.214	.047 lbs.	.564 lbs.
	.058	(No. 17)	.196	.055 lbs.	.660 lbs.
3/8"	.035	(No. 20)	.305	.043 lbs.	.516 lbs.
	.049	(No. 18)	.277	.060 lbs.	.720 lbs.
	.058	(No. 17)	.259	.068 lbs.	.816 lbs.
	.065	(No. 16)	.245	.074 lbs.	.888 lbs.
7/16"	.035	(No. 20)	.367	.051 lbs.	.612 lbs.
	.049	(No. 18)	.339	.070 lbs.	.840 lbs.
	.065	(No. 16)	.307	.089 lbs.	1.068 lbs.
1/2"	.028	(No. 22)	.444	.049 lbs.	.588 lbs.
	.035	(No. 20)	.430	.059 lbs.	.708 lbs.
	.049	(No. 18)	.402	.082 lbs.	.984 lbs.
	.058	(No. 17)	.384	.095 lbs.	1.040 lbs.
	.065	(No. 16)	.370	.107 lbs.	1.284 lbs.
5/8"	.028	(No. 22)	.569	.061 lbs.	.732 lbs.
	.035	(No. 20)	.555	.075 lbs.	.900 lbs.
	.049	(No. 18)	.527	.106 lbs.	1.272 lbs.
	.058	(No. 17)	.509	.121 lbs.	1.452 lbs.
	.065	(No. 16)	.495	.137 lbs.	1.644 lbs.
3/4"	.035	(No. 20)	.680	.091 lbs.	1.092 lbs.
	.049	(No. 18)	.652	.125 lbs.	1.500 lbs.
	.058	(No. 17)	.634	.148 lbs.	1.776 lbs.
	.065	(No. 16)	.620	.160 lbs.	1.920 lbs.
	.083	(No. 14)	.584	.204 lbs.	2.448 lbs.
7/8"	.035	(No. 20)	.805	.108 lbs.	1.308 lbs.
	.049	(No. 18)	.777	.151 lbs.	1.810 lbs.
	.058	(No. 17)	.759	.175 lbs.	2.100 lbs.
	.065	(No. 16)	.745	.199 lbs.	2.399 lbs.
1"	.035	(No. 20)	.930	.123 lbs.	1.476 lbs.
	.049	(No. 18)	.902	.170 lbs.	2.040 lbs.
	.058	(No. 17)	.884	.202 lbs.	2.424 lbs.
	.065	(No. 16)	.870	.220 lbs.	2.640 lbs.
1"	.083	(No. 14)	.834	.281 lbs.	3.372 lbs.
1 1/8"	.035	(No. 20)	1.055	.139 lbs.	1.668 lbs.
	.058	(No. 17)	1.009	.228 lbs.	2.736 lbs.
1 1/4"	.035	(No. 20)	1.180	.155 lbs.	1.860 lbs.
	.049	(No. 18)	1.152	.210 lbs.	2.520 lbs.
	.058	(No. 17)	1.134	.256 lbs.	3.072 lbs.
	.065	(No. 16)	1.120	.284 lbs.	3.408 lbs.
	.083	(No. 14)	1.084	.357 lbs.	4.284 lbs.
1 3/8"	.035	(No. 20)	1.305	.173 lbs.	2.076 lbs.
	.058	(No. 17)	1.259	.282 lbs.	3.384 lbs.
1 1/2"	.035	(No. 20)	1.430	.180 lbs.	2.160 lbs.
	.049	(No. 18)	1.402	.260 lbs.	3.120 lbs.
	.058	(No. 17)	1.384	.309 lbs.	3.708 lbs.
	.065	(No. 16)	1.370	.344 lbs.	4.128 lbs.
	.083	(No. 14)	1.334	.434 lbs.	5.208 lbs.
	*.125	1/8"	1.250	.630 lbs.	7.416 lbs.
	*.250	1/4"	1.000	1.150 lbs.	14.832 lbs.
1 5/8"	.035	(No. 20)	1.555	.206 lbs.	2.472 lbs.
	.058	(No. 17)	1.509	.336 lbs.	4.032 lbs.
1 3/4"	.058	(No. 17)	1.634	.363 lbs.	4.356 lbs.
	.083	(No. 14)	1.584	.510 lbs.	6.120 lbs.
1 7/8"	.058	(No. 17)	1.759	.389 lbs.	4.668 lbs.
2"	.049	(No. 18)	1.902	.350 lbs.	4.200 lbs.
	.065	(No. 16)	1.870	.450 lbs.	5.400 lbs.
	.083	(No. 14)	1.834	.590 lbs.	7.080 lbs.
	*.125	1/8"	1.750	.870 lbs.	9.960 lbs.
	*.250	1/4"	1.500	1.620 lbs.	19.920 lbs.
2 1/4"	.049	(No. 18)	2.152	.398 lbs.	4.776 lbs.
	.065	(No. 16)	2.120	.520 lbs.	6.240 lbs.
	.083	(No. 14)	2.084	.660 lbs.	7.920 lbs.
2 1/2"	.065	(No. 16)	2.370	.587 lbs.	7.044 lbs.
	.083	(No. 14)	2.334	.740 lbs.	8.880 lbs.
	*.125	1/8"	2.250	1.100 lbs.	12.720 lbs.
	*.250	1/4"	2.000	2.080 lbs.	25.440 lbs.
3"	.065	(No. 16)	2.870	.710 lbs.	8.520 lbs.
	*.125	1/8"	2.700	1.330 lbs.	15.600 lbs.
	*.250	1/4"	2.500	2.540 lbs.	31.200 lbs.

*These sizes are extruded. All other sizes are drawn tubes.

a slip fit or for slotting the tubing and then using hose clamps. To repeat, always get the next larger size and specify a 0.058-inch wall to obtain the 0.009-inch clearance.

With the chart, a little figuring will give you all the information you need to build a beam, including what the antenna will weigh. The 6061-T6 type of aluminum is a relatively high strength and has good workability, plus being highly resistant to corrosion and will bend without taking a "set".

Of course, the question always arises as to where one can obtain the tubing. We did some checking in the Yellow Pages and found three aluminum dealers in Hartford who stocked, or would order, the tubing. Hartford has a population of about 150,000 so that should give you an idea as to where to start looking. We don't know of any "mail order" firm so you'll have to make a trip to the city in order to get the tubing.

However, knowing what types and sizes are available will be a big help, and if you live in the boon docks, you can always work a ham in the city and get him to check the dealers for you, or even order the material. Some dealers will ship the tubing. — *W1ICP*

Strays

The beauty shop was full of customers when one of the employees received a ham radio phone patch from her husband in Vietnam. In order to reduce interference on the line, the shop manager pulled the main switch on all equipment in the shop! (from the *Christian Science Monitor*)

Cathode-Ray Tube Display Unit for Satellite Weather Pictures

BY JACK SPILLANE,* W7UGV

The picture-reproducing system described here permits use of an ordinary camera for recording the slow-scan TV weather pictures transmitted by the Nimbus II and Essa satellites. Relatively simple circuits are used, with horizontal synchronizing controlled by pulses included in the picture transmission.

AFTER using the weather-satellite facsimile circuit described by K2RNF[1] for about a year, the author decided to construct an oscilloscope-readout facsimile device in order to allow use of standard photographic methods. The surplus advertisements were examined for a suitable scope tube, and a 5CP11 was located at a price of $19.00[2]. The P11 phosphor is short-persistence, which is just right for photography.

Since there is no mechanical movement in the reproducing system it was unnecessary to provide 60-Hz. power for driving a synchronous motor, and since the light for photography is provided by the c.r. tube an argon lamp was not needed. (Both were part of the system used by K2RNF.) The picture-synchronizing system used here resembles, in principle, the synchronizing methods used in television reception.

The Horizontal Circuit

The horizontal sync circuit, Fig. 1, makes use of the 12.5-millisecond pulse transmitted at the beginning of each line. The output of the video demodulator (Fig. 4) is applied to one section of a 12AU7 where the video is removed and only a small percentage of the 12.5-ms. sync pulse remains. This pulse is amplified by two more 12AU7 sections and is then applied to a differentiation network. The output from the network triggers the 6AU6 phantastron[3] sweep circuit shown in Fig. 2. The HEP-158 diode is used as a gate to make the operation more stable, as this synchronizing system is amplitude-sensitive and therefore subject to interference from random noise pulses.

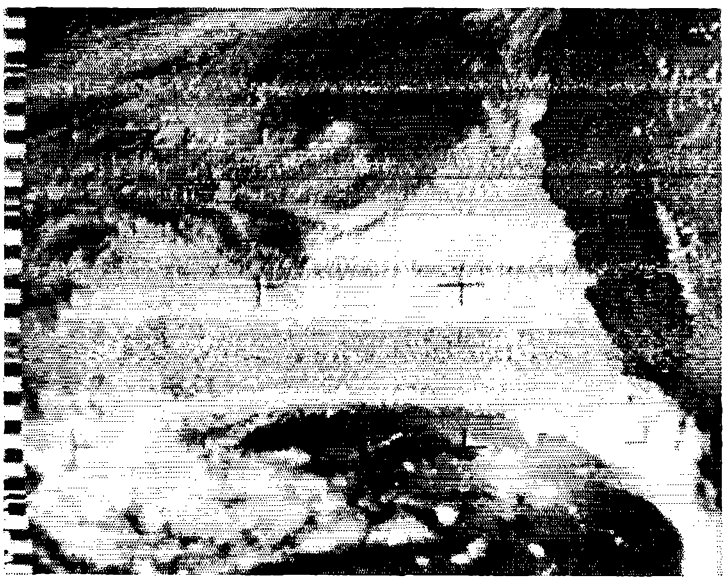
The phantastron generates a 250-millisecond ramp voltage which is adjusted for the proper period by means of the timing control. The diode-connected 12AU7 section, in combination with the 0B2 voltage-regulator tube, holds the ramp voltage to a 105-volt level. The ramp generator output is coupled to the push-pull deflection amplifier through a 12AU7 section used as a cathode follower. A bucking circuit between the cathode follower and the 12AV7 deflection amplifier/phase inverter permits centering the ramp voltage sweep on the c.r. tube screen. The sweep

* 2010 N.W. 60th, Seattle, Washington 98107.

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

[2] Barry Electronics, 512 Broadway, New York, N. Y. 10012.

[3] Millman and Taub, *Pulse and Digital Circuits*, pp. 221 and 217 (McGraw-Hill Book Co., New York).



A satellite weather picture reproduced by the system described in the text. This was transmitted by Nimbus II in a passage over the West Coast.

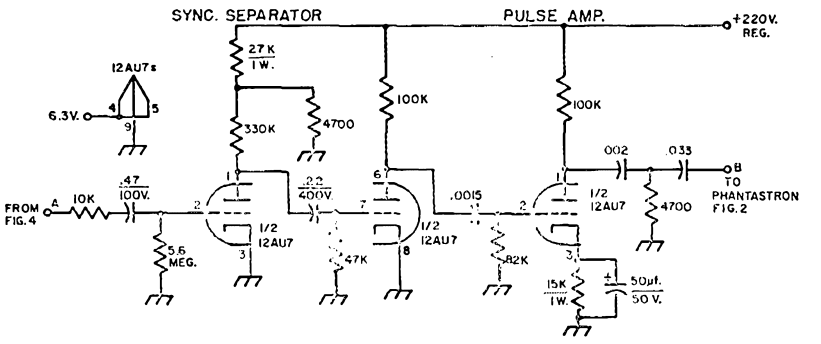


Fig. 1—Line-synchronizing circuit. Capacitances are in μf. Capacitors are paper, 600-volt, except as indicated; capacitors with polarity indicated are electrolytic. Resistances are in ohms (K = 1000); resistors are ½ watt except as indicated.

is from 16 volts positive to 16 volts negative, with the bucking circuit adjusting the zero crossing point for centering.

Vertical Sync

The vertical ramp generator is a Miller rundown circuit[3] driving a vertical amplifier. The rundown is started by removing the negative 105 volts d.c. from the grid network of the first tube section in Fig. 3 by opening the sweep/reset switch. This allows the 24-μf. capacitor (which must be nonpolarized — paper, oil, etc. — and have very low leakage) to discharge through the network resistors.

The bucking circuit at the 12AV7 vertical-amplifier grid has the same function in the vertical system as in the horizontal sweep circuit described earlier.

C.R.T. Circuit

The video signal input (modulated 2400-Hz. tone from the receiver or a tape recording) goes to the 4-ohm winding of an output transformer, T_1 in Fig. 4, to be stepped up to a level suitable for driving the cathode-ray tube grid. The output is converted to varying d.c. by a bridge rectifier and coupled to the c.r. tube through a 500-pf. capacitor. The rectifier gives a positive signal for driving the c.r.t. grid.

The signal can be monitored through a phone jack connected to the 4-ohm winding of T_1 in series with a 47-ohm resistor.

Power Supplies

Two power supplies are used. One, shown in Fig. 5, furnishes the low voltages required: 350 volts d.c. without voltage regulation, 220 volts d.c. electronically regulated, and −105 volts d.c. for bias, regulated by a VR tube, as well as heater power for all tubes except the 5CP11. The regulator circuit for the 220-volt output was taken from the *Handbook*.

The second supply develops the high voltage for the cathode-ray tube. Fig. 6 is the circuit of this supply. Note that there are two half-wave rectifier/filter circuits, each producing about 1800

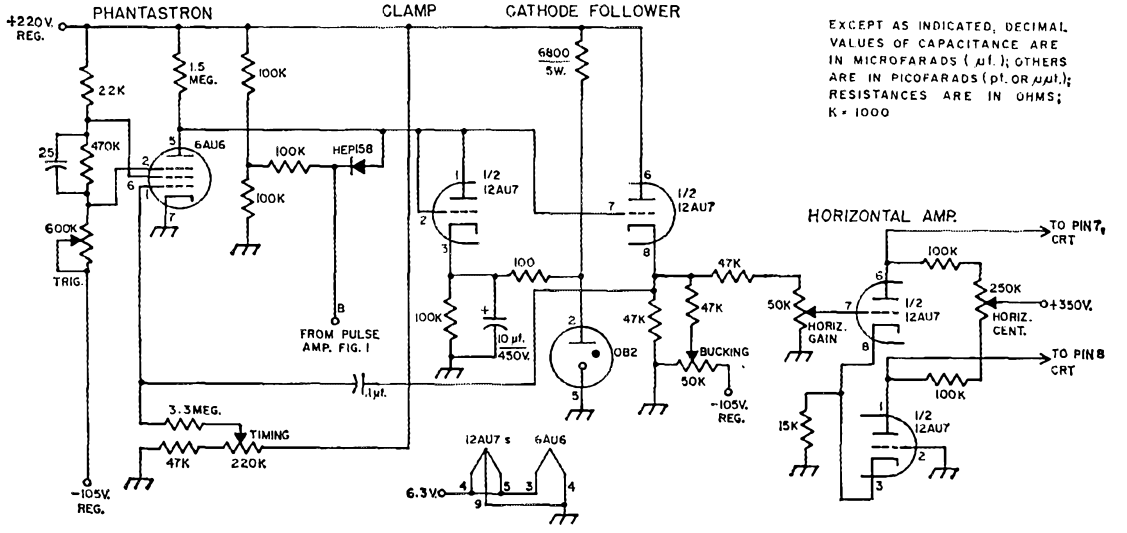
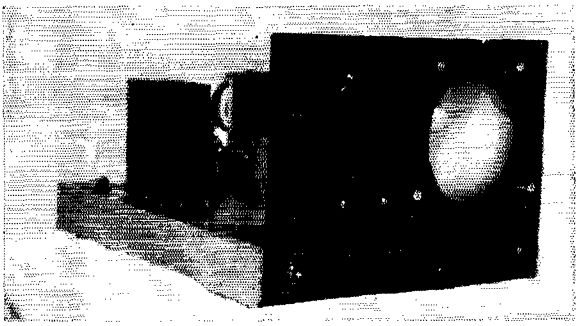
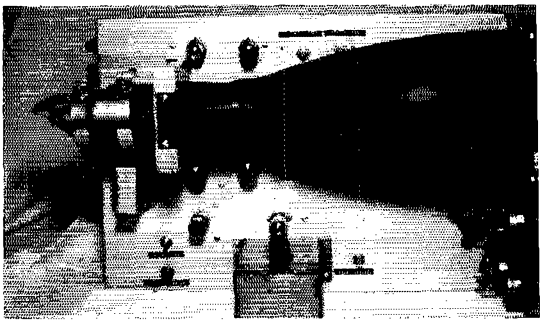


Fig. 2—Horizontal sweep and deflection circuit. Capacitor with polarity indicated is electrolytic. Fixed resistors are ½ watt except as indicated. Variable resistors are composition controls, linear taper.



All circuits except the power supplies are mounted on a 17×12×2 chassis, with the cathode-ray display tube and operating controls on a 7×12-inch panel.



Plan view of the chassis, showing the c.r. tube mounting. The tube shield is a Millen 80055 and the tube socket is a Cinch-Jones 3B14, 14-pin. High-voltage connectors on the rear chassis apron are a Millen 37001 and an Amphenol 86-CP4, 4-pin.

volts d.c., one positive and the other negative with respect to ground. Thus the total voltage applied to the c.r.-tube circuit is approximately 3600 volts.

Construction

With the exception of the power supplies, all circuits are built on a 17 × 12 × 2-inch chassis. The layout is shown in the photographs. The timing controls and bucking controls are mounted on the chassis near their respective vacuum tubes. The signal-input and monitor-speaker jacks are on the rear apron, as are also the astigmatism control and power-supply input connections.

All other controls are on the 9 × 12-inch front panel, along with the c.r. tube bezel.

Separate cables are used to connect the power supplies to the scope unit in order to minimize magnetic interference. While it may be possible to operate the c.r. tube without the shield, there is always the problem of magnetic interference. Sometimes a scope shield complete with mounting hardware can be salvaged from a surplus radar indicator.

The brightness and focusing controls should be submounted on an insulated plate and their shafts should be isolated from the control knobs by insulated couplings, since these controls are at high voltage with respect to chassis.

Setup and Operation

To adjust the phantastron circuit, set the triggering control at zero resistance and couple an oscilloscope probe to the plate of the phantastron tube. Then turn the triggering control toward maximum resistance, and at some point the circuit should start generating a free-running ramp voltage. Adjust the timing control for a repetition rate of 250 milliseconds (four sweeps per second), and then back off the triggering control toward minimum resistance until the circuit just stops running free.

At this point it is necessary to use an APT signal, which may be from a tape recording made earlier. With a signal from the video demodulator applied to the input in Fig. 1, the negative sync pulses coming out of the pulse amplifier will trigger the phantastron and the ramp will be locked at a rate of 250 milliseconds. Slight read-

(Text continued on page 46)

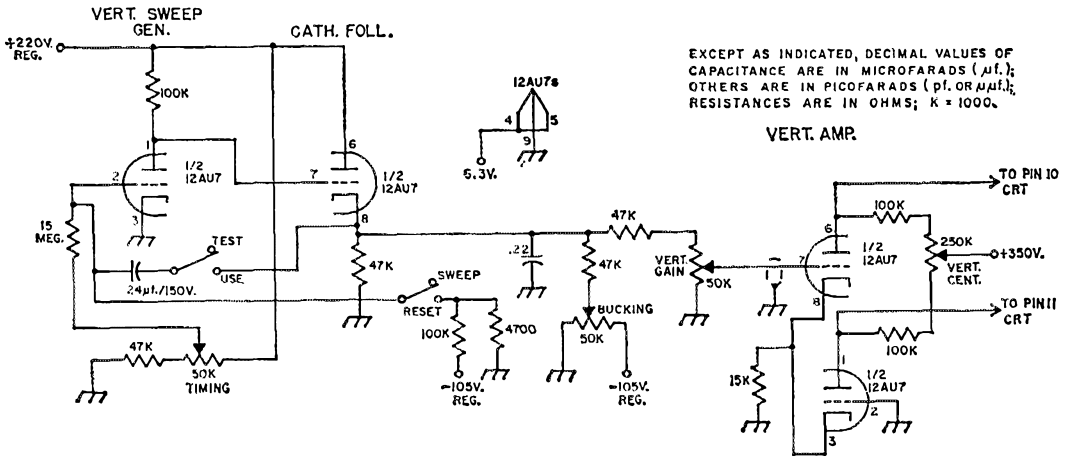


Fig. 3—Vertical sweep and deflection circuit. The vertical sweep is started manually for each frame. Switches are s.p.d.t. toggles; variable resistors are composition controls, linear taper.

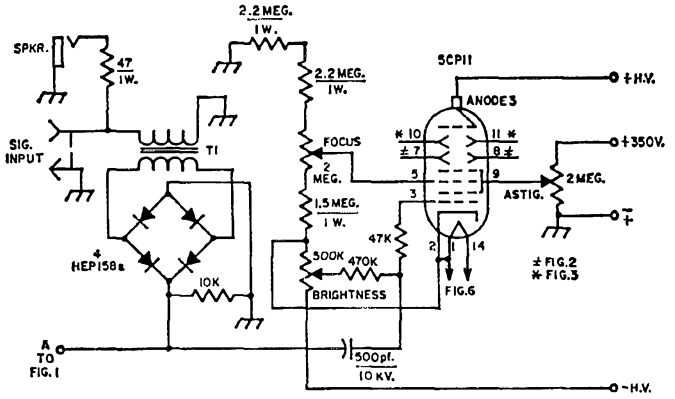


Fig. 4—Video demodulator and cathode-ray tube circuit. Resistances are in ohms (K = 1000); except as indicated, fixed resistors are ½ watt. Variable resistors are composition controls, linear taper. Focus and brightness controls must be well insulated. T_1 is a 5000/4-ohm output transformer (Knight 54 B 1403).

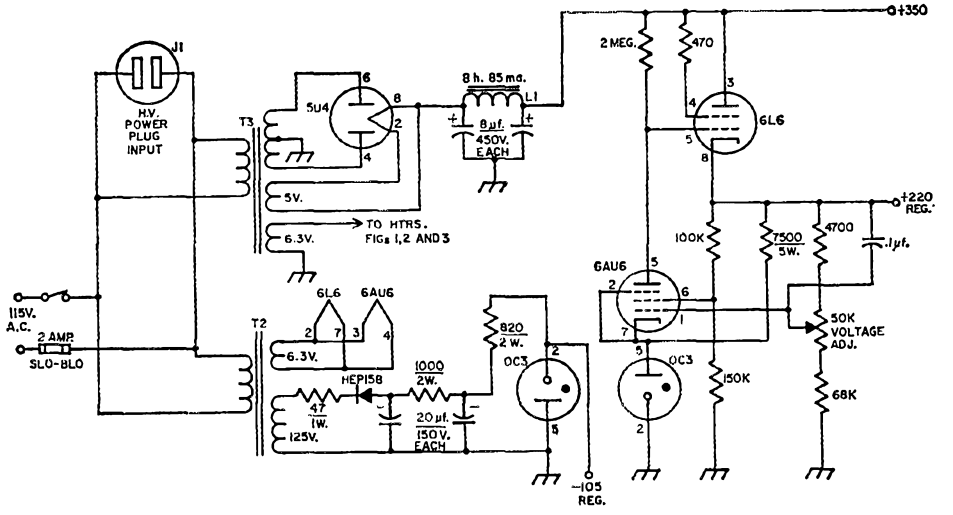


Fig. 5—Low-voltage power supply. Capacitors with polarity indicated are electrolytic. Resistances are in ohms (K = 1000); except as indicated, fixed resistors are ½ watt. Variable resistor is a composition control, linear taper.

L_1—8 henrys, 85 ma. (Knight 54 B 1485).
J_1—Chassis-mounting a.c. socket, female.
T_2—125 volts, 50 ma.; 6.3 volts, 2 amp. (Knight 54 B 1411).
T_3—700 volts c.t., 90 ma.; 5 volts, 3 amp.; 6.3 volts, 3.5 amp. (Knight 54 B 1429).

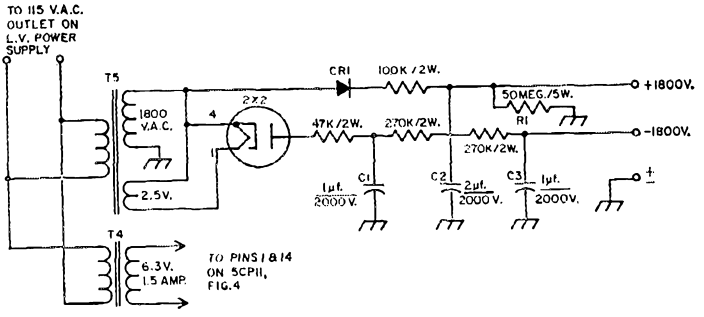


Fig. 6—High-voltage supply for cathode-ray tube. Resistances are in ohms (K = 1000); resistors are composition.

C_1, C_2, C_3—Paper or oil-filled.
CR_1—Selenium, 6500 volts p.r.v. (International Rectifier 61-8969).
R_1—Five 10-megohm, 1-watt composition resistors in series.
T_4—6.3 volts, 1.2 amp.; 5000-volt insulation (Knight 54 B 3715).
T_5—1800 volts, 2 ma.; 2.5 volts, 1.8 amp. (Knight 54 B 3727).

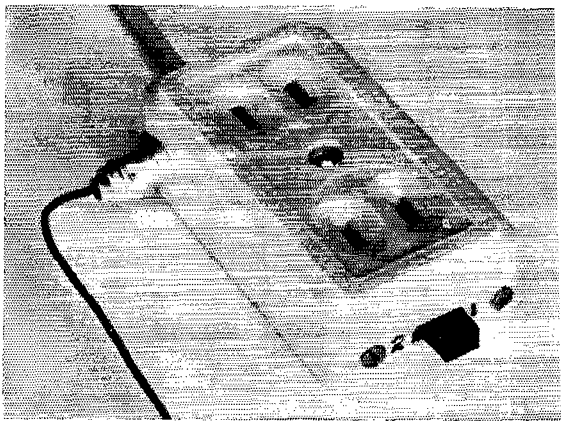
Touch Control

BY JOHN J. GLAUBER,* W4OB

THE article, "Touch To Talk,"[1] reminded me of a very compact solid-state unit described some time ago.[2] I built the device and it has given very satisfactory performance.

The unit described here depends upon body capacitance, as do those referenced above. However, instead of the 0A4G tube employed in the circuit described in *QST*, a silicon-controlled rectifier is used. Referring to Fig. 2, when no voltage is applied to the gate of the SCR, Q_1, the semiconductor acts like an open circuit, and no current flows to the load. However, when a positive pulse of sufficient amplitude is applied to the gate, anode current flows as long as the anode is positive with respect to the cathode, even if the gate no longer has a potential applied to it. In order for a positive pulse to reach the gate of Q_1, neon lamp I_1 must be triggered. If the resistance between the left side of I_1 and the ground side of the line is very high, sufficient voltage isn't developed across I_1 to fire the lamp. However, if a person touches the antenna lead, he effectively lowers this resistance to the point where sufficient voltage is available across C_1 to fire I_1 and send a positive pulse to the gate of Q_1. This causes Q_1 to conduct on every positive half-cycle of line voltage applied between Q_1's anode and cathode.

When S_1 is closed, V_1, a small cadmium-sulfide photocell, acts as an electronic latch. It permits Q_1 to remain conductive after the external capacitance that triggered the gate is removed. When no light is shining on V_1, the resistance of the photocell is so high that V_1 can be considered to be an open circuit. However, when I_2 fires because Q_1 is conducting, the light from I_2 causes the resistance of V_1 to drop to around 130,000 ohms. The resulting low series resistance of V_1 and R_2 then biases Q_1 into conduction during every positive half cycle of the line voltage, removing the need for I_1 to trigger the SCR until S_1 is opened.



The components of the touch control are housed in a plastic duplex outlet. When the s.p.s.t. slide switch is in the open position, touching the antenna lead at the left will cause power to be applied to the female outlets as long as contact to the lead is maintained. When the switch is closed, touching the antenna lead will result in power output regardless of whether or not contact is continued after the initial touch.

Because the SCR is both a half-wave rectifier and a switch, the output voltage is a pulsating d.c. voltage with an average value considerably less than the r.m.s. value of the input waveform. The fact that the voltage is pulsating makes it necessary to use an a.c. relay with the device, and the low output voltage may make it necessary to remove turns from the coils of some 115-volt a.c. relays employed. Depending on their design, some 115-volt a.c. relays will chatter at the low output voltage of the touch control and others will hold firm.

The sensitivity of the device is controlled by the size of C_1, the length of the antenna lead, and the area of a metallic plate if one is used. The smaller the capacitance of C_1, the greater the sensitivity of the unit. A fixed capacitor is used in the unit shown. Its value was determined by adjusting a variable capacitor in a breadboard model for the desired sensitivity. If a variable capacitor is used, for safety a plastic knob or insulated screwdriver should be employed to make the adjustment.

Parts placement is not critical except for isolating C_1 from a metal enclosure if one is used. Referring to Fig. 1, the photocell was mounted

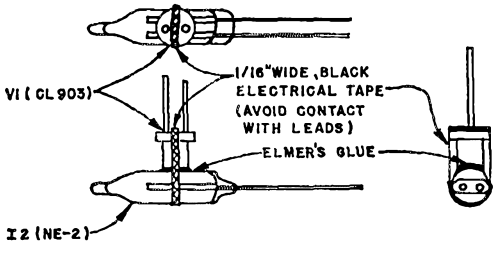


Fig. 1—Top, side and end views of the V_1I_2 assembly. After the neon bulb and photocell are joined as shown, coat the neon lamp with black paint, being careful not to get any paint on the leads of either unit (see the text).

* 798 Appleby Street, Boca Raton, Florida 33432.

[1] Felsted, "Touch To Talk," *QST*, October, 1968.

[2] Graf, "Build This Amazing Touch-Controlled Switch," *Popular Science*, September, 1966.

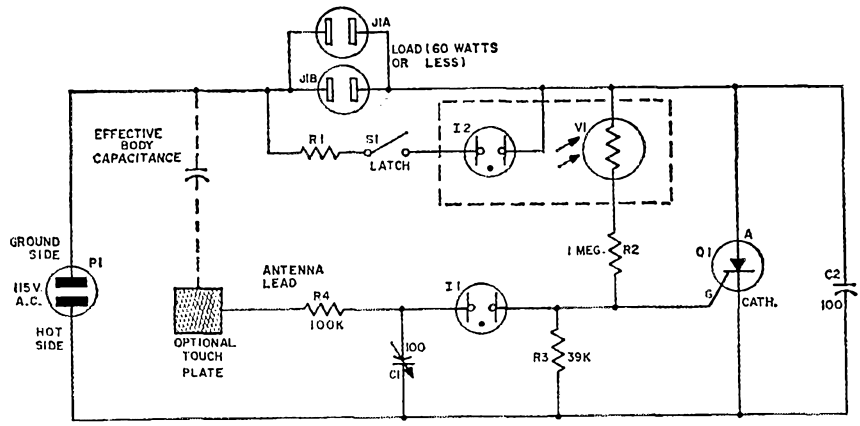
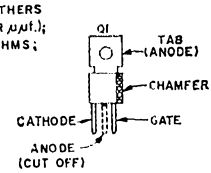


Fig. 2—Schematic diagram of the touch control.
C_1—100-pf. 500-volt silver mica or miniature variable (see text).
C_2—100-pf. 500-volt silver mica.
I_1—NE-83 neon lamp.
I_2—NE-2 neon lamp.
J_1—Plastic duplex outlet, female a.c. receptacles.
Q_1—C106B1 SCR (General Electric).
R_1—47,000-ohms, ½-watt composition.
R_2, R_3, R_4—½-watt composition.
S_1—S.p.s.t. toggle.
V_1—Clairex CL903 cadmium-sulfide photocell.

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

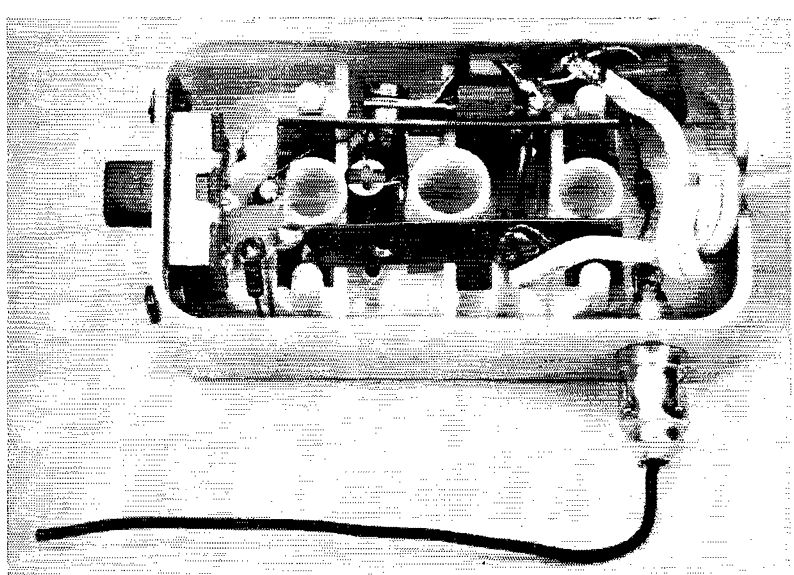


in direct contact with I_2. The two units were bound together with a razor-cut piece of black vinyl tape, 1/16 inch wide by 2 inches long, and some Elmer's glue. After the glue had hardened, the neon lamp was given a coat of black paint to prevent extraneous light from shining on the photocell. Precaution was exercised to prevent paint from contacting the photocell and neon lamp leads.

If a variable is used at C_1, the cost of the parts will be about $6. However, if a silver mica capacitor is used instead, the total should be ess than $5.

Note that in order for the unit to function, the device must be properly plugged in the line (see Fig. 2). If the line cord is reversed, there will be no hazard, but the device won't function.

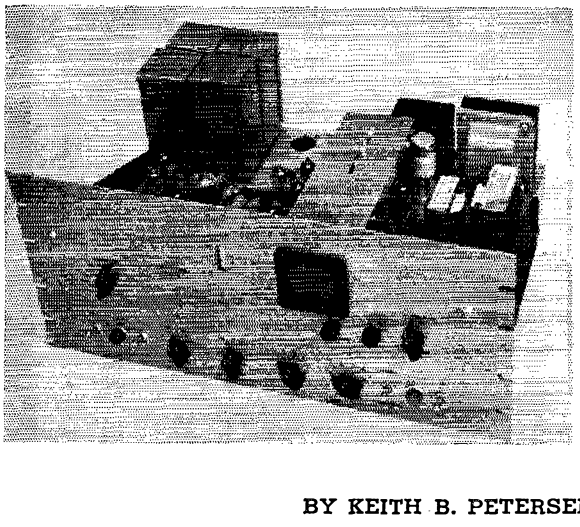
An incandescent lamp up to 60 watts may be plugged into the unit for demonstration purposes or, as mentioned before, an a.c. relay may be used to control larger loads. In my station, I connected a 3-inch metal disk to the antenna lead and placed the touch control on the floor. Touching the disk with my foot turns on the relay that controls the transmitter; thus both my hands are free at all times. QST



Underside view of the touch control. The capacitor between the SCR, which is bolted to the metal side of the outlet opposite the phono jack, and the case is C_2. C_1 is to its right. The V_1I_2 assembly is on the left side of the tubular plastic projection in the center, and I_1 is on the right side. R_1 is the resistor adjacent to the slide switch, and R_4 is the resistor connected to the phono jack.

The Mainline TT/L-2 F.S.K. Demodulator

Circuit Description, and the Mainline F.S.K. Keyer



In Two Parts—PART II[1]

A rack-mounting TT/L-2 demodulator as constructed by W1SOG. Controls and indicators across the bottom of the unit from left to right are the 850/170 Hz. bandpass filter selector switch, standby neon indicator, ATC/DTC switch, speed switch, limiter bypass switch, discriminator filter selector switch, rotary function switch, normal/reverse switch, receive neon indicator, and power switch. Above the receive neon indicator is the auto-receive sensitivity control. The eye-tube indicator is visible through the rectangular opening just to the left of center. The indicator sensitivity control is located above the standby neon indicator. In addition to the eye-tube indicator, this unit contains a phase shift indicator. The two round knobs are for intensity and focus adjustments for the cathode-ray tube.

BY KEITH B. PETERSEN,* W8SDZ

THE Mainline TT/L Demodulator was originally published in *RTTY* magazine in November 1964.[2] Improvements in the design were made and a motor-control system was added. The improved version was published in *QST* for August 1965.[3] A considerable number of additional improvements were later incorporated in the design—so many that the design was presented as an entirely new unit in September 1967.[4] Subsequent changes to the circuit for better reliability and improved operation are included in the version presented in this article.

Circuit Description

The Mainline TT/L-2 F.S.K. demodulator offers high-performance reception of RTTY signals. The design includes both the unique patented DTC (Decision Threshold Computer) and the improved ATC (Automatic Threshold Corrector) circuits. These circuits automatically control the incoming signal in a manner which allows the mark signal, the space signal, or both, to provide normal reception. The unit has a dynamic range of approximately 60 db., which allows reception of deeply fading signals. Provision is made for reception of higher teleprinter speeds by the inclusion of a switch-selectable three-speed low-pass filter.

In the following discussions of circuit operation, reference is made to Figs. 1 and 2 which appeared in Part I of this article.

INPUT-BANDPASS FILTERS

Two input-bandpass filters are provided. These filters are 3-pole Butterworth design, and utilize the commonly-available 88-mh. toroids. The use of these toroids permits simple resistor impedance matching to be used, providing a decoupling action which isolates the filters from any reactance in the receiver output circuit. At the same time, a constant load for the receiver output circuit is provided.

The bandwidth of the filter for 850-Hz. shift is approximately 1000 Hz. The bandwidth of the filter for 170-Hz. shift is approximately 275 Hz. Information for tuning these filters was given earlier.

AMPLIFIER STAGE

The amplifier stage, V_1, amplifies the output of the input-bandpass filter, and is transformer-coupled either to the first limiter input, or directly to the discriminator, depending on the position of the limiter bypass switch. Trans-

* 1418 Genesee Ave., Royal Oak, Mich. 48073.

[1] Part I of this article appeared in the May 1969 issue.

[2] Hoff and Petersen, "The Mainline TT/L FSK Demodulator," *RTTY*, November, 1964.

[3] Hoff, "The Mainline TT/L F.S.K. Demodulator," *QST*, August, 1965.

[4] Petersen, "The Mainline TT/L-2 FSK Demodulator," *RTTY Journal*, September, 1967.

former coupling is used for two reasons: it provides the necessary impedance match, and steps up the voltage from the plate of the amplifier stage to the grid of the first limiter. The coupling also provides a zero time-constant method of driving the first limiter.

LIMITER STAGES

A special symmetrical limiter provides more than 60 db. of zero time-constant limiting. It also gives complete freedom from frequency doubling. The limiting is provided by two 6BN6 tubes, V_2 and V_3, connected in cascade. Both stages are transformer-driven. The 0.002-μf. capacitor across the primary of T_2 reduces ringing when square waves are applied, and eliminates the possibility of 50- to 60-kHz. ultrasonic oscillations which might otherwise occur.

The 6BN6 tube is said to be one of the best f.m. limiter tubes available today. It provides greatly improved limiter performance compared to older types of limiters.

The IN-OUT switch, S_2, is provided to by pass the limiters when limiterless a.m. copy is desired. This method of switching from f.m. to a.m. reception eliminates the need for separate input stages for each mode.

DISCRIMINATOR FILTER SECTION

Two linear discriminators are provided — one for 850-Hz. shift and one for 170-Hz. shift reception. Any shift from 4 Hz. to over 1000 Hz. may be received by utilization of "straddle-tuning." No retuning of the discriminators is required.

Commonly available 88-mh. toroids are used for best stability and freedom from inductive pickup. Extra switch positions are available should the user desire to install other types of filters and yet retain these basic two.

One example of an arrangement for these extra switch positions would be to use the 2125-, 2295-, and 2975-Hz. Butterworth filters described earlier in *QST*.[5] Connect the input of the 2125-Hz. Butterworth filter to both the MARK SPARE A and MARK SPARE B switch terminals, and the filter output to the A MARK OUTPUT and B MARK OUTPUT terminals. Connect the input of the 2975-Hz. Butterworth filter to the SPACE SPARE A terminal and its output to A SPACE OUTPUT. Connect the 2295-Hz. Butterworth filter similarly to the SPACE SPARE B and B SPACE OUTPUT terminals. With these connections, the first and fourth switch positions would then utilize the *linear* discriminators included in Fig. 1, while the second and third positions would utilize the narrow-band Butterworth filters for 850- and 170-Hz. shift respectively.

DRIVER STAGE

The driver stage circuit, V_4, uses a standard transformer-coupled 12AT7 amplifier to independently amplify mark and space signals from the filter section. The transformer secondary voltages are quite high — 100 volts r.m.s. being typical — to provide a very wide dynamic range in the detector stage. The secondary connections marked SCOPE MARK and SCOPE SPACE may be connected to an external oscilloscope for use as an auxiliary tuning indicator. Be sure that the oscilloscope has a high-impedance input so it does not load the circuit down. The SCOPE MARK and SCOPE SPACE terminals could also be used for connection to the Mainline TT/O Semi-Counter.[6] This is a very worthwhile unit to add as it allows even more precise tuning, and in addition the user may measure the shift of an incoming signal.

DETECTOR STAGE

The detector stage uses two standard parallel-combined detectors. The polarity of one detector is the opposite of the other, yielding alternating polarity at the input to the low-pass filter section as the input tone varies from mark to space. A mark and space voltage of identical polarity (negative) is obtained through an OR gate, which consists of the two diodes hooked across the contacts of the NORMAL-REVERSE switch. This voltage is used for the tuning indicator and auto-receive stages.

LOW-PASS FILTER

The low-pass filter stage consists of two cathode followers and a 3-pole Butterworth filter. Cathode follower V_{5A} is used to provide a low-impedance drive source for the filter and to isolate the filter from the detector stage. The right-hand cathode follower is used to isolate the low-pass filter output from the ATC/DTC stage and to provide a low-impedance drive source for that stage. A four-pole three-position rotary switch is used to select the proper components for the optimum cut-off frequency for 60-, 75-, or 100-w.p.m. signals.

The test point is provided for convenient connection of a meter for use during the balance and set-up procedure. This point may also be used for the connection of a "flipping-line" oscilloscope indicator.

AUTOMATIC THRESHOLD CORRECTOR and DECISION THRESHOLD COMPUTER

The ATC/DTC circuit processes the detected signal so that the mark and space voltages are automatically centered around zero. The effect is to correct for mistuned or drifting signals when f.m. reception is used, and to give the proper decision level to the varying amplitude mark and space signals when a.m. (limiterless) reception is employed. A complete discussion and explanation of the ATC/DTC circuit appeared in the December 1964 issue of *RTTY* magazine.[7]

[5] Hoff, "High-Performance RTTY Filters," Part II, *QST*, September, 1966.

[6] Hoff, "Checking RTTY Shifts," *QST*, May, 1966.

[7] Hoff and Petersen, "Current RTTY Receiving Techniques," *RTTY*, December, 1964.

SLICER STAGE

The slicer stage consists of a cathode follower, V_{6A}, and a Schmitt trigger, V_7. The cathode follower isolates the output of the ATC/DTC circuit from the input of the Schmitt trigger, avoiding loading effects. The Schmitt trigger is a straight-forward type which has an input sensitivity of approximately 30 millivolts. A balance control is provided to adjust the cathode bias so that the tube will trigger properly.

"OR" GATES

The OR gates consist of three inputs hooked to a common point through diodes, to provide marking voltages to the keyer stage. The diodes are connected to prevent "backing up" of the positive voltage from any one circuit into the other two. Through these diodes, the keyer stage receives marking voltages from either the slicer stage, the auto-receive stage, or the anti-space stage.

KEYER STAGE

The keyer stage utilizes a triode-connected 6W6GT to key the loop circuit. The circuit is arranged so that the incoming signal, as well as the local teleprinter, can key the f.s.k. voltage output. This allows the operator to retransmit any incoming signal from another band, or a signal from a tape recorder.

TUNING INDICATOR

The tuning-indicator stage uses an EM-84/6FG6 single-bar tuning eye. The circuit provides an extremely effective and accurate tuning indication by directly comparing the amplitude of the mark and space signals. When the signal is correctly tuned, the mark and space signals provide equal eye closure.

The B-plus source for this tube is 150 volts regulated, providing two advantages: freedom from variations in the amount of eye closure due to line voltage variations, and increased fluorescent target life due to the lower-than-normal voltage. The brightness is more than adequate for operation in a normally lighted room.

AUTO-RECEIVE STAGE

The auto-receive stage prevents the teleprinter from printing garble when there is no signal present. A cathode follower, V_{11B}, is used to isolate an RC time-constant network from the high-impedance input source. The grid of the cathode follower has a diode clamp to chassis ground to prevent its going positive. The RC time-constant network is arranged to have slow-attack and fast-release characteristics. This prevents c.w. and other non-RTTY signals from fully charging the 2-μf. capacitor.

The first d.c. amplifier, V_{12A}, controls the triggering neon in its plate circuit. The gain of this stage provides exceptionally sensitive triggering action, allowing the circuit to easily distinguish between the d.c. levels of signal and noise. The second d.c. amplifier, V_{12B}, controls the STANDBY neon coupler. This neon feeds the OR gate ahead of the keyer stage, providing an artificial marking voltage for the keyer when there is no signal present. Cathode bias of the amplifier is stabilized with a Zener diode, so that its keying point will be constant with varying line voltage. When the ext. standby circuit is opened, the cathode circuit is biased heavily positive, causing this tube to be cut off. This allows the neon coupler to fire, applying a marking voltage to the 6W6GT keyer.

ANTI-SPACE STAGE

The anti-space circuit provides full protection against steady space signals. The section consists of a cathode follower, V_{6B}, an RC time-constant network, a d.c. amplifier, V_{10A}, and a neon trigger. The cathode follower provides isolation from the slicer stage and a low impedance drive source for the RC time-constant network. This network is arranged for a slow-attack and fast-release response, allowing it to distinguish between normal teleprinter signals and steady space signals.

The d.c. amplifier is used to control the neon trigger, which feeds a positive voltage into the OR gate to provide an artificial mark signal for the keyer tube when a steady space signal is received. The neon trigger also applies a positive voltage to the grid of the auto-receive cathode follower, V_{11B}, causing the diode clamp to saturate. This effectively grounds the auto-receive stage input and makes that stage operate as if no signal was being received. Thus, steady space signals are rejected entirely.

MOTOR-CONTROL STAGE

The motor-control stage consists of V_{10B}, a d.c. amplifier which operates the motor-control relay, a timing network, and V_{11A}, a clamp tube. The d.c. amplifier is directly controlled by the auto-receive stage, subject to possible delaying action of the timing network. This network consists of the 22-megohm resistor, the 1-μf. capacitor, and a neon trigger.

During various states of operation there are three levels of current present in the relay-control tube: no current, 4 to 5 ma., and approximately 12 ma. The normal plate current of the tube is 4 to 5 ma. The relay requires a current of 10 ma. for pull-in, the drop-out current being 2.5 ma. Thus, the relay will neither pull in nor drop out with normal plate current, but will remain where it was last set. The circuit is designed so that the motor is turned on when the relay is *not* energized. (This provides a fail-safe feature, guarding against loss of messages due to failure of the relay control tube.)

There are two control paths from the auto-receive stage to the grid of the relay-control tube, both coming from the plate of V_{12B}. One path is trigger-coupled from the STANDBY neon, through the timing network of the motor-control stage and its neon trigger, and through a 0.47-megohm resistor. The other path is direct-

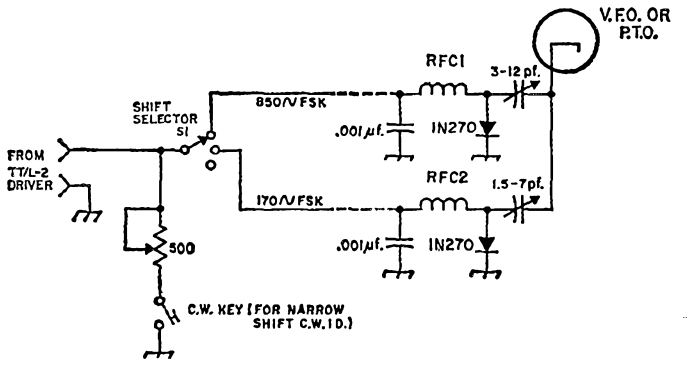


Fig. 3—Mainline F.S.K. Keyer.
RFC_1, RFC_2—2.5 mh. (National R-100).
S_1—Rotary, 1 pole, 3 position.

coupled through a 1-megohm resistor (connection E on the schematic) and two 0.47-megohm resistors. The plate voltage of V_{12B} swings more positive when there is no signal, and less positive when a signal is present. A voltage-divider circuit is formed by the series 1- and 1.5-megohm resistors connected from the plate of V_{12B}, to the regulated -150-volt supply. The junction of these two resistors swings positive and negative in response to changes in the plate voltage of V_{12B}. The diode connected from that junction to ground limits the positive voltage to about 0.6 volt.

For this discussion, assume that the rotary function switch, S_8, is placed in position 1 (AUTO-RECEIVE — MOTOR AUTOMATIC), and that the motor is off, with no signal being received. When there is no signal, the plate voltage of V_{12B} is greatest, thus making the voltage swing positive at the junction of the two resistors and the diode. The voltage at this junction, and therefore at the grid of the motor-control tube, will be about 0.6 volt. This voltage, combined with the cathode bias provided, causes the normal plate current to be 4 to 5 ma., and the motor remains off. (If tolerances of voltage, resistance, or tube characteristics cause this current to differ from the desired level, the value of the 1500-ohm cathode resistor may be changed to correct the condition.)

When a signal is applied to the input of the TT/L-2, V_{12B} will conduct, causing the voltage at its plate to decrease. The voltage divider action will cause the resistor-diode junction and grid of the relay tube to be approximately −30 volts, cutting off the tube. This allows the motor-control relay to drop out, turning the motor *on*. The relay-control tube will remain cut off as long as the signal is present.

When the signal leaves, the auto-receive stage reverts to its standby condition, allowing the plate current of the relay-control tube to return to the normal level. This is not enough current to pull in the relay and turn the motor off.

However, with no signal input to the TT/L-2, the auto-receive stage provides between +80 and +90 volts from the STANDBY neon to the OR gate, providing a holding mark voltage for the keyer tube. This same voltage is applied to the *RC* time-constant circuit of the motor-control stage. In about thirty seconds the capacitor charge builds up high enough to fire the neon lamp, giving a momentary positive pulse to the grid of the relay-control tube. The positive pulse increases the relay-tube plate current to approximately 12 ma., causing the relay to pull in. This turns the motor *off*. Relay contacts K_{1B}, upon closing, quickly discharge the timing capacitor, and prevent additional triggering of the neon. After the momentary pulse occurs, the plate current returns to its normal value but the relay will remain pulled in, because the current exceeds the drop-out current rating of the relay.

The clamp tube, V_{11A}, is actuated during STANDBY and MOTOR-ON modes of operation to prevent triggering of the neon. It does this by discharging the time-constant capacitor.

The a.c. line voltage for the printer motor is obtained through the main power switch of the TT/L-2 so that the machine will be turned off when the demodulator is off.

EXTENDED TUBE LIFE

Those diodes hooked from the grid to the cathode of tubes V_{5A}, V_{6A}, V_{6B}, V_{7B}, V_8, V_{10B}, V_{11B}, and V_{12B} are there to prevent premature tube weakening. In vacuum tubes there is a phenomenon known as cathode stripping that occurs

in some circuits. This occurs when a positive voltage is applied to the grid of a tube before the cathode has reached operating temperature. In the TT/L-2, this would occur each time you turn the unit on because the B-plus voltage is applied almost immediately, with solid state rectifiers used in the power supply. The grid strips some of the coating off the cathode, thus lowering the emission capabilities of the tube, and shortening the life of the cathode.

The cure for this problem is to clamp the grid to the cathode with a silicon diode where possible, consistent with the circuit design. The clamping is easily and effectively accomplished by hooking a 1N2070A silicon diode from the grid to the cathode, as shown in the eight stages. This is a small price to pay for the vastly increased life and adjustment stability of the tubes.

ROTARY FUNCTION SWITCH

The rotary function switch, S_8, replaces separate switches used on earlier demodulator models. This is a four-pole six-position switch which interlocks four separate functions. S_{8A}, connected into the auto-receive RC time-constant network, provides slow or fast auto-receive response. S_{8B} provides auto-receive on-off control, and S_{8C} provides standby or receive operation. These three sections together determine the exact mode of operation for the particular switch position. In position 6, S_{8C} provides a positive voltage (connection G) to the grid of the motor control tube, energizing K_1 and turning the motor off. S_{8D} controls the cathode circuit of the motor-control tube V_{10B} for AUTO/ON/OFF operation. This section also controls the conduction of the clamp tube V_{11A}.

LOOP SUPPLY AND F.S.K. DRIVER

The loop supply utilizes a heavy-duty line-isolation transformer and bridge rectification for excellent regulation and low hum level. The printer, keyboard, and other teleprinter equipment are connected in series with the 60-ma. loop. This allows normal operation of all equipment. The 1250-ohm 20-watt resistor sets the loop current. This resistor is not adjustable because its value has been chosen to provide proper operation of the loop circuit with varying a.c. line voltages.

Direct drive of a saturated-diode f.s.k. or a.f.s.k. circuit is provided by sampling the loop signal through a simple resistive bridge circuit. The system is all-electronic — no relays are used. The f.s.k. voltages balance control is provided to allow adjustment for exactly-equal mark and space voltage to the external keyer, to prevent distortion of the transmitted signal.

MAIN POWER SUPPLY

The main power supply is of heavy-duty design to provide reliable continuous operation. The current ratings of the transformer and filter chokes are well above the actual current drain of the unit, providing very cool operation. Choke-input filtering is used in both the positive and negative circuits for best regulation. Voltage regulation is provided for critical circuits in the demodulator so that the unit will operate normally with a.c. line voltages from 105 to 125 volts. Type 0D3/VR-150 tubes were chosen for both positive and negative supply regulators because they have a wider current range than the miniature type 0A2. The rectifiers are avalanche-type silicon diodes, rated at 800 p.i.v., 500 ma. They provide built-in protection against reverse transient overvoltage spikes. The large filter capacitors give low hum and good dynamic regulation.

The Mainline F.S.K. Keyer

The Mainline F.S.K. Keyer of Fig. 3 is a saturated-diode circuit in which the diode operates as an electronic switch to apply a shift capacitor to the transmitter/exciter v.f.o. or p.t.o. circuit. The TT/L-2 provides the necessary voltages to drive this circuit.

There are many advantages to a saturated-diode system:

1) Freedom from variations in frequency and shift due to changes in driving voltage.

2) Freedom from hum pickup in the wiring connection to the TT/L-2. (No shielding of this lead is necessary.)

3) Narrow-shift c.w. ID is easily applied.

4) Additional keyers may be paralleled for other shifts, without affecting the v.f.o. Switching from one shift to another is a simple matter of switching the TT/L-2 voltage source from one keyer to another.

Only a few simple precautions are necessary for proper operation of this f.s.k. circuit. Be sure that the keyer is mounted very close to the v.f.o. or p.t.o. so that a short connecting lead may be used. Be sure to use an NP0 type miniature ceramic trimmer for best stability. Use only an r.f. choke wound on a ceramic form. Ferrite or iron-core types are not suitable because of excessive internal capacitance, so the National type R-100 is recommended. Use only the 1N270 diode specified. This diode is a special high-conductance computer type which provides maximum circuit Q, avoiding variations in oscillator output level.

If reversed shift is desired, simply reverse the 1N270 diode.

Thanks go to Truman Boerkoel, K8JUG, for his suggestions on specification of parts and for his interest in this project, which prompted him to offer the package of parts mentioned earlier; to Irvin Hoff, W6FFC, for providing the design of the 3-speed low-pass filter and for his suggestions on the most convenient arrangement of the positions of the rotary function switch; to Ralph Leland, W8DLT, for suggestions on labeling in the schematic and for general moral support; to Jim Salter, K5BQA, for interest in the project, which prompted him to offer the printed circuit boards; and to those who tried the new circuits during the development of the TT/L-2. Special thanks go to my wife, Bev, for her help and understanding. QST

1275/2125-Hz. Filters For The TT/L-2 F.S.K. Demodulator

BY JERRY HALL,* K1PLP

THE demodulator design presented in the preceding article uses the amateur "standard" audio tones for operation — 2125 Hz. for the teleprinter mark frequency and 2975 Hz. for the space frequency. This pair of frequencies is normally used at v.h.f. for tone modulation of the carrier. Most RTTY amateurs also use these same tones for reception of 850-Hz. f.s.k. signals in the h.f. range. This is done by activating the receiver's b.f.o. and tuning the RTTY signal as if it were a lower sideband s.s.b. signal. The tuning indicator of the TT/L-2 shows when the receiver's main tuning dial (or the b.f.o. pitch control) is correctly set, with the audio pitches of the received signal matching the resonant frequencies of the demodulator circuit. For 170-Hz. f.s.k. reception, the TT/L-2 uses the same technique with audio frequencies of 2125 and 2295 Hz.

For those amateurs owning a receiver or transceiver with a steep-skirted 2.1-kHz. or so i.f. response and a fixed frequency b.f.o., complications arise when trying to receive 850-Hz. f.s.k. signals. The 2975-Hz. tone from the received signal, being outside the normal receiver i.f. passband, is attenuated considerably. Therefore the strength of the individual audio tones is not equal at the demodulator input. Although a good limiter, such as that of the TT/L-2, will remedy the situation for strong non-fading signals, reception of weak and fading signals is greatly impaired. Use of limiterless a.m. reception is almost impossible.

The types of receivers or transceivers presenting these complications usually have a crystal-controlled b.f.o. One method of curing the problem simply is to replace the crystal temporarily with another of a slightly different frequency, so the f.s.k. signal falls inside the receiver passband while the proper audio frequencies exist at the output. This was mentioned in an earlier *QST* article.[1] This method might not be so simple, though, if the original crystal is of the type which is soldered into the circuit. The inconvenience of having to change crystals when changing modes could also be discouraging, especially if one did not wish to modify the receiver or if the physical layout made it next to impossible to add a crystal-changing switch.

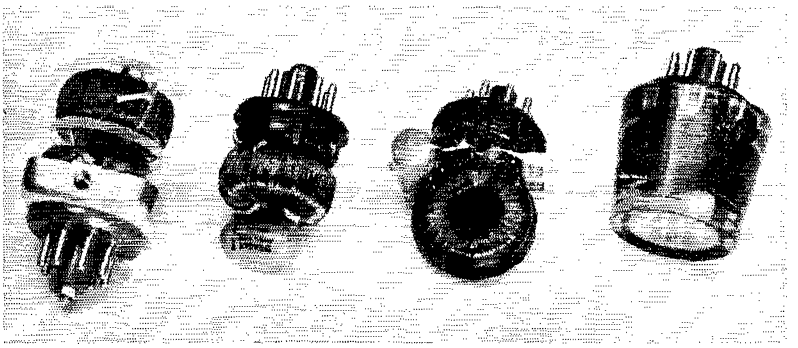
The next logical approach to curing the problem, if the receiver is to be left alone, is to redesign the demodulator circuit using audio tones which are normally available from the receiver. For h.f. reception of f.s.k. signals, any pair of audio tones may be used, as long as they are within the passband of the receiver and are not harmonically related. However, some degradation in operation does occur when lower-frequency tones are used. For one reason, the mark and space transitions are not detected as readily because of the longer period of the lower tones, creating the effect of fortuitous or random distortion of the signal.

Even so, the frequencies of 1275 Hz. for mark and 2125 Hz. for space have become an "alternate standard," giving quite satisfactory operation to amateurs using this approach. These frequencies fall nicely in the normal receiver passband, requiring no receiver modifications. For narrow-shift f.s.k. reception, tones of 1275 and 1445 Hz. are used. However, if an a.f.s.k. signal is fed into the audio circuits of an s.s.b. transmitter or transceiver for *transmission* in the h.f. bands, the lower tone frequencies should generally be avoided, for reasons covered by Hoff.[1]

The redesign of a demodulator to alter the audio frequency range requires that changes be made in the input-bandpass filter and in the discriminator filter sections. Normally the a.c. amplifiers, limiter, and d.c. stages need not be changed.

* Assistant Technical Editor, *QST*.

[1] Hoff, "A.F.S.K. for RTTY," *QST*, February, 1969.



Simple filters built directly on octal plugs. No hardware is required for three of the filters shown. The filter on the right has been encased in an epoxy resin for permanent protection of the parts. The method of mounting the parts on the Vector plug, at the left, can be used for ordinary octal plugs, by drilling through the bottom of the key-post to clear a long 6-32 screw.

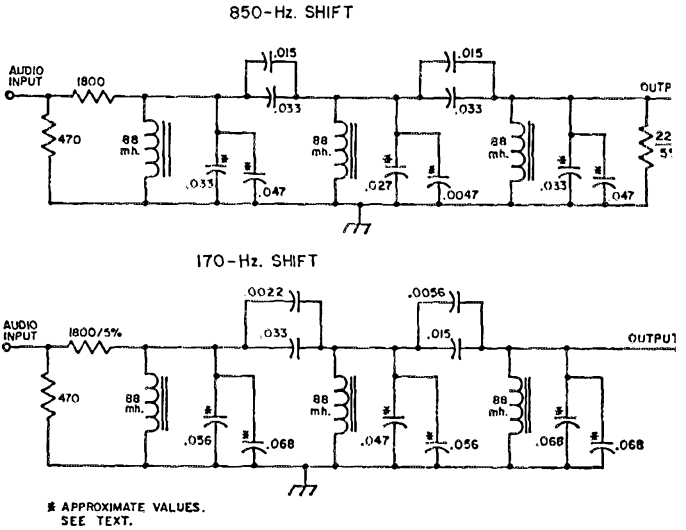


Fig. 1—Butterworth-response input-bandpass filter circuits for 1275/1445/2125 Hz. All resistances are in ohms, Resistors are ¼ or ½ watt, 5% tolerance. Capacitances are in microfarads (μf.), mylar, 75 or 100 w.v.d.c.

Input Bandpass Filters

Fig. 1 shows input bandpass filter sections designed for use with the TT/L-2 at 1275/2125 and 1275/1445 Hz. These are Butterworth designs with nearly the same response characteristics and impedances as the original filters of the TT/L-2, except at the lower frequency range. Commonly available 88-mh. toroids are used.

The shape factor of this type of filter is determined by the number of tuned circuits used. Merely "sliding" the response curve into a lower frequency range will make operation more susceptible to interference from audio harmonics of tones lower than those of the filter passband. With the 60-db. limiter of the TT/L-2 in use, strong signals in the 400- to 700-Hz. range, although attenuated by the bandpass filter, will be "squared" in the limiter (creating high-amplitude 3rd and 5th harmonics), and may interfere with the desired signal. (Comparable 700- to 1000-Hz. sub-harmonics for the 2125/2975-Hz. input-bandpass filter are attenuated an additional 7 to 14 db.) On-the-air tests proved these comparatively simple filters to be adequate under most conditions. However, the elliptic-function filter for the 1275/2125-Hz. frequency range as described by Wetherhold should provide more reliable operation during extreme near-frequency QRM, especially when receiving 850-Hz. shift signals.[2] Such filters provide a response null in the unwanted 500- to 700-Hz. range.

Of course these more simple filters may be used with any demodulator fed by a 500-ohm impedance source, if the filter output is not loaded by diode limiters or by current-drawing grids of limiter stages. The filter output should see a high impedance.

The tuning procedure for these input filters is the same as that given for the TT/L-2, except that the center frequency for all sections of the 850-Hz. shift filter is 1500 Hz., and for the 170-Hz. shift filter is 1350 Hz.

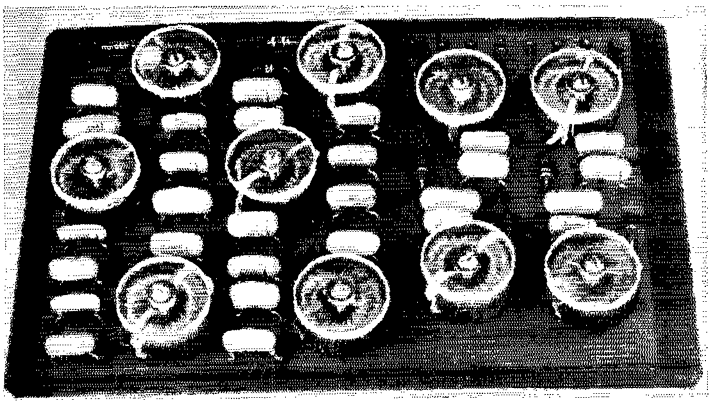
Discriminator Filters

Fig. 2 shows discriminator filter sections for the lower frequency ranges. These designs also use 88-mh. toroids, with appropriate circuit values to provide linear discriminator responses. The voltage responses of these filters will give the required d.c. signal levels in the TT/L-2. The individual *LC* filter sections should be resonated at the frequencies shown in the schematic diagram, using the approximate values given, while the resistors between the inductors and chassis ground are jumpered out. Don't forget to remove the jumpers for operation of the unit.

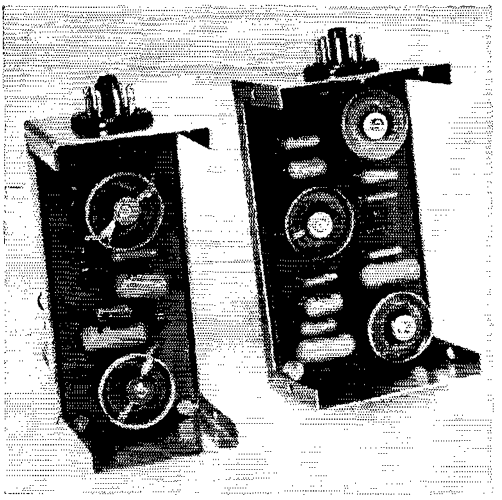
Filter Construction

Many methods can be used for mounting the components of the filters. A few ways are shown in the accompanying photographs. Plug-in filters are often used even though one does not expect to change them frequently, because only

[2] Wetherhold, "An RTTY Bandpass Filter For 1275/2125 c.p.s.," *QST*, August, 1967.



A large etched circuit board containing two input-bandpass filters and two discriminator filters. By mounting resistors and capacitors of the appropriate values, this board pattern may be used for either the 1275/1445/2125-Hz. or 2125/2295/2975-Hz. frequency range. Its size is about 6 × 9 inches. The retaining washers were cut from clear polystyrene sheets with a small rotary saw, available as an accessory for portable electric drills.



Etched boards mounted inside small chassis boxes fitted for plug-in use. The larger board contains a complete 3-pole Butterworth filter, while the smaller board contains all the fixed components of a discriminator filter. The boxes are 5¼ × 3 × 2⅛ and 5 × 2¼ × 2¼ inches. The boards may also be mounted in other ways on a larger chassis, and are not limited to RTTY use.

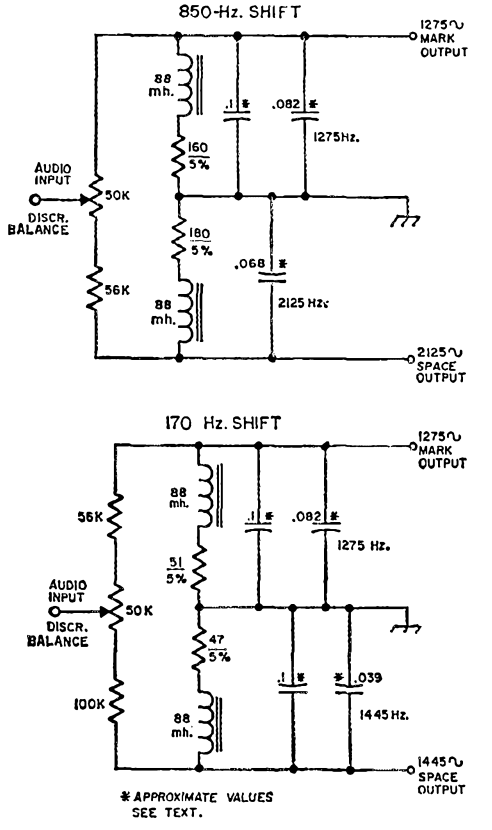


Fig. 2—Linear discriminator filter circuits for 1275/1445/2125 Hz. Resistances are in ohms, K = 1000. Fixed resistors are either ¼ or ½ watt 10% unless otherwise indicated. Variable controls are linear, low wattage. Capacitances are in microfarads (μf.), mylar, 75 or 100 w.v.d.c.

a small amount of chassis space is required for the complete filter. For the most satisfactory operation, the discriminator filter sections should be resonated in the circuit, rather than when isolated on the bench, even if plug-in mounting is used. In operation, external circuitry can lower the resonant frequency by as much as 25 Hz. — a considerable percentage of a 170-Hz. shift-width filter, for example.

The parts for a simple filter can be mounted directly on an octal plug, such as an Amphenol 86-CP8. Two or even three toroids can be "stacked" on one plug, using a long screw through the center key-post, and the capacitors can be supported around the outside by their own leads or by stiff bus wire.

Etched circuit boards provide a neat and convenient method of building a filter. The large board shown in the photographs matches the size of the K5BQA electronics printed circuit board for the TT/L-2. Except for the controls and switches, this filter board contains all components for two bandpass-input filters and two discriminator filters, and covers both 850- and 170-Hz. shifts. The board may be mounted on a separate chassis opening. Or it might be mounted "piggy-back" beneath the chassis-mounted K5BQA board, foil sides facing, using metal spacers and threaded hardware.

The two smaller etched filter boards shown in chassis boxes have a more universal application. One contains a complete discriminator filter, except for the balance control. The other contains a complete 3-pole Butterworth filter. The board patterns are "universal," so that by selecting the proper values for the resistors and capacitors, they may be used with the 88-mh. toroids for any frequency range and any f.s.k. demodulator. A 3-pole filter board can be used for either an input-bandpass filter, or for the narrow-band mark and space channel filters described by Hoff in September 1966 *QST*. In fact, this board is not limited to RTTY use, but could be used for other audio filter applications, such as the Selectoroid[3] and the Torofil.[4]

Although the boards are arranged primarily to fit inside standard-sized chassis boxes, they may be mounted in other ways. Each board could be mounted directly on an opening cut in the chassis, or several boards could be stacked with spacers and mounted either vertically or horizontally.

These etched boards were made in the ARRL lab. If you wish to etch your own boards, scale templates with parts layouts are available from the ARRL for an s.a.s.e. and 25¢ to cover handling. Or the boards are available already etched.[5] Completed and tuned filters on etched boards are also available.[6] QST

[3] McCoy, "The Selectoroid," *QST*, December, 1966.

[4] Gimmicks and Gadgets, "The Torofil — A QRM Reducer for the Phone Man," *QST*, April, 1967.

[5] Etched filter boards for any of the three patterns are available from the following: Stafford Electronics, 427 S. Benbow Rd., Greensboro, N. C. 27401; Jim Salter, K5BQA, 11040 Creekmere, Dallas, Texas 75218; or Foto Etch Co., 1760 Santa Maria Dr., Concord, Calif. 94520.

[6] Custom-built completed filters may be purchased from J. J. Electronics, Windham Rd., Canterbury, Conn. 06331.

● *Beginner and Novice*

Clean Up Your Harmonics!

How To Stay Out Of Trouble With The FCC

BY LEWIS G. McCOY,* W1ICP

A recent letter to ARRL Headquarters starts off, "For the past two years I have taken *QST*. I have faithfully purchased all of the ARRL books to aid the beginner. However, when it comes to the question of harmonic suppression, I believe that ARRL falls flat on its face. They continually give different aids on how to remove TVI harmonics, etc. However, they do not give specific data on how to run down harmonics in operation on the Novice bands. The second harmonic will often be picked up by ARRL observers, etc. and the poor Novice cannot comprehend the instructions to correct the fault."

We are not going to take issue with the writer of the letter except to point to the articles listed in the bibliography (at the end of this article) that have appeared in *QST* in the *last two years*. What the letter does point up is that spurious radiation of Novice signals is a serious problem and is a subject that must be continually gone over in *QST*.

Spurious Signals — What are they?

When we generate a radio signal and amplify it and finally feed it to an antenna to be radiated, we are only interested in having that *one* signal going out. If a signal appears on an any frequency but the desired one, the extra signal or signals are called *spurious* signals. Sometimes these signals are multiples, or submultiples, of our desired frequency, and in such case they are referred to as *harmonics* or *subharmonics*, respectively. In some instances a transmitter may have *parasitic* oscillations that generate signals not harmonically related to the desired signal. In any event, any signal that is caused to be radiated by the transmitter, other than the desired signal, is a spurious signal.

A Novice quickly learns that he must operate his transmitter with crystal control, the output frequency being the same as or a multiple of the crystal frequency. However, what he *doesn't* learn immediately is that being crystal-controlled

* Novice Editor

By far the stickiest problem a Novice must face is that of undesired harmonics. This article treats the whys and wherefores of spurious signals and how to get rid of them.

doesn't mean there won't be spurious signals radiated. Sometimes he receives an undesired QSL from the FCC Monitoring Service telling him that he has a spurious signal being radiated. Or if he is *lucky*, an ARRL Official Observer spots the spurious and lets him know. The reason we say "lucky" is that none of us wants FCC notices.

The most common problem the Novice encounters is the second harmonic from 80-meter operation. Any operation within the 3760–3750-kHz. region can produce a second harmonic in the 7400–7500-kHz. spectrum. Bear in mind that such a spurious signal would *not* fall in an amateur band but in a commercial service area. In other words, your harmonic could interfere with a commercial station's signal. Last year, there were just under 10,000 ARRL Official Observer notices sent to amateurs, and a very large percentage of these went to Novices for second harmonics of 80-meter operation.

The 80-meter problem is just one case of harmonic problems. Table I gives some of the spurious signal combinations and possibilities that can result from the Novice low-frequency band.

Proper Tuning Of The Rig

You'll note in Table I there is a category of spurious signals called "mistuned." Many Novices run into the problem of tuning their transmitters up on the wrong band, although thinking they are on the correct one. As an example, many transmitters can be tuned up on more than one band, per switch setting, even though the band switches show one band. Let's suppose that we are using a crystal at 3725 kHz. and desire to tune up on that frequency. It is entirely possible in many transmitters, with the

Table I

Spurious-Signal Data

Novice Crystal Used	*Desired Frequency*	*Spurious Signal Possibilities*
3700 to 3750 kHz.	3700 to 3750 kHz.	7400 to 7500 kHz. (Harmonic or Mistuned) 11,100 to 11,250 kHz. (Harmonic) 14,800 to 15,000 kHz. (Harmonic)
3575 to 3600 kHz.	7150 to 7200 kHz.	3575 to 3600 kHz. (Submultiple or Mistuned) 10,725 to 10,800 kHz. (Harmonic) 14,300 to 14,400 kHz. (Harmonic or Mistuned) 21,450 to 21,600 kHz. (Harmonic)
7150 to 7200 kHz.	7150 to 7200 kHz.	14,300 to 14,400 kHz. (Harmonic or Mistuned) 21,450 to 21,600 kHz. (Harmonic)
7034 to 7083 kHz.	21,100 to 21,250 kHz.	7034 to 7083 kHz. (Submultiple) 14,068 to 14,166 kHz. (Submultiple or Mistuned) 28,136 to 28,332 kHz. (Harmonic or Mistuned) Also harmonics that fall in TV Channels 3 and 6.

bandswitch set to 80-meters, to actually tune up at twice the 3725-kHz. frequency, or in the 7400- to 7500-kHz. section. In such a case the principal output of the transmitter would not be on 3725 kHz. but 7500 kHz. This would be a case of mistuning the transmitter.

Another common case of mistuning is starting off with a 40-meter crystal and planning to operate on 15-meters but actually winding up on 20 meters. To get to 15 meters in most Novice rigs we start off with a 40-meter crystal and triple the frequency to 15 meters. Unfortunately, nearly all transmitter tank circuits are capable of tuning both 20 and 15 meters with the band switches set to 15 meters. In tuning for a plate-current dip in the tank circuit you may find two dips, one near maximum capacitance of the plate tuning capacitor and another near minimum. The one near minimum is probably the correct one. If you should tune up with the dip near maximum you are likely to wind up on 20 meters. Everything will look right — but you might end up with an FCC rules violation notice.

While manufacturers of transmitters warn of such possibilities in their manuals, hams are noted for being nonreaders of instruction manuals. Rule number one should be: Always read the instruction manual from cover to cover. If you have any doubts at all of being on the wrong band a simple absorption-type wavemeter[1] will set you right. The wavemeter is a simple device that will give you a visual indication that you are on the correct band.

Why Spurious Radiations?

In both commercial and homebuilt transmitters it is common procedure to use a pi-network tank circuit in the final amplifier stage. The amount of harmonic attenuation one can expect with this type of circuit depends on the design and — even more important — on the load into which the circuit must work. However, one can expect attenuation of approximately 30 decibels for the second harmonic in a well-designed pi-network tank circuit. It is probably better to translate the 30 db. into a power example so the Novice will have some idea what this amounts to. With 75 watts input and let's say 50 watts output, 30 db. attenuation would mean that the second harmonic would have a power of 50 milliwatts or 0.05 watt. This may seem like an insignificant amount of power. But take our word for it, under the right conditions 50 milliwatts can be a pretty potent *interference*-causing signal. Also keep in mind that these figures are for a correctly-tuned transmitter.

This brings up an interesting point: Even if everything in the rig is operated according to Hoyle, a Novice can still be guilty of spurious radiation! The answer to the problem is that additional harmonic attenuation is required to what you get when you buy or build a conventional transmitter. The reader may be inclined to lay the blame on the manufacturer for having what could be considered inadequate attenuation but it isn't quite as simple as that. The manufacturer has no way of knowing how his equipment will be used, what the antenna system or load will be, or even if the transmitter is going to be used as an exciter. In any case, what is important is that the Novice, or higher-class license holder for that matter, must take precautions to prevent spurious radiations *regardless* of the type of transmitter used. *Always* assume that you have spurious signals and that something must be done about them. You can check for spurious signals, as we'll discuss in a moment, but it is always better to put in preventive measures to make sure that you won't have spurious radiations.

[1] This article does not carry constructional details for the devices needed for correcting the problems to be discussed. The bibliography at the end lists the articles that have appeared in *QST* in the last few years. The issues listed are still in print and available from ARRL Headquarters for 75 cents each. Also, *Understanding Amateur Radio* has all of the devices, or ones similar to them, listed in the articles.

Antennas

You won't be in ham radio very long before you'll hear a ham say that he won't have harmonic problems because he is using a one-band antenna, and a one-band antenna will reject, or not radiate harmonics. We hate to destroy such a sense of well-being but frankly, there "ain't no such animal." Simply, any piece of metal can be considered a "multiband" antenna. In fact, as ridiculous as it sounds, an ordinary paper clip could be called a multiband antenna. It might be difficult to get power "into" a paper clip on some frequencies, but it can be done. True, such an antenna will be very inefficient as a radiator but the important point is that such a unit can be made to radiate at any frequency.

While it is true that an 80-meter coax-fed dipole would present a considerable mismatch to a 40-meter harmonic, it is also true that the antenna will still radiate a harmonic that reaches it. In other words, never depend on the antenna for spurious signal rejection. An antenna is not normally selective enough to provide harmonic rejection.

By the same token, a trap-type multiband antenna has no built-in circuits to reject harmonics. Such antennas are usually designed to accept readily *all* amateur signals within the bands the antenna is designed for.

By this time, the Novice reader is probably ready to give up ham radio and take up stamp collecting. However, take heart, the problem isn't that complicated or difficult to cure.

Checking For Spurious Signals

One thing you'll quickly find out: Almost any checking you do in your own station is rather pointless, because what you find or hear in the way of spurious signals can be deceiving. If you try to use your receiver to listen to harmonics of the fundamental signal you will be certain to find plenty. However, such signals coming out of the receiver can be quite misleading. For one thing, when your receiver is operated in the field of a strong r.f. signal, such as your fundamental signal — and it will be very, very strong, no matter what steps you take — the receiver will overload and give false results. The strong signal coming into the receiver overloads the first stage causing "cross modulation," and your receiver will actually generate spurious signals within itself. That is why using your own receiver is pointless.

By the same token, asking a ham who lives close by to check your harmonics — and by close by we mean within a city block or two — can be misleading. He may have spurious signals generated in his receiver from your strong fundamental. If possible have a ham a mile or two away listen at the harmonic frequencies. If he hears your harmonics you know you must take steps to clean up the spurious signals. However, even if he doesn't hear harmonics that's not absolute proof that you don't have them. The signal can be skipping out and won't be heard locally. The *best* possible step is to assume you do have spurious signals being radiated and steps must be taken to eliminate them.

What To Do

As we said earlier, read the instruction book that comes with your transmitter and completely familiarize yourself with the tuning controls of all stages. When tuning up the amplifier and driver stages, never apply more grid drive than required. Excessive grid drive will cause an amplifier stage to generate strong harmonics. One good method to check the overall tuning of a final amplifier stage is to use an output indicator, such as a Monimatch, in the feed line to the antenna system. The Monimatch can be set to read forward power and the transmitter then tuned up in the normal manner. Tune up for maximum output, as indicated on the Monimatch, keeping the amplifier stage within the rated plate current for the tube or tubes in use. Once you have the maximum output, adjust the grid drive while watching the output indicator. Set the drive at the point where the output *just* starts to drop off. This is the best operating condition to reduce harmonic output. One small point here: You may find when observing the plate current dip and the Monimatch at the same time that maximum output does not occur at exactly minimum dip. However, disregard the minimum dip and tune for maximum output — keeping the tube within its ratings, of course.

Assuming you have checked out the rig with a wavemeter to make sure you are on the correct band (!) the above steps take care of correct tune-up. This doesn't mean that the output is free of spurious. What is required is additional selectivity between the transmitter and the antenna, and this means installing a selective device in the feed line.

If you are using coax feed from the transmitter to the antenna, one of the simplest methods of reducing or attenuating harmonics is with a half-wave filter. This is a simple unit to make, and when installed in the feed line it will attenuate any frequencies higher than its designed cutoff frequency. Once the filter is built and installed in the line, it doesn't require any adjustments to make it work. The only problem in using this type of filter is that a different one is required for each band. However, this is not a serious drawback, because it only takes a few seconds to change filters.

The other form of selectivity, and the one that we prefer, is to install a transmatch between the transmitter and the antenna. A transmatch is an adjustable circuit that not only provides the required selectivity to attenuate the harmonics but also provides a matching system between the antenna/feeder load and the transmitter. Fig. 1 shows a complete line-up of the transmitter and feeder system to the antenna. Note that an antenna relay is inserted in the line on the transmitter side of the transmatch.

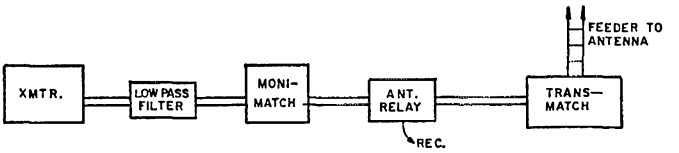


Fig. 1—This drawing shows a typical transmitter-to-feeder system. If TVI is a problem, a low-pass filter would be installed in the line as shown. The connecting line between the various units should be either 50- or 70-ohm coaxial line, the impedance depending on the impedance of the Monimatch used.

The transmatch will also provide additional selectivity for your receiver; many hams who live near a strong broadcast station find that they get bad cross modulation of ham and broadcast signals on the 80-meter band, and a transmatch will usually clear up this problem.

A Notice For All Hams

Regardless of whether or not you are a Novice or higher-class ham (short of Extra Class, that is) there is one rather new problem we are all faced with. While none of us are supposed to have *any* harmonics, in the past a harmonic could go unnoticed for a long period of time. For example, if you had a fundamental at 3520 kHz. a second harmonic at 7040 kHz. wouldn't normally attract attention because the spurious was in another ham band, even if illegal. However, under the incentive program, in order to operate in the exclusive band segments one must hold a license that qualifies him to do so.

Just to show you how a harmonic can really get you into trouble, let's suppose you are operating at 3610 kHz. and you have a strong second harmonic at 7220 kHz. The second harmonic is smack in the Extra/Advanced portion of 40 meters, and if you don't hold the proper type license you can be in trouble. There are of course many other signals, multiples and submultiples, that can fall in places where we don't want them. So it pays to take a good look at your station to make sure that your fundamental signal is the only one going out. QST

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"Why A Transmatch," *QST*, Jan. 1968.

Strays

Members of the Ralph Plaisted Polar Expedition[1] were reunited in Cedar Rapids, Iowa, on March 11 for the first time since they reached the North Pole last year. They toured Collins Radio Co., which provided communication equipment for the expedition. Shown (l. to r.) are Dr. Blair Woolsey, Donald Powellek, VE8YL, Ralph Plaisted, Walter Pederson, Ronald Schleder, and Jerry Pitzl.

[1]"Tiny Voice From the Arctic," QST, January, 1968.

This is Mark Paul, WA8TKW, who just received his Extra Class ticket. Mark is 13 years old and in the 8th grade at Litchfield Junior High in Akron, Ohio, is a member of the Akron Goodyear Tire and Rubber Co. ARC and attends every meeting of the Chippewa RC at the Veterans Hospital in Brecksville where he is a volunteer. In addition to his general interest in amateur radio he is also working toward his 1st class commercial ticket. Quite an inspiration for young squirts and old timers alike!

Three Innovations For Field Day

A Battery-Recharging System, Tilt-Over Tower, and a Desk for a Car

BY WAYNE E. OVERBECK,* K6YNB

Some useful ideas for Field Day and general portable operating. There's still time to put them into practice before this year's outing!

FIELD Day is when everything you don't expect happens.

You spend hours setting up the station before you discover that the #@&&**%$# generator you rented won't start.

Or maybe it didn't matter if the generator started or not, because all the antennas came down in a heap on their way up.

Perhaps everything went fine, except for the rattlesnake (or mosquitoes???) in the tent.

Or was it a stiff back you'll never forget, the result of sitting hunched over a transceiver in your car for 24 hours?

Maybe you arrived at the chosen mountaintop site only to find another group there — or else the Forest Service changed its mind at the last minute and wouldn't let you operate there.

Murphy's Law says all of these things will happen, and the author knows it, because they have all happened to him in the last few years.

After watching things go wrong for awhile, we decided it was time to come up with some better ways to run portable operations. Gradually the ideas for several new gadgets for portable hamming came along, and this article describes three of these new gadgets: an inexpensive but reliable battery-recharging system that qualifies for Field Day's 1.5 battery-power multiplier, a comfortable operating position for the car, and an inexpensive way to get a beam aloft out in the boondocks.

A BATTERY RECHARGING SYSTEM

Under the new Field Day rules, all portable groups can qualify for the 1.5 battery multiplier if they run 10 watts or less, while Class B and C stations can earn this multiplier regardless of power input.

To earn the battery multiplier, you can: 1) gather up a jillion well-charged batteries and hope they last through the contest; 2) get a 110-volt a.c. generator *and* a conventional battery charger; 3) keep the engine in your car running for most of the contest; or 4) build a 12-volt d.c. generating system.

The author chose the fourth alternative, and ended up with an emergency power system that has repeatedly proven its reliability and performance not only on Field Day but on all sorts of other occasions. In fact, a battery power system has some distinct advantages over a 110-volt generator for small-group portable operations, whether a multiplier bonus is offered or not. For instance, a battery-recharging system is less expensive than most small 110-volt a.c. generating systems, especially if you scrounge some of the components. And the battery system is more reliable, too; if the engine stalls, you can keep operating in the contest — off the batteries — while somebody gets it running. The system also has some disadvantages, such as its limited power output and the fact that you have to add an inverter to get 110 a.c. for station accessories, but these seemed relatively minor to us.

About 14 years ago W7FVI described a 6-volt d.c. generator system for Field Day[1]. His system is excellent, but the advent of 12-volt alternator systems opens the door for a whole new approach to emergency d.c. power.

The author's 12-volt alternator system is built around a 30-ampere Dodge alternator and a cannibalized 3.5-horsepower Clinton engine. As shown in Fig. 1, the engine is mounted on a three-quarter-inch plywood board and uses a V-belt to drive the alternator. One storage

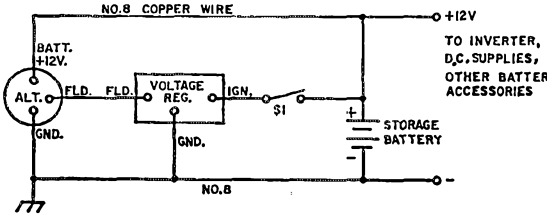


Fig. 3—12-volt alternator system. Parts required:
1—¾" plywood board, 18" × 36".
1—Alternator and voltage regulator (see text).
1—3.5-horsepower gasoline engine.
1—Pulley for engine, V-belt (see text).
2—Brackets to mount alternator.
1—Spark arrestor (see text).
1—S.p.s.t. toggle switch, 3 amp.
Miscellaneous: Hardware, No. 8 copper wire, battery clamps, turnbuckle, etc.

* 11552 Gail Lane, Garden Grove, Cal. 92640.

[1] Reddie, J. S., "An Inexpensive Battery Charger for Field Use," *QST*, July, 1955.

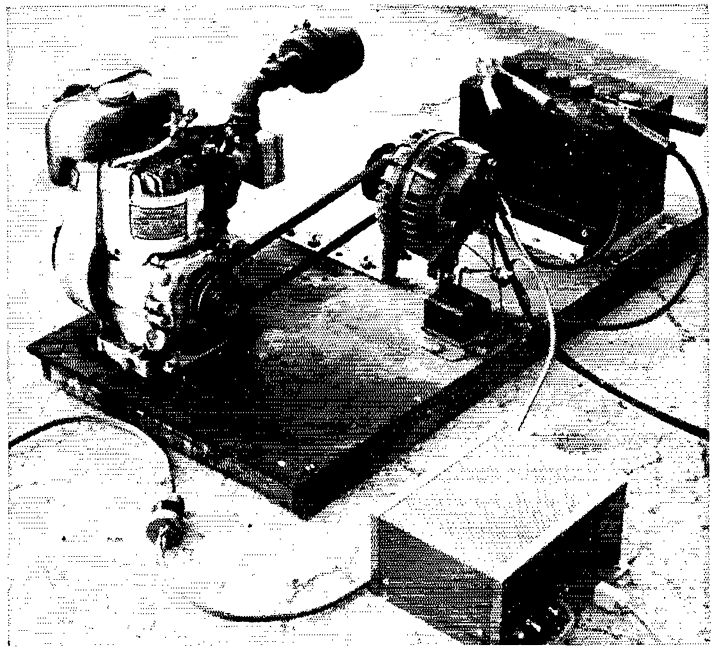


Fig. 1—View of the 12-volt battery recharging system, showing the 3½-hp. gasoline engine, the alternator driven by a V-belt, the voltage regulator, and battery. In the foreground is the d.c.-to-a.c. inverter used to obtain 117 v.a.c. at the portable site.

battery is mounted on the board, and there is cabling available to connect more batteries into the system.

Mechanical Details

Several mechanical considerations in the system should be noted at this point. For one thing, the alternator does not need to rotate at high speed to be effective; 1000 r.p.m. is fine. However, the alternator does load down the engine somewhat when it faces a heavy electrical load. We found that a 3.5-horsepower engine is entirely adequate to drive the alternator if the pulley selected for the engine's drive shaft is slightly *smaller* than the one on the alternator. Since the Dodge alternator has a 3-inch pulley, a 2½-inch pulley on the engine worked very well.

Another thing to keep in mind is the alternator's direction of rotation. The Dodge alternator is designed to rotate clockwise, as we discovered after building the system backward.

A third point to remember is that a great deal of vibration will occur on the board. Heavy plywood, reinforced underneath by 1 × 2 ribbing, is essential. Also, the brackets used to mount the alternator must be heavy or they will break very quickly. We used the heaviest angle brackets we could find. One other mechanical detail: there must be some provision to adjust the tension on the V-belt. We used a turnbuckle, as shown in Fig. 2.

Electrical Details

The electrical design of the system is conventional, as shown in Fig. 3. One thing to remember is that the alternator must have excitation to its field terminal before it will function. This excitation normally comes from the battery through the voltage regulator, but there must be some switching arrangement to isolate the field terminal from the battery when the system is not in use. Otherwise, the 3-ampere drain of the field will quickly produce a dead battery.

Our installation included two accessories that may not be necessary in all cases, a spark arrestor and an ignition resistor. The spark arrestor replaces the muffler on the engine, and is required if the system is to be used in a National Forest area. While it may not be needed in some regions, almost all of our operations have been on mountain peaks within U.S. Forest Service jurisdiction,

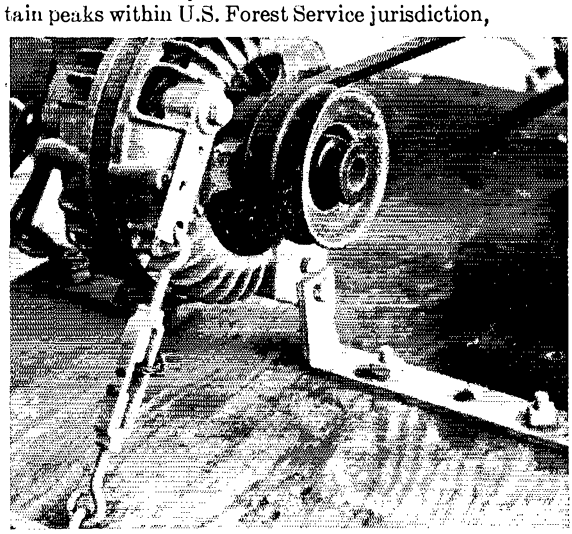


Fig. 2—Close-up view of the alternator, showing the system used to mount it on plyboard with a turnbuckle to adjust the tension on the V-belt.

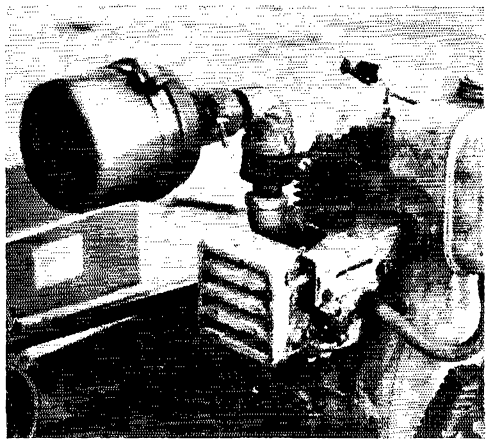


Fig. 4—Close-up view of the spark arrestor that is mounted on the engine, a requirement in U.S. National Forests.

and the system has been inspected frequently by fire-control officials. A Gill model 3C10P spark arrestor is used with the exhaust pipe configuration shown in Fig. 4, but different arrangements will be necessary with other engine types.

The only radio noise problem encountered with the system was a moderate level of ignition noise from the engine. A conventional spark plug resistor completely eliminated it without degrading engine performance appreciably.

Acquiring Components

Locating the components for a system such as this will probably require some local scrounging. The cheapest way to come up with a suitable engine is to cannibalize a *horizontal-drive* lawnmower engine. Anything rated at 3 horsepower or more should be suitable. Alternatively, a new replacement-type engine can be purchased for about $50 from a lawnmower or small-engine supply house.

Since the Chrysler Corporation has installed alternators on its new cars for some years now, auto junk yards are beginning to have a good supply of used alternators and their associated voltage regulators at reasonable prices. We found both items, taken from a 1964 Dodge, for $15 at a local junk yard.

Batteries for use with this system can obviously be borrowed from cars, but it is desirable to have one battery permanently mounted with the alternator, and a bit more scrounging solved this problem. The important thing to keep in mind in hunting for batteries is that the higher the ampere-hour capacity, the better the battery is for portable hamming.

Performance

The reliability and performance of this system have been proven several times in contests in the middle of nowhere. It will provide adequate power to keep the batteries charged while any of the popular transceivers is run from a d.c. power supply. There is also plenty of power left to run station accessories from a d.c.-to-a.c. inverter, and there is no reason why a mobile s.s.b. linear would overload the system if used on a reasonable duty cycle.

In fact, the recharging system can be shut down for several hours at a time while contest operations continue, if necessary. When started again, the system will recharge the batteries in a few hours and still supply enough power to run the station.

Installation Notes

In any high-current low-voltage system, heavy power cables are essential, especially when the cables are long, such as those running from the alternator to the operating position. About 75 feet is adequate separation to keep the engine noise from this system down to a reasonable level at the operating position, and 75 feet of No. 8 wire will handle the current required for a transceiver's d.c. power supply. Of course, the d.c.-to-a.c. inverter, if one is used, should be located near the alternator system to avoid another long run of heavy cable for station accessories and lighting.

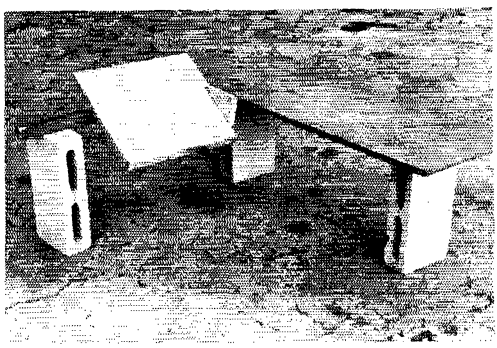
AN OPERATING POSITION IN A CAR

Another useful item for Field Day and other portable applications is a desk-type operating position that can be mounted in the front seat of a car, eliminating the need to operate in a tent or hunched over a transceiver under the dash.

Obviously, such a desk has to be custom-fitted to the individual car, but the author's design is shown in Fig. 5. It includes a plywood shelf wide enough to hold the equipment and long enough to reach from the back of the front seat to the dash. A 2 × 2 is bolted to the plywood shelf and runs across parallel to the dash, resting on the steering column. This 2 × 2 supports a tilted writing shelf large enough to hold log sheets and checklists.

As Fig. 5 shows, the desk will hold two transceivers, microphones, a keyer, and antenna rotor control, plus a few pencils and erasers. The equipment is at eye level, which is not the ideal height, but we have found that this is far more comfortable than leaning over a dash-mounted transceiver and fumbling all over the front seat for pencils or logs. In a typical contest where the station can be left on one frequency while successive stations call in, the operator faces forward and this installation becomes as comfortable as the home station.

The tilt angle of the writing shelf can be varied to suit individual preference; we found a 30-degree angle quite comfortable. The tilt



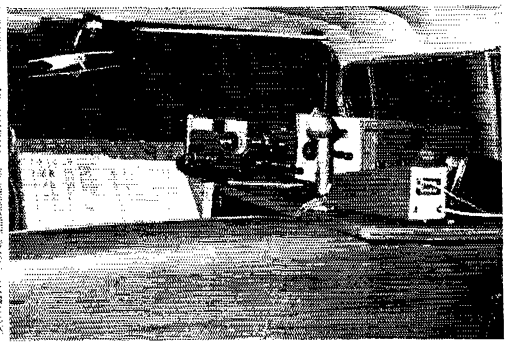


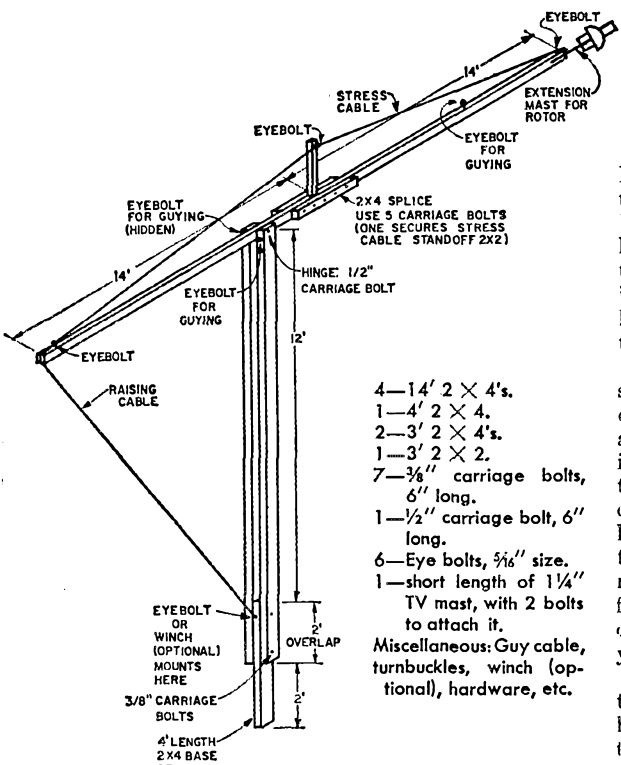
Fig. 5—Two views of the auto operating desk. At the left, the desk rests on three cement blocks, which are replaced by the steering column, dash, and the back of the front seat in the actual installation. At right, the desk is in place, with two transceivers and their accessories plus logs and checklist. Materials required:

1—¾" plywood board, 18" × 44" (see text).
1—4' 2 × 2.
1—¾" plywood board, 18" × 16".
1—18" strip of molding.
Miscellaneous: Hardware, shelf brackets, etc.

angle is determined by the size and placement of the shelf brackets used to anchor the tilting shelf to the level equipment shelf. A piece of molding along the bottom of the tilting shelf keeps pencils and logs from falling off.

It is probably not feasible to use this particular design in a car with bucket seats, because the operator sits in the middle of the front seat, away from the steering wheel. Also, it is not feasible to drive with the desk in place, because the 2 × 2 support gets in the way. The whole desk simply lifts out and can be carried in the back seat.

A TILT-OVER PORTABLE TOWER



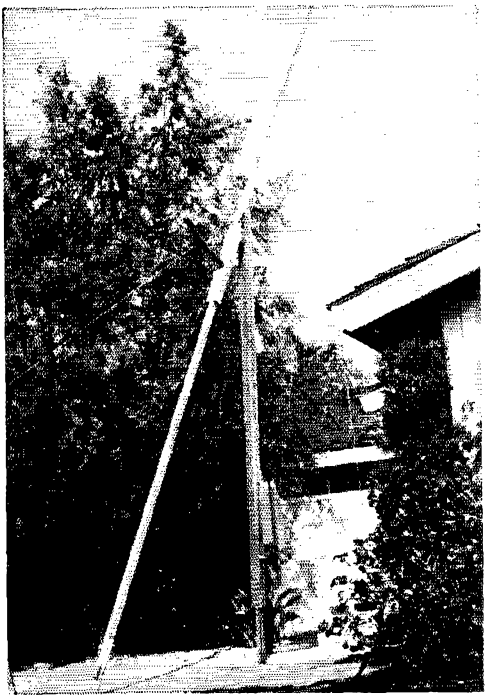
4—14' 2 × 4's.
1—4' 2 × 4.
2—3' 2 × 4's.
1—3' 2 × 2.
7—⅜" carriage bolts, 6" long.
1—½" carriage bolt, 6" long.
6—Eye bolts, 5/16" size.
1—short length of 1¼" TV mast, with 2 bolts to attach it.
Miscellaneous: Guy cable, turnbuckles, winch (optional), hardware, etc.

Fig. 5—Construction of 32-foot tilt-over tower. Materials required:

Finding a way to support a decent beam on Field Day is never easy. Portable towers tend to be too low, clumsy, and an invitation for Murphy to strike — or else they're expensive, heavy, hard to transport, and impractical. The tilt-over tower described here could well have its problems with Murphy if not properly guyed, but it seems to be a good compromise design that has worked well.

The tower shown in Fig. 6 is reasonably simple to build, costs less than $15 (unless the cost of lumber goes up again), will travel atop a car, and can be set up by two people (or one, in an emergency). It will support a 20-meter two-element cubical quad and rotor at a height of 34 feet, which isn't bad for Field Day. Perhaps the biggest advantage is that once the tower is in place and guyed, assembling and raising the antenna itself is simple. Going a step further, it's no problem to tilt the thing back over again so you can connect the rotor cable you forgot the first time.

As Fig. 6 and the photographs in Fig. 7 show, the tower consists of a 28-foot 2 × 4 mast, hinged and supported just below its center by two more 2 × 4's in a forked arrangement. The 28-foot mast is free to tilt up or down on a single half-inch carriage bolt which secures it to the forked supporting structure. Since the forked



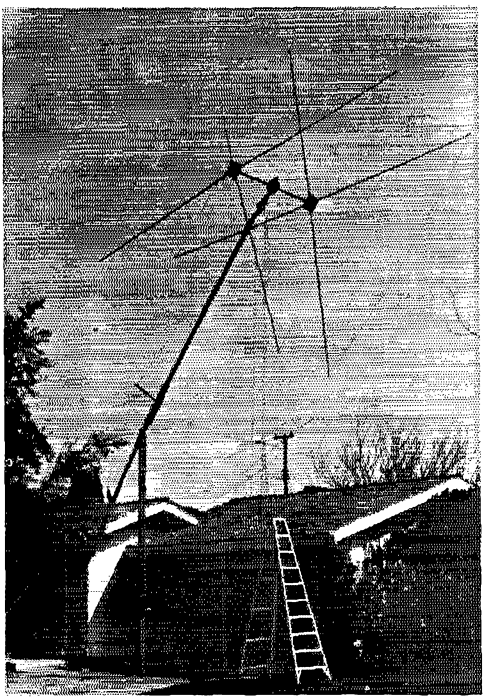


Fig. 7—Close-up of the tilt-over mast and a view of the quad halfway raised.

mast is anchored at the bottom by a four-foot 2 × 4 base section, the total height of the tower when erect is 32 feet. With a rotor atop this, the boom of an antenna is roughly 34 feet high.

Construction Details

The tilting 28-foot section is built in two pieces so it can be dismantled and hauled on a passenger-car top. The two 14-foot sections are spliced with short 2 × 4's and carriage bolts. At the center of the splice a 2 × 2 is fitted perpendicularly, providing a standoff for the stress cable. The stress cable can be made of guy wire or non-stretching rope, with a turnbuckle placed at one end.

The tower is guyed near the top as well as at the hinge point on the supporting 2 × 4's, but the guying at the hinge point is the all-important factor. The hinge-point guys opposite the top end of the tilting arm will encounter severe stresses as a heavy antenna is mounted and raised.

Four-way guying at the hinge point contributes greatly to an orderly antenna-raising operation. Note that the guys must be carefully attached to eye-bolts on both sides of the tilting arm if they are to clear the arm as it is raised and lowered.

An unorthodox but effective way to guy the tower while the antenna is being assembled and raised is to park two cars parallel to each other and about twelve feet apart. The base of the tower is centered halfway between the cars with the tilting arm parallel to the cars; guys are then run to the front and rear bumpers of both cars, creating a solid four-way guying system that will not interfere with the job of mounting an antenna on the end of the tilting arm. If necessary, the cars can be moved once the antenna is raised and the top section is securely guyed, but the lower guys then should be attached to another guying point.

The importance of proper guying with a tower like this cannot be overemphasized. With tight guys securely anchored, there should be no problem in raising fairly large antennas. If the guys are loose or will stretch, Murphy will probably prevail.

A winch may be mounted at the base of the tower if desired. This is optional, but it is definitely worthwhile when you're mounting an antenna on the end of the tilting mast and want it to stay put. It would be possible to attach an antenna directly to the top of the 2 × 4, but if a rotor is used, a short piece of TV mast is bolted to the top of the 2 × 4 and the rotor is then mounted on this stub of pipe.

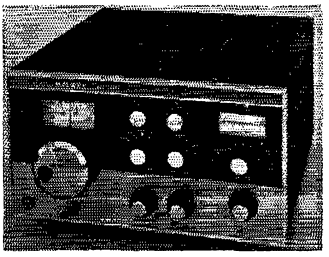
Conclusion

These three innovations have proven themselves again and again in Field Days, v.h.f. contests, and general portable work. The battery-recharging system and tilt-over mast both went along when K6YNB/6 led all Class B entries nationally in the 1968 Field Day (with the able operating of KØGJD). These gadgets won't always bring first-place scores, and they certainly won't repeal Murphy's Law, but they have made our hamming in the boondocks a lot more enjoyable and less hectic than it used to be. QST

Recent Equipment

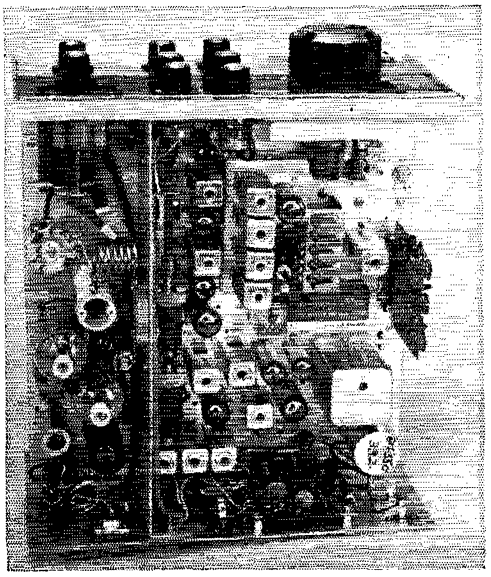
To acquaint you with the technical features of current amateur gear.

Galaxy GT-550 Transceiver



THE present trend in transceivers is toward versatile compact units that operate at higher power levels than their predecessors and use, wherever practical, semiconductors in place of vacuum tubes. The new Galaxy GT-550 transceiver is no exception. Rated at 550 watts p.e.p. input on s.s.b. and 360 watts input on c.w., the unit covers 3.5 to 4.0, 7.0 to 7.5, 14.0 to 14.5, 21.0 to 21.5 and 28.0 to 29.0 MHz. in six 500-kHz. segments. Semiconductors in the GT-550 outnumber tubes by more than two to one. There are eighteen transistors, nine diodes and thirteen tubes in the transceiver. The rig measures $6 \times 11\frac{1}{4} \times 12\frac{1}{2}$ inches and weighs only 17 pounds.

Because of the complexity of the transceiver, the circuit of the GT-550 has been broken down into two block diagrams to make it easy to follow an explanation of the operation of the unit. Fig. 1 shows the transmitter section and Fig. 2 shows the receiver. A star is located next to each tube and transistor that is used for both transmitting and receiving.



Top view of the transceiver. At the left of a partition that runs the length of the chassis are the tubes used in the receiver r.f. amplifier, transmitter driver, and final amplifier. The two variables adjacent to the right side of this plate tune the receiver r.f. amplifier and the transmitter driver. At the far right is the plug-in circuit board of the optional VOX unit. Anti-VOX, delay, and VOX gain controls on the right side of this board can be adjusted by inserting a screwdriver through cutouts in the perforated cover shown in the title photo. The large rectangle can in the lower right corner houses the components of the optional plug-in crystal calibrator. The components of the transistor audio stages are mounted on the circuit board at the bottom of the photo. Not shown is a perforated cover (not the one in the title photo) used to shield the components on the left side of the previously-mentioned divider.

Transmitter Section

Referring to Fig. 1, when the rig is on s.s.b. audio from any high-impedance microphone is amplified in Q_9 and Q_{10} and fed to the 12AT7 balanced modulator, V_7. Also arriving at V_7 is the r.f. signal from the 6GX6 crystal-controlled carrier oscillator, V_5. Depending on the position of a front-panel switch, S_2, the output of V_5 is on either 9001.25 or 8998.75 kHz. To prevent V_7 from pulling V_5's frequency when the GT-550 goes from receive to transmit a transistor buffer, Q_{16}, is used between V_5 and the balanced modulator (when the rig is in the receive mode, pentode V_5 is used as a b.f.o., product detector and audio amplifier).

The double-sideband output from the balanced modulator is fed into a 9-MHz. crystal filter which suppresses the unwanted sideband. The s.s.b. signal leaving the filter is amplified in V_3, a 6EW6, and passed on to the 6EJ7 mixer, V_8. Here the s.s.b. signal is heterodyned to the desired amateur frequency. Depending on the band of operation, injection is furnished by either the v.f.o. alone or by the v.f.o. in combination with crystal oscillator Q_3 and mixer V_{6A}. The 2N3563 v.f.o., Q_{12}, tunes 5.0 to 5.5 MHz. in a Colpitts configuration and is followed by three

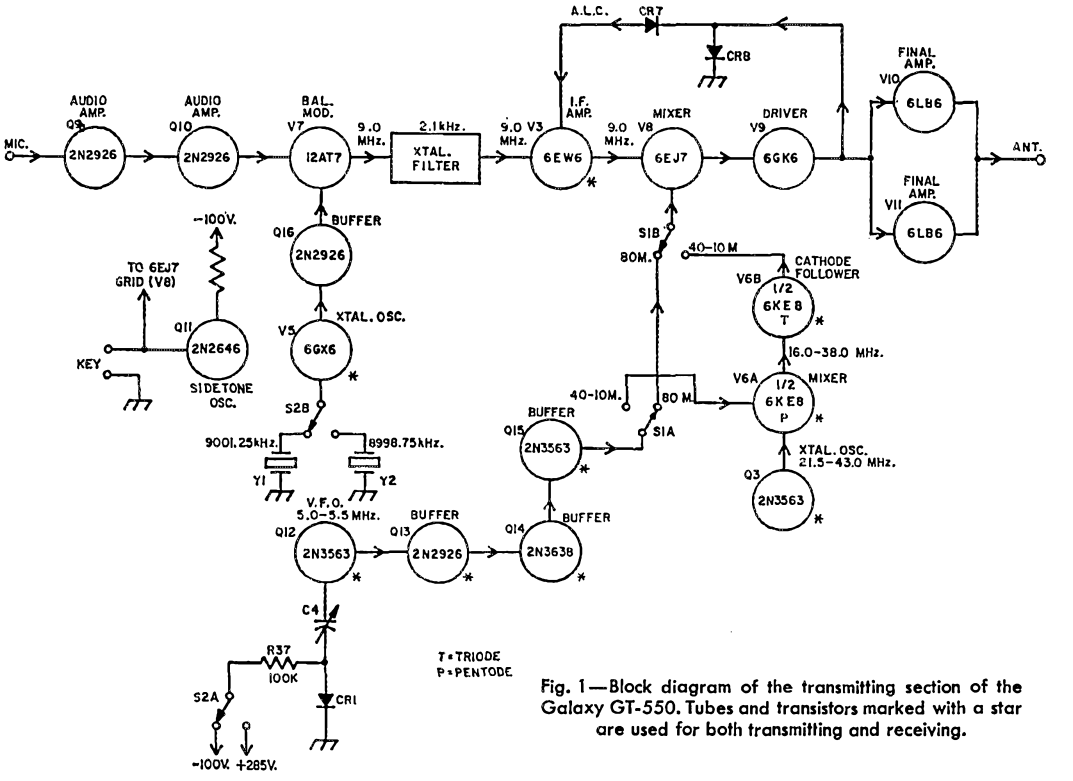


Fig. 1—Block diagram of the transmitting section of the Galaxy GT-550. Tubes and transistors marked with a star are used for both transmitting and receiving.

transistor buffer amplifier stages, Q_{13} through Q_{15}. On 80 meters the 5.0- to 5.5-MHz. output of Q_{15} is fed directly to V_8 where it beats with the incoming 9-MHz. s.s.b. signal to give an output of 4.0 to 3.5 MHz. On 40, 20, 15 and 10 meters the output of Q_{15} is passed on to V_{6A}. Fixed-frequency injection for V_{6A} on each band is provided by Q_3, which is on 21.5 MHz. for 40 meters, 28.5 MHz. for 20 meters, 35.5 MHz. for 15 meters, 42.5 MHz. for the bottom 500 kHz. of 10 meters, and 43.0 MHz. for the next 500 kHz. of 10 meters. As a result of the mixing process, the output of V_{6A} is in the range of 16.0 to 16.5 MHz. for 40 meters, 23.0 to 23.5 MHz. for 20 meters, 30.0 to 30.5 MHz. for 15 meters and 37.0 to 38.0 MHz. for 10 meters. (The top 700 kHz. of 10 meters can be covered by substituting optional crystals for those used in Q_3 to cover the bottom 1000 kHz. of the band.) The signal from V_{6A} goes to cathode follower V_{6B} and then to V_8 where it combines with the incoming 9-MHz. s.s.b. signal to produce output in the selected amateur band.

To keep the dial calibration accurate for both upper and lower sideband operation, a diode switching arrangement (C_4, CR_1, R_{37} and S_{2A}) is used in conjunction with the v.f.o. When V_5 is operating at 9001.25 kHz., CR_1 is reverse biased, allowing one end of C_4, which is connected to the v.f.o. tuned circuit, to float. However, when V_5 is operating at 8998.75 kHz., CR_1 is forward biased, effectively grounding the previously-free end of C_4. This decreases the v.f.o. frequency by an amount equal to the frequency difference between Y_1 and Y_2, thus keeping the v.f.o. dial calibration the same regardless of the sideband selected.

The amateur-band signal from mixer V_8 is amplified in the 6GK6 driver, V_9, and then fed to the final amplifier, a pair of parallel-connected 6LB6 TV horizontal-sweep tubes operated in Class AB_1. A pi network in the plate circuit is designed for non-reactive loads between 40 and 100 ohms. Two 1N462 diodes, CR_7 and CR_8, provide a.l.c. action. Whenever the final tubes draw grid current, audio is generated in the p.a. grid circuit. This audio is rectified by CR_7 and CR_8, and the resulting d.c. voltage is used to reduce the gain of the 6EW6 i.f. amplifier, V_3.

Three types of c.w. operation are possible with the GT-550: manual low power, manual high power and VOX break-in. The first type is accomplished by putting the FUNCTION switch in the TUNE position, and the last two are achieved by turning the FUNCTION switch to the cw position. In either position, a section of the FUNCTION switch reverse biases a diode switch which, in turn, unshorts a 100-pf. capacitor in series with the 8998.75-kHz. crystal in the carrier oscillator, V_5. This shifts the output of V_5 to 8999.45 kHz., a frequency within the 2.1-kHz. bandpass of the 9-MHz. crystal filter. Another

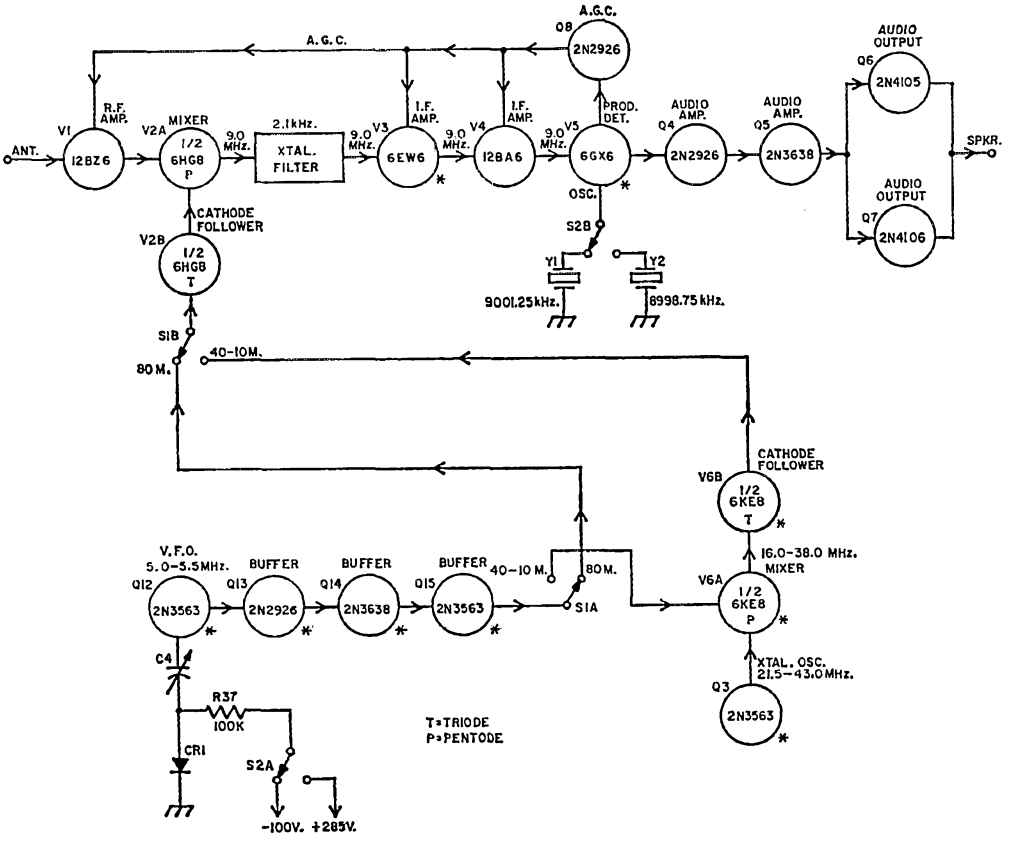


Fig. 2—Block diagram of the receiver section of the Galaxy GT-550. A star is shown alongside those tubes and transistors that are used for both transmitting and receiving.

section of the switch unbalances the balanced modulator so that the carrier can pass through. In the TUNE position of the FUNCTION switch, this section connects a variable negative bias to one of the triodes in the 12AT7 balanced modulator. (The potentiometer that controls this bias is ganged to the MIC gain control, permitting the c.w. input to be varied by adjustment of the aforesaid control.) In the CW position of the FUNCTION switch, this same switch section connects fixed bias, rather than variable bias, to one half of the balanced modulator, preventing adjustment by the MIC gain control of the amplifier input.

Still another section of the FUNCTION switch establishes the maximum input level for low and high power c.w. When the transmitter is on s.s.b., this switch section allows regulated 180 volts to be applied to the screens of the final amplifier tubes. It does so by shorting a 33,000-ohm resistor that is in series with the amplifier screens and the supply. For low power c.w. (TUNE position) this switch section removes the short, permitting the final amplifier to run at a maximum input of about 250 watts. For high power c.w. (CW position) this same switch section parallels the 33,000-ohm resistor with a 10,000-ohm resistor, allowing the final to operate at 360 watts input.

The rig is keyed in mixer V_8 by the blocked-grid method. A 2N2646 unijunction sidetone oscillator, Q_{11}, which operates at about 700 Hz., is keyed at the same time.

In the PTT position of the FUNCTION switch, push-to-talk switching operates the GT-550's send-receive relay. In the VOX position the changeover is accomplished by an accessory VOX unit, which plugs in a nine-contact socket inside the transceiver. In order to receive signals when operating low-power c.w. in the TUNE position it is necessary to return the FUNCTION switch to PTT or VOX, because the switch, not the key, operates the relay. When operating manual high-power c.w. in the CW position, before keying, the receive-transmit relay must be activated by closing the push-to-talk switch on the microphone. Of course, a foot switch can be used instead. It is not necessary to move the FUNCTION switch out of the CW position in order to receive signals; opening the p.t.t. circuit and the key is all that is required. For c.w. VOX break-in, the accessory VOX unit must be in-

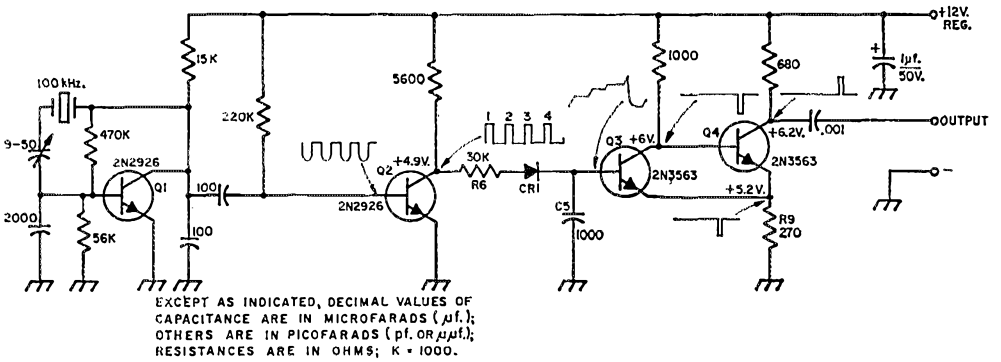


Fig. 3—Partial schematic diagram of the CAL-25 crystal calibrator. Voltages shown were measured with a v.t.v.m. between the points indicated and ground. Component labels are for text reference.

stalled and correctly adjusted. Then when the key is closed, the sidetone signal will key the VOX unit which, in turn, will switch the send-receive relay from receive to transmit. After the key is released, the relay will stay in the transmit condition for a length of time that depends on the setting of a DELAY control in the VOX unit. When this time is up, the set will automatically return to receive.

Transmitter adjustments are made by monitoring a meter in the cathode circuit of the final amplifier.

Receiver Section

Referring to Fig. 2, signals coming from the antenna are amplified in V_1 and fed to a 6HG8 mixer, V_{2A}. Local oscillator energy for V_{2A} is generated by the same stages used to provide injection for transmitter mixer V_8, and the injection frequencies are the same. A cathode follower, V_{2B}, is used to isolate V_{2A} from the local oscillator chain. The output of V_{2A} is fed through the 9-MHz. crystal filter, amplified in two i.f. stages, V_3 and V_4, and then passed on to V_5.

As mentioned earlier, on receive pentode V_5 functions as a product detector, b.f.o. and audio amplifier. The crystal-controlled b.f.o. employs the cathode, grid No. 1 and grid No. 2 of V_5 as a triode. Grid No. 2 serves as the oscillator plate, and S_{2B} selects the appropriate crystal for upper or lower sideband reception. During transmitting this oscillator supplies the carrier for the balanced modulator. The detector/audio amplifier uses the cathode, grid No. 3 and the plate of V_5.

Sideband selection, as well as v.f.o. shift for keeping the dial calibration the same regardless of the choice of sidebands, is accomplished in the same manner as described for transmitting. Audio from V_5 is amplified by Q_4 and Q_5 and then fed to the audio output stage, Q_6Q_7. Q_6 and Q_7 are used in complementary-symmetry push-pull, a circuit that eliminates the need for an output transformer. Output to an external 8-ohm speaker or headset is through two 100-μf. electrolytic capacitors.

The meter used to indicate transmitter adjustments is switched to the screen circuits of V_1 and V_4 during receiving periods. It shows signal strength by measuring the increase in screen voltage that results when a.g.c. voltage, caused by an incoming signal, reduces the gain of V_1 and V_4.

Accessories

There are at least ten accessories available from Galaxy for use with the GT-550. They include the AC-400 a.c. power supply, the SC-550 speaker console, the VOX-35C VOX unit, the RV-550 remote v.f.o., the F-3 audio filter, the CAL-25 crystal calibrator, the G-1000DC mobile supply, the RF-550 wattmeter, the LA-550 linear amplifier, and the PR-550 phone patch.

The CAL-25 25-kHz. crystal calibrator, probably the most novel accessory of the group, is illustrated in Fig. 3. Waveforms are shown at various points in the circuit to indicate what is going on in the device during four cycles of the 100-kHz. signal developed by crystal oscillator Q_1. The 100-kHz. output from Q_1 is amplified by Q_2. Q_2 is set up to saturate easily, resulting in a squared waveform in its collector circuit. Such a waveform is desirable if reliable frequency division is to be achieved.

If Q_1 was not oscillating, Q_2 would be conducting heavily and its collector voltage would be only about 0.1 volt. Because the oscillator is operating, Q_2's collector voltage goes highly positive every time a negative pulse reaches the base of the transistor. This voltage is used to charge C_5 through diode CR_1. Q_3 receives its forward bias from the voltage developed across C_5. Until this voltage gets to be about 0.6 volt greater than the reverse bias developed across R_9, Q_3 does not conduct. Referring to Q_2's collector waveform, during the first positive pulse C_5 charges up to some positive voltage. The charge on C_5 goes higher during the second positive pulse and even higher during the third. This can be seen by examining the waveform at the base of Q_3. Because Q_3 is cut off and because of the polarity of CR_1, C_5 can't discharge

during the first three pulses. The fourth positive pulse on the collector of Q_2 charges C_5 to a sufficiently high voltage to forward bias Q_3 into conduction. This gives C_5 a discharge path, and the capacitor quickly discharges through the base-to-emitter junction of Q_3. Then the whole cycle of events described above is repeated. As a result, one pulse (25 kHz.) is generated in the collector and emitter circuits of Q_3 for every four pulses (100 kHz.) from the oscillator.

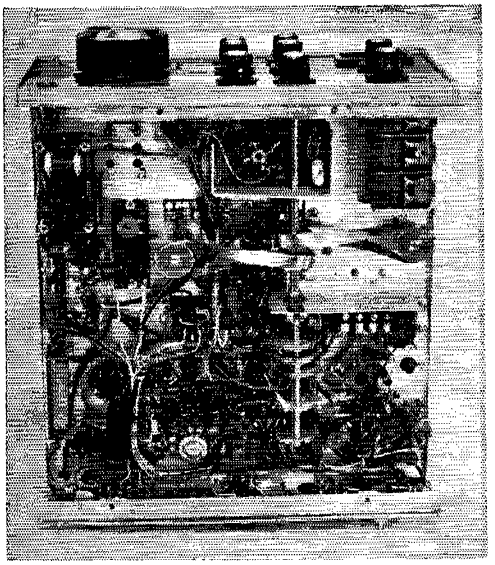
Note that the collector of Q_3 is tied to the base of Q_4 and that the emitters of the two transistors are connected together. Because of this wiring arrangement, an increase in current in one stage tends to cause a decrease in current in the other stage and vice versa. As a result, Q_4 not only amplifies the pulse from Q_3, but serves as a voltage regulator for R_9 as well. If R_9's voltage isn't held fairly constant, there is a chance of incorrect frequency division. That is, the output might be on 33.3 kHz. (divide by three) or 20 kHz. (divide by five).

Physical Details

The transceiver seems to be mechanically sound. Front and rear panels are of heavy-gauge aluminum, as is the chassis. Strips of aluminum angle stock and a heavy dial bezel give added strength to the front panel. The top and bottom covers are perforated to provide ventilation, as is a shield used to cover the final amplifier compartment. Sockets for the final amplifier tubes are mounted on spacers below chassis level, permitting the use of a low-silhouette cabinet and making it easy for air to circulate around the tubes. Circuit boards are used to mount most of the components of the various transistor stages.

A ball drive in conjunction with a gear train is used to tune the v.f.o. capacitor. The dial is calibrated from 0 to 500 in 5-kHz. steps. It takes 36 turns of the v.f.o. knob to tune 500 kHz. or, to put it another way, about one turn of the knob to tune 12 or 13 kHz. The large knob that is used should make the tuning process relatively easy, but in the set we tested there was some backlash in the mechanism. A finger hole in the knob lets one move around a band in short order, and a tab next to the dial window makes it possible to move the dial pointer about 10 kHz. for calibration purposes.

In addition to the main tuning knob, there are nine controls on the front panel: A.F. GAIN (with an ON/OFF switch on the back) and R.F. GAIN (these two controls are on concentric shafts), FUNCTION switch (PTT, VOX, CAL, TUNE, CW), SIDEBAND selector, MIC gain, EXCITER tuning, BAND switch, PLATE tuning, and final LOADing. The only other items on the front of the transceiver are a MIC jack and the meter used to measure final amplifier cathode current and to indicate signal strength.



A look at the underside of the transceiver. Except for five capacitors and the tuning mechanism, the components of the v.f.o. and buffer stages are mounted on the circuit board in the upper left corner. The copper shield that normally covers this board is not shown. The shaft that turns the band switch runs through the middle of the photo from top to bottom. The two band-switch sections that aren't on the bottom of the chassis are ganged to this shaft via aluminum pulleys and figure-eight-shaped loops of brass.

Instruction Manuals

The instruction manuals for the GT-550 and its accessories give ample information on how to operate the equipment, and they have parts lists and schematics. In addition the GT-550 manual has a test and alignment section, a trouble-shooting chart, a resistance chart, a voltage chart, and a block diagram of the transceiver. However, none of the theory sections of these manuals contains sufficient information to explain thoroughly what is going on in any particular unit, and the schematics are woefully lacking in labels. The radio amateur who wants to repair his equipment or understand how the various stages function had better have a good background in the field of electronics if he wants to accomplish his objective in a reasonable length of time.

Performance

Manufacturer's specifications of particular interest are as follows:

Input: 550 watts p.e.p. s.s.b., 360 watts c.w.

Suppression: Carrier −45 db., unwanted sideband −55 db.

Frequency stability: Less than 100 Hz. drift in any 15 minute period after warmup.

Crystal filter: 2.1 kHz. with a 1.8:1 shape factor (db. points not specified)

Receiver sensitivity: 0.5 μv. for 10 db. $S + N/N$ ratio.

These specifications were met in the transceiver checked in the ARRL lab. The manufac-

Galaxy GT-550 Transceiver

Height: 6 inches.
Width: 11¼ inches.
Depth: 12½ inches.
Weight: 17 pounds.
Power Requirements: 900 volts d.c. at 600 ma., 350 volts d.c. at 300 ma., 16 volts d.c. at 1 ampere, −100 volts d.c. at 50 ma., and 12.6 volts a.c./d.c. at 5 amperes.
Price Class: $450 less power supply and speaker; AC-400 power supply: $90; SC-550 speaker console: $20.
Manufacturer: Galaxy Electronics, 10 South 34th Street, Council Bluffs, Iowa 51501.

turer gave no figures on distortion products; however, after proper adjustment of the rig, third- and fifth-order products were down more than 26 db. below p.e.p. On the four lower bands the output of the rig, as measured on a Bird model 43 wattmeter, was about 130 watts c.w. in the TUNE position of the FUNCTION switch, 200 watts c.w. in the CW position, and 260 watts p.e.p. s.s.b. in the PTT position. For the 28.5- to 29.0-MHz. band these figures dropped to, in the same order, 90 watts, 140 watts, and 160 watts p.e.p.

The amount of signal that it took to get a specific S-meter reading varied a little bit from band to band, but on the average the receiver required a 2-μv. signal for an S1 reading, a 20-μv. signal for an S9 reading, an 80-μv. signal for a 20 db. over S9 reading, and a 2000-μv. signal for a 60 db. over S9 reading. Internally-generated spurious signals were found on all but the 3.5- to 4.0-MHz. band. Of the 18 unwanted signals found, only two — 14.14 MHz. and 21.2 MHz. — were strong enough to be bothersome. They also were the only ones that resulted in S-meter readings, the former being S4 and the latter, which is the fourth harmonic of the v.f.o., being 30 db. over S9. On the 3.5- to 4.0-MHz. band the set picked up a couple of broadcast stations, even when the antenna connector was shorted out and no antenna was attached. Prior to turning on the transmitter section of the transceiver, the receiver section tended to be slightly regenerative except on 40 meters. Once the transmitter section heated the rest of the set, this condition disappeared.

While the unit was being put through a fairly rugged test, the final amplifier tubes went sour and had to be replaced. Although this was most likely the fault of the tester and not the manufacturer, it points out that it's best not to leave the key down for any length of time if one wants the final amplifier in a sweep-tube rig to last for a reasonable period. In the case of the GT-550 it's a good idea to let a fan blow air across the 6LB6s, because the tubes run very hot even in normal operation. — *W1YDS*

Satellite Weather Pictures

(*Continued from page 21*)

justments of the timing control probably will be needed for optimum operation.

In the vertical deflection circuit, the Miller rundown is initiated by opening the sweep/reset switch, with the test/use switch closed. Adjust the timing control for a 200-second ramp.

Opening the test/use switch removes the 24-μf. timing capacitor from the circuit and allows the operator to adjust the vertical gain (Fig. 3) for proper deflection.

The bucking controls of both horizontal and vertical sections are adjusted to produce a signal that swings from positive through zero to negative polarity, with equal-amplitude maximum voltages of both polarities. The voltage excursions can be measured with a d.c.-coupled scope connected at the high ends of the gain controls.

The astigmatism control, Fig. 4, should be adjusted in conjunction with the focus control to give a sharp trace.

Adjust the signal input amplitude and the brightness control for a suitable picture; this probably will require some experimentation. The first line of the picture is at the top of the c.r.t. face, with the horizontal sweep starting at the left.

Adjustment of the synchronizing and deflection circuits, if carried out as described above, can be done without applying high voltage to the c.r. tube. Extreme care should be used when the high voltage is on, and a metal enclosure grounded to the chassis should be used in regular operation.

Photography

The camera presently used here is a 35-mm. Praktica with a Zeiss $f/2$ 58-mm. lens. A 10-mm. extension was used to allow the distance to the c.r.t. face to be 10.5 inches

The lens iris is set at $f/8$, and at the beginning of a picture sweep the shutter is opened by a cable release and locked. The monitor speaker is a great help at this time. At the end of the 200-second vertical sweep interval the shutter is closed. The pictures are taken in a darkened room, using tape recordings of the satellite passes as the signal source.

There is no reason why a Polaroid camera could not be used — perhaps with the use of a close-up lens kit.[3]

I would like to thank Mel Linse for his valuable aid and advice with the photographic work.

QST

[3] Coy, "Build a $20 Scope Camera," *Radio Electronics*, April, 1969.

Easily-Constructed Antennas for 1296 MHz.

Solving U.H.F. Antennas and Feed-Line Problems

BY DOLPH VILARDI,* WA2VTR

GROWING interest in the ultra-high frequencies, particularly 1296 MHz., with the advent of new semiconductor devices which operate efficiently at these frequencies, is evident in the conversations of many hams who now operate the v.h.f. bands. In the southern New York and northern New Jersey areas, many are moving up from 432 to 1296 MHz.

Although the majority of hams with interest in the u.h.f. region have some technical background, there are some who do not. In addition, they may not have the financial means or facilities for acquiring sophisticated devices. The purpose of this article is to cover the problem of adequate antennas and feed lines for 1296 MHz. in a basic and nontechnical way, to show what can be done with a minimum of expense and technical knowledge. Although more expensive equipment and exotic feed lines will obviously give superior results, the techniques described herein have been tested thoroughly, in actual operation at several northern New Jersey and southern New York stations.

It is important to recognize at the outset, without equivocation, that one must use the "most antenna" that can be assembled and erected. In addition, the feed line should be the most efficient that is obtainable for the amount of money to be spent. There is no question that this is the least expensive way to obtain maximum performance at these frequencies. The cost of even the finest antennas and transmission-line equipment may be far less than that of any equivalent improvement that can be obtained by using more sophisticated transmitting and receiving equipment. Especially important, the bonus is obtained on both transmit and receive. Receiver front-end sensitivity constitutes a major problem at these frequencies and feed line and v.s.w.r. losses mount astronomically at u.h.f. This article will attempt to describe the least expensive antenna and feed-line combinations which will give acceptable results, with a minimum of time and effort expended.

Maximum antenna aperture is desirable, and this requirement generally can best be met with large parabolic antennas. It is obvious that these present difficulties of construction, expense, and not the least of all, of mounting on towers in such a way that they are structurally sound. Large horn-type antennas also are efficient, but they involve more construction problems, and will not be included in this discussion.

Perhaps the simplest adequate antennas which can be constructed and erected are the expanded extended-element collinears, such as those described by Frank Jones[1]. Since these are essentially 300-ohm-impedance antennas, they lend themselves to feeding with the least expensive type of transmission line which is acceptable at these frequencies: a *high-grade foam-type* twin lead. Losses on this type of line are nominally quite low, but it must be understood that proper dressing of the line from the antenna to the transmitter and receiver is essential. Standoffs must be used, and sharp bends and proximity to metal structures must be avoided. Regardless of all these precautions, performance will deteriorate severely during wet or icy weather.

* 14 Oakwood Terrace, Spring Valley, New York 10977.

[1] F. C. Jones, *VHF for the Radio Amateur*, pp. 43–46.

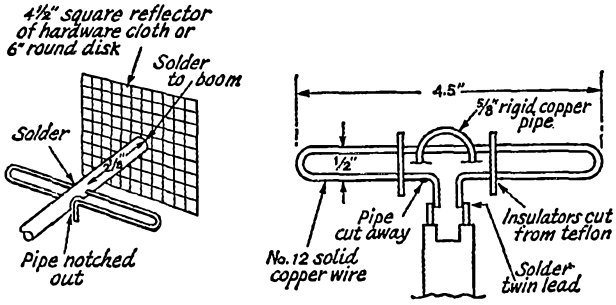


Fig. 1—Details of the driven element and reflector ("splasher") used to illuminate the parabolic reflector, for adaptation of u.h.f. TV antennas to amateur service on 1296 MHz. The reflector can be hardware cloth, perforated metal or solid sheet, and may be square or round. Note that the horizontal support is notched below the hole where the driven element passes through, to allow room for the ends where they are soldered to the feed line. Dipole length is for 1215 MHz. For 1296 use 4¼ inches.

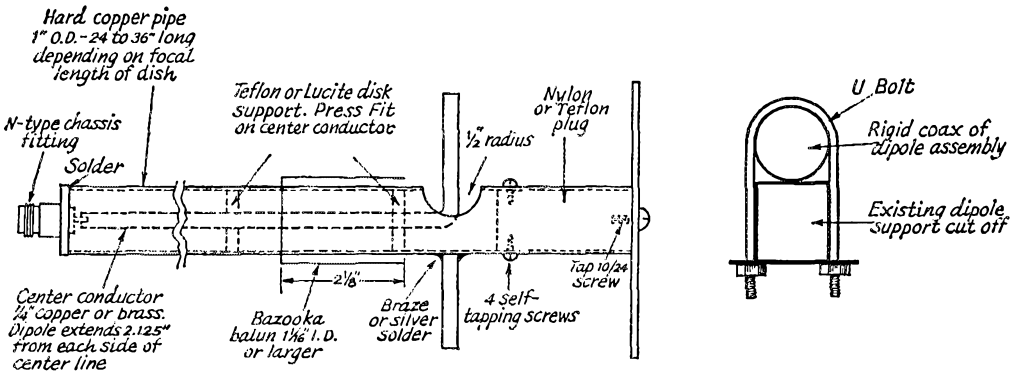


Fig. 2— Details of a dipole, reflector and rigid coaxial feed. Silver-plating of copper parts is desirable. Overall dipole length and reflector dimensions are similar to Fig. 1. Dipole-to-splasher spacing (2⅛ inches) is less critical if splasher is not grounded to the rigid coax.

It is essential that a properly constructed and efficient balun be used in order to match the impedance of the transmitter and receiver, and convert from the balanced line to unbalanced input and output circuits. Baluns for these frequencies are quite critical and the only simple one which we have found effective is also described by Frank Jones in his article on the collinear antenna previously mentioned. Four-to-one flexible baluns of the type ordinarily used on v.h.f. are impractical above about 500 MHz.; so no attempt to construct these should be made. Thirty-two element collinears of the type described by Jones have been used successfully by K2JNG and K2DZM. These antennas have rather broad beam widths and do not have the forward gain or front-to-back ratio of well-designed parabolic systems.

Good parabolas require considerable effort to design and construct. Most of the dishes which are available on the surplus market are not suitable since the ratio of focal length to diameter makes them difficult to illuminate. According to W2CCY, the F/D ratio for this kind of application should be in the neighborhood of 0.4. This makes for a much shallower dish than the usual surplus type. Tolerances for dishes below seven feet in diameter are within one-half inch of the true parabolic curve, and are not easily achieved by amateur constructors. For this reason and others involving cost, an attempt was made to convert commercial u.h.f. television parabolic antennas for use at 1296 MHz. The parabolic TV antennas described do not have an F/D ratio of 0.4, but they are considerably closer to it and therefore much better than the surplus dishes mentioned.

It was found that by following certain simple basic rules effective 1296-MHz. antennas could be constructed from these dishes. The antennas under discussion are available in five- and seven-foot diameters from Lafayette, Allied and other sources for about $15.00 and $25.00, respectively. Because of mechanical reasons the conversion of the five-foot dish is probably simpler. Since their original construction tends to be somewhat flimsy and the wind resistance will be increased by the conversion, the five-foot dish is the more practical for most workers, although several seven-foot dishes have been converted and are functioning very well.

The simplest conversion involves the use of 300-ohm transmission line, as described for the collinear antenna, and is illustrated in Fig. 1. The focal length has already been determined by the manufacturer and it is simply a matter of constructing a folded dipole of the proper dimensions, together with a splasher (reflector), and installing it at the original focal point. If it is at all possible this point should be adjusted for optimum forward gain, by actual measurements with a field-strength meter, but if it is placed at exactly the same point as the original folded dipole it will be quite close to optimum. The only other modification required is to increase the effectiveness of the reflector at 1296 MHz., by covering with ½-inch galvanized hardware cloth, making it conform as closely as possible to the original shape. The hardware cloth is fastened at as many points as possible with ordinary No. 18 copper wire, which is looped around the element and twisted tightly. The greatest open dimension in the parabolic reflector that can be tolerated at 1296 MHz. is about ⅞ inch, which is the diagonal measurement of ½-inch hardware cloth. All that remains is to dress the feed line down from the dipole properly, install a balun at the transmitter and receiver, as described for the collinear, and the antenna is ready for operation.

A somewhat better arrangement can be made utilizing a simple dipole and splasher arrangement[2] incorporating a "bazooka" balun and a section of rigid coaxial line constructed from copper tubing, as shown in Fig. 2. The length of the rigid section should be such that it will enable one to place the dipole at the same focal point as the original folded dipole.

The dish is supported by means of a square hollow arm, which extends from the backbone of the dish to the main vertical member, and on out forward to where the dipole and reflector are mounted. If this support is cut off just forward of the point where it attaches to the vertical

[2] Tilton, "Practical Operating Hints for 1215 Mc.," *QST*, February 1961.

member, the new dipole, reflector and rigid coax assembly, Fig. 2, can be attached to the square support with small U clamps, as shown at the right side of Fig. 2. The termination at the end of the rigid coaxial section should be an N-type chassis fitting, installed at the end of the copper tubing in such a way that it is watertight.

This type of feed will enable one to use a 52-ohm coaxial feed line of good quality. The absolute minimum feed-line loss which can be tolerated is about that which is found in RG-17/U. Feed lines such as RG-19/U are considerably superior but are quite heavy and unwieldy. The new aluminum foam lines, ½-inch diameter or preferably larger, are quite efficient and fairly easy to handle. Their disadvantages are the cost of fittings for this type of line, and the need for a flexible line section if the array is to be rotated. It goes without saying that nitgrogen-filled lines would be extremely desirable but they present problems for the average amateur. The feed-line length should be kept to an absolute minimum.

An extremely efficient type of feed, which eliminates certain problems with matching and balun construction, has been proposed by W2CCY and is shown in Fig. 3. This wave-guide type of feed can be matched to the feed line perfectly before it is installed in the dish[3]. It presents some problems of installation on a dish which does not have peripheral rigidity, such as these converted TV dishes, but it can be installed by use of a question-mark-shaped support, which could be clamped to the existing center structure in the same way as the rigid coaxial section described for the dipole and

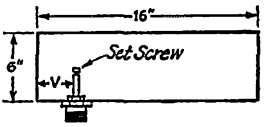


Fig. 3—Wave-guide feed for 1296-MHz. dish recommended by W2CCY. The cylinder, shown in cross section, is 6-inch-diameter copper or brass. The probe is 2 inches high, of ¼-inch rod or tubing, with a screw threaded into the top end. Dimension V, also approximately 2 inches, and the probe length should be adjusted for best s.w.r.

splasher system. According to W2CCY, the wave-guide type of feed gives considerably better illumination of the dish and probably a better match to the feed line, and hence would give greater forward gain.

Many types of antennas have been described in the amateur literature for use at these frequencies. These include helical, backfire, horns, and corner reflectors. All of these require certain accommodations from the standpoint of matching, forward gain, or physical construction. An attempt has been made here to describe simple, low-cost, easily-constructed antennas which have given proven performance over a period of two years in the hands of the average amateurs involved. TV dishes converted as described with the folded dipole have been used very successfully by WB2VQK and WB2WVY. A seven-foot dish converted with a dipole and splasher arrangement, as described in Fig. 2, has been in use at WA2VTR for about one year. A slight variation of the feed system of Fig. 3 is in use in a home-constructed parabolic dish by K2JNG. No gain figures have been given, since they are meaningless because of variations in construction practices, and are hard to measure with high accuracy. Theoretical gains at 1296 MHz. are 26 db. for the seven-foot dish, and 21 db. for the five-foot model. In actual practice however, these figures may not be achieved.

QST

[3] Micromatch bridge units sold by some surplus houses for under $10.00 will give adequate readings for this purpose, and are a very useful piece of low-cost equipment for u.h.f. They are rated up to 1000 MHz., but are useful to 1300 MHz. For information on homemade devices for s.w.r. monitoring, see Burhans, "U.H.F. Coaxial S.W.R. Bridge," *QST*, June 1960, and Tilton, "Slotted Line for U.H.F. S.W.R. Checks," *QST*, January 1969.

Strays

Apropos of the article on long-delay echoes appearing in the May issue, W6QYT advises that as a consequence of disruption associated with a recent sit-in at Stanford University, he had the good fortune to turn up a file which had been mislaid for nearly nine years and was believed to have been accidentally destroyed. The folder contained the results of a 1959 attempt to collect reports on long-delay echoes from radio amateurs residing close to the geomagnetic equator in Peru and in the Marshall Islands. The general nature of these reports is remarkably similar to the recently-obtained ones, and tends to corroborate the reality of the effect.

W6QYT extends his sincere apologies to Messrs. Feld, Hollings, MacKinnon and Mix.

Date	*Call*	*Band MHz*	*Approx. Duration in Seconds*	*Time, GMT*	*Phone/ C.W.*	*Audible on Own/Other*
June or July, 1952	OA4C	21	≈ 5	≈ 0100 or 0200	C.W.	Own
Mid-March, 1954	OA4ED	21	≈ 1	≈ 0450	C.W.	Own
31 May 1957	KX6CG (K6TYF operator)	14	≈ 3–4	≈ 1600–1800	C.W.	Own
24 June 1959	W1TS	3.5	≈ 1	≈ 0430	C.W.	Other

Hints and Kinks For the Experimenter

ALL-WEATHER QUAD

STRENGTHENING bamboo poles for an all-weather quad isn't easy to do with the weather we get up here in the Yukon Territories, but here's an idea that may help you with your flimsy quad. Start by giving the bamboo poles three or more coats of exterior varnish. Be sure to let each coat of varnish dry completely before applying the next coat. After the last coat has been applied, let the poles stand and dry for two or three days to allow the varnish to harden properly. Then wrap the poles completely from one end to the other with good quality, all-weather, black vinyl plastic electrical tape. Wrap the tape fairly snugly, but be sure not to stretch the tape too much. During cold weather, stretched tape has a greater tendency to break than tape that hasn't been pulled so tightly.

Although it took 16½ rolls of tape and lots of elbow grease to weatherproof the eight poles used in my 20-meter quad, the results have been more than worth the effort. The quad has been up at the 50-foot level in temperatures 60 degrees below zero and has lately gone through a wind storm with gusts up to 72 m.p.h., yet there have been no signs of cracking or other damage. — *Don I. Stubberfield, VE8DS*

BATTERY BOXES

WITH transistor gear in vogue, there is a need for many types of low-voltage d.c. power supplies. Two examples of battery packs, recently built by K1TVF, are shown in Figs. 1 and 2. D cells are used because they will handle a wide range of current demands, are readily available, and often cost less per volt than 6-, 9- and 12-volt batteries that have the same service life but are less common. The larger supply, which contains eight cells, has a maximum output of 12 volts, and the smaller unit, which contains six cells, has a maximum output of 9 volts. Octal sockets are used as output fittings, permitting several voltage taps in each supply. Durable plastic cases make convenient housings for the batteries.

The 12-volt supply uses two four-cell battery holders (Burstein-Applebee 12A2449) to mount the flashlight cells, and the 9-volt supply uses a single six-cell battery holder (GC Electronics F3-068). Two large rubber bands hold the two battery holders together in the larger supply. Strips of polyurethane foam are used between the holders and the cases to make for tight, secure packages. The smaller case (Sterling 528) was designed to store 3 × 5-inch file cards, and the larger cabinet (Sterling 529) was made to house 4 × 6-inch file cards. Both units, which were purchased at a local department store, have lifetime hinges and snap locks. A handle (Stanley CD479F) was affixed to each battery box to make the units easy to carry. — *W1YDS*

PROTECTING THE HD-10 KEYER FROM R.F.

MY Heath HD-10 keyer would not operate properly when I used my kw. amplifier on some frequencies. The trouble proved to be r.f. pickup by the a.c. line cord and the keyed line. I bypassed the former with 0.1-μf. capacitors and replaced the latter with coax. This cured the problem. — *Thomas Webb, W4YOK*

(A possible severe shock hazard may result if the line is bypassed to ground with 0.1 μf. capacitors. A better solution is to use as small a capacitor as necessary across the line. For safety, *never* use a line bypass larger than 0.01μf. — *Editor*)

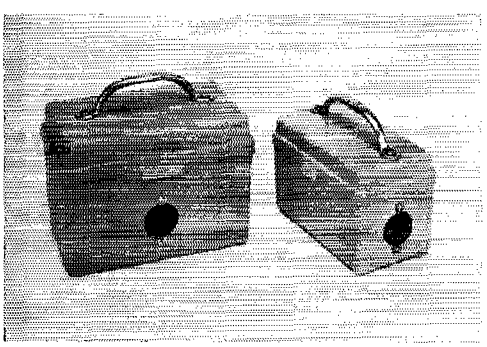


Fig. 1—Two modified file card cases make convenient battery boxes.

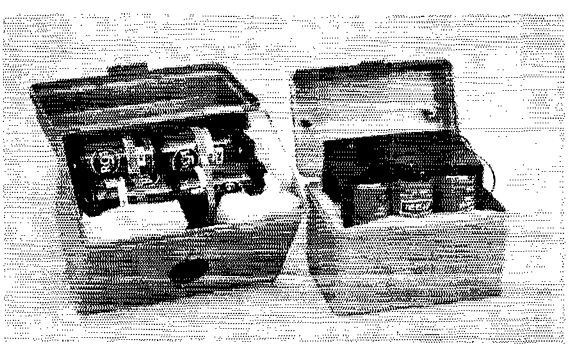


Fig. 2—Inside view of the battery packs. Pieces of plastic foam keep the battery holders securely in place.

EASY BIAS

A RECENT club project resulted in a number of single band s.s.b. transceivers being built from plans centered around two *QST* articles.[1,2] To power the units, several older type transistorized d.c. power supplies, including the Heath MP-1, were obtained at a reasonably low cost. These were ideal for our purpose, except for one thing: they didn't furnish the required bias voltage. Although a separate bias supply could have been built or bias batteries purchased, it seemed logical to extract the necessary voltage from the existing supply, if at all possible.

As shown in Fig. 3A, the MP-1, as well as the other units purchased, uses the transformer secondary in a voltage-doubler circuit. Because both sides of the secondary are positive with respect to the negative rail, it is not easy to obtain a negative voltage from this configuration. However, taking a look at the primary side of the transformer, we find that 12 volts is applied alternately to each side of the center-tapped winding, producing a 24-volt square wave across the whole primary. Since most bias requirements are quite modest, it is possible to steal the power from this point without disrupting the operation of the balance of the circuit.

A 25-volt filament transformer is used in reverse to step up the primary voltage. Because a suitable transformer was not on hand, a small filament transformer with a 6.3-volt secondary was rewound for 25 volts. A buffer capacitor, silicon rectifier, filter capacitor, and bleeder resistor or voltage divider complete the parts list of the supply. (Fig. 3B).

After the bias circuit was wired, the 25-volt winding of the filament transformer, T_1, was connected to points 1 and 2 in Fig. 3A. In the original test setup, an 0C3A/VR105 and its associated dropping resistor were used as a 15-ma. load. As a result of adding the loaded bias circuit, there was no noticeable change in the switching frequency or waveform, except for a slight despiking of the primary square wave. The battery current increase was less than 250 ma., and with a fully charged 12-volt battery, the unregulated output voltage was between 130 and 135 volts.

If a higher bias voltage is needed, a transformer with an 18-volt secondary can be used. Of course, it will load the circuit more heavily and increase the input current by some 400 to 450 ma. In addition there will be a slight deterioration of the switching waveform, and the switching frequency will change a small amount.

A word of caution: Do not mistakenly connect T_1 across the power supply feedback windings. (There is no such problem with a converter that uses a separate feedback winding.) In the MP-1 locate the junctions of the heavy transformer leads and the wires going to the transistor emitters

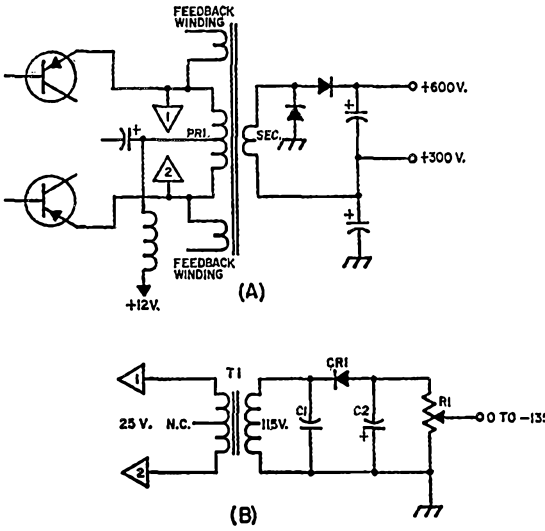


Fig. 3—Abbreviated schematic of the MP-1 power converter (A), and the diagram of a bias supply (B) which can be added to the MP-1 or similar units.
C_1—0.005-μf. or 0.01-μf., 600-volt tubular.
C_2—20- to 30-μf., 250-volt electrolytic.
CR_1—400-p.i.v., 500-ma. silicon diode.
R_1—20,000-ohm wire-wound control or a tapped voltage divider consisting of several series-connected 1-watt resistors.
T_1—25-volt filament transformer, 0.6 ampere or more.

and connect the bias transformer to these points. Mount the bias transformer on one end of the power-supply chassis and feed the transformer leads through a grommeted hole. Under the chassis there is enough space along the back wall for a connector strip and the remaining components. — *Carl N. Vollick, VE3AKQ*

USING HIGH-IMPEDANCE HEADPHONES

HERE is an old trick that many newcomers might not be aware of. As shown in Fig. 4, high impedance headphones can be used with a receiver having low-impedance output by adding C_1 and J_1 to the receiver. The speaker is disconnected when the headset phone plug is inserted in J_1. — *Joseph E. Gore, WA4RTE/4*

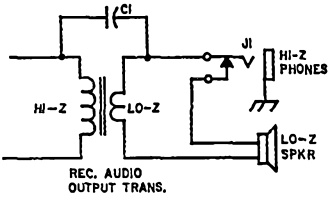


Fig. 4—Partial circuit of receiver output stage.
C_1—0.1-μf., 600-volt paper.
J_1—Closed-circuit phone jack.

[1] Taylor, "A 75-Meter S.S.B. Transceiver," *QST*, April, 1961.
[2] Day, "A 50-Watt P.E.P. Output Transceiver for 75," *QST*, June 1967.

Technical Correspondence

"LINEAR" AMPLIFIER LINEARITY

Technical Editor, *QST:*

The "Evolution of an Amplifier" article in April 1969 *QST* brings up an interesting point on the use of surplus/used tubes which find their way into amateur transmitters as linear r.f. amplifiers. In the once-popular Class C amplifier, the mere facts that the tube filament would light and r.f. power output was indicated were all that was necessary. However, the tube's distortion products should be considered as an important additional factor in a linear amplifier.

Adjusting the bias in a lightly-loaded, used, 2½-k.w. tube for minimum distortion may not be critical, depending on the tube. But this bias adjustment can be critical with smaller tubes that are generally used at their dissipation limits, if one is to obtain minimum distortion during their last hours. The adjustment should be checked frequently.

There are a number of ways to check distortion, but many are not available to most hams. WØTTK's "Linearity Tracer" that first appeared in November 1954 *QST*,[1] and which has been referenced numerous times since, should be a required addition to any linear amplifier. The block diagram of this linearity tracer is shown in Fig. 1. Attenuator test points at the input and output of all linear amplifiers, regardless of the origin of the tubes, should be available for making linearity tests. — *Wayne W. Cooper, K4ZZV, 9302 N.W. 2nd Place, Miami Shores, Fla. 33150.*

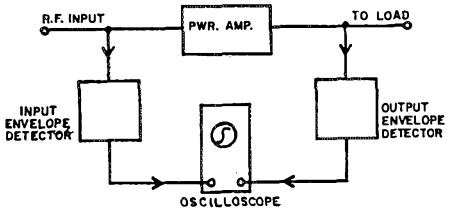


Fig. 1—Block diagram of the WØTTK linearity tracer. The schematic for the envelope detectors and information about trace patterns are given in Bruene's article.

SIDEBAND INVERSION IN MIXING STAGES

Technical Editor, *QST:*

In the course of preparing a recent program for our radio club (South Hills Brass Pounders & Modulators), I planned a homebrew color slide show which covered basic sideband theory and the application of that theory to actual equipment design. Using the HT-46/SX-146 combination to illustrate the application, I felt that an accepted explanation of the occurrence of sideband inversions would properly belong to such a presentation. The HT-46/SX-146 combo, besides, with its white and red band markings (indicating inversions and non-inversions), made the offering of such an explanation virtually a "must" as part of this presentation.

Researching for a quotable explanation, however, was a rather fruitless effort. In one of the popular sideband handbooks, a single sentence of "explanation" was found, which, in substance, was simply that an inversion will *always* occur in a mixer stage when the *difference frequency* is utilized. This "explanation" was found, surprisingly, to be accepted by a number of fellow amateurs without question, despite the fact that, by reason of its incompleteness, it is only 50% correct!

Simple logic will readily establish the "Law on Sideband Inversion," which is simply that "An inversion will always occur in a mixer stage when (and *only* when) the injection frequency is *higher* than the sideband signal *and* the *difference frequency* is utilized." Offering no possibility of exceptions, this statement can truly be said to constitute a law, and it was, accordingly, offered as such in our recent program, to replace the popular and erroneous "explanation." — *Walt Schwarz, K3WNX, 195 Travis Dr., Pittsburgh, Pa. 15236.*

SOME AFTER-THOUGHTS ON LIGHTNING

Technical Editor, *QST:*

While up at WB8BYX this past July, my home QTH was hit by lightning. Three major hits seem to have occurred; one on the pole transformer, blowing the complete assembly off the pole (the 7.5-amp. fuse was found 100 feet away on the front lawn!); one on the TV antenna and tower; and last, the southwest pole supporting the rhombic.[2] All antennas to the amateur equipment were disconnected and grounded with no damage to the r.f. sections. The XYL had been using the TR-4 to monitor my operation at 'BYX, and left the power cord plugged into the mains. The power supply of the TR-4 was cinderized — a new word, but adequate. The TR-4 condensers were blown. The B+ supply for the final amplifier was relieved of all forty diodes in the bridge supply, and the filament transformer for the 4-1000A had blown condensers on the 117-volt side. The interesting thing about this, and the lesson I wish to convey, is that all equipment with fuses contained in the power plugs (Heath monitor scope, etc.) had merely blown fuses, and suffered no damage other than that. All power cords in this QTH now bear fuse-containing plugs.

Of further interest, all base plugs in the house were damaged — some blown completely out of the plastered walls. The color TV was neither plugged in to the a.c. line nor connected to the antenna, yet had to be degaussed, and the a.g.c. and delay lines rebuilt. Starting relays in the deep freeze, washer, dryer and refrigerator were welded in the closed position! I might add that the s.w. rhombic pole looked like the chewed end of a wood match; and of 1500 feet of copperweld wire six pieces, none longer than six feet, were recovered. Where the rest of it went, I do not know — vaporized, perhaps!

I would advise all hams to ground all equipment, and unplug it when leaving it. The installation of fuse-containing a.c. plugs such as used by Heath is also a good idea. — *James W. Voorhees, W8EGR/WB8BYX, 97 S. Broad St., Hillsdale, Mich. 49242.* (Reprinted from Detroit Amateur Radio Association Bulletin.)

[1] Bruene, "Distortion in Single-Sideband Linear Amplifiers," *QST*, November, 1954. Also *Single Sideband for the Radio Amateur*, ARRL, any edition; see "Linear Amplification" section.

[2] Voorhees, "The Ruptured Rhombic," *QST*, November, 1968.

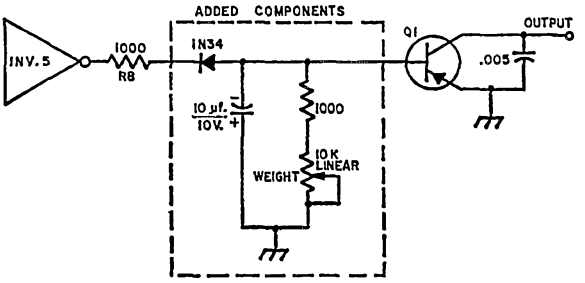


Fig. 2—Adding a weight control to the IC keyer circuit.

WEIGHT CONTROL FOR DIGITAL-LOGIC KEYERS

Technical Editor, *QST*:

Thanks for printing the fine article on the IC keyer in April 1968 *QST*. Upon keying my Johnson Ranger with the unit, though, I discovered the r.f. output keying to be too light, although the dot-space ratio at the keyer output was perfect. A weight control was added, as shown in Fig. 2. I also found it necessary to add an r.f. bypass capacitor on the collector of Q_1 as shown, to prevent Q_1 from being held on after the first dot or dash. — *Edward T. Edwards, W2ZEP, 1313 Stewart Ave., Wanamassa, N. J. 07712.*

EMERGENCY POWER FROM AUTOMOBILE ALTERNATORS

Technical Editor, *QST*:

You may be interested in the results of the following experiments, relating to the use of automobile alternators, belt driven, for the purpose of providing amateur radio emergency power.

Recently I purchased an AutoLite alternator, with the idea of getting a cheap emergency plant. These alternators sell here for $20 with a trade-in machine, or $40 without. The machine turned out to be a 3-phase job, with the armature (stationary) connected in a "star" or "Y." It is quite critical as to the adjustment of r.p.m. and field current; the best alternator speed seems to be about 1800–2000 r.p.m., and the field current should not be over 15 amperes.

At this speed, an old TV power transformer with 12-volt and 5-volt filament windings connected in series will give the required step-up, using the original primary as a secondary. See Fig. 3. The generator output is taken from two legs of the "Y." If my arithmetic is correct, the generator frequency is about 180 cycles per second, so induction motors for a load are ruled out. I get the battery charging current from the center of the "Y," so that very little loss occurs in dropping the voltage down to 12 volts. A battery is needed across the field in this machine, as it will not self-excite. Power output seems to be a maximum of about 450–500 watts, but with an unregulated field current, the best load seems to be 250–300 watts, which is sufficient for my station.

Voltage regulation is terrible and I hope to cure it with something. I don't think transistors will work, as one big Delco job I tried ran kind of hot. I understand carbon piles are used, but not having experience in this line, I don't know who to ask about it. Perhaps someone has a better idea.

With a fan attached to the alternator for cooling, the hand can be held on the armature laminations indefinitely, indicating a temperature of less than 110–120 degrees. The TV power transformer runs cool as an iceberg except the 5-volt filament wire (No. 18) runs just perceptively warm.

These alternators are available cheap from the junk yard. Along with the many lawn-mower type gasoline engines, they promise depression-type economics to yield large results. — *Horace B. Weaver, W4JRU, 109 E. Indian River Rd., Norfolk, Va. 23523.* QST

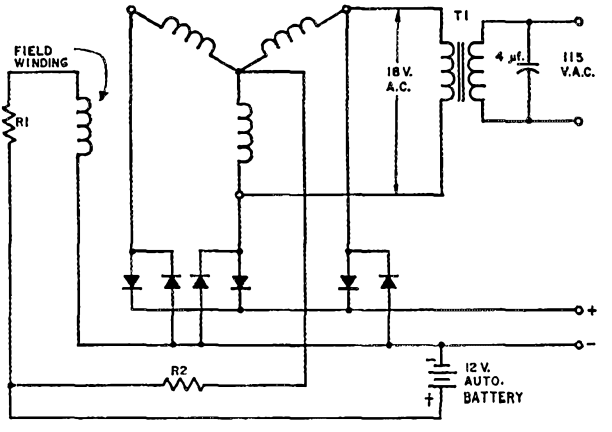


Fig. 3—An automobile alternator wired for powering an amateur station. The alternator is an AutoLite 15-volt, 55-ampere unit, available from Sears Roebuck and Co. A 4-inch pulley is used on the gasoline engine, and a 6-inch pulley on the alternator. The diodes are of the low-voltage high-current type used in automobile electrical systems. These are contained inside most types of alternators. R_1, R_2—Only a few ohms, made with some nichrome wire. T_1—See text.

AMSAT • • •

The Radio Amateur Satellite Corporation

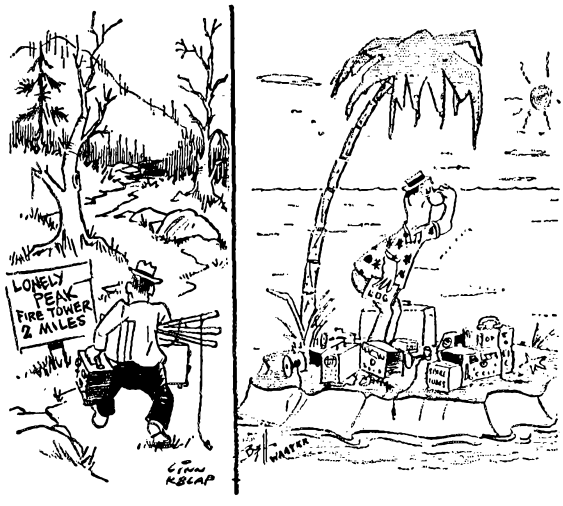
BY PERRY I. KLEIN,* K3JTE AND WILLIAM A. TYNAN,* W3KMV

It's a chilly winter evening and darkness has fallen. The last remnants of twenty-meter signals are just going out as you bid 73 to your friend Joe across the country. You have been keeping weekly skeds with Joe since he left the area two years ago. It's sure nice to be able to keep in touch with him. "Twenty is about out," you say to yourself as you switch the receiver down to forty. Mostly foreign broadcast stations, a few amateur signals sandwiched in between; no clear spots and no CQs can be heard. What's going on down on seventy-five? A quick listen reveals the usual gang on 3999. Everything is pretty jammed up there, too. You start to pull the big switch and go in and watch TV with the XYL when you remember. A few flicks of switches later you're tuning two meters. There are a number of weak but readable signals. That accent sounds like a VK! You wait for him to sign. Sure enough, he's working a JA. The JA comes back on the same frequency. He's not as strong as the VK but he's readable nevertheless. You tune around some more. There's a VE8 calling CQ. Imagine two-meter activity in such a location. His signal is not very strong but good and steady, not fluttery like stations from that area usually are on the h.f. bands.

Is this merely a fantasy? It won't be if a newly formed Washington-area group has anything to say about it. This group had its beginnings on January 9, 1969, when George Jacobs, W3ASK, addressed a meeting of the Communications Satellite Corporation Radio Club on the subject of Project Oscar. In the course of his talk George suggested the formation of an East Coast-based group to build new communications satellites for amateur use. He pointed out that the capability to design, build and test satellites now exists in the Washington, D. C. area among amateurs employed by the numerous Government and industrial laboratories located in and near the nation's capital. George's suggestion was taken seriously and led to the formation of Amsat, the Radio Amateur Satellite Corporation.

The idea of forming a Washington-based amateur satellite organization was discussed among representatives of the amateur radio clubs of The Johns Hopkins University Applied Physics Laboratory, IBM Federal Systems Division, Aeronautical Radio, Inc., Communications & Systems, NASA's Goddard Space Flight Center, and Comsat. It was immediately evident that interest and enthusiasm were high. Many of the interested members of these clubs were already involved in space programs and they represented a considerable expertise in the design and construction of space systems. Equally important, they were in communication with officials throughout the Government and industry who could possibly render valuable assistance.

*Radio Amateur Satellite Corporation, P.O. Box 27, Washington, D. C., 20044.



Will v.h.f. mountain topping be replaced by DXpeditions to remote islands?

Incorporation

After a series of organizational meetings, the group incorporated on March 3rd as the Radio Amateur Satellite Corporation, a nonprofit organization in the District of Columbia. A set of bylaws was drafted and approved by the membership. An interim Board of Directors was established and temporary officers were named by the board to accomplish the organizational, administrative and engineering functions of Amsat until the first annual meeting planned for November, 1969. One month after incorporating, Amsat membership stood at nearly fifty.

In addition to the organizations already mentioned, Amsat's membership includes amateurs and interested scientists associated with ARRL Headquarters, ESSA's National Environmental Satellite Center, NASA's Office of Space Applications, the U. S. Information Agency, the National Bureau of Standards, the Department of Housing and Urban Development, the Office of Telecommunications Management, the Federal Communications Commission, RCA, Telcom, North American Rockwell, the Federal Aviation Administration, the Coast Guard, and

the Department of Transportation, as well as several independent consultants.

Talks were initiated at an early stage with officials of Project Oscar. They welcomed the formation of Amsat and offered whatever assistance they might provide in its activities.

Amsat is geared to function through the coordinated activities of "Member Clubs" (recognized groups, clubs or organizations) which are willing to undertake specific task responsibilities. Tasks are suggested by Amsat management, or may be proposed by the groups themselves. For example, a Member Club might propose to build an entire satellite, a communications repeater subsystem, a telemetry subsystem, or offer to handle satellite tracking and orbital predictions. Tasks already being undertaken by Member Clubs include:

Gravity gradient stabilization feasibility study
Satellite repeater study
Satellite antenna study
Launch vehicle interfacing
Solar and nuclear power source study
Satellite access and operating procedures
Frequency coordination and selection
Diplexer study
Launch vehicle space availability investigations

This list is by no means complete; groups are accepting new task assignments as they affiliate with Amsat.

Australis Launch

One of Amsat's first major activities is expected to be the launching of the "Australis Oscar."[1] This is a 35 lb. satellite constructed by a group of Australian amateurs and forwarded to Project Oscar for assistance in locating a suitable launch. Unfortunately, a launch did not materialize on the West Coast and Amsat volunteered its assistance in initiating discussions with the space agencies in the Washington area. These discussions have begun and it is believed a launch can be obtained. Both its Australian builders and Project Oscar have welcomed Amsat's offer to coordinate the launch of the Australis Oscar.

The satellite contains beacons on 29.450 MHz. and 144.05 MHz. It is not a transponder type unit which can be used to relay communications, as Oscar III and IV were and as future Amsat satellites will be. Amateurs the world over should find tracking it and recording its data an interesting and worthwhile exercise; its two beacons may provide some valuable scientific information, particularly during the present period of high solar activity. Details of the satellite's design, construction and operation will be contained in a forthcoming article.

A number of ambitious projects are envisioned for the future. Active repeater satellites in synchronous or semi-synchronous orbits relaying amateur c.w., a.m., f.m., s.s.b., and even television signals are being seriously discussed.

[1] "Australis-Oscar arrives in U. S." *QST*, July, 1967, p. 58.

The organization of Amsat is set up in such a manner that the Member Clubs, in addition to their function of performing tasks, are the means by which nominations are made for the seven-member Board of Directors of the Corporation. The Board is then elected by vote of the general membership at the annual meeting from those candidates nominated by the clubs. In this way the management of Amsat is kept closely associated with its most active Member Clubs, and individual members are encouraged to participate as part of groups or teams in carrying out the various task assignments. The elected officers are selected by the Board of Directors at a meeting following the annual meeting. Membership is open to individuals and groups from all over the U.S. and in all foreign countries. International participation is especially welcome.

Finance

Financing of Amsat is currently accomplished by member dues, $5.00 annually for individuals and $10.00 annually for Member Clubs. Thus far, Amsat has been able to keep expenses to a minimum by locating amateurs sufficiently interested to supply free printing and addressograph facilities. Needless to say, none of Amsat's members is paid for his time. The cost of the satellite components will be kept to a minimum by generous application of amateur ingenuity. It is expected that some no longer needed space-qualified parts, particularly satellite hardware left over from completed space projects, may be obtainable. This possibility is now being actively pursued.

As to launch facilities, spare space may be available in the launch vehicles used for a number of satellite missions. Efforts are underway to make this space available to Amsat for amateur piggyback satellites. In addition to complete amateur satellites, Amsat is also investigating the possibility of constructing experiments that could be included on large satellites which are designed to carry a number of experiments furnished by various Government agencies, colleges and universities.

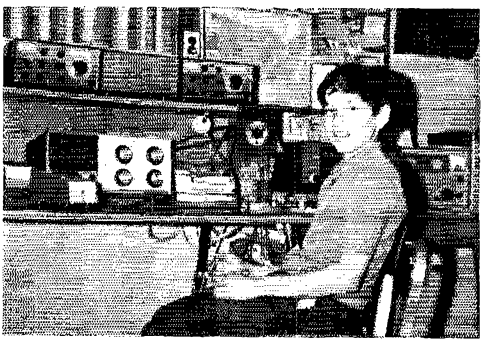
Amsat invites interested groups and individuals to participate in its activities. Would you or your group like to build a satellite, satellite subsystem, construct a satellite experiment, or take part in a tracking network? If so, write Amsat, P.O. Box 27, Washington, D. C., 20044. You will be sent a membership application form and additional information about the organization, its aims and objectives.

This article is intended to acquaint the amateur fraternity with Amsat and provide a brief sketch of its objectives. Future articles in *QST* and other publications will provide detailed information on specific satellites, types of orbits and other space-related information. Watch for them. In the meantime, join Amsat and do your part in writing this new chapter in the evolution of our hobby and making the fantasy of worldwide DX on v.h.f. and above a reality.

QST

Results, 1969 ARRL Novice Roundup

REPORTED BY BOB HILL,* W1ARR



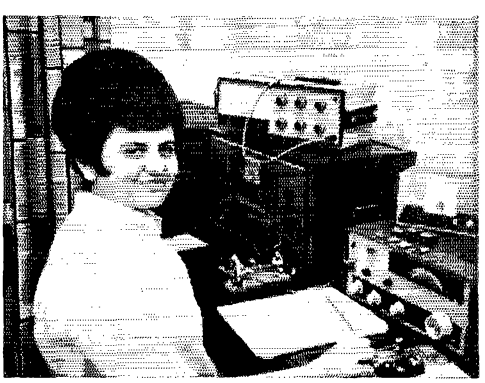
Two Hudson hotshots: Division champeen **WN2DFD** *(left)* daydreams a bit while companion Shandou (HS1CAT) enjoys some nice warm plate dissipation. **WN2FSF** *(right)* attacked the ether for 23K in 27 hours; that NCL-2000 is a no-no for Eric, of course—it's used by brother WB2TKP and OM WB2TKQ.

NINETY-two Novice entries . . just *15* higher-class logs . . . a top score of 6392 points . . . Don't get excited: we're talking about the very *first* "Nervous Roundup," held way back in January 1952! But that infant NR has grown into a muscular 17-year-old by now, and the growth has been spectacular. The 1969 Roundup boasts 473 logs (320 Novice, 139 General-and-up, 14 checklogs) and some phenomenal scores — in fact, no fewer than 149 WNs exceeded the score of 6392 that was good enough for first place in '52. The one who exceeded it the most was WNØVKP, whose score of 53,970 is an easy record-breaker and one that may not be topped for many years to come. His and 58 other section awards will be hitting the mails in mid-June.

Miscellany: This NR was the first in which a Novice had a second chance to win a section award or lead his section two years in a row — the latter feat pulled off by WN4HOK (Tennessee) and WN6ZXN (Orange). . . . Seventh-call-area participation and log submission was the best ever; keep it up out there! . . . Despite our request, many non-Novices insisted on braying CQ NR instead of answering WN callers, thus creating unnecessary QRM for the newcomers. . . . There has been a lot of sentiment in favor of cutting down the contest period. How about one full week bracketed by two weekends (i.e., nine days)?

One thing is for sure: this is one contest in which *everyone* wins. If you weren't first in your section, at least you got your code speed up or landed some new ones for WAS. Glad you could make it, OM!

* Assistant Communications Manager, ARRL.

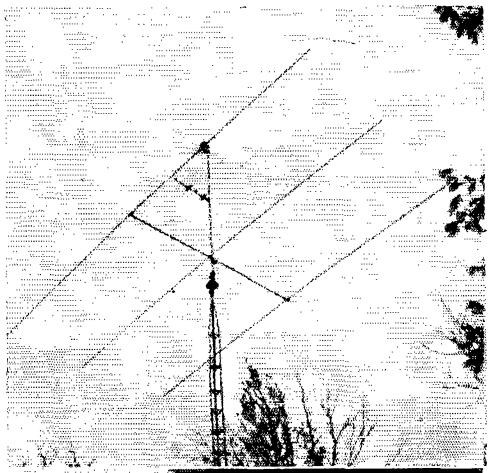


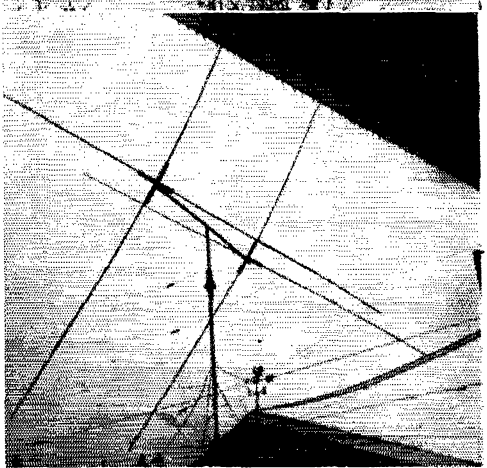
If you attended the sixth grade in New Orleans you just might have **WN5UWH** for a teacher. Gay's OM is K5MBE.

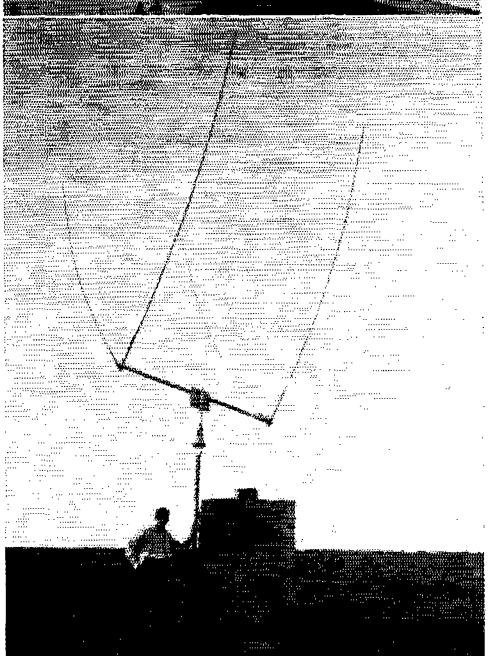
Soapbox

"Lots of fun, but relatively slow after second weekend. Nine days should be enough." — **WN3KDR.** "The last few days I couldn't find anyone." — **WN3LMO.** "Some Novice entrants in the NR are going to become first-rate c.w. ops." — **WA3JAP.** "Found the information in *QST* and decided to give it a try. What a surprise! First of all, these Novice operators had pretty good fists; some sounded a good bit like W1AW during code practice. Now I know where all those hot operators come from in the other contests. It was my first experience with the Novice operator and I can only say that they appear to be a credit as well as the hope of ham radio. Aside from making me feel very old and in need of improving my operating skill, I am pleased to have made the discovery." — **W3EYF.** "Had to fight for rig, as OM entered also." — **WN3LEQ.** "Even though Murphy's grim legions reared their pointed little heads, I still had a groovy time. One thing, though; shorten it to one week." — **WN2GFE.** "The Generals caused more QRM on the band calling CQ NR than all the Novices together." — **WN2EKW.** "Really enjoyed it, but think it should be only on weekends. I worked W1AW for the first time." — **WN2GTQ.** "Sure lots of fun and good experience for us grandpas. Keep up the good work." — **WN2FBE.** "Heard a lot of WP4s and worked one but none of them were in the NR." — **WN2HJY.** "I haven't had so much fun since the day I first used a homebrew crystal set to listen to local stations, and that was about 40 years ago! Yes, I'm a 51-year-old Novice and proud of it." — **WN2GPO** "Actually it's a wonder I had any points at all. My whole family, including myself, was in bed with the flu for four days; I lost my DX-60 for two days (bad tubes); on 80 meters my s.w.r. was so high I couldn't read it; and I was using an indoor antenna for all bands. But with all this I

Whatever happened to the end-fed hunk of kinky wire running ten feet off the ground to a tree branch? Today's with-it Novice employs such sophisticated machinery as *(top)* WN1JFG's 3-element 15-meter beam on a 37-foot tower, *(center)* WN7IWU's 2L quad for that nice low-angle DX, and *(bottom)* WN5UHX's new Delta Loop, an effective performer on 21 MHz.

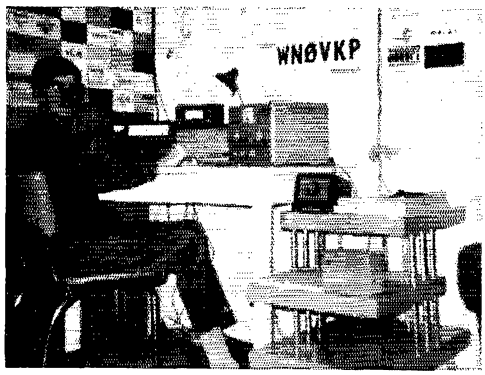






still had a great time." — **WN3IGT.** "Adding RST to the exchange would make QSLing easier." — **WN9ZXU.** "With very few exceptions, everyone I worked or heard exhibited very good operating procedures. A lot less endless repetition of exchange data (compared to last year)." — **WA9WXL.** "You guys really know how to put on a contest." — **WN9-ZGO.** "Our section of town had a power failure during the last Code Proficiency run, so I couldn't qualify." — **WN9-ZXE.** "A good receiver, good transmitter, low s.w.r., lots of time, and an unusual call, resulted in what is probably the lowest score in my section. The contest should be shortened to either one week or two weekends." — **WN9YYY.** "All phases of the NR were great, except I heard a lot of Generals calling CQ NR instead of only answering the CQs of Novices." — **WN9WKA.** "I think anyone working the NR should work with the same power input we Novices do." — **WN4JKU.** "We have the Simulated Emergency Test to find out about the shortage of good c.w. ops, then we have the Novice Roundup to find out that there's still hope." — **WB4JFT.** "Worked my 50th Novice state in the '69 Roundup. Lots of good operators on this year." — **WN4IIF.** "Each new crop of Novices seems sharper than the last. The NR is my favorite contest. Hope to put in more time next year; by then the XYL (WN4IIF) will be a General and won't have the equipment tied up." — **W4-YOK/4.** "What an experience the NR was! Even though for two weeks my wife wouldn't speak to me and my kids didn't know me, it was great. Although my family is glad it's over, I'm all for contests (in moderation, of course)." — **WN8ATX.** "Sorry I didn't do a well as last year, but school activities prevented it." — **WN8ZBJ.** "With the lack of selectivity of my 2-tube regenerative receiver, I had the 'advantage' of being able to hear almost everyone in the contest on 80 meters at the same time (at least it seemed that way)." — **WN8AZN.** "Great contest until I tried for two JA1s which got lost in a pileup of NRs." — **WN2EBJ.** "It was frustrating to hear some Novices calling CQ NR twenty times or more before signing. During the contest, on 80m, I was surprised by a call from 6Y5UC. I wish I could have gotten on 15 for additional multipliers. It was a fine experience, especially working W1AW." — **WN2GOR.**

"Just before the NR began, my mother decided it was about time for me to start worrying about college. Therefore, every night I was bawled out for 'sitting behind that stupid radio' and not reading catalogs and cramming for college boards." — **WA2EUX.** "Only wish that I had a transmitter on 15 meters and maybe another crystal to keep my lone present one company. It's rough when Generals with v.f.o.s swoop down on a CQ NR before you can." — **WN2-FIU.** "A couple of things that didn't help me were the guys that want to ragchew in a contest QSO and the guys that think Op Aid #6 is something to soak their feet in, or think that two QSOs are better than one! A certain WN4 must have enjoyed the contest too, because he was still calling CQ NR two hours after the contest had ended!" — **WNØ-VBW.** "It's nice to be in a contest where you don't need a full KW into a 90-element beam to get any kind of a score." — **WAØUIS.** "Got my last two states for WAS, a Brazil QSO and one in Peru. What more could you ask for?" — **WN1JFG.** "I have had my license 3 months and I sure do like hamming. I almost ran out of time because I started out slowly but then at the end I really hurried. I am 9 years old and in the 4th grade." — **WN7LIX.** "Thought it was great fun, in a miserable sort of way." — **WN4KFZ.** "Sounds like a great group of new operators coming along; wish I could have spent more time." — **W4KFC.** "During the NR I was called WNØUJO, WNØVJM, WNØAJT . . . In fact, I was called so many different things that I was checking my license after every contact." — **WNØUJO.** "The most helpful thing I had, thanks to my dad and a friend who couldn't take his beam with him when he moved, was a TH4 beam up a good steady 70 feet. I don't imagine very many Novices have that kind of antenna!" — **WN7-JLO.** "Let this be a warning: tell W4KFC I'm going to



challenge him for the SS this November!" — **WN4LNM.** "Now I know: simple equipment produces simple results." — **WN4LEM.** "Amazed at the exceptional operating ability of these newcomers. Hard to believe many had over 100 QSOs after only two days." — **K4IEX.** "I really enjoyed taking part for the first time in this contest. It's more like my speed. Next year I hope to give more Novices their first VE5." — **VE5TT.**

Scores

Listings are grouped by ARRL divisions and sections. The operator of the station listed first in each section is award winner for that section. Example of listings: WN3KFR 18,003-353-51-20, or total score 18,003, different stations worked 353, sections worked 51, total operating time 20 hours.

ATLANTIC DIVISION

Delaware

WN3KFR	18,003-353-51-20
WN3KDR	12,450-234-15-26

Eastern Pennsylvania

WN3JYB	14,335-305-47-21
WN3LMO	9415-254-35-37
WN3LAB	8897-217-41-13
WN3KRO	8160-189-40-37
WN3LCD	2666- 86-31- 7
WN3LEI	2058- 98-21-13
WN3KXX	1624- 48-28-21
WN3JTG	1540- 67-20-29
WN3LUA	665- 35-19-16

Maryland-D. C.

WN3KSP	34,902-539-63-40
WN3JYV	17,888-334-52-37
WN3LFU	16,881-316-51- –
WN3LEB	11,457-201-57-27
WN3JXJ	11,322-212-51-20
WN3LER	4692-123-34-31
WN3LHL	4318-127-34-19
WN3LGN	4290-100-39-17
WN3LEQ	2002- 57-26-13
WN3LEH	1848- 66-28- 8
WN3LBU	1500- 60-25-12
WN3KQQ	1078- 34-22-11

Southern New Jersey

WN2VYA	22,878-369-62-39
WN2EFV	14,136-223-57-30
WN2FVU	12,444-229-51-39
WN2QYJ	8976-204-44-18
WN2GFE	372- 21-12- 3

Western New York

WN2EPV	20,068-331-58-30
WN2FRR	17,700-300-59-37
WN2HDZ	15,224-346-44- –
WN2EKW	12,740-245-52-18
WN2FYB	12,144-233-48-39
WN2GTQ	7910-206-35-19
WN2YFU	7128-162-44-19
WN2FJX	5152-141-32-19
WN2FAT	4270-122-35-14
WN2GTM	4040-101-40-39
WN2FBE	4025-100-35-32
WN2HJY	3069- 93-33-32
WN2GPO	2666- 86-31-38
WN2ICU	2204- 76-29-12
WN2HIJ	1540- 60-22- 7
WN2GXN	338- 16-13- 5

Western Pennsylvania

WN3LQE	21,780-381-55-32
WN3KQA	17,100-300-57-34
WN3KMY	7918-214-37-39
WN3IGT	2914- 84-31-23
WN3KZY	1675- 52-25- 8

CENTRAL DIVISION

Illinois

WN9YMY	23,746-363-62-28
WN9ZTJ	23,016-401-56-22
WN9YAP	12,096-204-54-32
WN9ZRV	9450-189-50-23
WN9ZXU	7020-156-45-28
WN9ZGO	6210-125-46-19
WN9ZXE	4032-126-32-16
WN9ZQJ	3762- 89-38-23
WN9YUJ	3306- 87-38-30
WN9AJB	3248-102-29-17
WN9WZX	1900- 56-25-40
WN9ZDO	1824- 76-24-14
WN9YYY	1450- 50-29- 5
WN9AOE	1400- 50-28-27
WN9YOD	1364- 52-22-19
WN9YCF	900- 45-20-16
WN9ZWY	48- 6- 3- 6

Indiana

WN9YWY	26,910-414-65-38
WN9YIC	22,304-328-68-39

If you plan ahead, borrow lots of crystals, have an outstanding signal, and go-go-GO, you too can pile up 771 QSOs, 70 sections and 53,970 points—just like **WNØVKP.** (So why didn't you?) Bob's QSO average of nearly 20 per hour is one that will be plenty tough to surpass in future NRs.

WN9ZKL	20,650-350-59-35
WN9WZE	11,562-236-47-27
WN9ZDP	9653-182-49-23
WN9WKA	7050-150-47-24
WN9WZF	576- 36-16- 7
WN9ZZR	546- 27-13- 3

Wisconsin

WN9YCY	6579-153-43-29
WN9ZWL	3420- 85-36-21
WN9ZCN	3239- 79-41-26
WN9YUZ	2366- 81-26-32
WN9AJP	540- 26-15- –

DAKOTA DIVISION

Minnesota

WNØVKP	53,970-771-70-40
WNØWBG	14,045-265-53-23
WNØMHJ	13,334-226-59-13
WNØVPK	8568-153-51-40
WNØWOV	3328- 74-32-20
WNØVEB	1825- 73-25-10
WNØTRY	310- 16-10- 2

South Dakota

WNØWBI	21,300-355-60-38
WNØWNF	450- 30-15-10

DELTA DIVISION

Arkansas

WN5VSV	11,742-206-57-33
WN5VMI	4950-110-45-20

Louisiana

WN5WLO	10,560-220-48-16
WN5UWH	7968-156-48-16

Mississippi

WN5WNR	10,556-188-52-33

Tennessee

WN4HOK	25,296-393-62-26
WN4JKI	21,181-359-59-25
WN4JKU	8775-215-39-40

GREAT LAKES DIVISION

Kentucky

WN4KVP	19,175-310-59-40
WN4IIF	14,809-236-59-23
WN4LKP	11,250-215-50-29
WN4LIL	5376-113-42- –
WN4KER	1325- 53-25- 8

Michigan

WN8CNV	21,924-368-58-34
WN8AHT	17,160-266-60-29
WN8CKB	12,225-265-43-35
WN8CIE	6993-182-39-27
WN8CAD	3596-124-29-24
WN8BUG	1700- 85-20-40
WN8BJJ	1265- 45-23-14
WN8AQR	1197- 63-19-14
WN8ZAC	1128- 47-24- 4
WN8CMQ	1058- 46-23-33
WN8ZBV	496- 31-16- –
WN8ASH	340- 24-10- 4
WN8BTY	330- 13-10- –
WN8BTN	187- 17-11- 4
WN8AEM (WN3JAS, WN8AEM AEP)	19,314-333-58-33

Ohio

WN8YWI	36,970-445-58-30
WN8BPI	26,078-442-59- –
WN8AZA	23,484-412-57-30
WN8AJY	22,258-339-62-35
WN8ATX	19,936-336-56-40
WN8BLL	19,305-351-55-27
WN8BZK	15,651-333-47-34
WN8BCU	12,852-238-54-22
WN8CEH	9333-173-51-24
WN8ZGL	7958-148-46-38
WN8ADF	4655-133-35-19
WN8CCO	4080-120-34-28
WN8CAJ	3663-111-33-16
WN8ZBJ	3420- 80-38- –
WN8CGN	3344- 88-38-34
WN8BBO	2320- 80-29-13
WN8AWM	1863- 54-27- 8
WN8AAE	1344- 48-28-30
WN8AZN	1210- 55-22-40
WN8CWQ	135- 15- 9- 4
WN8CKI	120- 12-10- 9
WN8ZID	50- 10- 5- 7

HUDSON DIVISION

Eastern New York

WN2GHQ	19,034-297-62-27
WN2FBI	16,550-311-50-36
WN2FWK	10,476-184-54-16
WN2FIQ	8460-165-47-14
WN2HKR	2272- 71-32-11
WN2FMQ	1159- 61-19-11
WN2HIC	416- 26-16-11
WN2FXP	140- 14-10-10
WN2HOT	120- 12-10- 6

N.Y.C.-Long Island

WN2DFD	31,188-442-69-26
WN2EBJ	12,400-233-50-23
WN2HPP	12,042-223-54-18
WN2HWA	7667-177-41-32
WN2HBZ	5544-153-33- 5
WN2HZY	3216-134-24-22
WN2GOR	2784-116-24-18
WN2FQH	2465- 65-29-16
WN2EPO	2320- 80-29-19
WN2IEM	1512- 72-21-20
WN2FGB	1218- 48-21-40
WN2GTK	748- 34-17-17
WN2IGT	540- 36-15-16
WN2HTC	360- 20-12-14
WN2EUG	240- 20-12-16

Northern New Jersey

WN2HYP	27,001-403-67-38
WN2DFC	25,850-455-55-40
WN2FSF	23,562-359-63-27
WN2FUE	21,771-354-59-36
WN2DXW	19,320-307-60-40
WN2GHM	9633-237-39-13
WN2GOJ	8610-205-42-36
WN2GAG	8096-169-44-15
WN2HAD	5046-174-29-17
WN2FRZ	3640-130-28-30
WN2GXI	3192- 84-38-21
WN2FIU	2834-109-26-16
WN2CZP	2574- 63-33-14
WN2IIZ	2442- 64-33-15
WN2WFY	2387- 62-31-30
WN2GCQ	846- 47-18-21
WN2ICJ	544- 22-17- 7
WN2HSG	198- 18-11-14
WN2FWA	154- 12- 7- 8
WN2HSH	80- 10- 8- 9
WN2IHL	3- 3- 1-17

MIDWEST DIVISION

Iowa

WNØVKF	25,893-396-63-40
WNØTSN	18,183-304-57-37
WNØVBW	11,025-230-45-32
WNØWGE	6357-163-39-38
WNØUZH	5280-100-44- 7
WNØUAU	4370-115-38-22
WNØTNB	3990-105-38-19
WNØUEQ	2046- 63-33-11

Kansas

WNØTUS	34,060-524-65-40
WNØVJF	13,260-245-52-32
WNØTAS	4730- 90-43- 9
WNØUUT	3280- 80-41-23
WNØVFL	300- 20-15- 7
WNØUCZ	264- 22-12- 5

Missouri

WNØWBK	3600- 90-40-36
WNØWSV	989- 43-23-10
WNØTSB	703- 37-19- –

NEW ENGLAND DIVISION

Connecticut

WN1KEM	12,480-245-48-33
WN1JQA	11,904-238-48-35
WN1JZC	8883-174-47-39
WN1KNG	3484-134-26-36
WN1JSJ	2812- 64-38-22
WN3JSU/1	1800- 72-25-11

Eastern Massachusetts

WN1KOO/1	17,442-323-54-29
WN1KAG	14,672-247-56-30

The Seven-Land boys turned out in fine style this year. One of six Arizonians to submit NR logs was **WN7KBN,** who notes that it's hard to avoid interruptions when you're a priest!

QST for

From nine logs in '68 to twenty-five logs in '69—that's the gratifying increase in output from the seventh call area. Some of the scores were whoppers, too: **WN7KLP** *(above)* paced Montana and the Northwestern Division and attained the sixth-high score among all entrants; **WN7IOY** *(upper right)* was boss man in Arizona and the Southwestern Division, plus finishing tenth overall; **WN7JKQ** *(lower right)* was Oregon's leader and just missed the Top Ten listing.

WN1JVL 6232-137-41-23
WN1JPZ 1224- 51-24-13
WN1IRY 780- 32-15-29
WN1JKQ 720- 36-20-16

Maine

WN1JFX 4674-114-41-40

New Hampshire

WN1JKO 15,602-259-58-36
WN1JSD 3150- 75-35-17

Rhode Island

WN1JFG 23,424-384-61-35
WN1KOA 15,232-272-56-39
WN1JXR 8145-181-45-20
WN1JST 3498- 96-33-19
WN1JEP 1080- 54-20- 7

Vermont

WN1KAH 1702- 74-23- 8

Western Massachusetts

WN1JYD 432- 36-12- 9

NORTHWESTERN DIVISION

Idaho

WN7KNM 2508- 76-33-33

Montana

WN7KLP 31,689-493-63-38
WN7JLU 10,229-178-53-36
WN7JXT 80- 10- 8-10
WN7KLR/7 30- 6- 5- 5

Oregon

WN7JKQ 28,864-451-64-39
WN7JOV 10,200-204-50-22
WN7IWU 2040- 68-30-12
WN7KJV 210- 21-10- 2

Washington

WN7JMV 13,640-233-55-19
WN7JBG 13,018-283-46- –
WN7KBU 3627- 78-39-17
WN7JZF 1107- 41-27- 5
WN7KWY 768- 33-16-12

PACIFIC DIVISION

East Bay

WN6FWJ 18,727-292-61-36
WN6OBZ 10,972-196-52-40
WN6AUA 3444- 84-41-21
WN6IQX 1581- 51-31- 8
WN6LHD 828- 36-23-12
WN6MKS 690- 30-23- 6

Nevada

WN7LIX 7248-151-48-40
WN7HVW 90- 13- 5- –

Sacramento Valley

WN6ZMX 13,110-230-57-21

San Francisco

WN6ZUC 34,056-501-66-40

San Joaquin Valley

WN6EPP 18,900-300-60-33
WN6FWP 408- 24-12-12

Santa Clara Valley

WN6DWO 23,310-370-63-30
WN6NHD 21,167-332-61-28
WN6HQR 19,345-365-53-26
WN6OER 10,304-184-56-19
WN6QQE 880- 40-22- 6
WN6ZSG 310- 16-10- 6

ROANOKE DIVISION

North Carolina

WN4ILO 22,326-351-61-29
WN4KKJ 18,258-343-51-34
WN4KPD 9180-189-45-26
WN4IMW 6716-141-46-23
WN4IKO 6440-130-46-25
WN4LHI 30- 6- 5- 4

Virginia

WN4KFZ 11,550-216-50-40
WN4LMJ 2268- 84-27- –
WN4IYX 1586- 51-26- 9
WN4IRA 1491- 61-21-10
WN4HYO 70- 10- 7- 5

West Virginia

WN8AKQ 11,622-273-39-26
WN8AKR 10,780-225-44-35
WN8BMX 6825-195-35- –
WN8BMV 5109-121-39- 9
WN8BMW 774- 33-18- 6

ROCKY MOUNTAIN DIVISION

Colorado

WNØUAV 21,181-344-59-20
WNØUJO 13,770-255-54-26
WNØTML 6578-128-46-20

New Mexico

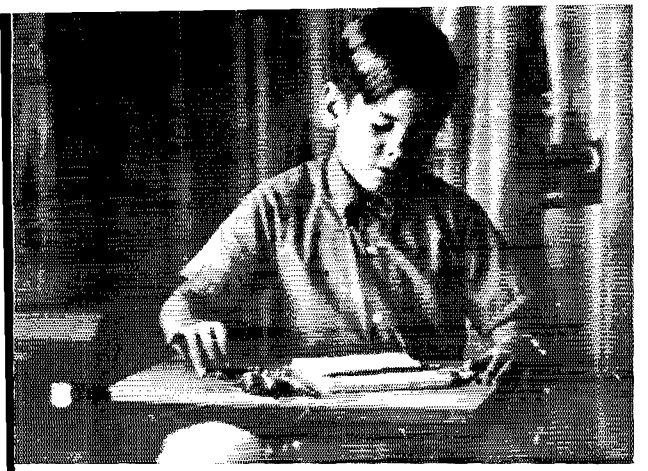
WN5TVO 13,496-241-56-20

Utah

WN7JLO 37,520-545-67-40
WN7IZF 7515-157-45-16
WN7KIY 2378- 82-29-19
WN7JXG 2242- 59-38-12

THE TOP TEN

Call	*Section*	*Score*	*Bands*	*Transmitter*	*Receiver*	*Antenna(s)*
WNØVKP	Minn.	53,970	40, 15	Heath DX-40	Drake 2B	3-el (15), dipole (40)
WN7JLO	Utah	37,520	80, 40, 15	DX-60B	Heath HR-10B	4-el (15), inverted Vee (40, 80)
WN3KSP	MDC	34,902	80, 40, 15	DX-60B	HR-10B	Vertical (15), dipoles (80, 40, 15)
WNØTUS	Kans.	34,060	80, 40, 15	Heath HW-16	HW-16	Beam (15), inverted Vee (40), vertical (80)
WN6ZUC	S.F.	34,056	40, 15	Drake 2NT	2C	6-el (15), dipole (40)
WN7KLP	Mont.	31,689	40, 15	DX-60B	Heath SB-301	Quad, inverted Vee
WN2DFD	N.L.I.	31,188	80, 40, 15	2NT	2C	3-el, dipole
WN6ZXN	Orange	30,464	80, 40, 15	DX-35	National NC-183	18AVQ
WN4HZS	E. Fla.	29,388	40, 15	DX-60B	2B	14AVQ
WN7IOY	Ariz.	28,900	80, 40, 15	DX-60A	Drake R-4A	2-el (15), dipole (40), vertical (80)



Would you believe that **WN7LIX** will be eligible for membership in the Old Timers Club at the age of 29? That wrist watch was Ken's reward for passing the code test. Keep it up, OM!

SOUTHEASTERN DIVISION

Alabama

WN4LNM	17,759-286-59-24
WN4LHH	9212-173-49-22
WN4LAL	8216-158-52-14
WN4IYO	6040-151-40-12
WN4LEM	1276- 44-29- 8

Eastern Florida

WN4HZS	29,388-464-62-34
WN4JLB	18,012-301-57-38
WN4LEQ	17,490-330-53-23
WN4IZU	12,690-235-54-19
WN4JJH	510- 24-15- 3
WN4KXZ	96- 12- 8- 3

Georgia

WN4IEJ	1550- 50-31- 5

Western Florida

WN4JHQ	13,160-235-56-26

SOUTHWESTERN DIVISION

Arizona

WN7IOY	28,900-425-68-30
WN7JDQ	21,042-324-63-24
WN7KUO	18,060-301-60-23
WN7KBN	5240-121-40-33
WN7JMU	3780- 90-42-10
WN7KNF	176- 16-11-21

Los Angeles

WN6MPF	22,336-349-64-29
WN6ZTL	16,008-276-58-35
WN6PGY	14,706-238-57-19
WN6FDO	5152-112-46-40
WN6MVT	1300- 42-25- 8

Orange

WN6ZXN	30,464-456-64-39
WN6FOQ	16,182-264-58-30
WN3KER/6	11,330-191-55-15

San Diego

WN6NYT	18,774-288-63-30
WN6FXM	8925-155-51-36

Santa Barbara

WN6YWF	4815-107-45-11
WN6KDI	4142-109-38-22
WN6HOM	992- 47-16-10

WEST GULF DIVISION

Northern Texas

WN5VPL	15,635-295-53-27
WN5UOB	3196- 94-34-15
WN5WCN	1586- 46-24- 4

Oklahoma

WN5UHX	21,360-356-60-33
WN5WCK	6232-152-41-34
WN5VYU	270- 10- 9- 2

Southern Texas

WN5UBB	12,036-236-51-11
WN5UGE	3500-100-35-13
WN5VAF	3116-82-38-19
WN5UVD	63- 9- 7- 8

DIVISION LEADERS

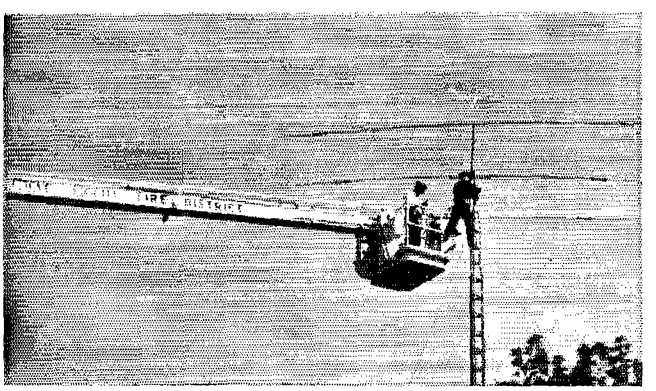
Atlantic	WN3KSP	New England	WN1JFG
Central	WN9YWY	Northwestern	WN7KLP
Dakota	WNØVKP	Pacific	WN6ZUC
Delta	WN4HOK	Roanoke	WN4ILO
Great Lakes	WN8YWI	Rocky Mt.	WN7JLO
Hudson	WN2DFD	Southeastern	WN4HZS
Midwest	WNØTUS	Southwestern	WN6ZXN
		West Gulf	WN5UHX

Non-Novice Scores

W1ARR 252, W1AW (multiopr.) 9537, W1DAL 7802, W1MRW 532, WA1FCD 1121, WA1FHU 805, WA1FNQ 1562, WA1HOL 615, WA1HUH 3456, WA1HVL 1950, WA1HYI 4700, WA1ION 4730, WA1IQJ/1 1575, WA1JHL 9072, WA1JHW 3978, WA1KQM/1 4687, K2GLQ/1 6783, K2MFF (multiopr.) 741, K2QPN 264, W2NEP 1920, WA2APO 3850, WA2COL 5632, WA2CRW 860, WA2DTP 3366, WA2EKI 3071, WA2EUX 7995, WA2FUI 4200, WA2GAY 6, WA2HA1 3498, WB2CMO 444, WB2FVR 1320, WB2RKK 3052, WB2YJS 1592, WB2ZHM 208, K3HNP 9751, K3YBW 1536, W3EYF 3936, W3GN 3535, W3QCB 768, W3QEI 7912, WA3DNH 5940, WA3HTH 1872, WA3ITR/1 2550, WA3JAP 3360, WA3JGQ 1344, WA3JGY 9408, WA3JJH 646, WA3JKO 140, W3JPG 80, WA3JWF 420, K4IEX 6930, K4IX 1680, K4PIC 4558, W4DR 8460, W4ILE 480, W4KFC 456, W4YOK/4 2340, WA4IUN 2772, WA4OFS 6468, WB4AXQ 16,900, WB4FDK 1334, WB4FPU 10,199, WB4FSG 12,879, WB4JFT 3955, WB4KRZ 1000, K5KDG 16,461 W5QNY 8007, WA5ROU 5880, WA5TPO 10,608, WA5TWT 12,000, WA5UHG 4800, WA5UKY 403, WA5VQT 1166, W6BVB 1860, W6OEO 3498, WA6JAN 1012, WA6JDT 1550, WA6JNN 25, WA6MER 689, WB6KML 880, WB6WEY 252, WB6YCA 6336, WB6YMW 4100, WB6ZHD 1680, WB6ZLM 11,070, WB6ZPC 130, WB6ZVC 2000, K7JRE/1 539, K7KHA 3515, K7SQD 2408, W7TVF 1302, WA7FBL 9776, WA7ISP 3572, WA7LFG 608, K8SWW 7144, W8IZ 1176, WA8LWH 5922, WA8SCZ 11,417 WA8UTT 1166, WA8VCI 1323, WA8VLM 17,820, WA8VRB 3780, WA8WGM 7285, WA8YMZ 1104, WA8YLT 1449, WA8ZBA 8016, WA8ZDT 690, WB8BPD 4655, WB8BSE 87, WB8BSO 2541, WB8BZX 315, WB8CLF 442, K9HYE 6020, K9KEP 1620, K9SRR/2 532, WA9MMT 12,720, WA9PEH 7520, WA9RJI 12,201, WA9RTU 5040, WA9SQN 14,560, WA9UNR 992, WA9WIF 6708, WA9WXL 7007, KØGVA/Ø 2240, WØQMS 13,450, WAØATY/7 1320, WAØBMV 5980, WAØNMA 2520, WAØPUL 2387, WAØSUD 9486, WAØTLT 1440, WAØTVC 893, WAØUBL 966, WAØUIS 2079, VE2DIN 1770, VE3DIE 13,440, VE3DNR 442, VE3DRV 3854, VE5TT 2430.

Check logs: WA1IUY, K2CQR, WA3HCG, WA5PNM, WA5RAA, WA5TOS, WN5VFW, WN5WFE, WB6LMN, WAØELO, VE1ASJ, VE3BNX, VE3GEA, VE5RI. QST

Strays



When WØJMT's antenna was damaged during some bad weather, the Creve Coeur (Mo.) Fire Department came to the rescue (It was officially called a "training mission" with its "snorkel"). In a matter of minutes, Captain Bob Zimmerman made the repairs to the St. Louis Priory and School's amateur radio club antenna.

Results

22nd ARRL V.H.F. Sweepstakes

REPORTED BY

BOB HILL,*

W1ARR

WA1IAN's 2-meter beam, jolted unmercifully by r.f. overload from that big sig of W2JKI, finally capitulated at the end of the contest.

ANYONE who has ever participated in a V.H.F. Sweepstakes knows that this contest is, as much as anything else, a test of sheer perseverance: conditions usually vary from poor to poorer, and only the strong (in signal as well as stamina) survive. In January we have to make do without the sporadic-*E* that enlivens a June QSO Party and the aurora that often lights up the September affair. So, while the SS does stir up a goodly amount of activity among the club enthusiasts, it's still basically a matter of plugging away without benefit of glamorous propagational trickery to perk things up. Yet those who do well can bask in the feeling of contentment that comes from having succeeded in spite of instead of because of!

We can't exactly crow about participation in SS No. 22: only 899 logs found their way to Newington, as compared with 964 last year and 1123 the year before. Could it have been that too many World Abovers were still recuperating from New Year's Eve as late as the weekend of January 4–5? Certainly the weather in most parts of the country wasn't any worse (or any better) than is usual when the calendar gets flipped over to start another annum. There is conviction in some quarters that 6-meter c.w. contest operation was dealt a severe blow by the FCC, what with Generals-and-below being restricted to 50.1 and above. Still and all, we can hope for a better turnout to usher in the next decade. So when you draw up your list of New Year's resolutions for abstaining from beating the wife and kicking the dog, why not resolve to join the SS fray? Put a large red circle around January 10–11.

Because v.h.f. propagation is inherently unfair, rewarding as it does the thickly-populated northeast with a smile and the rest of the U.S. and Canada with a sneer, just about all the big scores come out of the first, second and third call areas. The boys work plenty hard for those impressive totals, however, and deserve full credit. Top single-operator marks were earned by **K3IPM** (43,456), **W3MFY** (41,912 and a record 806 QSOs), **K8UQA** (34,232), **WB2MTU** (30,300), and **WA3CAG** (26,052). Other call-area leaders were **W1MEH, K4SUM, WA5TXI, K6YNB/6, W7FN, K9HMB** and **WØPFP; VE3ASO** was high man for Canada. Plaudits for leading multiop results go to **W2JKI** (41,965), **WB2GKE/2** (40,599) and **WA8PLZ** (29,684).

Clubs

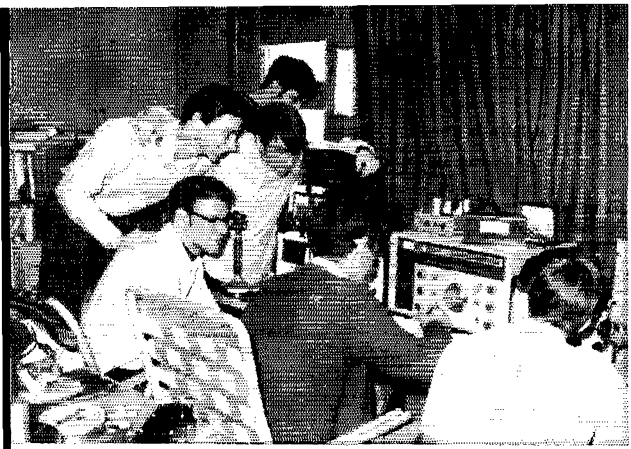
The **Mt. Airy V.H.F. Radio Club** makes it nine gavels in a row; their three top scorers placed in the top five single-op contest entries, and 21 of their 74 logs exceeded 10,000 points. (Seems like those Pack Rats are simply unbaitable!) WB2MTU paced the **South Jersey Radio Association** to second place. Last year's runner-ups (or is that "runners-up"?), the **Rochester V.H.F. Group,** again turned out *en masse* but had to settle for third. The **Albany Amateur Radio Association,** sparked by erstwhile Hq. staffer WA2BAH, retained control of fourth position. Fifth spot, and the only other total over 100K, was claimed by the **Mobile Sixers Radio Club.**

In all, 31 ARRL-affiliated clubs entered the competition, vs. 33 in 1968. Strangely enough, with sections scarcer and scores lower, there were five clubs aggregating more than 100,000 points; only three managed this pinnacle last year. Did *your* club compete?

Soapbox

"Although there were not very good band openings, there was still much to be had on 6 and 2 c.w. I worked over a fourth of my stations on 2 c.w." — **WA3JWL.** "Had water seepage into basement for more than half the contest, so it was necessary to interrupt operating for 5 or 10 minutes at least twice an hour to mop up and bail out." — **W3LUL.** "Been a ham for 37 years and this was my first contest." — **W3MSM.** "Conditions on 6 made it very difficult to work as many sections as I had hoped. A.m. saved the day

* Assistant Communications Manager, ARRL



Thirteen can be a lucky number when you have 13 operators to make 522 QSOs in 29 sections. That's the success story of **WB2GKE/2**, the Interstate V.H.F. Society, whose gang operated from one of the highest points in N.J. This view of the 6-meter position shows a jolly group consisting of *(standing L to R)* WA2AOL, WB2WIK, WA2DZL, *(seated L to R)* WA2BAT, WA2FZW and WA2DBD.

on that band! Two-meter conditions were very good, with many stations participating." — **WB2YEH.** "Well, as usual my statement of many years concerning these silly contests has held. That is, these contests are a license for the contestants to use any terrible signal that they can put on. Everything in the way of good technical operating goes by the boards, and this goes for both a.m. and s.s.b. Conditions were not the best. Signals in Trenton from New England and the D.C.-Va. area were weak and not up to the usual signal level. The scatter signals from the west were very good and could indicate what could take place if there were more activity. Why is a 34-hour endurance test necessary in these V.H.F. Sweepstakes? It seems to me that 20 hours is plenty of time for an operating contest. After all, people do have to go to work Monday and amateur radio is only a hobby!" — **W2AXU.** "It seems that Western Mass. is getting as hard to work as Vermont. Where do they all hide?" — **W2WGL.** "Very enjoyable contest, good club participation, beautiful weather." — **W2OW.** "Just got a 32-element collinear up for 2 meters Saturday night in sub-zero weather and it worked great." — **WA3ISY.** "I've experienced noisy conditions before, but nothing like that which prevailed during this contest. Even locals were difficult to read. Now bring on June!" — **WA3BAK.** "If this is the year of the supposed sunspot peak, why is there a significant lack of good band openings in northern Illinois and surrounding area while all over the U.S.A. propagation is great? I know 6-meter activity is low here, but that has nothing to do with propagation. On openings (as poor as they are) mainly s.s.b. stations are heard. Is a.m. really out?" — **WA9FIY.** "Glad to note the appearance of many new calls on v.h.f. It would be nice if they would continue to operate after the contest." — **WA9ULU.** "The new licensing is OK, but not on 6. Not one signal was copied from 50.0 to 50.1, and the c.w. was well mixed with the s.s.b. just above 50.1." — **K9QCB.** "This was my first contest from Indiana and it isn't like the East Coast. It is obvious I will have to get more power and put my antenna higher and stack my two beams to reach out where the stations are. It was fun but had to dig for every contact." — **WA9ZRH.** "Six-meter conditions in Wisconsin were at their worst." — **WA9EZU.** "I'm ashamed to send in such a score. The lowest level of activity I can remember for this contest. Local activity nil, propagation miserable, area activity sorry. Heard 5s, 9s and 8s, but none were in long enough to work." — **W4WQZ.** "I must say that things weren't going my way and, to me, the 2-meter band was lousy. I did hear an m.s. run on Jan. 5 at 0704 CST when K4GL was being called, but I was never able to figure out who was calling him." — **K4TAX.** "This is the first contest that I have worked and I must say it has been a great pleasure, and I have profited by the experience. I now have more confidence in my equipment and also more confidence in my personal ability in amateur radio. Since the contest I have accepted net control several times on a local net on 145.35 MHz., and have been complimented on my operations." — **WA8YJC.** "Found again most of 2-meter activity crowded around 145.0 to 145.3. Greatest thrill was working VE2APN and WA8ZLP back-to-back. That was 300 miles north and 300 miles south." — **WB2YQU.**

"It was a good thing that no band openings were predicted for the contest weekend, otherwise I would have been very disappointed. Groundwave to Conn. and Mass. was very good, but what happened to the rest of One-Land?" — **WA2VFQ.** "Seems like the guys spent a mint on transmitters but not a penny on the receiver!" — **WB2ZTD.** "More scatter than local." — **W9ECV/Ø.** "This was a contest for the better stations and operators. Conditions were never extremely good, and what opportunities there were tended to favor the better-equipped stations and the most alert operators. Use of c.w. paid off handsomely on 144, and there was plenty of it. But on 50, the restriction of the c.w. band to Advanced and Extra Class licensees had the practical effect of eliminating effective use of this most effective contest-operating mode. In past years, use of c.w. on 6 has been a joy, but it was rough this time, with nearly all c.w. use being in the s.s.b. 'kilowatt alley' just above 50.1." — **W1HDQ.** "Activity was good on 2 meters, but everyone was clustered around 145 on phone. C'mon, fellas — spread out!" — **WA1IQJ.** "Heard KV4AD working a VE3." — **K1KKK.** "This was my first experience with a v.h.f. contest and, although the number of stations heard was few and far between, it was fun and educational." — **W1QV.** "Konechno byl nastoyashchij SS." — **KL7ELA/1.** "50-Mhz. scatter was in during most of the contest; most frequently heard were WA8PLZ, W8VP and K8DOC."

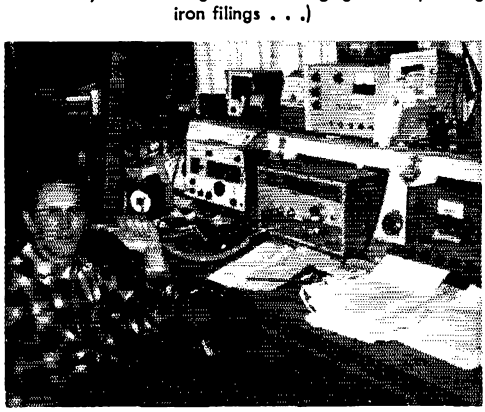
AFFILIATED CLUB SCORES

Club	*Score*	*Entries*	*Certificate Winner*
Mt. Airy V.H.F. RadioClub (Pa.)	635,127	74	K3IPM
South Jersey Radio Association	325,121	68	WB2MTU
Rochester V.H.F. Group (N. Y.)	252,285	120	W2CNS
Albany Amateur Radio Association (N. Y.)	121,646	68	WA2BAH/2
Mobile Sixers Radio Club (Pa.)	103,491	39	W3IZU
Hampden County Radio Assn. (Mass.)	67,994	38	WA1HHN
Talcott Mountain U.H.F. Society (Conn.)	67,993	23	K1HTV
Suburban Amateur Radio Club (Pa.)	50,208	7	K3MTK/3
Dayton Amateur Radio Assn. (Ohio)	39,780	22	W8KKF
Rock Creek Amateur Radio Assn. (Md.)	36,099	22	W3LUL
Wantagh Amateur Radio Club (N. Y.)	29,134	3	W2VA/2
1200 Radio Club (Mass.)	22,231	13	K1KNI
Dutchess County V.H.F. Society (N. Y.)	16,366	9	WB2YQU
Six Meter Club of Chicago	16,090	11	WA9FIH
York Radio Club (Ill.)	14,044	10	WA9RIJ
Mid-Hudson V.H.F. Society (N.Y.)	13,996	4	W2CGM
Suffolk County Radio Club (N. Y.)	13,228	7	WB2UZU
Alexandria Radio Club (Va.)	11,484	8	W4VZR
Greater Pittsburgh V.H.F. Society	11,330	9	WA3ISY
Nittany Amateur Radio Club (Pa.)	10,354	4	WA6KPF/3
Lake Success Radio Club (N.Y.)	8172	12	W2TUK
Queen City Emergency Net (Ohio)	8011	8	W8HQK
Southern California V.H.F. Radio Club	7182	4	WB6IMV
Skokie Six Meter Indians (Ill.)	4720	6	WA9FIY
Central Michigan Amateur Radio Club	4504	4	K8AJC
St. Louis Amateur Radio Club	4200	7	WØDSW
Murphy's Marauders (Conn.)	3599	7	WA9HHH/1
Fulton Amateur Radio Club (N. Y.)	2460	4	WA2SOO
Six Meter Club of Dallas	1914	4	W5BWX
Syracuse V.H.F. Club (N. Y.)	1800	4	K2AVA
Dividing Ridge Amateur Radio Club (Pa.)	1733	3	K3JCZ

— **K1AGB.** "In the very early morning (2–5 A.M.) our noise level drops about four S-units below the 8 P.M. average, but there are times in the early evening when the noise can be as much as 20 db. above that average. It would be nice to see some way of encouraging contest operation on the higher bands (220 and 432)." — **W1MX.** "Conditions in southern N. H. were just plain rotten. Would you believe I had to send my section 15 times to get the two-way QSO points for Eastern New York? It's a shame there aren't any of the fellows brave enough to work out the details with some ski lodge (like Hogback Mt.) and sit around a roaring fire while they work a January contest." — **K1PMM.** "Really enjoyed this contest until hearing a great number of stations on 6 s.s.b. relaying contacts via a third station. What happened to our integrity?" — **K1DYL.** "It seems as if the moment a contest begins, the regulars on 2 meters go into hiding." — **WA7IJV.** "We would like to thank you for putting on these events because of their benefit to band occupancy." — **K7VIT.** "Dead band conditions for entire contest. Scatter contacts Saturday night and Sunday morning into California were much appreciated. M.s. conditions were above average. Local contest activity much improved over last year." — **W7FN.** "Sure would like to know what some of the gang of 6s are using for antennas. Quite a few were almost solid copy when they pointed them our way. Did an awful lot of tailending on a certain 2-letter call in the area. No openings, but lots of fun." — **K7OFT.** "Many stations were heard that could not be copied because of the low percentage of modulation; could have made 2-way if only they had used a key." — **W7FQE.** "Toward the end of the contest, our pleas for contacts took on an air of comic drama; in fact, as we learned later, many v.h.f.ers (including ex-v.h.f.-contest-nut K6-JHV) left their TVs to listen to our fictional tales of icicles, 100-m.p.h. winds and numb fingers!" — **WA6ZTY/6.** "Quite a bit of 50-MHz. A.M. activity in the area. Scatter was quite prevalent at night. Heard W2s, VE2 and VE3s but could not contact them." — **WB4INE.** "Local N.C. activity very poor. Only one contact on 2m in my own state, but I made four Md. contacts (300 mi.), one Del. (300 mi.) and one N.Y. (475 mi.) contact on 2. The same situation on 432 where no contacts to be had in my own state, but one made to Va. about 200 miles away." — **W4-HJZ.** "The 6-meter band showed signs of opening, but didn't. Could hear some New England, New York, Ohio and Illinois stations in short bursts but had little chance to work them. It would have been wild if the skip had come in." — **WB4GKF.** "Everyone tried, but conditions just didn't cooperate." — **K4GL.**

"I've always wanted to try what the larger multiop groups do: haul a good tower, enough equipment for a full-blown contest effort, and a power source, to a mountaintop — but all by myself. I finally did that for the V.H.F. SS, and I can say that spending two nights in January alone on a remote mountaintop is a memorable experience. At least

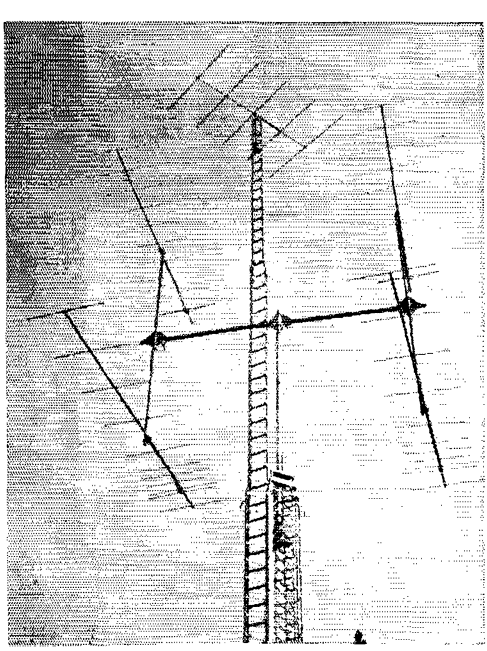
This is "The Poor Farmer of Sicklerville," WB2MTU. His antenna crop looks pretty healthy this year: 5 elements on six at 100′ and 42 elements on two at 106′! Tony's 30K paced SNJ by a comfortable distance. (Maybe there really *is* something to that old gag about planting iron filings . . .)



DIVISION LEADERS

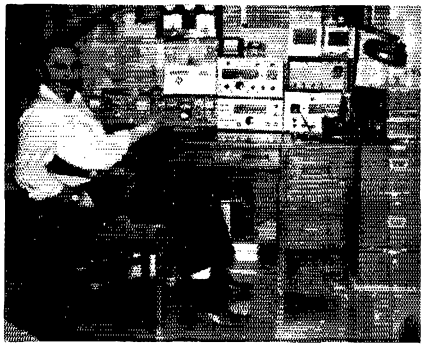
Single Operator		*Multioperator*
K3IPM	Atlantic	W2PAU
K9HMB	Central	K9YHB
WAØFWR	Dakota	.....
WAØUWL		
WB4IOB	Delta	.....
K8UQA	Great Lakes	WA8PLZ
K2RTH	Hudson	W2JKI
WØPFP	Midwest	WAØJYK
W1MEH	New England	WA1EHL
W7FN	Northwestern	K7VIT
		W7SBC/7
WA6FAC	Pacific	WA6ZTY/6
K4SUM	Roanoke	.....
WØAJY	Southeastern	WAØPHZ/Ø
K6YNB/6	Southwestern	WA6DIW/6
WA5TXI	West Gulf	.....
VE3ASO	Canadian	VE2BGJ

I made it home with nothing worse than the flu to help me remember the weekend. If my score holds up, it was worth it." — **K6YNB/6.** "Six meters here was pretty punk for me. One of the Washington stations told me there were W6s coming through, but I never heard a peep from them. After working the local stations Sunday morning I never heard another thing on the band, so most of my points came from the f.m. portion of 2 meters. Wish there had been a few more W7s on the band." — **VE7VZG.** "Forgot about contest — crummy conditions — visiting relatives — Hong Kong flu. PHOOEY!" — **VE7XF.** "I would like to see the scoring system of this contest modified to allow power multipliers in order to help the low-power fellows using Twoers, etc., in their impossible battle with the high-power fellows with their top-notch receivers and converters, etc. Thank you for a wonderful contest that I enjoyed greatly." — **VE3FWV.** "Local participation average (lousy). C.w. only fair. To all Ws who missed VE3 section: Ottawa is due north of Syracuse!" — **VE3GAF.**



Scores

In the tabulation to follow, scores are listed by ARRL divisions and sections. Unless otherwise noted, the top scorer in each section receives a certificate award. An asterisk denotes a Headquarters staff member, ineligible for an award. Columns indicate final score, number of contacts, number of different sections worked, and bands used. A represents 50 MHz., B 144 MHz., C 220 MHz., D 420 MHz., E 1296 MHz., and up. Multioperator stations are shown at the end of each section tabulation.



WA2WZP ran roughshod over the competition in NNJ and just missed heading the list for the entire Hudson Division. Bruce ran a pair of 3-400Zs into 8L and 11L spinners.

Even from California you don't really have to have rotatable Yagis to make contacts on v.h.f. **WB6YCL** used Vee-beams and a long wire on 6 and had 37 two-ways.

VE3GAF notes that Ottawa-area participation was not exactly overwhelming, and adds that we Yanks would have a better chance of working VE3 if we turned our beams north once in a while!

ATLANTIC DIVISION

Delaware

W3CGV 6118-133-13-ABCD
K3OBU 2904- 66-12- B
K3NYG 144- 6- 2-AB
WA3KFT/3 130- 5- 3-A

Eastern Pennsylvania

K3IPM 43,456-776-18-ABCD
W3MFY 41,912-806-16-ABCD
WA3CAG 26,052-501-16-ABC
W3KKN 24,300-451-17-ABC
K3IUV 22,490-433-16-ABCD
W3LHF 20,000-400-15-ABC
W3CL 17,688-402-12-ABC
W3HFY 17,688-402-12-ABCD
K3ZPN 14,688-306-14-ABC
WA3BIV 14,007-334-11-ABC
K3JJZ 13,788-383- 8-ABCD
W3GEW 12,768-336- 9-ABC
K3MTK/3 (WA3HGX, opr.) 12,324-237-16-A
W3HK 12,282-267-13-AB
WA3EFS 12,084-318- 9-AB
K3GAS 11,772-327- 8-ABCD
WA3ADN 11,704-308- 9-AB
K3BPP 11,571-305- 9-ABC
W3IZU 11,198-255-12-ABC
W3CJU 10,944-304- 8-ABCD
W3SAO 10,656-296- 8-ABC
W3CCX (W3SAO, opr.) 10,620-295- 8-ABC
WA3EJY 10,032-209-14-B
W3ETB 10,026-279-18-AB
W3AJF 9720-270- 8-ABC
W3CXU 9450-225-11-AB
W3UJD 9200-230-10-ABCD
W3MVF 8640-240- 8-ABC
K3FGB 8626-227- 9-A
K3MXM 8010-267- 5-ABC
WA3HIT 7840-280- 4-AB
K3QMK 7744-242- 6-AB
W3BBC 7744-242- 6-AB
WA3IVY 7744-242- 6-AB
W3SAK 7600-200- 9-AB
K3ACR 7378-217- 7-A
K3IGX 7089-209- 7-A
K3KTY 7084-253- 4-ABC
K3AQH 7038-207- 7-AB
WA3ERQ 6825-263- 3-ABC
WA3HVN (WA3FKM, opr.) 6354-177- 8-B
K3NMN 6328-226- 4-AB
K3HSS 6214-239- 3-ABC
W3FGQ 6210-207- 5-AB
WA3IMT 6104-218- 4-AB
K3ZPQ 6018-177- 7-AB
W3HKZ 5916-174- 7-ABCD
K3ATL 5814-171- 7-AB
W3QXV 5700-190- 5-A
WA3IOB 5688-158- 8-AB
WA3FCZ 5628-201- 4-AB
K3DMA 5538-213- 3-AB
W3KXH 5490-183- 5-A
K3EPB 5460-182- 5-AB
WA3CND 5348-191- 4-AB
K3OBY 5200-200- 3-ABC
WA3GNV 5096-182- 4-AB
WA3JMM 4800-160- 5-A
K3ZKY 4480-112-10-AB
WA3BRV 4480-160- 4-AB
K3DUC 4440-148- 5-AC
K3JJO 4416-138- 6-AB
K3BOY 4170-139- 5-AB
K3VEQ 3666-141- 3-ABC
K3GQJ 3640-140- 3-ABC
K3BQD 3614-139- 3-AB
WA3IFL 3600-150- 2-AB
K3FYX 3584-112- 6-AB
WA3FEH 3444-123- 4-AB
W3ZRR 3432-132- 3-AB
K3TEF 3406-131- 3-AB
WA3BTE 3200-100- 6-AB
K3WEU 3072-128- 2-A
K3YPL 3048-127- 2-A
WA3GQF/3 3024-108- 4-AB
WA3JWL 3016-116- 3-AB
K3KUB 3000-100- 5-AB
WA3EXP 3000 125- 2-B
WA3HET 2910- 97- 5-A
K3DLS 2760-115- 2-BC
WA3DGR 2760-116- 2-A
K3IYA 2646- 95- 4-A
WA3FAA 2600-100- 3-AB
WA3HEB 2580- 86- 5-A
W3NSI 2496-104- 2-ABC
W3WIJ 2340- 90- 3-A
WA3HVR 2280- 76- 5-AB
W3GXB 2184- 84- 3-BC
W3PST/3 2136- 89- 2-AB
W3IA 2072- 74- 4-B
W3BRU 1846- 71- 3-A
WA3JSR 1824- 76- 2-A
WA3FBC 1656- 69- 2-A
WA3IGY 1652- 59- 4-AB
W3DYL 1598- 47- 7-A
WA3LGC 1584- 66- 2-A
K3ZKO 1536- 64- 2-AB
W3IK 1378- 53- 3-ABCD
K3ZLL 1287- 50- 3-A
W2BHK/3 1248- 52- 2-A
W3GS 1014- 39- 3-A
K3AA 936- 36- 3-A
WA3KFT 900- 38- 2-A
WA3IEL 720- 30- 2-A
W3HYO 624- 26- 2-B
W3FQI 468- 18- 3-A
WA3KFT/3 442- 17- 3-A
W3OR/3 384- 16- 2-A
W3FQI/3 374- 17- 1-A
K3FYX/3 364- 13- 4-A
K3GZT 336- 14- 2-A
W3AWA 192- 8- 2-A
K3HNP 130- 5- 3-A
WA3HFJ 110- 5- 1-A
K3QMK/3 44- 2- 1-A
W3BBC/3 44- 2- 1-A
WA3IVY/3 44- 2- 1-A
WA3FVK/3 (K3ZSG, WA3FVK) 12,493-203-21-AB
W3LP (5 oprs.) 9576-266- 8-AB
WA3KIO/3 (4 oprs.) 8640-270- 6-AB
WA3IEM (WA3s IEM IGV) 7968-249- 6-AB
WA3IUD (10 oprs.) 5888-184- 6-AB
K3IEC/3 (10 oprs.) 5160- 79-10-AB
K3FYU (K3FYU, WA3HFA) 2400- 80- 5-A
WA3EKM (WA3s EKM FFR) 2324- 83- 4-A
K3WGJ (K3s WGJ WGK) 2184- 78- 4-ABC
K3WGK (K3s WGJ WGK) 2184- 78- 4-ABC
W3EVE/3 (WA3s HFL KFT) 1632- 68- 2-AB
WA3HFA (K3FYU, WA3HFA) 1560- 52- 5-A

Maryland-D.C.

W3LUL 6336-132-14-AB
W3HB 3360- 70-14-AB
W3KMV 3058- 70-12-A
WA3ELO 2880- 90- 6-A
K3FPE/3 2400- 80- 5-AB
W3GN 2200- 55-10-B
W3PIH 2176- 68- 6-AB
W3OTC 2057- 61- 7-AB
W3MNE 1980- 55- 8-B
W3LVC 1870- 55- 7-B
K3LFN 1716- 66- 3-AB
W3MHB 1600- 50- 6-B
W3PZK 1568- 56- 4-AB
W3EWP 1534- 59- 3-AB
W3CPM 1372- 49- 4-B
W3YAG 1316- 47- 4-B
K3GMB 1232- 44- 4-AB
W3MSM 870- 29- 5-A
W3FNU 840- 35- 2-B
W3ZCJ 832- 32- 3-AB
W3AEA 780- 30- 3-B
W3KUH 768- 32- 2-B
W3JQN 504- 21- 2-B
W3CER 456- 19- 2-B
W3BNL 384- 16- 2-B
K3LZX 264- 11- 2-A
W3AIR 22- 1- 1-B
W3PGA (6 oprs.) 8784-183-14-AB
WA3EOP/3 (WA3s EOP GYX JPI) 4050-135- 2-AB

Southern New Jersey

WB2MTU 30,300-505-20-AB
W2EIF 20,775-416-15-ABCD
W2BV 20,764-358-19-AB
WA2EMB 18,765-350-17-ABCD
WB2SZK 13,148-346- 9-ABC
WB2YEH 11,676-278-11-AB
W2EA 10,626-253-11-AB
W2TQ 9900-275- 8-AB
W2AXU 9536-149-22-ABC
WA2DWT 9462-249- 9-AB
W2JAV 8280-207-10-ABC
W2ZUL 8256-258- 6-AB
WB2IOE 7956-234- 7-ABCD
WB2CDP 7740-215- 8-AB
K2EGH 6556-149-12-A
W2BLV 6240-120-16-B
W2ORA 6176-193- 6-A
W2OSD 5976-166- 8-AB
WB2JEP 5628-201- 4-A
W2EPA 5423-160- 7-B
WB2LWZ 5250-175- 5-A
W2VX 5220-145- 8-B
W3ALE/2 5187-124-11-AB
WB2UVB 5152-184- 4-AB
K2DFE 5088-159- 6-AB

WB2WVC 4920-164-15-AB
WA2HVD 4800-160- 5-AB
WA2MGV 3752-134- 4-AB
W2EWN 3744-118- 6-AB
WA2EIY 3724- 98- 9-A
WA2BIW 3392-106- 6-B
WA2ONB 3318- 79-11-A
WB2YXP 3094-119- 3-AB
W2QBH 3052-109- 4-AB
W2KF 3040- 95- 6-B
WB2VMD 3016-116- 3-A
W2DIL 3000-100- 5-A
W2BAY 2912-112- 3-ABC
WA2AXF 2609-100- 3-B
W2RBE/2 2430- 81- 5-A
W2GVB 2208- 92- 2-AB
WA2FCZ 2028- 78- 3-A
W2UCV 2016- 84- 2-A
WA2YHD 1924- 74- 3-A
WB2OAD 1908- 53- 8-AB
K2AA/2 (W2FYS, opr.) 1728- 72- 2-AB
W2ZVR 1716- 67- 3-B
WA2CLD 1704- 71- 2-A
WB2SPJ 1656- 69- 2-AB
K2MIZP 1488- 62- 2-B
WB2AMM 1488- 62- 2-AB
W2SDB 1320- 55- 2-B
WA2QZQ 1300- 50- 3-A
WA2ABY 1224- 51- 2-A
WB2NPY 1224- 51- 2-A
WB2CIW 1152- 48- 2-AB
WB2EFL 1040- 40- 3-A
WB2VLD 1032- 43- 2-A
W2HBE 624- 26- 2-B
W2PFQ 624- 26-12-A
WA2NPD 616- 22- 4-A
W2BQ 504- 21- 2-A
WA2BPL 480- 20- 2-B
WB2UVB 2 480- 20- 2-A
WA2ABY/2 384- 16- 2-A
WA2CLD/2 264- 11- 2-A
WA2FCZ/2 240- 10- 2-A
K2HBY 220- 10- 1-A
WA2MGV/2 198- 9- 1-A
WB2FDL 192- 8- 2-ADE
W2PAU (W2s ESX PAU) 19,920-425-14-ABC
W2REB (K2PWV, W2REB) 16,692-321-16-AB
WB2BNE (WA2KRX, WB2BNE) 14,060-370- 9-ABC
W2FYS (W2FYS, W3CXO) 9594-267- 8-AB
K2MIO (K2s MIO RRC) 6750-225- 5-AB
WA2DRI (WA2DRI, WB2s WRP ZPB) 4240-133- 6-B
WA2GYG (WA2s GND YGY) 2916-122- 2-A

Western New York

W2CNS 12,844-247-16-ABCD
K2CEH 8464-184-13-ABD
K2YCO 8320-208-10-ABCD
W2UTH 7852-151-16-AB
WA2ZNC 5920-185- 6-AB
K2ISP 5376-168- 6-AB
WA2GCF 5152-161- 6-AB
W2ALL 5130-171- 5-AB
WA2TEY 5100-150- 7-AB
WA2YTK 4530-151- 5-AB
W2QY 4472-172- 3-AB
WA2KND 4108-158- 3-ABD
K2RZI 3960-165- 2-ABD
K2RHS 3888-162- 2-AB
WB2NFY 3876-114- 7-A
WB2JFL 3624-151- 2-AB
K2JA 3600-150- 2-AB
WA2KVN 3564-149- 2-AB
WA2YPT 3408-142- 2-AB
W2DUC 3289-150- 1-AB
K2WW 3216-134- 2-AB
WB2ZFS 3192-133- 2-AB
WB2EQW 2880- 96- 5-A
W2VVG 2860-130- 1-AB
WB2UDV 2860-130- 1-AB
W2OWF 2856-119- 2-AB
WA2THS 2856-102- 4-AB
WA2HWC 2832-118- 2-AB
WB2FZB 2816-128- 1-AB
WB2QXB 2808-117- 2-AB
WB2MAB 2800-100- 4-A
WB2VZH 2760-115- 2-AB
WA2FVG 2750-125- 1-AB
WB2HLI 2728-124- 1-AB
K2JJT 2592-108- 2-A
WA2LHM 2574-117- 1-AB
WB2WYO 2568-107- 2-A
K2YMM 2530-115- 1-AB
WB2LZM 2178- 99- 1-AB
WA2EIX 2112- 96- 1-AB
W2ECH 2054- 79- 3-A
K2BBJ 2040- 85- 2-AB
WA2BEH 2024- 92- 1-A
K2GMZ 1936- 88- 1-AB
WB2NJE 1920- 80- 2-AB
WB2MCP 1914- 87- 1-AB
WB2YJH 1870- 85- 1-A
DL7KX/W2 1848- 77- 2-B
WA2YSG 1848- 84- 1-ABD
W2UAD 1824- 76- 2-B
K2MGT 1804- 82- 1-AB
K2ZFV 1760- 80- 1-AB
WA2YRH 1728- 72- 2-ABD
WB2SNA 1672- 76- 1-A
K2OPC 1650- 75- 1-A
WB2LJG 1650- 55- 5-A
WB2DKA 1628- 74- 1-A
WB2HJN 1628- 74- 1-A
WB2JGV 1608- 67- 2-AB
WA2AQW 1584- 72- 1-A
WB2KUY 1540- 70- 1-AB
WB2KWZ 1540- 70- 1-AB
WA2SOO 1512- 63- 2-AB
WB2ZUN 1496- 68- 1-AB
WA2FKW 1474- 67- 1-AB
K2UOA 1452- 66- 1-A
WB2GJL 1452- 66- 1-A
WB2KYQ 1440- 48- 5-B
WB2INN (K9EOP, opr.) 1375- 63- 1-AB
WB2RVV 1364- 62- 1-A
W2RPO 1344- 42- 6-AB
K2INV 1320- 60- 1-B
K2QWC 1320- 60- 1-A
WB2DPT 1320- 60- 1-B
K2AIG 1298- 59- 1-A
WA2EKN 1298- 59- 1-B
W2ECM 1254- 57- 1-AB
WB2MBP 1254- 57- 1-AB
K2DRA 1210- 55- 1-B
K2MAJ 1210- 55- 1-A
K2TFO 1210- 55- 1-A
W2EJ 1166- 53- 1-B
W2ICE 1166- 53- 1-AB
WA2UGE 1166- 53- 1-A
WB2ZJY 1166- 53- 1-A
W2UZL 1128- 47- 2-B
K2APX 1122- 51- 1-A
K2DZV 1122- 51- 1-B
K2UFD 1122- 51- 1-A
W2DYY 1122- 51- 1-B
WB2CMR 1122- 51- 1-AB
K2YQT 1100- 50- 1-A
W2DBS 1056- 48- 1-A
WA2TJS 1056- 48- 1-A
W2WGL 988- 26- 9-B
WB2WBZ 924- 42- 1-B
WB2NSD 836- 38- 1-A
W2STM 792- 36- 1-A
WB2SMD 770- 35- 1-B
W2BFP 768- 32- 2-B
W2ZHB 696- 29- 2-B
K2UCI 682- 31- 1-A
W2RIS 682- 31- 1-A
K2LSS 660- 30- 1-A
WB2RJB 627- 29- 1-A
K2AVA 616- 28- 1-AB
WB2QGL 572- 26- 1-A
K2DUR 552- 23- 2-AB
K2RTU 528- 24- 1-A
W2IYR 528- 22- 2-B
W2UXP 528- 24- 1-AB
WB2LTN 528- 24- 1-AB
WB2NXL 528- 24- 1-AB
WB2WZG 528- 24- 1-B
WB2YWI 528- 24- 1-AB
K2PKK 480- 20- 2-AB
WA2GCX 462- 21- 1-A
WA2YSD 440- 20- 1-AB
WB2HOI 440- 20- 1-B
WN2EKR 396- 18- 1-B
K2BRE 374- 17- 1-A
K2LZF 330- 15- 1-A
WA2GVH 330- 15- 1-B
K2HDY 286- 13- 1-A
WB2FPT 242- 11- 1-A
W2UKA 176- 8- 1-A
W2BOC 154- 7- 1-A
WB2EDT 154- 7- 1-B
WN2EJY 154- 7- 1-B
WB2BFH 66- 3- 1-A
W2OW (17 oprs.) 7560-135-18-AB
WB2LZD (4 oprs.) 4288- 97-12-AB
WB2VPY (14 oprs.) 1148- 41- 4-A

Western Pennsylvania

WA3ISY 3996-111- 8-AB
WA3BAK (W3BWU, opr.) 2664- 74- 8-ABC
WA6KPF/3 2277- 50-13-AB
WA3ANO 1624- 58- 4-AB
K3AKR 1188- 33- 8-AB
W3DJM 1120- 40- 4-A
K3JCZ 870- 29- 5-A
K3NOA 858- 33- 3-ABC
K3MLE 676- 26- 3-AB
K3F1W 462- 21- 1-A
W3KJM 264- 11- 2-AB
WA3CZX 242- 11- 1-A
WA3CCM 228- 11- 2-A
K3IXR 220- 10- 1-A
WA3AWO 187- 9- 1-AB
K3TTP 144- 6- 2-AB
WA3JDT 132- 6- 1-B
K3HKK/3 (K2SVL, K3RBH, WA3JUV) 6625-133-15-AB
WA3EOQ/3 (WA3s EOQ LJR) 1530- 90- 7-B

CENTRAL DIVISION

Illinois

K9HMB 15,708-231-24-AB
K9GHR 6210-207- 5-AB
WA9JKT 4192-131- 6-B
WA9FIH 3510-135- 3-AB
K9ENZ 3332-119- 4-AB
WA9TMC 3108-111- 4-AB
WA9KIJ 2990-115- 3-AB
WA9FXH 2940- 98- 5-B
K9VCZ 2899-112- 3-AB
WA9NRI 2626-101- 3-B
WA9ENM 2280- 76- 5-A
K9ZWU 2208- 92- 2-ABC
K9ZWV 2208- 92- 2-ABC
W9DJZ 1950- 75- 3-A
WA9TZH 1872- 72- 3-B
W9DY/9 1820- 70- 3-B
K9DTB 1696- 53- 6-AB
WA9QPM 1620- 68- 2-B
K9VQN 1452- 66- 1-AB
WA9FIY 1392- 58- 2-A

Here's Tennessee and Delta Division winner **WB4IOB,** one of a small group of 4s who plugged away in spite of some of the worst propagation in the country.

WA9ULU 1248- 48- 3-B
WA9ZHF 1166- 53- 1 B
K9SYA 1148- 41- 4 A
K9YJQ 1100- 50- 1-AB
WA9YZO 1034- 47- 1-B
K9BDJ 1014- 39- 3-A
W9ABA 1012- 46- 1-B
WA9LFR 984- 41- 2-B
WA9ZGF 984- 41- 2-B
WA9MSZ 870- 29- 5-B
K9DNW 770- 35- 1-A
W9BOD 506- 23- 1-A
W9GYN 484- 22- 1-B
WA9IRZ 484- 22- 1-AB
K9ONA (WA9IRZ, opr.) 462- 21- 1-AB
K9UGP 352- 16- 1-A
W9LYA 352- 16- 1-AB
WA9SGC 352- 16- 1-B
K9YOA 308- 14- 1-A
K9DKI 242- 11- 1-A
WA9OWF 242- 11- 1-B
K9FHM 132- 6- 1-AB
W9ZEW 132- 6- 1-AB
WA9UIII 110- 5- 1-A
WB9ABT 66- 3- 1-A
K9YHB (K9RHY, WA9EJD) 6194-163- 9-AB
G3PAC/W9 (G3PAC, K9HMY) 5970-200- 5-AB
WA9QZE (WA9s QZE TCW) 2212- 79- 4-B

Indiana

K9QCB 4242-101-11-AB
K9GSB 1598- 47- 7-AB
WA9ZRH 1118- 43- 3-AB
K9UBF 308- 14- 1-AB
W9BZN/9 (9 oprs.) 5742-160- 8-A

Wisconsin

K3GCT/9 432- 18- 2-A
WA9EZU 168- 7- 2-A
W9YT (K9OXY, WA9s GJJ GZO) 3726- 83-13-AB
W9AYR (WA9s MCC SXN) 840- 28- 5-AB

DAKOTA DIVISION

Minnesota

WA9FWR 1300- 50- 3-A
WA9UWL 1300- 50- 3-A
K9GYO 960- 40- 2-A
W9QIN 943- 22-13-A
WA9JHH 168- 7- 2-A

DELTA DIVISION

Louisiana

W5UKQ 384- 16- 2-B
W5JFB 154- 7- 1-B

Tennessee

WB4IOB 912- 38- 2-AB
W4WQZ 810- 27- 5-ABD
WB4JDD 528- 22- 2-A
K4UWH 520- 20- 3-AB
K4TAX 22- 1- 1-B

GREAT LAKES DIVISION

Kentucky

WA4CQG/4 5258-120-12-A

Michigan

K8YYE 2720- 85- 6-AB
W8CNL 1830- 61- 5-AB
WB8BIN/8 1300- 50- 3-B
WA8IST 1092- 42- 3-AB
W8CVQ 840- 35- 2-ABD
WA8RQJ 602- 22- 4-B
K8AJC 308- 14- 1-A
W8WVU 264- 12- 1-B
K8WEX 198- 9- 1-AB
W8CKK 110- 5- 1-B
WA8USU 44- 2- 1-B
W8TJQ/8 (4 oprs.) 3888-108- 8-AB

Ohio

K8UQA 34,232-389-34-AB
W8MOW 11,178-207-17-AB
W8VP (WA8FHF, opr.) 9600-160-20-A
W8KKF 6112-191- 6-AB
WA8SAJ 5700-150- 9-A
WA8IHC 3898-114- 7-A
K8OWB 2782-107- 3-AB
WA8BOB 2600-100- 3-AB
W8JRN 2548- 98- 3-AB
W8HQK 2460- 82- 5-AB
K8BPB 2310- 77- 5-A
W8IPT 2210- 85- 3-AB
WA8STX 1924- 74- 3-AB
WA8IKN 1820- 70- 3-AB
W8WEN 1764- 43-11-B
W8HU 1728- 72- 2-AB
K8HRR 1500- 50- 5-AB
WA8COA 1378- 53- 3-A
WA8YHN 1316- 47- 4-A
K8MHJ 1218- 48- 3-AB
WA8YJC 1248- 52- 2-B
WB8BVK 1200- 50- 2-AB
W8PBX 1118- 43- 3-A
WA8LXW 984- 41- 2-A
WA8DTU 968- 44- 1-AB
WA8ZWI 888- 37- 2-AB
K8GDV 864- 36- 2-A
W8WAU 770- 35- 1-B
WA8RCN 768- 32- 2-A
K8DEO 756- 27- 4-B
WA8TCG 728- 26- 4-B
K8TIS 704- 32- 1-B
W8RLY 638- 29- 1-B
W8KSE 624- 26- 2-A
WA8LYM 616- 28- 1-B
WB8AHY 594- 27- 1-A
WA8YXE 456- 19- 2-B
W8BOV 440- 20- 1-B
K8DGE 360- 15- 2-A
W8DPW 352- 16- 1-AB
K8EJI 330- 15- 1-A
WA8GRR 240- 10- 2-A
WA8CKB 216- 9- 2-A
W8CRT 198- 9- 1-A
WA8BNW 198- 9- 1-AB
WA8YNV/8 88- 4- 1-B
WA8MPW 72- 3- 2-A
WA8PLZ (9 opr8.) 29,684-724-31-AB
W8CCI (12 oprs.) 20,848-356-19-AB
W8RXM/8 (WA8s VTW ZWJ, WB8BIM) 9782-157- 3-B

W8BI (5 oprs.)
2756-106- 3-AB
W8ZOF (W8ZOF, WA8-HUB) 2470- 95- 3-AB
W8VND (4 oprs.)
1235- 48- 3-A

HUDSON DIVISION

Eastern New York

WA2BAH/2
14,761-255-19-ABC
WB2RBG
13,716-260-17-AB
WB2SIH
10,649-232-13-AB
W2CGM 9672-157-21-A
WB2YQU
6188-119-16-AB
K2DNR 5800-116-15-AB
WA2GDS
3852-107- 8-AB
K2TMB 3528- 84-11-A
K2BGU 3496- 76-13-A
WB2MHH
2296- 82- 4-AB
WA2WSY
2288- 88- 3-AB
WB2ICZ 2262- 87- 3-AB
WA2DTE
2184- 84- 3-AB
WA2VUO
2160- 72- 5-AB
WA2VQZ
1992- 83- 2-AB
WA2MCP
1734- 51- 7-AB
WA2JWO/2
1456- 52- 4-AB
W2CTH 1380- 46- 5-AB
WA2GGD
1326- 51- 3-B
W2OOJ 1320- 44- 5-A
WA2KCB/2
1296- 54- 2-AB
WA2RWR/2
1200- 50- 2-AB
W2DSK 1128- 47- 2-AB
WA2OYV
1066- 41- 3-AB
WA2GXM
1056- 44- 2-AB
W2EOM 975- 38- 3-B
K2BUF 962- 37- 3-B
WA2PZB 930- 31- 5-A
W2FEN 840- 35- 2-B
W2HZZ 840- 28- 5-B
WB2GXF 800- 25- 6-AB
K2KTJ 792- 33- 2-B
WA2BER 768- 32- 2-AB
WA2FXJ 767- 30- 3-A
K2ACB 748- 34- 1-AB
WB2SWB 744- 31- 2-A
WB2SWA 726- 33- 1-A
K2ZEL 672- 28- 2-B
WB2QVX 660- 30- 1-AB
WB2OGN 638- 29- 1-A
W2AWF 624- 26- 2-B
WB2PZL 598- 23- 3-AB
WA2YRF 594- 27- 1-B
W2IP 570- 19- 5-B
WA2HAQ/2
560- 20- 4-B
WB2ICI 552- 23- 2-AB
WA2JIK/2
550- 25- 1-AB
WA2HAQ 480- 16- 5-B
WB2NPR 468- 18- 3-AB
W2HCS (K2ACB, opr.)
462- 21- 1-AB
WB2HSS 456- 19- 2-A
W2TMM 418- 19- 1-A
K2ECJ 396- 18- 1-B
WA2HRE 360- 15- 2-B
WB2BDG/2
336- 12- 4-AB
WB2DVV 336- 14- 2-B
K2HUG 330- 15- 1-A
WA2BQP 288- 12- 2-AB
WB2VLM
286- 13- 1-AB
WB2VLM/2
264- 12- 1-AB
WB2CLF/2
242- 11- 1-AB
WB2PUH/2
242- 11- 1-B
WB2BZE 240- 10- 2-AB
WA2YAF 220- 10- 1-A
WB2TDN
220- 10- 1-B
W2KBH 192- 8- 2-B
WB2VLZ 176- 8- 1-A
WA2BRA/2
154- 7- 1-AB
WA2EAH/2
154- 7- 1-AB
WB2VMF/2
154- 7- 1-AB
WB2WWZ
154- 7- 1-AB
WA1FPS/2
144- 6- 2-AB
WB2BPS/2
132- 6- 1-AB
WA2ETB/2
110- 5- 1-A
WA2YAF/2
66- 3- 1-B
K2KVC 22- 1- 1-A
WA2YBK 22- 1- 1-A
WB2VJB 22- 1- 1-B
WN2FWK 22- 1- 1-B
WN2HIH 22- 1- 1-B
W2JKI (6 oprs.)
41,965-605-25-ABCD
WA2BLM (WA2S BLM TYV)
12,006-261-13-AB
W2YPN (4 oprs.)
2106- 81- 3-AB
WB2FXB (WA1GWS, WB2FXB)
1408- 44- 6-B
K2UKE (K2UKE, WB2-OQU) 1170- 35- 7-B
WB2HWU (WA2BER, WB2ZCM)
308- 14- 1-B

N. Y. C.-L. I.

K2RTH
18,414-279-23-AB
W2VA/2 WB2DIN, opr.)
10,200-214-14-AB
WB2MZE
6834-201- 7-AB
WA2VFQ
5588-127-12-AB
K2RLW 3390-113- 5-AB
WB2UZU
3200- 80-10-AB

Lower Manhattan is probably not the world's best radio location, but **K2RLW** found it enough for a fifth-place finish among 31 NLI single-op entries.

WB2TJE
2856- 84- 7-AB
W2TD 2808- 78- 8-AB
W2TUK 2400- 60-10-AB
WB2GWU
2144- 67- 6-AB
WB2TYR
2000- 50-10-B
WB2ZTD
2000- 50-10-B
WA2DPF
1952- 61- 6-B
W2QAN 1736- 62- 4-AB
W2KXG 1620- 54- 5-B
WA2EUS
1560- 52- 5-ABCD
W2BNS 1350- 45- 5-B
WB2TUT
1320- 44- 5-B
W2TNI 1316- 47- 4-B
WB2YYV
1260- 45- 4-B
WA2CJF/2
660- 22- 5-B
WB2BFE 504- 18- 4-B
W2AGT 448- 16- 4-B
W2NBI 308- 11- 4-B
W2ML 264- 11- 2-B
WB2YIG 216- 9- 2-B
WA2FSX 168- 7- 2-AB
W2ZPG 144- 6- 2-B
K2JWT 140- 5- 4-B
WA2VBO 22- 1- 1-A
WA2YKH 22- 1- 1-B
W2AEE (WB2WWB, WB6NIK)
12,535-275-13-AB
WB2YZV (WB2S ESD YZV)
12,100-275-12-AB
WA2CVS (WA2BCY, WB2WOD)
9614-210-13-AB
WB2ENV (WA2HBP, WB2S DRW ENV)
1156- 34- 7-B

Northern New Jersey

WA2WZP
17,496-324-17-AB
WA2YEI
3072- 98- 6-B
WB2ECU
2941- 87- 7-B
WA2GIE
1904- 56- 7-AB
WB2ZGA
1740- 58- 5-B
W2CVW 1656- 47- 8-AB
WA2FAX
1652- 59- 4-AB
W2JM 1530- 51- 5-B
W2MEO 1410- 47- 5-B
WB2HEO
1060- 38- 4-B
WB2VPR 988- 38- 3-B
WA2EUO 494- 19- 3-B
WA2OOD 480- 16- 5-B
WB2GKE/2 (13 oprs.)
10,599-522-29-AB
K2OJD (4 oprs.)
18,816-336-18-AB
WA2UPK/2 (6 oprs.)
17,280-320-17-AB
W2GTF (5 oprs.)
9842-259- 9-AB
W2TA/2 (K1ANV, W2TA)
7992-222- 8-AB
K1HTV
10,179-177-19-B
W1HDQ*
8441-184-13-ABC
WA1IED
6890-133-16-ABCD
W1VTU 5460-105-16-B
K1ZJH 5439-130-11-AB
K1ZFE 5145-123-11-AB
W1WHL 4826-127- 9-AB
WA1IQJ 4180-110- 9-AB
WA1HUE
4040-101-10-AB
WA1IGQ
3924-109- 8-AB
K1TZD
3528- 98- 8-ABC
WN1ISD
2520- 71- 8-B
WA1IUO
2412- 67- 8-AB
W1VLK 2340- 65- 8-A
K1KKK 1664- 64- 3-AB
W1ENZ 1320- 55- 2-B
W1TL 1312- 41- 6-A
WA1JLD
1230- 41- 5-B
W1PRT 806- 31- 3-B
WA9HHH 1*
800- 25- 6-A
W1WOG 696- 29- 2-B
WA1ICI 624- 24- 3-B
W1EXU 576- 24- 2-A
W1RNT 572- 22- 3-A
WA1GIS 546- 21- 3-A
WA1ICN 528- 22- 2-B
KL7ELA/1*
507- 20- 3-B
WA1ISE 494- 19- 3-A
W1WRQ 456- 19- 2-AB
K1VIK/1 432- 18- 2-B
W1NBP 420- 15- 4-B
W1HAX 408- 17- 2-B
WA1HOL 408- 17- 2-B
W1QV 392- 14- 4-B
WA1IVD 384- 16- 2-AB
W1ICP* 336- 14- 2-B
WA1IAO 312- 13- 2-B
WA1GOI 264- 11- 2-B
WN1ISF 264- 11- 2-B
W1IKE* 240- 10- 2-B
WA1IUL/1
216- 9- 2-A
K1QNF 96- 4- 2-A
WA1EHL (K1DQV, WA1ANB)
14,560-260-18-AB
WA1IUO (K1VIK, W1-EXU, WA1IUO)
8844-201-12-AB
W1ARR (W1ARR, WA9-IHH) 1071- 33- 7-A
WA1GTP (WA1S EDJ FSK GTP)
736- 23- 6-AB
W1ORS (W1ASO, WA1-HNL, WN1JIG)
216- 9- 2-B

Eastern Massachusetts

K1AGB
9050-181-15-ABC
W1EUJ
8400-168-15-ABD
K1KNI 3600-100- 8-A
WA1GXW
3486- 83-11-A
WA1FCD
3383-100- 7-AB
K1CHY
3315-111- 5-ABC
WA1GVH
2805- 83- 7-A
W1DC (K1NZQ, opr.)
2074- 61- 7-A
K1QYY 1632- 51- 6-A
W1BXI 1582- 57- 4-AB
W1AGN 1540- 55- 4-A
WA1GDR
1350- 45- 5-AB
WA1BLS
1280- 40- 6-A
W1JVL 1215- 41- 5-B
K1CQX 1148- 41- 4-AC
WA1EHK
1120- 35- 6-B
W1RSR 1118- 43- 3-AB
W1NKA 1008- 36- 4-A
W1CHF 702- 27- 3-A
W1EZA 264- 12- 1-A
WA1JPU 96- 4- 2-A
W1MX (5 oprs.)
10,373-226-13-ABCD
WA1EIH/1 (WA1S EIH HRQ) 2772- 77- 8-A

New Hampshire

W1JSM 2912- 56-15-B
K1PMM 2460- 82- 5-A
WA1HZK 598- 23- 3-A
W1ALE 168- 6- 4-A

Rhode Island

K1IKN 4992-104-14-A
W1POP 2088- 58- 8-AB
K1JSG 1512- 42- 8-AB
W1CPC 900- 30- 5-A

Vermont

K1GYT 1260- 32-10-AB

Western Massachusetts

WA1HHN
8228-187-12-AB
W1VNH
5124-122-11-ABC
K1FWF/1
4408-116- 9-AB
K1DYL 3604-106- 7-AB
K1PYX 3120- 78-10-A
W1STR 3024- 84- 8-AB
W1QWJ 2580- 86- 5-BC
W1UPH 2380- 70- 7-B
W1ALL 2310- 83- 4-AB
K1RPB 1984- 62- 6-AB
WA1ECR
1846- 71- 3-AB
K1ANF 1836- 51- 8-AB
K1ULZ 1764- 63- 4-AB
W1CJK 1760- 55- 6-A
WA1GZO
1752- 73- 2-AB
K1NJC 1710- 57- 5-AB
K1BZM 1530- 45- 7-B
W1IC 1430- 55- 3-AB
K1LMY 1344- 48- 4-AB
W1UCB 1288- 46- 4-AB
WA1GYK
1248- 52- 2-B
W1TTL 1224- 36- 7-A
K1LDT 1144- 44- 3-B
WA1GOK
1092- 39- 4-AB
W1NY 1040- 40- 3-B
W1MDM 984- 41- 2-AB
K1PMK 960- 40- 2-B
K1BNS 888- 31- 4-A
W1OBQ 832- 32- 3-B
W1KK 806- 31- 3-B
K1WXU 756- 27- 4-B
W1ALL/1
W1ALL/1 728- 28- 3-B
K1ESN 600- 25- 2-B
W1UPF 552- 23- 2-AB
K1LJH 544- 17- 6-A
W1UWX/1
468- 18- 3-B
W1KUI, 448- 16- 4-A
W1UUB 384- 16- 2-B
K1CZZ 364- 14- 3-B
W1UWX 336- 14- 2-AB
WA1BTU/1 (5 oprs.)
5586-148- 9-AB
W1KXM/1 (4 oprs.)
5508-154- 8-AB
W1UKR (W1S KUE UKR) 1792- 56- 6-A
WA1IAN (WA1S IHX IAM LAN)
1350- 45- 5-AB

NORTHWESTERN DIVISION

Oregon

WA7IJV 1392- 58- 1-AB
K7WXW
1368- 57- 2-AB
K7ZIR 1066- 41- 3-AB
WA7GFP 682- 31- 1-AB
K7VIT (K7VIT, WA7-HAA) 1680- 70- 2-AB
WA7ECY (K7ZCB, WA7ECY)
884- 36- 2-AB

Washington

W7FN 2718- 77- 8-A
K7OFT 2002- 73- 4-A
K7VNU 1066- 41- 3-AB
W7FQE 432- 18- 2-B
W7SBC/7 (13 oprs.)
1680- 70- 2-A

PACIFIC DIVISION

East Bay

WA6ZTY/6 (WA6ZTY, WB6TIE)
6615-221- 5-B

Nevada

WA7GXM
512- 16- 6-A

Sacramento Valley

WB6VEO/6 (WB6UVH, opr.) 2400- 80- 5-AB
WB6NTL
2142- 63- 7-AC
WB6YCL
1110- 37- 5-A
W6KDJ 208- 8- 3-B
WA6JDT 120- 5- 2-B

San Francisco

WA6JUV 468- 18- 3-B

San Joaquin Valley

K6GSS/6
3306- 87- 9-AB
WA6NRV
3024- 72-11-B
W6YK8 420- 14- 5-B

Santa Clara Valley

WA6FAC
5760-160- 8-AB

K6DTR 1952- 61- 6-AB
WA6OMJ 756- 27- 4-B
WA6YGF/6 (4 oprs.) 4830-161- 5-AB
WB6YNP (WA6DXC, WB6YNP) 2346- 69- 7-BD
WB6WLE (WA4VKA, WB6s RGR WLE) 1108- 43- 3-AB

ROANOKE DIVISION

North Carolina

K8YKO/4 2100- 70- 5-A
WB4INE 1536- 48- 6-A
W4HJZ 570- 19- 5-ABD
WB4GKF 555- 19- 5-A
WB4CES 504- 21- 2-AB
K4DFI 374- 17- 1-B
WB4HTR 252- 11- 2-A

South Carolina

K4GL 532- 19- 4-AB
WB4BVF 234- 9- 3-A

Virginia

K4SUM 5418-129-11-ABD
W4VZR 1836- 51- 8-B
W4HRA 1232- 44- 4-B
W4LYX 1136- 36- 6-B
K4TXD 352- 11- 6-B

West Virginia

WA8ZLP 1598- 47- 7-AB
K8JLW 1428- 42- 7-A

ROCKY MOUNTAIN DIVISION

Colorado

WØAJY 1344- 56- 2-AB
KØYJG 704- 32- 1-AB

C.W. was the salvation of **WA8PST,** who placed fourth in Michigan. Ken used an Ameco TX-62 into a Hy-Gain DB62.

WAØPHZ/Ø (4 oprs.) 1320- 60- 1-AB

Utah

K6DLY/7 22- 1- 1-B

SOUTHEASTERN DIVISION

Alabama

K4WHW 704- 32- 1-AB
K4EAO 264- 12- 1-AB

Eastern Florida

W4OJU 1364- 62- 1-AB
WB4KUN 624- 24- 3-A
WB4HML 594- 27- 1-B
WB4HIP 286- 11- 3-A

Georgia

W4PYM/4 (K4KJP, WA4HKX, WB4FNV) 572- 22- 3-AB

West Indies

KP4DFH 165- 8- 1-A

SOUTHWESTERN DIVISION

Arizona

WA7GUH 88- 4- 1-A

Los Angeles

WB6CKT 3870-129- 5-AB
WB6IMV 3052-109- 4-ABC
K6BPC (W6FNE, opr.) 2472-103- 2-AB

WA6KIK 1274- 49- 3-A
WB6YVP/6 384- 16- 2-B
K6S8N 264- 11- 2-B
WB6UZY 260- 10- 3-A
WA6DIW/6 (WA6DIW, WB6s FRD RJG) 3912-163- 2-AB

Orange

K6YNB/6 7680-256- 5-AB
WB6PHO 672- 28- 2-AB

WEST GULF DIVISION

Northern Texas

WA5LUM 1210- 55- 1-A
K5WVX 1180- 30-10-A
W5BWX 924- 42- 1-A
K5YKK 506- 23- 1-A
K5ZAM 264- 12- 1-A
K5CMC 220- 10- 1-A

Oklahoma

WA5OUU 770- 35- 1-AB
WA5RCG 552- 23- 2-AB

Southern Texas

WA5TXI 1638- 41-11-A

CANADIAN DIVISION

British Columbia

VE7AZG 888- 37- 2-AB
VE7XF 312- 13- 2-A

Ontario

VE3ASO 7130-155-13-B
VE3BQN (VE3ABG, opr.) 4488-102-12-BD
VE3FWV 3328-128- 3-B
VE3DSQ 2091- 62- 7-B
VE3ERQ 1800- 75- 2-B
VE3AIB 816- 34- 2-BD
VE3GAF 510- 17- 5-A
VE3OJ 480- 20- 2-AB
VE3DNR 432- 18- 2-B
VE3AQT 286- 13- 1-B

Quebec

VE2BMH 198- 9- 1-A
VE2BGJ (5 oprs.) 2288- 53-12-ABD

Check logs: WA1KMT, W7MRX.

June 1944

. . . K. B. Warner's Editorial winds up with "The country's established practice of protecting and fostering amateur radio must commend itself to everyone as the wisest kind of national policy." He lists five general categories of reasons. The most important, he feels, is the availability of amateur bands in time of national emergency. Were there no amateur radio, these frequencies would be occupied by all sorts of services and it might be well nigh impossible to capture them.

. . . Cyrus T. Read, W9AA, proposes that post-war hams devote considerable time and energy toward developing a method of directive reception for the low frequencies. He lays the groundwork for such research and suggests a few methods of approach. This device is indicated in view of the anticipated QRM.

. . . "Restoring Dry Cells" is the topic discussed by Robert N. Eubank, W3WS. He has done a pretty thorough job on this and tells just how it is done. Rates of charging, as well as recommended time cycles. The material affected is not the zinc, as one would suppose, but the depolarizer, maganese dioxide. This turns to a monoxide during discharge. Charging the battery reverses this process. Very interesting and useful information, even today.

. . . S. E. Spittle, W4HSG, gets us into a little math. He is talking about the concept of using admittances in the solution of problems involving parallel and series-parallel circuits. He solves some problems and the math doesn't look too tough.

. . . I find myself reading "25 Years Ago this Month" by K. B. Warner. This, of course is about the goings on fifty years ago. The League was broke; it was necessary to pass the hat at the board meeting to raise sufficient funds to get started after WW1. The Wouff Hong had come into being and Warner delightfully described the reaction of board members upon first viewing this awesome object. (Wonder what it *really* was — *RBB*).

. . . More math. Edward M. Noll, ex-W3FQJ, shows how to apply simple mathematics to screen and plate voltage problems. There is nothing but ordinary arithmetic — no trig and no complex quantities.

. . . "Hams in Combat" this month relates the adventures of a hospital ship in the war zone. The story is well told by S/Sgt. John F. Wojtkiewicz, W3JGY. While he uses code names for places involved, it is not difficult to deduce just about where the action took place.

. . . J. K. Bach, W4CCE/3 writes satirically about the "Menace of Amateur Broadcasting." It is anticipated that this article will bring a flood of protesting mail. — *WIANA*

Although a story involving CBers, this tragedy should be a lesson to us all . . . "What should have been a carnival atmosphere turned into one of mourning as two citizen band radio enthusiasts were electrocuted while attempting to put up an antenna at the site of a regional 'carnival' for CB radio operators. The two men were killed when a 35-foot antenna they were attempting to put up fell against a power line." (From the *Wichita Falls Times*)

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity

HRH

CONDUCTED BY GEORGE HART,* W1NJM

Standard Operating Procedure

ONCE, long ago, a member wrote in asking how come the amateur and the Navy didn't use the same procedure. The reply was that this would indeed be a good idea, but unfortunately the Navy seemed reluctant to adopt amateur procedure.

This was intended to be humorous and was taken that way, but it illustrates a good point, just the same. There is a limit to the universality of standard operating procedure, better known as SOP. But first of all, let's make sure we all know what it means.

Those of us who served in the armed forces will know, for all of us have had it drilled into us in one way or another. In general, it means having a set, prescribed way of doing things, without deviation. Often it is given as a reason for doing certain things a certain way, as though the SOP were the reason in itself, without in turn being based on reason. You would hear someone say, for example: "Why? Because it's SOP, that's why!" Or sometimes, humorously, the answer would be: "Because it's harder that way," or "There are three ways of doing things — the right way, the wrong way and the Army way."

But all SOP, and communications SOP especially, is based on the requirements to be met in handling the communications. These requirements differ from service to service, sometimes radically, sometimes only in certain details, but rarely is the SOP the same for any two services. Even within our own armed services there are marked differences between Army, Navy and Air Force. Commercial services have their own idiosyncrasies. Telephone and wire companies and railroads have still different procedures. Thus, they are "standard" within the service, but there are few if any inter-service standards, except in a very general way.

Down through the years, as amateur radio has slowly matured as a communications service, the amateur SOP has developed as a conglomeration of procedures used by various commercial services, the armed forces and the amateurs themselves. The international Q signals have been widely adopted, yet some used do not derive from this source. Military message format has influenced our own, but yet there are many differences. Prosigns and prowords have been developed that are strictly amateur, yet many have been adopted from other services. Amateurs have objected because the procedure recommended by ARRL has not always followed the procedure of whatever service in which the objector was trained. But the fact is that no two services have the same exact requirements and therefore it is not only unlikely but illogical that any two services will have exactly the same procedure.

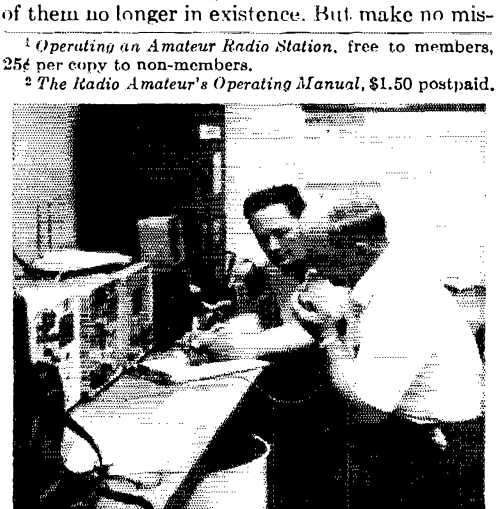
This brings us again right smack up against the question we were talking about last month. Is amateur radio itself a service, or does it simply consist of amateurs scattering their know-how among a dozen or so other services and using their procedures? If the latter, there is no problem: we'll just stay at arm's length from each other, each use his own type of procedure and eye each other suspiciously across the amateur spectrum.

But if we decide we want our own service, set up for the purpose of serving others, then we should also decide what our procedure shall be and who shall set it. Your ARRL, ever since The Old Man's "Rotten" articles, has endeavored to set standards for the amateur service, and has to a great extent been successful. The procedures set down in the Operating Booklet[1] and in more detail in the Operating Manual[2] reflect a couple generations of amateur experience, with liberal borrowings from other services, some of them no longer in existence. But make no mis-

*Communications Manager, ARRL.

[1] *Operating an Amateur Radio Station*, free to members, 25¢ per copy to non-members.

[2] *The Radio Amateur's Operating Manual*, $1.50 postpaid.



Even though Eastern Florida had a successful SET, Polk County Radio Officer K4EBO held a "semi-unannounced" drill on March 30. Here, W4OVE (foreground) and K4EBO are in the control center. Our reporter says the drill was successful and everybody had a ball.

take about it, they are *amateur* procedures set up to meet amateur requirements. Get yourself a copy of one or the other of the above and use amateur procedure on the amateur bands. — *W1NJM.*

Public Service Diary

On February 20, while demonstrating a new receiver to a friend, WA2SZS tuned across a Chilean amateur requesting aid in the location of drug to control bleeding in hemophiliacs. A nine-year-old boy was in need of an appendectomy, and without the special drug to help stop the bleeding, the necessary operation would almost certainly prove fatal.

A student pharmacist, WA2SZS immediately recognized the drug and offered to try to locate the serum. The manufacturer of the drug, in the midwest, was contacted and transportation for the drug was arranged. At last report the Chilean boy was recovering. — *W3NOH.*

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The Ross County (Ohio) Civil Defense Director requested amateur communications assistance to aid in the fighting of forest fires at Waverly, Jackson, Hamden and Wellston. Six mobiles, one in an airplane, responded to the call and were assigned to various areas. A total of twelve amateurs participated in the activity. — *K8SUB, EC Ross County, Ohio.*

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The Los Alamos, New Mexico, AREC was contacted on March 21 to aid with communications in the search for a woman and her baby who were lost somewhere in the area. The Civil Defense Headquarters station was manned by K5QIN and WA5RCP while the Los Alamos ARC station, W5PDO, was operated by W5NDW, WA5ROU and WA5RPC. Field mobile units were set up by *W5s* OJM PNY, *K5s* EJW MFD RHR UNV, *WA5s* ROW YCP. The woman was located alive, but the child had died. — *K5QIN, Assistant EC Los Alamos, N. M.*

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In the April Diary, the search for a missing aircraft in which amateurs had participated was described. The plane, however, was not found and the search was eventually called off. However, amateurs did figure in the location of the wreckage more than two months later.

On March 25, two men discovered the wreckage in the remote western section of the Pretty Girl Ranch ten miles west of Anselmo, Nebr., while hunting coyotes. The hunters immediately drove to the nearest home to inform the proper authorities.

The nearest residence was that of the foreman of the ranch, WAØEWC. Since there is no telephone at the home, the amateur radio rig was used to summon aid. KØLFA answered the call, and the police were notified.

The crash, in which six people died, was not discovered in the original search because of heavy snow that completely hid the wreckage. — *KØOAL, SCM Nebraska.*

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On February 9, K2HTX was contacted by the local Radio Officer and was advised that a snow emergency was in effect. All AREC members were advised and nets were held on 10, 6, and 2 meters with checkins from Babylon, Smithtown, Huntington, and Oyster Bay, New York. These nets remained active until it was apparent that roads were being cleared and the emergency was over. — *K2HTX, EC Suffolk, N. Y.*

Members of the Western Quebec VHF and UHF ARC supplied check-point communications for the National Sled Dog Races held in Hudson, Quebec, on March 2. Eleven amateurs were on the scene, but fortunately nothing out of the ordinary occurred. — *VE2ALE, SEC Quebec.*

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At 1515 Z on March 9, Assistant EC WB2RPL of Glens Falls, N. Y., was contacted by officials of the Saratoga Chapter of the American Red Cross. A train derailment had occurred in Mechanicsville and communications were needed between the scene of the accident and the chapter headquarters.

One of the derailed cars was a tanker containing 33,000 gallons of liquid petroleum. Fire and explosion were feared. WB2RPL contacted WB2GCN and asked him to man the station at Red Cross headquarters; WB2YMY went to the scene of the derailment with his mobile. It became necessary to use a relay between the two points so WB2RPL used a second mobile unit to provide the necessary function. Fortunately, no explosion occurred and the operation was secured at 1652. — *K2AYQ, EC Glens Falls Area, N. Y.*

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A sports-car rally sponsored by the Stanford (Calif.) Area Explorer Scout Post was held on March 9 with communications between check-points and judges being supplied by another Explorer Post, sponsored by the South County Amateur Radio Society and the Redwood City C. D. and Disaster Group. Eighty meters was used with two checkpoints, one located at Boulder Creek and the other along the Cabrillo Highway in Santa Cruz County. The Net Control Station and judges were at the Palo Alto Civic Center.

Communications were initially established at 2045Z with portable generators being used for power. The last car passed the final check-point at 0115Z on March 10. Exact times of arrival and departure of each of 25 automobiles were dispatched to the judges from each of the two check-points. — *W6DEF, EC Redwood City, Cal.*

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A communications network for a cerebral palsy fund drive was set up covering most of south central Tennessee on March 9. More than twenty amateurs were active in the operation, which was used to pass collection totals from various points around the state to the headquarters in Tullahoma. W4IYU was operating from the headquarters while K4TQL and K4VFA operated from Manchester; K4EGC was in Lynchburg; and WA4RAS reported totals from Winchester. Seventy-five and two-meter facilities were used. *W4s* CIO WJH, K4AVB, and WB4KHW acted as *net controls during* the six hours of the drive. — *W4WJH, SEC Tennessee.*

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The Platt County (Nebr.) Emergency Operations Center was maintained on a 24-hour-per-day watch for three days beginning March 11 as a large ice jam on the Loup River was threatening to cause flooding of some residential areas in the county. KØRPC, WAØOHO and several other amateurs assisted civil defense authorities by taking river readings. There was some minor flooding and some areas were evacuated, but the ice jam was dynamited on March 14 and the water receded. Seventy-five and two-meter equipment was used. — *KØODF, SEC Nebr.*

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Forty-three SEC reports were received for the month of February, 1969, representing 16,059 AREC members. This is two more reports and 682 more

members than the same month last year. Sections reporting were: Ala, Alta, Ariz, Ark, BC, Colo, Conn, Del, EFla, EMass, EPa, Ind, Iowa, Kans, Ky, La, Mar, Mich, Mo, Mont, Nebr, Nev, NMex, NLI, NNJ, NTex, Ohio, Okla, Que, SDgo, SF, SCV, Sask, SDak, SNJ, STex, Tenn, Utah, Va, Wash, WVa, WFla, WPa.

Traffic Talk

Recent developments in the organized traffic-handling front seem to indicate that it is time for some soul-searching regarding our ARRL traffic-handling organization. The feeling by some worthwhile traffic-handling contingents that they are "left out" of the League's organizational sphere has reached policy level in some places. Suppose we do some impartial introspection on the matter.

Yes, we said impartial. This means without prejudice, either for or against. Unfortunately, most people are *highly* prejudiced one way or another, often to the extent that they are prone to claim prejudice on the part of others who do not share their prejudices. For example, can you tell a phone operator who has never handled traffic on c.w. that he must learn c.w. in order to be a fully rounded traffic man? Can you tell a c.w. man who doesn't own a modulator and doesn't want one that it is possible to handle traffic quickly and accurately by voice? Can you tell *either* of them that they must work together in a single traffic-handling facility, each in the place where he will do the most good?

Well, you can, but convincing anybody of anything against his prejudices "ain't easy." Time and again we are asked to set up a national traffic system on phone to parallel the presently existing one through which it is claimed the c.w. amateur enjoys sponsorship by ARRL which the phone amateurs cannot share. At a certain level, it is said, phone operation is cut off and c.w. takes over, as witness the fact that at the NTS region, area and TCC level the operation is exclusively c.w. Yet, there are more section and local traffic nets operating by phone than by c.w. Why can't a system of nets at the same or equivalent high levels as present NTS higher levels be set up so that all phone traffic can be handled by phone, from origin to destination? Why must they all go through the same cumbersome, slow, multi-relay c.w. channels before again arriving at a local (usually phone) level for delivery? As voice operation using sideband with VOX increases in popularity and traffic-handling by this method increases in efficiency, the demands for more recognition of this type of handling become more insistent.

K7ZQV. Woody is another "rare" Nevada traffic man and member of the Northern California Net.

(Photo by K6KOL)

The questions thus posed are legitimate ones and deserve answers, but the situation is not quite so simple as would appear at first glance. In the first place, in defense of the present NTS setup let it be said that there is not now nor ever has been any prohibition against use of voice or voice nets at any level. What has made it seem this way is the requirement for liaison between and among all NTS nets, and the fact that NTS operates as a unit. That is, there is only *one* NTS sponsored by the League — an integrated one using all or any mode available to amateurs but letting the *need*, rather than the mode, set the theme of operation.

Okay, just what *are* the needs? Well, they vary at the various levels. At the local levels (Local and Section) the need is coverage — as many QNIs as possible to saturate the area so that incoming traffic can be delivered almost by shouting out the window. At region, area and TCC levels, the need is representation — of sections at region level, of regions at area level and of areas at TCC level. The way it has worked out so far, phone best serves the need at local and section levels, c.w. at region, area and TCC levels. Voice nets have been attempted at region level, but without notable success. RTTY has also been attempted at transcontinental (TCC) level with better success but hampered by a lack of qualified operators who are more interested in traffic handling than in RTTY; in other words, there are plenty of RTTY enthusiasts willing to handle traffic, but mighty few who are interested enough in traffic handling as such to conduct the necessary liaison with c.w. nets to get the traffic at one end and dispose of it at the other.

When it comes to "needs," however, even more basic than the above are the following, not necessarily in order of importance: (1) To get the most traffic promptly and accurately from its origination to its destination. (2) To set up nets and schedules capable of accommodating a maximum number of participants at times suited for maximum convenience. (3) To provide a maximum of training to the greatest number of people.

A lot of words, but what do they really mean? Well, the first point has to do with speed, accuracy and quantity. The problem is not this or that message, but the mass handling of traffic in quantity if or as it is necessary — such as it certainly would be in an emergency situation; in other words, *system*. We don't handle traffic by the seat of our pants, we know precisely what is to be done with each message and we handle it accordingly, pretty much in stride.

Point number two does not mean accommodation of any individual's or group's convenience, but the setting up of standard meeting times of the various net echelons in accordance with times when most hams can be on the air. When is this? During the early and mid-evening hours, naturally. Thus, most NTS activity occurs between the hours of 7 and 10 P.M. local.

Point three represents a step *away* from the time-honored "iron man" tradition of the past by providing for different net control stations, different alternate NCS's and different liaison representatives and alternates for each night of the week to get as many traffic people as possible into the leadership phases of the activity. It also permits traffic to pass systematically from one echelon to the other in a manner consistent with overall efficiency.

Critics of the system are prone to point out that points (1) and (3) conflict, that providing for all the relays (and consequent training benefits, real or imagined) slows down the traffic and increases the error factor. From a purely practical standpoint, this is unfortunately true; and yet, since the traffic being handled for practice purposes is seldom of importance (shouldn't be on the amateur bands otherwise — during "normal" times), is it worth it to dispense with the training angle to eliminate these relays? Besides, if properly handled, there really isn't all that delay, or all those errors, because the nets meet sequentially to avoid it.

But enough of the defense posture. Perhaps we should take down our guard and have a good long look at our NTS. Is it obsolete, as many critics claim? Should we revise the structure? If so, how? By tearing it down and starting from scratch? By setting up a parallel phone NTS? How about still another NTS for RTTY? Or should we abandon the NTS concept entirely and start over, utilizing all presently-operating independent nets? That is, should ARRL get out of the traffic-system sponsorship game altogether? Maybe the best thing to do is leave local and section organizations as they are at present but tear down the present NTS superstructure that ties them together and replace it with a bunch of national calling and answering frequencies which operate on a 24-hour basis.

There are lots of proposals kicking around. The problem is to find one which will do a satisfactory job for the greatest number of amateurs and at the same time adequately fulfill our public service responsibilities. — *WINJM.*

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National Traffic System. Many net managers have commented on the aurora of March 24. CAN manager WA9RAK says he couldn't hear a thing, but a CAN session was held with perfect representation and some traffic was passed. Doug also lists 7090 kcs. as the CAN secondary frequency for the rough summer sessions just around the corner. W6VNQ also reports PAN switching to 40 meters with the return to 80 tentatively scheduled for September 1. W2FR congratulates NLI on representation in all 62 sessions of 2RN for the first time in two years. A 4RN certificate has been issued to K6QPH/4.

March reports:

	Sessions	*Traffic*	*Rate*	*Average*	*Representation (%)*
EAN	31	2016	1.299	65.0	100.0
CAN	31	1166	1.118	42.1	100.0
PAN	31	990	1.003	32.0	100.0
1RN	62	783	.395	12.6	96.3
2RN	62	707	.885	11.4	98.7
3RN	62	551	.429	8.9	98.4
4RN	59	608	.428	10.3	87.6
RN5	62	592	.372	9.5	88.2
RN6	62	951	.659	15.3	98.9
RN7	59	299	.267	5.1	46.3
8RN	62	608	.405	9.8	98.4
9RN	60	531	.443	8.9	83.9
TEN	62	492	.552	7.9	81.9
ECN	59	216	.279	3.7	72.5
TWN	59	244	.264	4.1	67.7
Sections[1]	2306	12881		5.6	
TCC Eastern	124[2]	774			
TCC Central	93[2]	694			
TCC Pacific	124[2]	862			
Summary	3129	25965	EAN	13.1	—
Record	3031	33737	1.420	14.2	—

[1] Section and Local nets reporting (71): PTN (Me.); MSN, MJN (Minn.); NCNL, NCNE, THEN (N. C.); EPA, PTTN, VHFTN, EPAEPTN, PFN (Pa.); NMRTN (N. M.); WSN (Wash.); 1LN (Ill.); M6MTN, QMN, WSSB (Mich.); GN, VEN, FMTN, WFPN, FAST, TPTN, FPTN, NHN (Fla.); FCATN, KTN (Ky.); CN, CPN (Conn.); WIN, WSSN, WSBN (Wisc.); OZK (Ark.); MDDCTN (Md.-D. C.); OSN, BN, OSSB, Franklin Cty. (Ohio); BUN (Utah); NYS, NLI, NLI Phone, NLI VHF (N. Y.); SSZ, OLZ (Okla.); QIN (Ind.); RISPN (R. I.); HNN, CNN (Colo.); NJEPTN (N. J.); VSBN, VN, VSN (Va.); West Quebec UHF, RTQ (Que.); GSN (Ga.); TTN, TEX (Tex.); NCN (Cal.); WVN (W. Va.); AENB, AEND, AENH, AENM, AENR (Ala.); TN (Tenn.); LAN (La.); WMN (Mass.); MTN (Mont.); QKS (Kans.); BCEN (B. C.).

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

W6DEF. Hal is a long-time traffic handler and is also active in AREC as Emergency Coordinator of Redwood City, California.

Transcontinental Corps. W3EML reports most skeds working well with conditions generally good. W7DZX reports many Pacific Area skeds now moving to 20 meters.

January reports:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	124	94.4	2238	774
Central	93	96.7	1430	694
Pacific	124	94.4	1716	862
Summary	341	95.0	5384	2330

The TCC Roster: Eastern Area (W3EML, Dir.) — *W1s* BJG EMG EOB NJM YKQ, K1ESG, *W2s* FR GKZ MTA PU, K2RYH, *WA2s* BHN BLV UWA, WB2OYE, W3EML, K3MVO, *W4s* NLC UQ ZM, K4KNP, WB4DXX, K6CAG/1, W8s AHZ IXJ UM, K8KMQ, WA8POS, VE3GI. Central Area (WØLCX, Dir.) — W4OGG, K4AT, WB4AIN, *W5s* MI RHF, *W9s* CXY DND VAY, *WA9s* BWY RAK VZM, *WØs* LCX HI INH QQQ, *WAØs* DOU IAW MLE, KØAEM. Pacific Area (W7DZX, Dir) — *W6s* BGF BNX EOT IPC IPW VNQ VZT, K6DYX, *WA6s* BRG ROF, WB6HVA, *W7s* KZ ZIW, K7HLR, WA7CLF.

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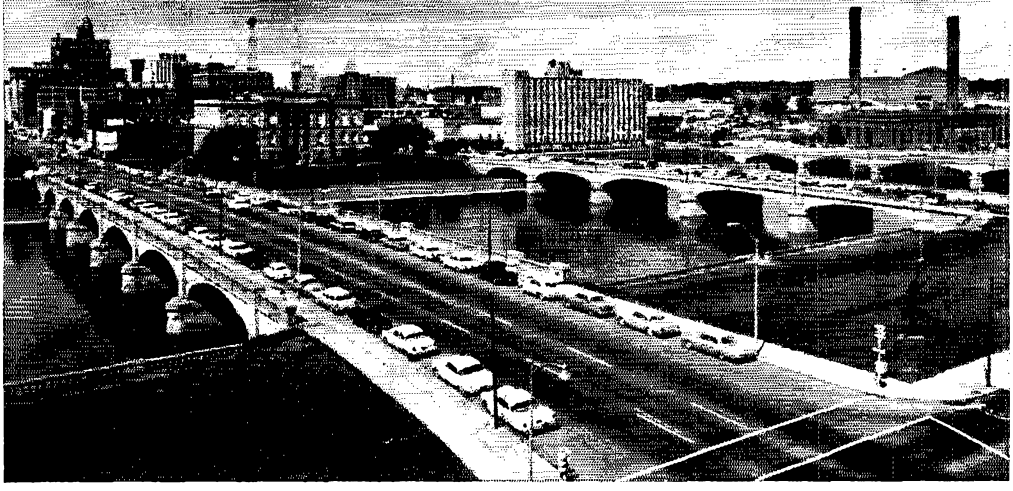
Independent Net Reports:

Net	*Sessions*	*Checkins*	*Traffic*
All Service	5	89	30
QTC	21	222	91
Mike Farad E & T	26	349	229
7290	42	1851	1298
Northeast Traffic	31	384	439
Hit & Bounce	31	383	255
Eastern U. S. Traffic	27	72	103
Clearing House	25	420	260
20 Meter ISSB	21	483	8651
North American SSB	26	615	356
75 Meter ISSB	31	1219	286
Eastern Area Slow	31	155	77

QST

1969 ARRL NATIONAL CONVENTION



Des Moines, Iowa *June 20–22*

BY VERN MODELAND,* WAØJOG

THIS month's multicolor convention cover depicts the midwest flavor of Iowa, home of radio pioneer Art Collins, WØCXX and ARRL President Bob Denniston, WØDX. More than 1600 guests are expected to attend the festivities at the Fort Des Moines Hotel in downtown Des Moines.

Iowa Governor Robert D. Ray is to participate in the convention. The governor will open formal convention activities Friday, June 20, and will again appear on the program during the closing banquet at noon Sunday. Governor Ray has proclaimed the week of June 15-21 as Amateur Radio Week in Iowa in recognition of the public and community service performed by licensed amateur radio operators.

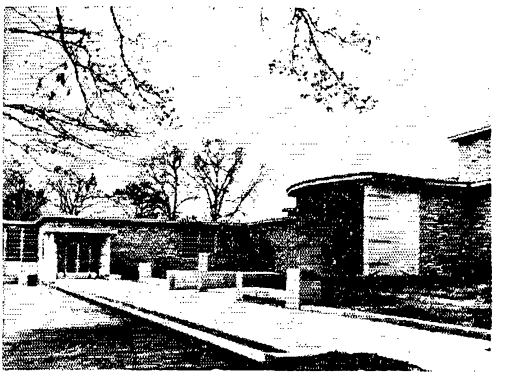
A year in planning, Convention '69 — as the 1969 National has been labeled — will include in its program a full variety of features to attract all interests within the amateur radio fraternity as well as their families. Featured banquet speaker for the convention will be U. S. Senator Barry Goldwater, K7UGA. The program has been built around a theme of "Communications — Our Future." Planned highlights in addition to Sen. Goldwater's address, include a question and answer session to be conducted by Everett G. Henry, W3BG, Chief of Amateur and Citizens Radio Division of the Federal Communications Commission. Henry joined the FCC in 1938 as a radio inspector and has held a number of engineering posts in the Office of Chief Engineer, Broadcast Bureau and Safety and Special Radio Services Bureau. From 1953 to 1956, he was engineering assistant to commissioner and spent the following four years in the Office of Opinions and Review. From 1960 until his present appointment, he was Chief of the Marine Radio Division. A native of Oregon, Henry holds a B.S. degree in Electrical Engineering from the University of Washington.

Representing the ARRL will be President Denniston, WØDX; John Huntoon, W1LVQ, General Manager; George Hart, W1NJM, Communications Manager; Robert Booth, W3PS, League General Counsel; Bob White, W1CW; Ellen White, W1YYM; Lewis McCoy, W1ICP, and Ed Tilton, W1HDQ.

Tilton, v.h.f. editor of *QST*, will present a program on v.h.f. radio techniques and McCoy, Beginner and Novice editor, will conduct a presentation on antennas. Hart is scheduled to speak on traffic handling. Ellen and Bob White will provide features on DX and DXCC with Mrs. White's program slanted to the lady ama-

*602 S. Clifton Ave. Wichita, Kansas 67218.

Governor Robert D. Ray of Iowa signs the proclamation designating the week of June 15 to June 21 as "Amateur Radio Week." Looking on from left to right are Tom Fergus, KØQXT, Warren Huffman, KØCVT, President of the Des Moines Radio Amateur Association, Gov. Ray, Lee J. Roy, WØUDO, Convention Chairman, Don Starr, WAØMUR, Bob Eaton, WØHFU, State Radio Officer.



The Des Moines Art Center is one of the many cultural attractions for the XYL and family to visit while the OM is making the rounds at "Convention Central."

teur's point of view. Bob Booth has been scheduled to participate in a general forum on amateur affairs.

Other convention features include a tri-service Military Affiliate Radio Service (MARS) meeting headed up by Edward S. Liscombe, K4KNV, Chief Army MARS, Maj. Richard B. Wareing, Air Force MARS, and Lt. Cdr. Robert E. Mickley, Chief Navy MARS.

H. W. Bourell, Engineer-In-Charge, FCC 17th District, Kansas City, Mo., has arranged for amateur radio license examinations to be given on the opening day of the convention. Examinations will be conducted in Room 314 at Des Moines Technical High School, approximately five blocks west of convention headquarters, between the hours of 9:00 A.M. and 1:00 P.M. Anyone interested in taking an examination in connection with convention activities must be pre-registered with the FCC District Engineer-In-Charge, 601 East 12th Street, Kansas City, Mo. 64106.

Senator Barry Goldwater, K7UGA, will be the featured guest.

A code contest also will be conducted by FCC personnel on Friday. Cermonies of the Royal Order of the Wouff Hong, the amateur secret society of the ARRL, will be held at midnight Saturday.

Throughout the convention, representatives of the Eye Bank Network will explain functions of the network in detail, while the National Post Office Net also will hold an open meeting for all convention guests discussing and explaining the operations of this amateur radio service. National Post Office Net Manager Philip D. Brust, W8QCU, is to attend as well as representatives of the communications, research and engineering departments of the Post Office Department.

WØDXCC will meet in conjunction with the national convention with members assisting in other DX presentations. Both Amateur Radio Public Service (ARPS) and Radio Amateur Civil Emergency Service (RACES) program features have also been included in the program planning for the convention.

Latest radio equipment from several manufacturers is to be displayed on the third floor of the hotel where the leading amateur radio publications also will be represented.

Special women's features will include tours, fashion shows, a cinerama showing, luncheons and programs on hair styling and grooming. Many department stores and fashion shops are within easy walking distance of the convention hotel.

A night club act, The Colleagues, has been booked to entertain with music and comedy routines on both Friday and Saturday nights.

While pre-registration is scheduled to close May 15, tickets will be available at the time of the convention. Registration is set at $6 for the convention, $6 for the two nights of entertainment and $6 for the Sunday banquet.

According to convention officials, two other major hotels in the downtown area and several large nearby motels will be available to accommodate late registrants. QST

COMING ARRL CONVENTIONS

June 13–15 — Pacific Division, Sacramento, California.
June 20–22 — NATIONAL, Des Moines, Iowa.
July 4–6 — Rocky Mountain Division, Salt Lake City, Utah.
July 5–6 — West Virginia State, Jackson's Mill.
August 16–17 — West Gulf Division, Amarillo, Texas.
August 29–30 — Great Lakes Division, Louisville, Kentucky.
October 11–12 — Roanoke Division, Huntington, West Virginia.
October 17–19 — Southwestern Division, San Diego, California.

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.

ROCKY MOUNTAIN DIVISION CONVENTION Salt Lake City, Utah July 4-5-6

The Rocky Mountain Division Convention will be held in Salt Lake City, Utah on July 4–6, at the Hotel Utah. There are many activities for youngsters, oldsters, YLs, XYLs and kiddies. The convention program will include an opening address by the Governor, the PICON award, ladies program and luncheon, and a Saturday night banquet. Technical sessions will cover semiconductor applications, moon bounce, MARS, nets, traffic handling, c.w. contest, ARRL open forum, Wouff Hong initiation and a DXpedition presentation by Lloyd Colvin, W6KG, and his XYL. And last but not least, a gathering for the finale which we all look forward to. The MC of the Saturday evening banquet will be our Division Director Carl Smith, WØBWJ. Attending League officials will be ARRL President Bob Denniston, WØDX, and Communications Manager George Hart, W1NJM. In between convention activities there will be fireworks in several areas near the Salt Lake. Tourist attractions include the "Promised Valley" play and the world famous Mormon Tabernacle Choir broadcast right next to the Hotel Utah. Plan to arrive early. There are many places to stay in Salt Lake City; but, make reservations early as this date is in the middle of the busy tourist season. Convention preregistration is $4.50 before June 20th; after that date it is $5.50. Banquet tickets are $5.25. Hotel Utah single rates are $12.00 and double rates are $16.00. Make hotel reservation directly to Hotel Utah at South Temple and Main Street, Salt Lake City, Utah. For convention registration and banquet tickets write to Kenneth N. Brown, 401 Newhouse Building, Salt Lake City, Utah 84111. All checks should be made payable to the Utah Council of Amateur Radio Clubs.

PACIFIC DIVISION CONVENTION Sacramento, California June 13–15

The 1969 Pacific Division Convention will be held June 13–15 at the El Dorado Hotel in Sacramento. Convention Chairman Ev Taylor, W6DOR, has called it the Convention with Dimension. Besides the various displays of leading manufacturers and suppliers of amateur equipment, we will have a chance to meet the "Main Street Gang" from Hq. in Newington. Various guest speakers and forums are lined up including Ozzie Jaeger, W3EB, who will discuss solid state rectifiers; Ney Landry, W6UDU, from the FCC to answer all your questions concerning regulations and testing; Gregg Tobin, W6CCN, who will cover weather satellite tracking; and a DX forum to be handled by Hugh Cassidy, WA6AUD, of the NorCal DX Association. The RAMS, guided by Les Cobb, W6TEE, will be judging the mobile contest and, of course, WB6CBW and the Westcars gang will be there. The MARS forum will be conducted by Chief Air Force MARS, Assistant Chief Navy MARS, Chief Army MARS, and a Marine Corps representative. As a real "extra", the Northern California QCWA will have the largest display of antique ham and commercial equipment. It will include material from KQW, San Jose, the oldest commercial broadcast station in the United States. Preregistration, including banquet ticket, is $10. For details write to Pacific Division Convention Committee, 4100 Worthington Drive, North Highlands, California 95660.

WEST VIRGINIA STATE CONVENTION Jackson's Mill July 5–6

The eleventh annual ARRL West Virginia State Radio Convention will be held at Jackson's Mill near Weston on July 5 and 6. Activities will start at 1 P.M. on Saturday and include MARS meetings, a DX session, a technical session with Lewis McCoy, W1ICP, a code copying contest, an ARRL forum, a flea market and lots of eyeball QSOs.

Special activities for the XYLs include SWOOP and a hobby display. XYLs in attendance are urged to bring and enter in the display items of their hobby.

Full registration for the convention is $8.00 for adults and $3.00 for children under 12. This price includes one meal Saturday evening, two meals on Sunday, and Saturday night lodging. Registration tickets only will sell for $2.00 each, or three for $5.00. Requests for tickets should go to convention chairman David L. Mays, K8MYU, 106 Ullom Street, Fairmont, W. Va. 26554. Trailer sites may be arranged through Harley V. Cutlip, Jackson's Mill 4-H Camp, Weston, W. Va. 26452. See you at the Mill.

FLASH! The New Ocean House having burned to the ground May 8, the Swampscott Convention has been relocated to the Statler Hilton, Boston, same dates.

Hamfest Calendar

British Columbia — The Vancouver Island Picnic is scheduled for June 15.

Georgia — The Atlanta Radio Club will hold its annual Hamfest on June 14 and 15 at the North DeKalb Shopping Center in Atlanta.

Illinois — The Starved Rock Radio Club will hold their Annual SRRC Hamfest at the La Salle County 4-H Home and Picnic Area Southwest of Ottawa, Ill. on June 8. This all-day affair has advance registration until May 29 at $1.50 or at the gate at $2.00. Free coffee and doughnuts from 10 to 10:30 A.M. CDST. Food available and ample parking provided. For a full day of activities, follow big, yellow "Hamfest" signs on Route 71 from the South end of Illinois river bridge at Ottawa. For further details, including data on available motels and/or camping facilities, write G. E. Keith, W9QLZ/W9MKS, RFD #1, Box 171, Oglesby, Ill. 61348

Iowa — The Iowa 160-meter Picnic will be held in Webster City, June 15 at the Hamilton County Fairgrounds.

Kansas — The Hambutcher picnic will be held at Fort Leonard Wood Missouri this year on the 15th of June with the fun frolic on the evening of the 14th. For more information contact WAØBHG.

Kansas — The Coffeyville, ARC will hold a Hamfest June 1 at Floral Hall in Pfister Park in Coffeyville. Program, XYL activities, talk-in on 3.910 MHz. s.s.b., 145.1 MHz. a.m., code-speed test, mobile hunt, and more. Bring covered dish. Registration is $1.00.

Louisiana — The Southwest La. ARC will sponser the Lake Charles Fish Fry and Hamfest on June 28 and 29. See at Prien Lake Park?

Maine — The Augusta Maine ARC will hold their 10th annual Hamfest at the Calumet Club, Route 104 in Augusta on June 15. There will be an open house and get-together on Saturday evening, the 14th, at the same location.

Ohio — The Lancaster and Fairfield Co. ARC will have their annual Hamfest June 8 at the Soap Box Derby Downs, one mile South of Lancaster, Ohio on the BIS road, State Route 793.

Ontario — The Ottawa ARC is sponsoring a Convention in Ottawa June 6 and 7.

Pennsylvania — The Somerset County ARC will hold its Hamfest on June 8 at the Casebeer Church Grove, located on Route 219, about 7 miles North of Somerset, Pa. (or Exit 10 on the Penna. Turnpike). Hours will be from 9:00 A.M. until 5:00 P.M. Plenty of free parking. Special catering group will sell refreshments. Flea market and ham swaps. Tickets in advance $1.50, at the door, $2.00. Tickets and additional information can be obtained from Theodore J. Leonberger, K3RCI, Rd. #2, Rockwood, Pa. 15557.

Pennsylvania — The sixth annual Penn-Central Hamfest by the West Branch and Milton groups will be held Sunday June 8, starting at 12 noon, at the Union Township Volunteer Fireman Grounds, on Route 15, Winfield, Pa. Informal, picnic style, no speeches, no banquet, snack bar handy or bring your own lunch . . . come and go as you please. Auction, contests, swapping, gabfest. Free parking, with both indoor and outdoor facilities provided. $2.00 registration at the gate, XYL and children admitted free. Exhibits welcome. For information contact Mile H. Frey, K3MSG, Quarry Rd., Muncy, Pa. 17756.

Pennsylvania — The Foothills Radio Club, Inc. of Greensburg, Pennsylvania will hold its annual Hamfest on Sunday, June 8. This year the event will be held at Wendel Park, Route 30, Irwin, Penna.

Quebec — Le congrès annuel de l'Association provinciale (RAQI) aura lieu dans la coquette ville de Granby les 27-28 et 29 juin. Tous les amateurs du Québec et leurs amis sont invités à assister à ces importantes assises. Il y aura élection du nouvel exécutif de l'Association pour l'année 1969-70. Plusieurs comités groupant des amateurs de Granby ont accompli un excellent travail d'organisation et nul doute que ce congrès remportera un franc succès. Conférences, sessions d'étude, loisirs pour toute la famille, soirées sociales, magnifiques préx à gagner . . . voilà ce qui vous attend au Congrès Provincial de RAQI à Granby les 27-28 et 29 juin 1969.

Saskatchewan — Remember the Hamfest in Moose Jaw on Saturday and Sunday, July 5 and 6 at the Wild Animal Park South of the city.

South Carolina — There'll be a meeting and Hamfest in Columbia on May 31 and June 1.

Tennessee — The Humboldt ARC will hold its Fourth Annual Hamfest on Sunday, June 8, at the Scoutland Camp one mile North of Humboldt, Tenn. Participants are welcome to bring picnic lunch or use nearby restaurant facilities. There will be various ham activities, ladies program, swap table, etc. For further information contact Ed Holmes, W4IGW, 501 N. 18th Ave., Humboldt, Tenn. 38343.

Texas — The 1969 South Texas Emergency Net Convention will be June 6, 7, and 8 in Austin.

Washington — The Apple City Radio Club is planning a Ham Jamboree in June and it will be open to the public.

Wyoming — The annual Wyoming Hamfest is planned for July 5 and 6 at Story. QST

Strays

Watch those QSLs! Out of a group of 20 QSLs made out by recent visitors to W1AW, a spot check yielded:

One to a WØ in Kansas City, Miss.
One to a W8 in Detroit, Minn.
One with name and street address okay but to Fargo instead of Bismark, N. D.
One to Ed in Albany, Calif., when station worked was Bob in Los Angeles.
One to Pete in San Diego when station worked was Marvin in Los Angeles.

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Stolen Equipment

On April 27, the following equipment was stolen from my car which was parked in my driveway for the night: Gonset Communicator IV, Model 3342, Serial No. 14301. David E. Trimbath, K3LWT, 311 Peebles St., Wilkinsburg, Pa.

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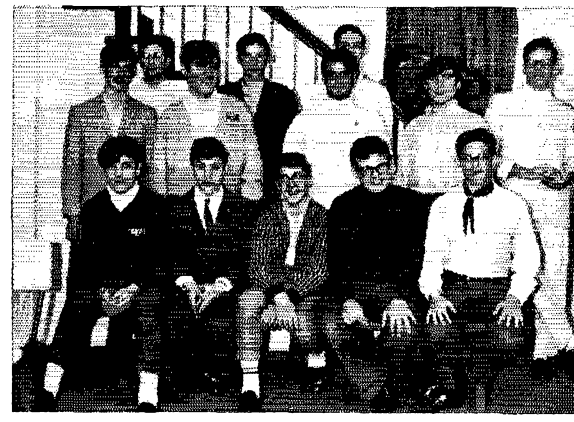
My Swan 350 was stolen from my car in the Bronx, New York City. It can be identified by the additional miniature toggle switch under the S meter and a miniature jack located by the power connector. Bob Decker, K2ORA, 31 Prescott St., Garden City, N. Y.



These jovial young chaps are members of "The Long Island Sound," a teenage amateur radio net. The photograph was taken recently at a "net-in" at WA2COL's house. Shown are seated (l. to r.) WA2FLO, WB2ZEI, WB2FNO, WA2EOI, WN2GTY; second row: WA2ETO, WA2COL, WB2BCI, WA2CMW, WB2DNO; back row: WB2VBZ, WA2DZH, WB2VBU, WA2DMG.

Happenings of the Month

TEN-METER RTTY, TWO-METER C.W. TO MOVE

As we reported briefly in League Lines last month, FCC has published a Notice of Proposed Rulemaking, Docket 18508, which would move the F-1 subband at 29.0–29.7 MHz. down to 28.0–28.5 MHz and the A-1 subband 147.9–148.0 MHz. down to 144.0–144.1 MHz. The proposals originated with petitions from ARRL filed more than three years ago.

The first would bring the ten-meter band into line with the other h.f. bands, where A-1 and F-1 share the same space. The second would move the "weak signal" subband into the worldwide segment of the two-meter band (144–146 MHz.) where it would be useful in, for instance, communication with amateur satellites.

Comments may be filed by any interested person on or before June 11, 1969 with the FCC, Washington, D. C. 20554. Formal participation requires an original and fourteen copies, but FCC usually accepts smaller numbers of copies, even singles, from private individuals as "informal comments."

The text of the docket follows:

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of	
Amendment of Section 97.61 (a) of the Commission's Rules concerning frequencies and emissions in the Amateur Radio Service.	Docket No. 18508 RM-886 RM-950

NOTICE OF PROPOSED RULE MAKING

Adopted: April 2, 1969; Released: April 3, 1969

By the Commission: Commissioner Wadsworth absent.

1. The Commission has under consideration two petitions for rule making in the above-entitled matter submitted by the American Radio Relay League (ARRL). In RM-886 ARRL requests that the rules be amended to allow only A1 emission in the 144.0–144.1 MHz. portion of the 144–148 MHz band. By RM-950 ARRL requests that F1 emission be permitted in the 28.0–28.5 MHz portion of the 28.0–29.7 MHz band.

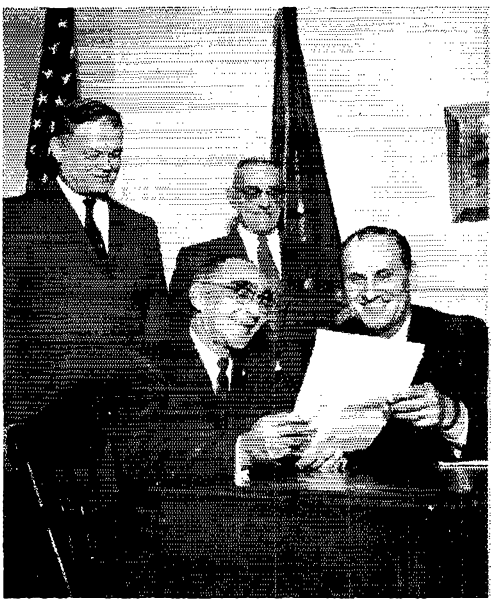
2. In support of its request in RM-886, ARRL states that propagation studies and long distance communications in the very high frequency (VHF) portion of the spectrum are usually conducted by the use of A1 emission. ARRL further states that such studies and communications are susceptible to interference because of their very low signal strength, and for these reasons, the Commission on December 3, 1958, amended its rules to permit only A1 emission in the band 147.9–148.0 MHz (Docket 12485, FCC 58-1164).

3. In 1963 an Extraordinary Administrative Radio Conference amended the Radio Regulations, Geneva, 1959, to specifically authorize amateur satellite operation in the band 144.0 to 146.0 MHz. Petitioner states that two-way contacts via amateur satellite were made using A1 emission, and it is expected that A1 emission will continue to be widely used for that purpose.

4. The Commission believes that clearance of a portion of the 144–146 MHz band is desirable for continued experimentation in space techniques by amateurs. Since the present segment of the band available exclusively for A1 emission is not available for satellite operation, it is proposed to amend the rules to permit only A1 emission in the band 144.0–144.1 MHz and to permit AØ, A2, A3, A4, A5, FØ, F1, F2, F3, and F5 emissions in the band 144.1–148.0 MHz.

5. Section 97.61(a) of the rules authorizes F1 emission in those portions of the 3500 kc/s, 7000 kc/s, 14 MHz, and 21 MHz bands which are reserved for telegraphy only. However, F1 is not permitted in the exclusive telegraphy portion of the 28 MHz band.

6. In RM-950 ARRL requests that the rules be amended to permit F1 emission in the band 28.0–28.5 MHz which is now available only for A1 emission. ARRL cites the usefulness of the 28.0 MHz band for long distance communications and



Last month we mentioned amateur radio week in New Hampshire. Here's the signing of the proclamation, with Don Morgan, K1QES, SCM of New Hampshire and Governor Walter Peterson, seated; J. L. Prescott, K1BCS, RM and Edwin Antz, K1APQ, PAM, standing.

the expanding use of radioteletype operation by amateurs in support of its request.

7. Since F1 emission is permitted in the exclusive telegraphy portions of the lower bands and there appears to be no valid reason why similar provisions should not be made in the 28.0 MHz, it is proposed to amend the rules to permit the use of F1 emission in the band 28.0–28.5 MHz and to delete the permissive use of F1 emission in the band 29.0–29.7 MHz.

8. The rule changes proposed herein are set forth in the attached Appendix. Authority for the proposals is contained in Section 4(i) and 303 of the Communications Act of 1934, as amended.

9. Pursuant to applicable procedures set forth in Section 1.415 of the Commission's Rules, interested persons may file comments on or before June 11, 1969, and reply comments on or before June 23, 1969. All relevant and timely comments and reply comments will be considered by the Commission before final action is taken in this proceeding. In reaching its decision in this proceeding, the Commission may also take into account other relevant information before it, in addition to the specific comments invited by this Notice.

10. In accordance with the provisions of Section 1.419 of the Commission's Rules, an original and 14 copies of all statements, briefs, or comments filed shall be furnished the Commission.

FEDERAL COMMUNICATIONS COMMISSION

BEN F. WAPLE
Secretary

Part 97 of the Commission's Rules is amended. In §97.61, paragraph (a) is revised to read as follows:

§97.61 Authorized frequencies and emissions.

(a) Following are the frequency bands and associated emissions available to amateur stations, subject to the limitations stated in paragraph (b) of this section and §97.65.

appendix

Frequency Band Mc/s	Emissions
28.0–29.7	A1
28.0–28.5	F1
28.5–29.7	A3, A5, F3, F5

Frequency Band Mc/s	Emissions
144–148	A1
144.1–148.0	AØ, A2, A3, A4, A5, FØ, F1, F2, F3, F5

MARITIME MOBILE ON 7 MHZ. PROPOSED

Acting on a petition by Commander Richard A. Ackerman, WA4FIJ, FCC has issued a Notice of Proposed Rulemaking, Docket No. 18506, which would permit amateurs operating on or over the high seas to use 7.0–7.1 MHz. worldwide. At present, such stations may use the 14, 21 and 28 MHz amateur bands worldwide and in addition, the 7, 50 and 144 MHz bands when within Region 2 (roughly, North and South America west to Hawaii and the western portion of the Atlantic Ocean). At the same time, the Commission denied a companion request to permit operation in the 3.5–3.8 MHz. bands by these amateur stations, because the band is shared between the fixed, mobile and amateur services and interference to a non-amateur station of another country could result. Comment deadline is June 11. The text reads:

David G. Meier, WB4EAB, has his arms full of applause from the Delta Amateur Radio Club of Memphis, Tenn. The right hand holds a plaque awarded for winning a membership drive, the left "Ham of the Year" for 1968. Nice going!

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of Amendment of Section 97.95 (b) (2) of the Amateur Radio Service Rules concerning mobile operation.	Docket No. 18506 RM-981

NOTICE OF PROPOSED RULE MAKING

Adopted: April 2, 1969; Released: April 3, 1969

By the Commission: Commissioner Wadsworth absent.

1. A petition for rule making in the Amateur Radio Service has been filed by Richard F. Ackerman. Petitioner proposes that Section 97.95(b) (2) of the rules be amended to permit amateurs to operate in any amateur band between 3.5 MHz. and 148 MHz. while located anywhere in Region 2 and, in addition, to permit operation in the bands 3.5 to 3.8 MHz. and 7.0 to 7.1 MHz. outside Region 2.

2. Section 97.95(b) (2) presently permits amateur operation when outside the jurisdiction of any foreign government in any amateur band between 7.0 and 148 MHz., inclusive, in Region 2 and only in the 14.00–14.35 MHz., 21.00–21.45 MHz., and 28.0–29.7 MHz. bands outside Region 2. Region 2 which is defined precisely in the Geneva Radio Regulations (GRR) and Section 97.95 of the Rules, includes the continents of North and South America, the western portion of the Atlantic Ocean, and the eastern portion of the Pacific Ocean.

3. Petitioner's request would extend the present operating authority to include the world-wide use of 3.5–3.8 MHz. and 7.0–7.1 MHz. while outside the jurisdiction of foreign governments. By inter-

WHO THE DEVIL IS WHO?

Fourteenth in a Series of Call Conversion Charts

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

Now	*Was*	*Now*	*Was*	*Now*	*Was*	*Now*	*Was*
W1IR	WA1FSB	W3TJ	W3KDR	K6DS	W6HEK	W8BK	W8LCT
K2AB	W2LJF	W3UT	W8FE	K6JE	W6TUC	W8DY	W8SPF
W2DM	W2ING	W3VC	W3UIV	K6MK	W6PPN	W8EZ	W8HCJ
W2GV	K2CEI	W3WX	W3JKH	K6MT	W2FXO	W8JG	W8OCT
W2JI	W2FK	W3YJ	W3JNN	K6NF	WB6QAT	W9BE	W9JKC
W2JX	W2RVG	K4BN	W4FCF	K6NO	K6CSC	W9CV	K9KND
W2NZ	W2JDL	K4II	WA4IKU	W6NW	W6BPE	W9DT	W9JYD
W2OQ	W2NMH	K4IN	W4AJC	K6NZ	W6SIB	W9DY	K9MWE
W2UU	W3DFR	K4IR	W4HEG	K6OC	W6NEX	W9EI	W9JCY
W2YP	W2HCI	K4IW	WA4JDG	K6OJ	W6PUY	W9EM	W9GIM
W2ZP	W3CIG	K4KW	WA4JIH	K6OV	W2FJE	W9FA	W9ZLM
W2ZS	W2SWC	W5AO	W5CKY	W6WR	K6YRQ	W9FD	W9UZS
K3BU	WA3JHN	W5DW	W5OVB	W7JD	W7IIY	W9GF	W9LFK
W3MT	W3QLV	W5FR	W5OBX	W7KN	W7ECD	WØFD	W6OTR
W3NY	W3KPO	W5IA	W5NRC	W7LL	WA7JGU	WØJA	WØUQV
W3RN	W3ISF	W5LL	W5FPX	W7MI	W7GHB	WØJC	WØSPR
W3RS	W3ERW	W5NC	K5JLQ	W7NX	WA7ASP	WØJW	WØDAO
W3TH	W5DVQ	K6AL	W6ZMW	W7OG	W7DHN	WØKB	WØLUA

national agreement, in all regions the 3.5–3.8 MHz. band is allocated for shared use by the Amateur, Fixed, and Mobile Services; and the band 7.0–7.1 MHz. is allocated exclusively to the Amateur Service in all regions.

4. In support of his request, petitioner states that the extension of operating privileges would permit amateurs operating mobile aboard ships and aircraft to contact and meet fellow amateurs throughout the world; it would also permit these same amateurs to more readily maintain contact with United States amateurs. Petition also cites the usefulness of the 3.5–3.8 MHz. band for domestic contacts by amateurs operating in the area surrounding the East and Gulf Coasts of the United States.

5. In view of the world-wide exclusive availability of the 7.0–7.1 MHz. band to the Amateur Service, the Commission proposes to amend its Rules to permit United States amateurs, when outside the jurisdiction of a foreign government, to operate in that band when in Regions 1 and 3. Such operation is now permitted in Region 2.

6. The Commission, in Docket 12307 (FCC 58–105), denied a petition to make the band 3.5 to 4.0 MHz. available to amateurs operating aboard ships "sailing between ports on the East coast; between ports of the Gulf coast; or between ports of these coasts; or between ports of the Pacific coast; and the Hawaiian coast," because the proposal, if adopted, would provide no specific boundaries within which such operations would be permitted and would be so indefinite as to preclude effective administration.

7. The instant proposal for extension of operating privileges in the 3.5 to 4.0 MHz. band presents additional problems since it would permit amateur mobile operation throughout Region 2. In Region 2 this band is allocated by the 1959 Geneva Radio Regulations to the Amateur, Fixed, and Mobile Services. However, all administrations do not permit amateur operation in identical segments of the band. Thus, mobile operation aboard ships of the United States could significantly increase the possibility of causing harmful interference to certain stations using this frequency band in accordance with the Geneva Radio Regulations and prior notification to the International Frequency Registration Board. Accordingly, the request to amend the rules to permit mobile operation in the 3.5 to 3.8 MHz. anywhere in Region 2 while outside the jurisdiction of foreign governments is not included in this proposal.

8. The rule changes proposed herein are set forth in the attached Appendix. Authority for these proposed amendments is contained in Sections 4(i) and 303 of the Communications Act of 1934, as amended.

9. Pursuant to applicable procedures set forth in Section 1.415 of the Commission's Rules, interested persons may file comments on or before June 11, 1969, and reply comments on or before June 23, 1969. All relevant and timely comments and reply comments will be considered by the Commission before final action is taken in this proceeding. In reaching its decision in this proceeding, the Commission may also take into account other relevant information before it, in addition to the specific comments invited by this Notice.

10. In accordance with the provisions of Section 1.419 of the Commission's Rules, an original and 14 copies of all statements, briefs, or comments filed shall be furnished the Commission.

FEDERAL COMMUNICATIONS COMMISSION

BEN F. WAPLE
Secretary

MORE OBSCENITY ACTION

In January this column reported a suspended sentence and fine had been levied against Walton B. Berkley, WB4AOE, Hickory, Kentucky, by the Federal Court at Paducah. Now FCC has taken its own action against this amateur for "wilfull and repeated violation of the Rules." The Commission ordered Berkley to show cause why his license should not be revoked. His operator's license was also ordered to be suspended for the remainder of its term.

"The Commission said that Berkley had on February 5, April 20, September 14 and 16, October 12 and 14 and December 17, 1967, violated Section 97.119 of the Rules by transmitting communications containing obscene, in-

decent or profane language or meaning on Amateur Radio Service frequencies.

"On October 21, 1968, Berkley was convicted of broadcasting obscene language in violation of Title 18, U.S.C.1464. Berkley was given a suspended sentence, placed on probation for two years and fined $100.

"Action by the Commission March 25, 1969 by its Chief, Safety and Special Radio Services Bureau. By Order and Order to Show Cause." *From FCC Public Notice dated March 25, 1969.*

CONGRESSMAN LAUDS AMATEUR

In the Congressional Record for February 6, 1969, there is "extension of remarks" by the Honorable Thomas P. O'Neill, Jr., Representative from Massachusetts, praising James Jacobs, K1GHT/HI8GHT, of Brookline, Mass. for his part in arranging for heart surgery at Boston which saved the life of a boy from the Dominican Republic. To the kind words of the congressman addressed to Jim, may we add a hearty "well done!"

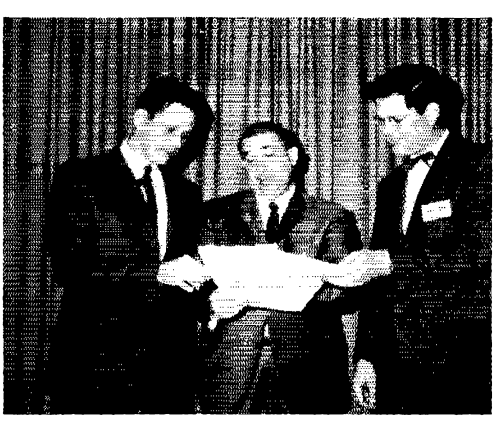
ALASKA REWARDS ITS AMATEURS

The Alaska State Legislature has adopted House Bill 103, which sets a fee of $1 for vehicle registration and call letter license plates for amateurs who have mobile equipment on 80 through 10 meters in their cars. (Ordinarily, the fee is $30!) The bill recognizes amateur work in the earthquake of 1964 and the Fairbanks flood of 1967, and is intended to further encourage amateurs to equip for emergency use. (Thanks to KL7FPA of the Juneau Amateur Radio Club for this information.)

CONTROL OF PREMISES MODIFIED

Section 97.37 of the Commission's rules has required a "satisfactory showing of control of the transmitting station for which license is desired and of control of the specific premises upon which all of the station apparatus is to be located . . ." This language has been a source of concern especially to amateurs renting a room or apartment. FCC has now modified the section to leave out this phrase, feeling that there are adequate safeguards elsewhere in the rules; moreover, each applicant affirms on the Form 610 that the station will be inaccessible to unauthorized persons. Effective April 18, the rule reads:

§ 97.37 General eligibility for station license. A license for an amateur station will be issued in response to proper application therefor to a licensed amateur operator for use at a designated fixed location. An amateur station license may also be issued to an individual, not a licensed amateur operator (other than an alien or a representative of an alien or of a foreign government), who is in charge of a proposed amateur station for recreation under military auspices (only of the Armed Forces of the United States) which is to be located in approved public quarters but not operated by the U.S. Government.



At the Pacific Division Director's Meeting in Oakland, Director Doc Gmelin shuffles papers with Jon O'Brien, W6GDO, member of the ARRL V. H. F. Repeater Advisory Committee and James Maxwell, W6CUF, chairman of the ARRL Contest Advisory Committee.

The Quarter Century Wireless Association's chapter banquet in Washington has become an established function where officialdom and amateurs meet for sociability. At the 1969 version: Bill Leonard, W2SKE, vice president of CBS and the main speaker; Bill Grenfell, W4GF, Chief, Rules and Standards Branch, Amateur and Citizens Radio Division, FCC; and H. H. Robinson, W3RE, past president, Washington Chapter QCWA.

NAVASSA ISLAND OPEN TO VISITORS

The U.S. Coast Guard reports that it will now give favorable consideration to a reasonable number of visits to Navassa Island (KC4) by amateurs. Previously, visits were not allowed to the prospective DXpedition site. The Coast Guard would prefer visits to occur when a CG ship is in the area. Visitors will need a permit obtainable from the Commander, 7th District Coast Guard, 51 S.W. First Ave., Miami, Florida 33130. QST

Correspondence From Members-

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

LICENSES FOR IMMIGRANTS

¶ Coming to the U.S. I was hoping to apply for a W call but here I realized that getting a U.S. license means to me a full 5 years waiting period. That is because the present law permits issuing of amateur radio licenses only for American citizens.

Senator Goldwater (K7UGA) has introduced a bill in the Congress which, if passed, would allow foreign amateurs to get American licenses after they have received their "first papers."

A lot of other foreign amateurs are in the same situation. Now, I ask every W/K to express his support for this bill, called Senate Joint Resolution 27, sending a letter to the Chairman of the Committee on Commerce; Senator Warren G. Magnuson, Washington, D. C. 20510.

The American amateurs have been always friendly and helpful to me during thousands of QSOs and I sincerely hope they will give me now the necessary support to get a W call. — *Illie Nuculae, ex-YO4AAC, New York, N. Y.*

ALASKA IS APPRECIATIVE

¶ Both houses of the Alaska State Legislature have, by an overwhelming vote, passed House Bill No. 103 which relates to the annual license tax on vehicles containing mobile amateur radio stations. Under the new law, rather than pay $30.00 for a license plate, an amateur holding an FCC license and with mobile capability of 75 meters through 10 meters may obtain his license and his call letter license plates for a total fee of $1.00.

The idea behind the bill was to encourage amateur radio operators to equip for emergency use. You will recall that in the case of the Anchorage earthquake in 1964 and the Fairbanks flood in 1967, the power was off and regular communications were completely disrupted for a substantial period of time. In both cases radio amateurs provided an emergency link-up until power and normal communications were restored. In these days of zoning regulations which cramp amateur radio, TVI complaints and million dollar lawsuits, it is heart warming to see the policy of a sovereign state of the Union recognizing the unique capabilities of the amateur radio fraternity, and I think an appropriate article in your magazine might well be an eye-opener for other parts of the nation. Truly, the entire country should support the principle set forth in Alaska's House Bill No. 103 for no one is completely safe from natural disasters. — *Douglas L. Gregg, KL7FPA, Juneau, Alaska.*

APRIL TRICKERY

¶ I suspect a little trickery in your cover photograph for April and I think maybe you may have overlooked it. If you examine the picture closely, some of the birds are perched out in thin air off the ends of the antenna. Maybe these portions of the antenna are painted with the "invisible" paint that you described in *QST* several years back. — *Ronald O. Teofan, D.D.S., WB4CWM, Winston-Salem, North Carolina.*

¶ W4TZB's idea for a hidden mobile antenna (April *QST*) is FB. I tried it on my wife's car, and it works fine. The one drawback is the sharp null in a sideways direction due to the normal pattern of a loop antenna. I finally decided it was too unnerving to oncoming traffic to see me aiming directly at them in an attempt to swing the null off a station I was working.

Fortunately, my own car is a Corvette with fiberglass body. In this car, I was able to make a horizontal loop antenna by sawing out a gap in one side of the chassis (filled with epoxy, of course). The pattern is such that no null is apparent in any direction. — *Kenneth K. Bay, W4UQ, Lynchburg, Va.*

¶ In regard to the article titled "A Hidden Mobile Antenna" by W4TZB dated April, 1969, I would like further information. I assume the operating frequency would depend on the type of auto involved, such as Cadillac on 80 meters, Fords and Chevrolet on 20 meters and perhaps Volkswagens on 6 meters. How about the rotary lawnmower on 2 meters for local ragchews? Also I suggest a gamma match instead of separating the pillars.

And a happy April one to you too. — *Samuel F. Ward, K1UJX, Lincoln, Rhode Island.*

¶ You did it again. Your continuation of the April tomfoolery in *QST* may show cleverness in disguising humor, but it does so only by tarnishing the record of ARRL/*QST* for integrity . . . and by perhaps inadvertently leading some inexperienced readers into unsafe or even illegal practices.

If you feel you must include humor, keep it on the cover, in the "Letters" or in the editorial (as it was in February; I wish I could laugh when I read it). — *H. Ross Hawkins, W3BGE, Wilmington, Delaware.*

¶ I couldn't help noticing that in your Feedbac column (under the heading of "Strays," *QST*, April, 1969, Pg. 19) you have Feadback spelled incorrectly. Knowing your policy of correcting all possible errors in publication through the use of the Fedback columns, I considered it my duty to call this matter to your attention. I trust you will now publish the correct spelling of Feedbak in a future Feedbeek column. — *J. E. Cervini, WA3MDT, Rockville, Maryland.*

[of coarse. — EDITOR.]

THANKS FELLOWS

¶ As a mark of affection and respect from the amateurs in this area, W1EAE, Vice Director, New England Division, presented a transceiver at a testimonial dinner on April 11, 1969, after my retirement.

[from FCC's Boston office EDITOR.]

Because I am unable to thank individually all contributors, as I do not know who they are, I hope this letter can be published in *QST* to publicly express my thanks and appreciation for this completely unexpected and very welcomed gift. — *Nathan A. Hallenstein, W1JMA, Wellesley Hills, Mass.*

MORE ON FREE SPEECH

¶ Good old W1LVQ, you've gone and done it again! First there was your February fiasco, and now your April editorial seasoned with your commentary on such matters as "permissiveness" and "lowered ethical standards." Apparently, you never considered that what you take to be "lowered standards," other ARRL members such as myself might regard as better standards free from puritanism and hypocrisy (a view shared, by the way, by much of the youth on whom the future growth and prosperity of amateur radio depends).

But in the context of *QST*, disagreement on social questions is secondary. The primary issue is that the editor of *QST* is, in effect, a spokesman for ARRL, an organization whose members joined for reasons of interest in radio and not because of belief in a particular socio-political view. This being the case, I feel strongly that you have an obligation to keep your editorials free of personal comments on non-ham issues; otherwise, you give myself and other ARRL members no choice but to disassociate ourselves from the League if we wish to disassociate ourselves from your views, a choice which is as unfair to us as it is bad for the League.

Perhaps April's "Correspondence" will help to remind you that the proper place for personal opinions (with sensible choices of words, of course) is on the air, where your views will be clearly identified as personal and where you can test them in free discussion with other free people. Once you realize that rights such as free speech are lost more through disuse than through repression, then maybe you'll feel freer about speaking to me on the air, instead of unfairly trying to speak for me in *QST*. — *David G. Becker, W6HAU, Manhattan Beach, Calif.*

¶ Whatever the merits of the various points of view expressed, I was struck by the generally high level of the letters to the editors in the April issue regarding the matter of "Conversation Discipline." It is heartening to read arguments which exhibit such reasoning and restraint in light of the heat which this issue might engender. Other controversies on the "Correspondence" pages have not evoked this kind of response. The amateurs who wrote regarding conversation discipline are obviously capable of conducting any kind of discussion on the air with the assurance that the talk would be stimulating, informative and enlightening. I would like to think that they represent the larger body of amateur radio operators. — *Julian N. Jablin, W9IWI, Skokie, Illinois.*

¶ I have for a long time believed that these editorial comments might be better left unpublished.

Why not just write them and reflect on what is written.

Surely the time spent could be used in a more profitable manner adding to the value of *QST* as a radio magazine.

This constant bickering after a touchy subject is published is no enhancement either.

I have just renewed but I wonder why. — *F. E. Evans, W1JFF, Newport, R. I.*

¶ I agree with February *QST* one-hundred percent. Amateur radio is a privilege and the best way to lose it is by abusing it, even though it be in the name of "Freedom of Speech."

So, I say hooray for all "unprincipled editors." — *Richard Turensky, K9SSB, Green Bay, Wisc.*

¶ Why all the fuss? I can't see that anyone is being muzzled or that the right of free speech is being endangered. Such touchy subjects as religion, sex, race, and in many instances even politics are so charged with emotion that you get nowhere in discussions and you even stand a good chance of making an enemy. It is perfectly proper to discuss such topics with a crony in the privacy of your home — but without innumerable persons listening in.

In 40 years of ham radio I have avoided comments which might prove offensive to anyone, and I have never run out of material to talk about, and this includes subjects other than the rig and the weather. — *Mert Hasse, WØDKJ, Vermillion, S. D.*

¶ I think it's stupid for all of our population of hams to get so upset about such a thing as this Conversation Discipline. All in the world our editor of *QST* is trying to say, is that we should keep ourselves from getting in a heated argument with other amateurs. If we feel so strongly about something that we think we need a knock-down and drag-out fight to prove our point then please, we should keep our "yaps" shut. Amateur radio is a hobby, not the "express" means of self-expression. All you guys that have been raising . . . about every little thing the ARRL says, go soak your heads in the Amateur's Code long enough to read it! — *Lee Hays, III, WA5PPF, Abilene, Texas.*

¶ I am amazed at the anguished outcry of those who take offense at a plea for "responsibility and personal discipline" in the content of on-the-air amateur conversations. You are not making laws! What are they afraid of?

There were some ill-chosen words in your February editorial; you have acknowledged this. But your message — an exhortation to help keep amateur radio clean — came through loud and clear. Your call to hams to help "retard, at least within our own ranks, the trend to a new social order of permissiveness and lowered moral and ethical standards" is timely and imperative for hams and non-hams of this generation. — *Cyrus Rohrer, Jr., W9EKL, Champaign, Illinois.*

IRREGARDLESS!

¶ In my opinion, at least, one of the most abused words in the English language is the word "regardless." When I say it is abused, I should more properly say it is prostituted into a word-form that is not even found in any English dictionary. — *E. H. Colliau, W6JFQ/ZSG, South Pasadena, Calif.*

[EDITOR'S NOTE: Our sense of humor is apparently out of tune. The exclamation point after the non-word was intended to politely needle Lt. Greenberg who used the non-word in his letter.]

¶ There seems to be some fuss going on over the use of the word "irregardless" as appeared in "Correspondence" a few months back. The latest Webster's Collegiate defines irregardless as a probable blend of irrespective and regardless, *nonstand.*: regardless.

Under their definition of the term nonstandard they state: "The stylistic label *nonstand* for "nonstandard" is used for a very small number of words that can hardly stand without some status label but are too widely current in reputable context to be labeled substand:

Note that Webster's term is "reputable context". . . . So, the word doesn't appear to be incorrect or even in bad taste. Wot' say, editor? — *L. G. Yocum, Simsbury, Conn.* QST

I.A.R.U. News

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

GB2HRH AT INVESTITURE

Amateur radio will participate in the historic investiture of HRH The Prince of Wales on July 1, on the outskirts of the Royal Borough of Caernarvon. The British licensing authorities have authorized the call sign GB2HRH for the station which will operate from the investiture site.

Operation on the amateur bands 10 to 160 meters will be from June 28 through July 6. Requests for schedules will be welcomed; the station's operators will be especially interested in contacting stations in Commonwealth member-countries, and particularly Welsh speaking amateurs.

Contacts with GB2HRH will be confirmed with a commemorative card. Further information is available from John Griffity Evans, G3WET, 22 Sherifoot Lane, Four Oaks, Sutton Coldfield, Warwickshire (enclose IRCs).

TUNISIA

3V8AC reports that the licensing officials in Tunisia will accord temporary operating privileges to amateurs wishing to operate for periods of a few weeks. Applicants should address inquiries to the Secretariat for Post, Telegraph and Telephones, Central Post Office, Tunis.

NOTES

Under the terms of a new Post Office Bill, the status of the United Kingdom's Post Office (the amateur licensing authority) will be changed from that of a government department to that of a nationalized corporation. The new corporation will have the same responsibilities as at present, but a Minister of Posts and Telecommunications will take over the functions of the Postmaster General, with respect to broadcasting and certain other matters. (*Tnx Region I Bulletin.*)

Due to postal rate increases, the *Vereniging voor Experimenteel Radio Onderzoek in Nederland* (Netherlands IARU Society) requests that applicants for their awards enclose 7 rather than 5 IRCs with applications. Nine IRCs are requested if registered return of QSLs is requested. The mailing cost of the Code Proficiency award is increased to 3 IRCs whereas for endorsements, 2 IRCs is sufficient. Details on these awards are available from *VERON*, P. O. Box 9, Amsterdam, The Netherlands.

VK HAMS AID FIREFIGHTING

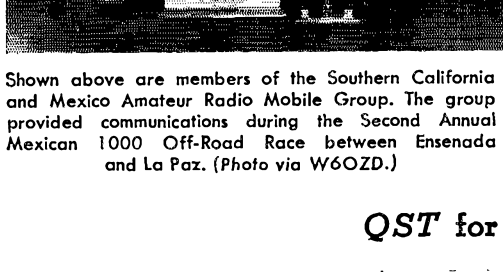
In September, 1968 a brush fire originated in fairly inaccessible country along the Grose River in the Blue Mountains area of N.S.W., Australia. Changing winds and ready fuel caused the fire to accelerate in proportion, and by November 23, arise as an impending situation of extreme danger.

Radio amateurs came into action using 146 MHz. f.m. providing back-up communication and filling in gaps in existing communications systems. As time went on, and more and more telephone lines fell to the blaze of the fire, the amateurs' role became more strategic. In addition to their back-up function, amateur networks became the primary conveyors of messages and information.

By November 29, the situation had eased and the amateurs reverted to a standby condition. Before stopping, however, the fire, with 60 m.p.h. winds, had scorched about 50 sq. miles of earth; eighty homes were lost; one amateur, VK2CT lost his life as a fire-fighter. (Adapted from a report of VK2AVN in Feb. 1969 *Amateur Radio*, journal of the *Wireless Institute of Australia.*)

QSL BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards to the bureau of the proper country as listed below. Cards for territories and possessions not listed separately may be mailed to the bureau in the parent country: *e.g.*, cards



Shown above are members of the Southern California and Mexico Amateur Radio Mobile Group. The group provided communications during the Second Annual Mexican 1000 Off-Road Race between Ensenada and La Paz. (Photo via W6OZD.)

for VP8s go to *RSGB* in Great Britain, W, K, VE and VO stations only may send foreign cards for which no bureau is listed to *ARRL*. See "How's DX?" for QSL information on specific stations

Algeria: ARA QSL Service, P.O. Box 2, Algiers
Angola: LARA, P.O. Box 484, Luanda
Antarctia: KC4AA cards go to the Office of Antarctic Programs, National Science Foundation, Washington 25, D. C. KC4US cards go to K1NAP, COMCBLANT, USN, CBCEN, Davisville, E. Greenwich, R. I.
Argentina: RCA, Carlos Calvo 1424, Buenos Airos, BA
Austral/French Antarctic Lands: via Malagasy Republic
Australia: VK1, VK2 QSL Bureau, WIA Box 1734, GPO Sydney, N.S.W.; VK3 QSL Bureau, E. Trebilcock, 340 Gillies Street, Thornbury, Vic. 3071; VK4 QSL Bureau, H. Scholz, 95 Stephens St., Morningside, Brisbane, Qld., 4170; VK5, VK8, QSL Bureau, Mr. Geo Luxon, VK5RX, 27 Belair Road, West Mitcham, S. Aust.; VK6 QSL Bureau, Mr. J. Rumble, VK6RU, Box F319, GPO Perth, W.A.; VK7 QSL Bureau, Mr. J. Batchelor, VK7JB, 39 Willowdene Avenue, Lower Sandy Bay, TAS.; VK9, VKØ, Federal QSL Bureau, 23 Landale Street, Box Hill E., 11 Victoria.
Austria: OSVSV, Box 909, Vienna 1/9
Azores: via Portugal
Bahama Islands: BARS, Box 6004, Nassau
Bahrein: (All MP4) Ian Cable, MP4BBW, P.O. Box 425, Awali
Barbados: ARSB, Highgate Signal Station, Flagstaff Road, St. Michael
Belgium: UBA, Postbox 634, Brussels 1
Bermuda: RSB, Box 275, Hamilton
Bolivia: UCB, Casilla 2111, La Paz
Brazil: LABRE, P.O. Box 2353-ZC 00, Rio de Janeiro/GB
Bulgaria: CRCB, Box 830, Sofia
Burundi: via Congo (9Q5) QSL Bureau
Canada: See page 90.
Canal Zone: Gloria M. Spears, KZ5GS, Box 522, Balboa
Cape Verde Island: RCCV, CR4AA Praia, Sao Tiago
Ceylon: RSC, P.O. Box 907, Colombo
Chagos: via Mauritius
Chile: RCC, P.O. Box 13630, Santiago
Colombia: LCRA, P.O. Box 584, Bogota
Congo: (TN8) QSL Bureau, P.O. Box 2239, Brazzaville
Congo: (9Q5) UCAR, QSL Bureau, B.P. 3748, Elizabethville
Cook Island: ZK1 QSL Bureau, % Radio Station Rarotonga, Rarotonga
Costa Rica: RCCR, Box 2412, San Jose
Cuba: ANRAC QSL Bureau, P.O. Box 6996, Havana
Cyprus: CARS QSL Bureau, P.O. Box 216, Famagusta
Czechoslovakia: CAV, Box 69, Prague 1
Denmark: EDR QSL-Central, Harry Sorensen, OZ6HS, Ingstrup-9480-Lokken
Dominican Republic: RCD, P.O. Box 1157, Santo Domingo
Ecuador: GRC, P.O. Box 5757, Guayaquil
El Salvador: CRAES, P.O. Box 517, San Salvador
Ethiopia: KSARC, ET3USA, APO, New York, N. Y. 09843
Faeroes Islands: OY-QSL Bureau, Sofus Rubeksen, OY3B, Undir Savartafossi, DK-3800 Torshvan
Fiji Islands: QSL Bureau, P.O. Box 184, Suva
Finland: SRAL, Box 10306, Helsinki 10
Formosa: (BV1US calls only) TARC USARSCAT, Box 8, APO, San Francisco, Calif, 96263. All other BV stations: QSL Bureau, CRA, Box 2007, Keelung, Taiwan, Rep. of China
France: REF, Boite Postale 70, 75 Paris 12
French Oceania: RCO, P.O. Box 374, Papeete, Tahiti
Germany: (DL4 & DL5 only) DL4-DL5 QSL Bureau, Headquarters Stratcom, APO N. Y. 09056
Germany: (Other than above) DARC, Box 86-03-20, D8 Munich 86
Ghana: GARS QSL Bureau, P.O. Box 3773, Accra
Gibraltar: RAF Amateur Radio Club, New Camp, RAF
Great Britain: (and British Empire): RSGB QSL Bureau, G2MI, Bromley, Kent
Greece: RAAG, P.O. Box 564, Athens
Greece (SVØs only): Signal Officer, Hqtrs. JUSMAGG, APO, New York, N. Y. 00223
Greenland: via Denmark
Greenland (KG1, OX4 and OX5 calls only): KG1A-KG1E (OX5) to MARS Director, OX5BX, APO, New York, N. Y. 09023, KG1F-KG1Z (OX4) to MARS Director, OX4FR, APO, New York, N. Y. 09121
Guam: MARC, Box 445, Agana, USPO 96910
Guantanamo Bay: GARC, Box 12, FPO, New York, N. Y. 09593
Guatemala: CRAG, P.O. Box 115, Guatemala City
Haiti: RCH, Box 943, Port-au-Prince

DX OPERATING NOTES

Reciprocal Operating

(**Bold face** indicates changes since last list.)

United States Reciprocal Operating Agreements currently exist *only* with: Argentina, Australia, Austria, Barbados, Belgium, Bolivia, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Finland, France, Germany, Guyana, Honduras, India, **Indonesia**, Ireland, Israel, Kuwait, Luxembourg, Monaco, Netherlands, Netherlands Antiles, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Sierra Leone, Surinam, Switzerland, Trinidad and Tobago, United Kingdom and Venezuela. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write headquarters for details.

Canada has reciprocity with: Bermuda, France, Germany, Israel, Luxembourg, the Netherlands, Nicaragua, Norway, Senegal, Switzerland, United Kingdom, U.S. and Venezuela.

Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the regular international communications facilities — may be handled by U.S. radio amateurs on behalf of third parties *only* with amateurs in the following countries: Argentina, Barbados (only U.S. stations/-8P) Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela, Permissible prefixes: CE CM CO CP CX EL HC HH HI HK HP HR LU OA PY TI VE VO W or K/8P XE XP YN YS YV ZP 4X and 4Z. Canadian hams may handle these same type third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Israel, Mexico, Peru, U.S. and Venezuela. Permissible prefixes are: CE CP HR K OA TI W XE YS YV and 4Z.

DX Restrictions

U.S. amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the ITU under the provisions in Article 41 of the Geneva (1959) conference.

Cambodia, and Vietnam forbid radio communication between their amateur stations and such of other countries. U.S. amateurs should not work XU XV or 3W8. Canadian amateurs may not communicate with Cambodia, Laos, Thailand, Vietnam and Jordan. Prefixes to be avoided are HS JY XU XV XW8 and 3W8.

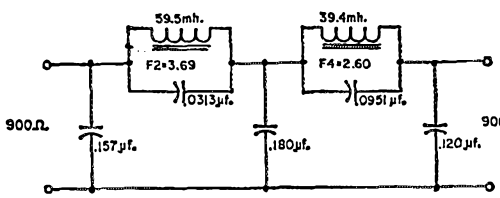
Honduras: Jacobo Zelaya, Jr., HR1JZ, Bo. Buenos Aires, 13 Calle 505, Tegucigalpa, D. C.
Hong Kong: HARTS, P.O. Box 541
Hungary: HSRL, P.O Box 214, Budapest 5
Iceland: IRA, Box 1058, Revkiavik
India: ARSI, QSL Bureau, P.O. Box 534, New Delhi 1
Iran: ARSI, APO, New York, N. Y. 09205
Ireland: IRTS, QSL Bureau, 24 Wicklow St., Dublin 20124
Israel: IARC QSL Bureau, P.O. Box 65, Herzlia
Italy: ARI, Via Scarlatti, 31, 20124 Milan
Ivory Coast: ARAI, B.P. 20036, Abidjan
Jamaica: JARA, Red Cross Bldg., 76 Arnold Rd., Kingston 5
Japan: (JA only): JARL, Box 377, Tokyo Central
Japan: (KA only): FEARL-M, APO, San Francisco, Calif. 96525
Johnston Island: KJ6BZ, % MARS Stn., Det. 1, 1957 Comm. Gp., APO, San Francisco, Cal. 96305
Kenya: RSEA QSL Bureau, Box 30077, Nairobi
Korea: KARL, Central Box 162, Seoul
Korea: (HL9) HL QSL Bureau, Signal Section, 1SFK/EUSA, APO, San Francisco, Calif. 96301
Kuwait: Alhalf Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf
Laos: Houmphanh Saignasith, XW8AL, P.O.B. No. 46, Vientiane
Lebanon: RAL QSL Bureau, P.O. Box 1217, Beirut
Liberia: LRAA, Post Box 1477, Monrovia
Libya: 5A QSL Service, Box 372, Tripoli
Liechtenstein: via Switzerland
Luxembourg: R. Schott, 35 rue Batty Weber Esch-Alzette
Macao: via Hong Kong
Madeira Island: via Portugal
Malagasy Republic (Madagascar): QSL Bureau P.O. Box 587, Tananarive
Malawi: 7Q7RM, P.O. Box 472, Blantyre
Malaysia: QSL Manager, MARTS, Box 777, Kuala Lumpur
Malta: R. F. Galea, 9H1E, "Casa Galea," Railway Road, Birkirkara
Mariana Islands: see Guam
Marshall Islands: KX6 QSL Bureau, via KX6BU, Box 444, FPO, San Francisco, Calif. 96555
Mauritius: Paul Caboche, VQ8AD, Box 467, Port Louis
Mexico: LMRE, P.O. Box 907, Mexico, D.F.
Midway Island: KM6BI, Box 14, FPO, San Francisco, Calif. 96614
Monaco: ARM QSL Bureau, Pierre Anderhalt, 3A2CN, 41 Bd du Jardin Exotique
Mongolia: JT1KAA, Box 639, Ulan Bator
Morocco: AAEM, P.O. Box 299 Rabat
Mozambique: LREM QSL Bureau, P.O. Box 812, Laurenco Marques
Netherlands: VERON, Postbox 400, Rotterdam
Netherlands Antilles: VERONA, P.O. Box 383, Willemstad, Curacao
New Zealand: NZART, P.O. Box 489, Wellington
Nicaragua: Mike Murciano YN1MO/W4, Box 902, Cora Gables, Florida, U.S.A.
Nigeria: NARS QSL Bureau P.O. Box 2873 Lagos
Northern Ireland: via Great Britain
Northern Rhodesia: see Zambia
Norway: NRRL, P.O. Box 21, Refstad, Oslo 5
Nyasaland: see Malawi
Okinawa: OARC, APO, San Francisco, Calif. 96331
Pakistan (East): Mohd, AP5CP, TARC, Dacca Signals, Dacca 6
Pakistan (West): LARS, P.O. Box 65, Lahore
Panama, Republic of: LPRA, P.O. Box 9A-175, Panama 9-A
Papua: Via VK9 QSL Bureau.
Paraguay: RCP, P.O. Box 512, Asuncion
Peru: RCP Box 538, Lima
Philippine Islands: PARA QSL Bureau, P.O. Box 4083, Manila
Poland: PZK QSL Bureau, P.O. Box 320, Warsaw 1
Portugal: REP, Rua de D. Pedro V., 7-4; Lisbon
Puerto Rico: Alicia Rodriguez, P.O. Box 73, San Juan 00919
Rhodesia: RSSR, P.O. Box 2377, Salisbury
Roumania: CRC, P.O. Box 95, Bucharest
Rwanda: via Congo (9Q5) QSL Bureau
Samoa (American): Utulei High School Amateur Radio Club, % Director, Pago Pago, Tituila, 96920
Samoa (Western): Director of Post Office and Radio, Post Office, Apia
Scotland: via Great Britain
Senegal: Ch. Tenot, 6W8BF, P.O. Box 971, Dakar
Sierra Leone: RSSL, P.O. Box 907, Freetown
Singapore: QSL Manager, MARTS, P.O. Box 777
South Africa: SARL, P.O. Box 3037, Cape Town
Spain: URE, P.O. Box 220, Madrid
St. Vincent: QSL Bureau, P.O. Box 142, St. Vincent, West Indies
Surinam: QSL Manager (PZ1AR), SARL, P.O. Box 240, Paramaribo
Swan Island: Swan Island, West Indies via Tampa, Florida
Sweden: SSA, Fack, S-122 07 Enskede 7
Switzerland: USKA, 6233 Bueron/LU
Syria: TIR, P.O. Box 35, Damascus
Tanzania: RSEA, P.O. Box 2287, Dar es Salaam
Trinidad and Tobago: T&TARS, P.O. Box 1167, Port of Spain
Uganda: RSEA QSL Bureau, P.O. Box 3433, Kampala
United States: See page 90.
Uruguay: RCU, P.O. Box 37, Montevideo
U.S.S.R.: CRC, Box 88, Moscow
Vatican: HV1CN, Domenico Petti, Radio Station, Vatican City
Venezuela: RCV, P.O. Box 2285, Caracas
Virgin Islands: Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, V.I. 00820
Wake Island: Jack A. Chalk, KW6EJ, P.O. Box 415, Wake Island 91930
Wales: via Great Britain
Yugoslavia: SRJ, P.O. Box 48, Belgrade
Zambia: RSZ, P.O. Box 332, Kitwe

QST

Strays

Feedback

Component values shown at the bottom of page 20, May *QST*, (Berry, "Legalize Your Phone Patch") should be changed to those given in the accompanying circuit.



The statement in W7EFV's frequency-standard article in March *QST*, page 42, that 25-kHz. markers could be obtained was an inadvertent error based on earlier work with another circuit arrangement. The 5-kHz. output will of course give 25-kHz. multiples, which are easily identifiable by reference to the 10- and 50-kHz. outputs.

—···—

In the article on "Weak Signal Synchronous Detection", December 1968 *QST*, circuit on page 32, there should be no connection between the junction of R_3 and the 24K resistor and the collector of Q_8. The 12K resistor remains connected to Q_8's collector, however.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

"Rather shoddy job," the house owner told the carpenter, surveying a rooftop of crooked shingles.

The carpenter cheerfully agreed. "It's my new hundred-dollar labor-saving autohammer."

"Maybe you need more practice before you use it on a job." the customer observed.

"Oh, I do practice," assured the carpenter. "On-the-job practicing. For years, now."

That parallel occurs to us while listening to a local dueling his not-so-new keyer, a labor-saving (?) device meant to improve c.w. transmission. He once had a decent bug fist. His spacing is totally shot now, and if he gets through a short phrase without flubs he's flushed with satisfaction. Doesn't apologize for weird code anymore, just keeps saying KEYER ACTING UP AGN. Not *his* fault, you see; it's the keyer's.

This bit of buck-passing is part of our new national pastime of turning human responsibilities over to The Computer. Nobody need really feel at fault for errant magazine subscriptions, way-off billings, impossible engineering specs, ludicrous financial statements, etc., anymore. "Sorry 'bout that—The Computer, you know." (Programmers? Shh-hh—when *they* get organized later on and slow down or strike . . .)

But we digress. W9DY-W9GFF, egged on by W9BRD, WA9s THQ and VOL, comes up with a handy gadget we can recommend to the keyer clique who have such a frightful time sending their own calls right. Bud dubs it his Turquoise Tail-ender, but we like to call it the Gus Machine. It's an old gimmick (see photo) with revived application, especially in view of current DX pile-up techniques and FCC tail-ending regs.

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

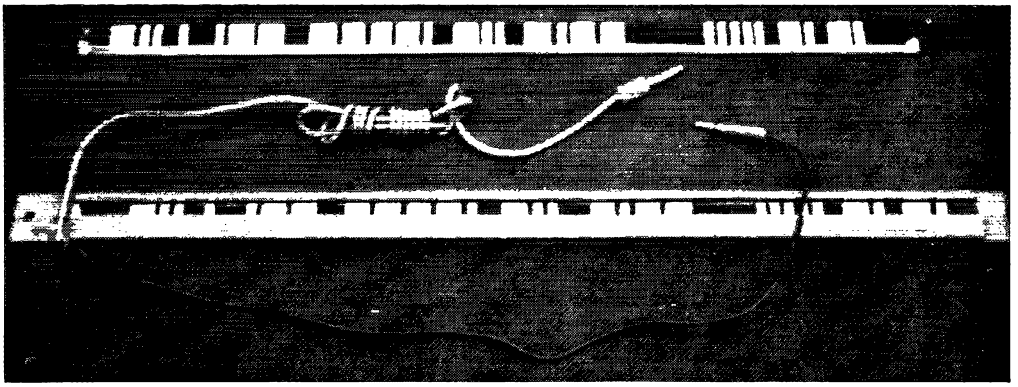
This little operating aid clips right across one's key. A gentle rub of the stylus zips out DE W9DY at any speed, and we mean *any* speed. Good clean, faultless fist, too, and some old Lake Erie swing can be built in if desired. Why not rig up one for Field Day—CQ FD DE WXXXX K—and turn your club's phone men into the snappiest c.w. ops in town?

* * *

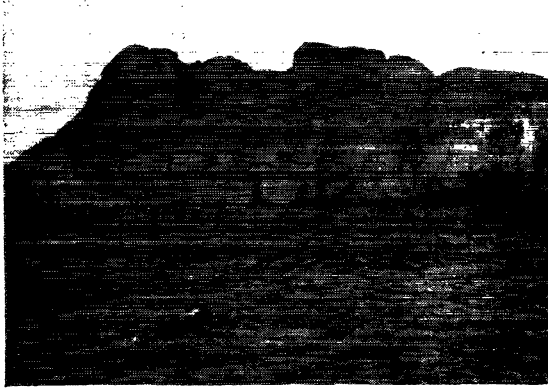
What:

Many DX hounds are nearing the home stretch in hot pursuit of ARRL's new Five-Band DX Century Club award, so this month we'll check DX prospects on 3.5 through 7.3 MHz. As expected, old 75/80 is the toughest nut to crack. Figures in parentheses represent kiloHertzes above the low band edge, and digits outside parens stand for GMT whole hours. . . .

80 c.w. comes across for **W**s 1BGD/2 1SWX 4YOK 7BE, **K**s 1UHY 8DHT, **WA**s 1FHU 2DQE 2FOR and 8MCQ with such items as **CO**2s DR (5) 3, QR (9) 5, **CR6**s AI (10) 5, EI (25) 3, **CT**s 1LN 1VS 0, 2AT, fourteen DJ-DK-DLs, DJ6SI/**LX** (4) 21, **DM**s 2ATD (1) 4-5, 2AUO 2BJD 6, 2CIM (4) 4, 3TMA (1) 3, 4ZL, **EI**s 4BK 3, 5BH 9J (4) 22, **ET3**USA (5), eleven Frenchmen, 37 G-men, **GC**s 2FMV 2LU 7, 3IEW 6, **GI3**s GAL (7) 8, NZZ OLJ OQR SKII (8) 6, **GM**s 3PFQ 3TCW 5AHS (1) 1, **GW3**s FSP 3, ITZ 7, JI (18) 4, NJW 2, WVG (8) 23, **HA**s 3GF 4, 4KYB (1) 5, 5HM 5KDQ 4, 5KFZ (2) 2, 7LU 8KUX, **HB9**s DX 5, KB 3, **HI3**PC (10) 9, **HK4**ALE (26) 6-8, **HL9**s KB KQ (12) 11, TT 12, **HP1**XHG (27) 4, **I1**s IZ (10), PIS (27) 6, **JA1**JWI, Ks 4PHY/**YV5** (35) 6-7, 5KFT/**KP4**, **KH6**DQ (30) 10, **KL7**IR (8) 7, **KP4**UW, **KR6**EL 12, **KV4**s AM FZ 6, **KW6**EJ (2) 10, **LA**s 1OA (20) 4, 3LC (32) 6, 3XI (2) 23, 6U (30) 5, **OA4**PF (3) 4, **OD5**LX (5) 3, **OE2**TO (1) 23, **OH**s 1AD (2) 2, 2AC (6) 4, 2BW 5VQ (30) 6, twenty-seven OKs, **ON4**s HC (19) 6, XG 6, **OX3**s NN (12) 2, WX (10) 23, **OY**s 1R 2H (24) 23, 5NS 6FRA, **OZ**s 1LO 6, 1W 5, 2LX (34) 6, 4FA (38) 7, 7YY, **PA0**s BW (22) 9, LOU 2, **PJ**s 2CC (20) 2-3, 2VD (16) 3, 3CE (8) 2-3, 7JC (5) 23, 7VL (2) 2, 8AA (25) 6-8, **SK6**s AB 6, CF, **SM**s 4CIM 4DJE 5CUN 6AEK 7DBN 7EVE/6 ØCRC, **SP**s 2ART 3AKR (1) 4, 3CQP 3PL (7) 1, 6AEW 9DH (4) 5, **TA2**E (28) 2-3, **UA0**s KZB (1) 13, KZD (8) 13, **UB5**s CV (20) 2, KDS (2) 2, **UC2**s AR (9) 2, KSB WP (8) 4, **UG6**AD (10) 4, **UH8**AE (8) 3-4, UI8s FF KAA KBA, **UJ8**KAA,



W9DY's Gus Machine, the Turquoise Tail-ender, is formed on a strip of copper-clad circuit board. Spaces are etched out leaving one continuous side. The rubbing stylus is a dulled tester lead. Wood track railings complete the job. Bud's is a plush heavy-duty model, but simpler usable versions can be whipped up quickly from cardboard, tinfoil and glue.

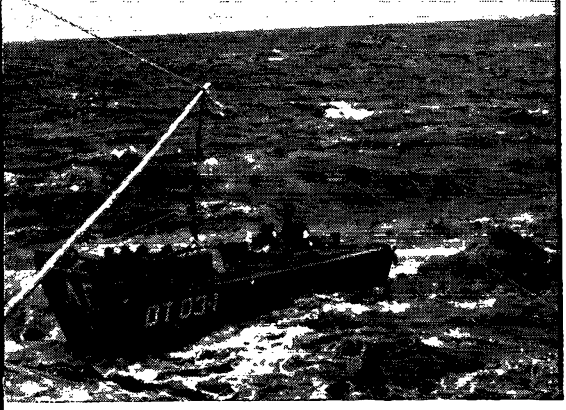


HKØTU, a collective DXpeditionary effort by Colombian and U. S. DX men, collected some 8000 QSOs from Malpelo island over four hectic days in March. In these photos, from top left to right, we see (1) *Almariante Padilla*, Colombian destroyer and DXpedition transport; (2) the Rock itself, one mile round peaking at 856 feet, jammed with unhospitable crabs, birds, etc.; (3) landing-craft riders precariously putting in near a bamboo supplies hoist; (4) the single-sideband station on rockside; (5) HK3RQ resting at Cali after sustaining

UO5PK, **UP2**s KBA (1) 3, KBI KNP (1) 3, **UR2**EK, **UQ2**AN (8) 4, **UT5**KDP, **UY5**XO (1) 5, a dozen VKs, **VP**s 2KK (1) 4, 2MJ 2MK (8) 23, 2MO 7BG 3, 7NA (30) 5-9, 9GG, **VQ8**CP (6) 2, **VR2**DK (5) 12, **VS6**AA (3) 13, W6CXF/**KL7** (2) 9, WB2NCS/**VP9** 5, **XE**s 1AAC 2AAG (35) 6, 2JS, ØGEN (30) 4, ØGJR (3) 2, **YA2**HWI 4, **YO**s 3SF (1) 5, 7VJ 9APJ (8) 3, **YU**1BCD, **YV**s 10B (36) 4, 4OY 7, 5ANT, **ZB2**WA, **ZD8**Z, **ZL**s 1AYG 2PS, **ZS**s 1A (20) 4, 3AW (2) 4, 5QU 6FN (17) 5, 6FW (17) 4, 6KO (18) 4, **4X4**s MR WN (12) 2, **5R8**BB (27) 6, **6Y5**SR (5) 2, **8R1**J, **9G1**HM (5) 2, **9H1**s AX (20) 23, BL 23, **9J2**s MX (5) 2 and VB (2) 4.

75 phone, mostly just below the Yank suballocation, treats **WA**s 8MCQ 9SQY, tuner P. Kilroy and clubs press reporters to an earful of **CM2**DC, **CN8**AW, **CO2**DC, **CT2**s AP AT 2, **DJ**s 8QQ 8TQ ØSR, **DK2**BK, **DL8**s KZ XO 6, **EA8**EX, **EL8**s D J, **EP**s 2BQ 0, 3AM, F9UC/**FC**, **FG7**XX 3, **FY7**YM 5, **G**s 3NNT 7, 3PFZ 7, 3VXY 6, 8CO, **HBØ**LL, **HB9**WG, HCØBY/**HR1**, **HI**s 7VDC 8XRM, **HK**s 3ATS 3BAS 5ACI, **HP1**JC, **HU1**P 5, **HP1**JC, **I1**TAE, **KC4**USP, **KP4**CL, **KV4**FZ 8, **KW6**EJ 10, **KZ5**WH, **LA**s 1WL 2YE 5KG, **LX1**s BW RC, **MP4**s BEC 22, TAF 22, **OA4**OS, **OD5**s BA 2, EJ, **OH**s 4FD ØNC 21, **OK3**BU, **ON4**UN 6, **OX3**WX, **OY**s 1X 4OV 7S 9IE 9LV, **OZ**s 1IF 5KF 20, **PJ7**JC 3, **SM3**CVF, **SP5**CK, **TF3**EA, **TG9**EP 6, **TI**s 2NA 8-9, 8WPE, **UA**s 1FD 2KBD, **UI8**LM 22-23, **VE8**RCS. **VK1**FW, **VO1**s FB FG FX, **VP**s 2AA 4, 9BK 22, W6CXF/**KL7**, WA3HXR/**YV5**, WB2NCS/**VP9** 6-7, **XE**s 1CE 5, 1KB 8, 1WS 3AF 4, 3EB, **YN1**GLB 9, **YU**s 2REC 3OV. **YV**s 3OR 5ANF 5BBQ 5SW 7AV, **ZB2**BS 1-2, **ZD8**s HL 4-5. Z, **ZF1**GC 5, **ZL3**ABJ/c, **3A**Øs CU 21, ER, **4X4**s BL GV UF, **4Z4**DV, **5A1**TY, **6Y5**CC 4-5, **8R1**G 8 and **9Y4**MM 4, just about all on single-sideband.

40 c.w. is a joy to **W**s 1ARR 1BGD/2 3HNK 3KNG 4YOK 7BE 8YGR, **K**s 8DHT 9SRR/2 9YRA ØGVA, **WA**s 1FHU 2FOR 5SOX 7BOA 8MCQ, **WB4**GTI and **VE3**GHO thanks to **A2**CAU 4, **CE3**s ADG (19) 6, NL (4) 3, **CM2**s CL KW (12) 1, **CO**s 2BB 2DR 9, 2IIS 2PY 3CS 5-6, 3DC, **CR6**s AI (5) 22, GO (1) 3, EI (20) 4, **CT**s 1MO 7, 2AT 10, 2BO 0, **DM**s 2ADC (10) 4, 3BE (10) 4, 4WL 17, 4YEL (26) 20, **DU1**ZAW, **EA**s 1AM 7, 2CL 2DT 0, 4DK 4IS 8FJ (30) 9, **EI8**BR (4) 1, **EL2**s B 22, Y, **ET3**USA, **FG7**s TI/**FS7** (1) 1, XX (23) 23, **FP**ØDM (7) 2, G3VJI/**8R1** (30) 2, **GC3**EML (5) 21, **GD6**UW (19) 2, **GI3**OQR, **GM**s 2HCZ 7, 3JAA (3) 0, 5AHS 7, **GW3**s ITZ 6, LEW (4) 22, **HA**s 1KSA 3KNA 4, 4KYB (8) 5, 5HA (24) 3, 5KDQ (6) 23, 5KHC 8UD 4, 8VM (9) 5, 9KOB ØDD (23) 6, **HB9**s AW KB MD RX UB, **HI**s 7JMP (10) 4, 7JQP (15) 2, 8IBC (18) 1, 8OAF (27) 13, 8RV (2) 23, **HK**s 3BKU (20) 3, 3RQ 5, 4ALE 4EX, **HL9**KQ (7) 11, **HP1**XHG 4, **IT1**s AGA (5) 1-2, EGW, **JA**s 1NUT 6BJT 8DCM, **JH1**CBI 22, K4PHY/**YV5**, **KC4**USM 7, **KH6**s DQ GHC GQW, **KJ6**CD (25) 6, **KP4**UW, **KV4**FZ, **KW6**EJ (26) 10-11, **KZ5**s BR (16) 3, JQ (6) 2, KN 5, **LA**s 3LC 3X (3) 1, 6U ØAD, **LU8**DQ, thirteen LZs, **MP4**BBA, **OA4**s DX 5, HG (5) 4, KF 8, PF, **OD5**LX 21-1, **OE**s 3KKA 5, 4SZW (21) 0, **OH**s 1AD 2AC (3) 3, 2PBD 5VQ (30) 6, **ON**s 4XG 5HU 5WL, **OY6**HX, **PA**Øs ELS (26), STN (31), **PJ**s 2CC (20) 2, 3CE 6AA (15) 3-4, 7JC 2, 7VD 5, 8AA, **PY**s 2NE (5) 23, 4AKV 0, 7PO 0, 7AUU (23) 2, 7AVS 7AWE ØEP, **PZ1**DE (50) 9. **SK6**CF, **SL3**ZV 8, **TA2**s E 4, EM (1), **TF3**TF 5, **TG**s 9CD (3) 5, ØAA, **TI**s 2AB (20) 23, 8LAJ 5, **UA**s 1KED (4) of Franz Josef Land, 2DS (15) 5, 2EC (1) 23, 9CM 23, ØIW ØKAE, **UB5**s KCN (23) 0, KDS (5) 2, MZ 4, VY (27) 21, **UC2**AR (3) 21, **UD6**BJ 6, **UF6**AU (19) 0. **UN1**AN 5, **UO5**s DN (8) 4, WT (4) 22, **UP2**KBA (16) 6, **UQ2**s PM (3) 4, YA (14) 4, **UR2**s EJ (14) 4, KAA 6, LO (0) 4, **UT5**s BL (9) 2, CZ (21) 4, HD (31) 5, KDP (30) 4, KHS (23) 23, MD (11) 2, **UW**s 9WL 21, ØBQ ØIG, **UY5**s CW (4) 21, GB (20) 5, XG (14) 4. **VO1**HH 23, **VP**s 2KK (1) 4, 2LE (25) 3, 2MK (5) 23, 2MQ (2) 2, 7NQ, **8K**F (6) 5. **VQ8**CC, **VR2**DK (20), **VS9**K (18) 10, **XE**s 1AX 4, 1WS 2AY (16) 3, 2JO 2JS (3) 2, OAK 8, ØGEN 7, **YA1**HD, **YN1**CW (20) 21, **YO**s 3RF 5DA (27) 0, 6ANI (3) 21, 6AW 7EL (23) 4, 8MC (12) 5, 9HO, **YV**s 1OB 0, 4FX (10) 23, 4LY/2/3 (8) 1-2, 4OV 5ANT 5CVE (6) 5, 6GV (11) 2, **ZB2**BS (28) 21-22, **ZD8**s 5X (20) 0, 8Z, **ZL**s 1AMO 11, 2ANX 10, 3GQ 7, 4GA 7, **ZS**s 1A 3AW (3) 20, 5BE



leg injuries in landing; (6) the c.w. layout with W4VPD standing, W4DQS pumping and WØDX at ease; (7) newsman-photog H. Hernandez (right) interviewing members during the undertaking; (8) on-scene DXpeditioners K6JGS, HK3BSV, HK5ASF, W4DQS, a Colombian marine, and (top) HK3VA, W4VPD, HK5EV, an HK sailor, WØDX and HK3BAS. ARRL President WØDX couldn't miss this rumble, having helped put on the last big Clipperton DX show in the early '50s. *(Photos via W4VPD)*

3, 5DE (5) 5, 50V (5) 0, 6FN, **4X**4s NMU 21, RH (4) 1, WN (10) 5, **4Z**4BK (10) 23, **5H3**KJ (17) 0, **6Y5**s GS 5, RA (2) 23, SR 22, **7P8**AB, **7X**ØAB (26) 21, **8P6**CF (18) 15, **8R1**J (7) 23, **9G1**HM (20) 6, **9H1**s BA (5) 23, BL 0, **9J2**VB (5) 2, **9Q5**BE (27) 9, **9Y4**s NN (23) 1 and TR (100) 4, plus loads of DL G F I1 OK OZ SM SP VK and YU customers.

40 phone finds **W8**YGR, **WA8**MCQ, monitor Kilroy and club publications accounting for **AP2**MR, **CM2**DC 6, **CO2**DC 6, **CR6**s GA GE GT IV JJ LX YL 20, **CT1**MW 8, **DM2**ATD, **EA**s 3JE 8EV 8FF 8FS, **EL**s 2BD 8J 0, **EP**s 2BQ 1, 3AM 0, F9UC/**FC** 1, **FG7**XX 7, **G**s 2PU 3JOC, **GC3**LPV, **HBØ**AG, **HC2**HM 6, **HI8**RXM, **HK3**AIS 6, **HP1**JC 6, **HR3**FJI (205) 2, **HU1**P, **I1**TAE, **JA**s 1EUV 2BAY 2BTV 2EKX 9BGX 9JX, **KP4**CL, **KR6**s FC JD KN, **KV4**FZ, **KW6**EJ (226) 10-11, **LX1**RG, **MP4**s TAF 23-0, TCE, **OA8**BA, **OD5**s AB 1, EJ, **OE1**ZNC, OHØNI 7, **OK3**BP, **OY5**NS, **PJ2**CB, **PX1**PA 6-7, **PY**s 1CAD 2SU 4BEC 5-6, 4ND 7ASW 7VI 7VKZ 8VA **SK6**AB, **SM6**DFL/5, **SV1**s AB CD, **TI3**FAV, **UC2-**WA, **UD6**BR, **UF6**CR, **VK**s 2FU 3HW 3OZ (265) 12-13, 3ZL 6CD, **VP2**s DC 7, KF, **VS6**DR, **XE1**BR, **YU1**BCD, **YV1**BI, **ZB2**BS 1, **ZD8**Z, **ZL**s 1BCG 3LE, **ZS6**PD, **4X4**BL, **5A1**TY, **5H3**KJ, **5N2**AAX, **6W8**DY, **6Y**ØA, **9H1-**I, **9J2**VX, **9Y4**s MM 1-3 and KR.

Coming up for inspection shortly are other DX playgrounds populated by (15 c.w.) **W**s 1BGD/2 1EGM 2LJF 3BBO 3HMR 3HNK 3KNG 4YOK 7BE 8BQV 8YGR, **K**s 5MHG/6 5YUR 6TWT 9EUZ, **WA**s 1FHU 1JKZ 1KEX 2APG 2DQE 2FOR 3GVP 3JRY 5SOX 7BOA 8VBY 8YXE, **WB**s 2DZZ 2RNL 2UOO 4IGL, **WN**s 2DRS 2FEL 2GMC 4LAL 7JOV 9WLF 9ZRV ØWEP, **VE7**BST, **I1**ER; (15 phone) **W**s 1BGD/2 2DY 2LJF 2VOZ 3HNK 4UF 4YOK 5BZK 8BQV 8YGR, **K**s 1UHY 5YUR 6TWT, **WA**s 1FHU 1IDP 2BHJ 9MQI 9SQY 9TFM 9URY, **WB2**DZZ, P. Kilroy, B. Tindall; (10 c.w.) **W**s 3HNK 4YOK 7BE 8BQV 8YGR, **K**s 1HDO 3CUI 3UXY 5YUR ØGVA, **WA**s 1FHU 1JKZ 3ATX 5PPZ, **WB2**s RNL UOO, **I1**ER; (10 phone) **W**s 1EGM 2VOZ 3HNK 4UF 4YOK 5OJZ 8BQV 8YGR, **K**s 1HDO 5YUR, **WA**s 1FHU 8MCQ 8YXE 9TFM, **WB2**DZZ; (160 c.w.) **W**s 1BB 2RAA, **K8**DHT, **WA1**FHU; (20 c.w.) **W**s 1ARR 1FK 3HNK 3KNG 4YOK 6EAY 7BE, **K**s 1LWI 1UHY 6TWT 8DHT, **WA**s 1FHU 5PPZ 9SQY, **VE7**BST: (20 phone) **W**s 1BGD/2 2VOZ 3HNK 4YOK 8YGR, **K**s 1UHY 6TWT, **WA**s 1FHU 1JMR 5PPZ 8YXE, I1CTL, **VE7**BST and tuner Kilroy. Conditions slacked off a bit this spring—are we over the sunspot hill?

Where:

ASIA—KA9JS (WA5VNE), QSL manager for club station KA9MF, comments: "Since we QSL non-contest QSOs 100 per cent we send out 300 to 400 cards per month. This makes it impossible for us to send cards direct. QSLs are shipped to listed QSL bureaus, Stateside and DX. However, on receipt of s.a.s.e. (self-addressed stamped envelopes) second cards are mailed direct. If you've worked KA9MF and have not received our QSL make sure you have s.a.s.e. on file with your local QSL bureau." .–.–.– "VS6DO is QRT for six months on homeleave," reports VS6AL. "I have his log-book and will be QSL manager for some four thousand QSOs. Cards will be sent out via bureaus in the next few weeks. S.a.e. plus International Reply Coupons (IRCs) will obtain direct QSLs but the bureau route is preferred." .–.–.– "Just received my JT1KAA card after a 25-month wait," cheers K1UHY. *Much* better late than never!

AFRICA—QSL tender W5QPX remarks, "In my own experience I find that new rare-DX operators go like a house afire for a year or two, then slowly drop off to relative inactivity. Thereafter what few QSLs they get can go via bureau. For example, CR6FW and FG7XJ have been rather inactive for some time and no longer really need my services as QSL manager. Therefore henceforth please QSL these stations direct, not through me." W5QPX also reminds us that the primary purpose of postage stamps is to indicate payment of postage; higher QSL returns may result from avoiding use of chauvinistic issues in international *mails* .–.–.–

West Coast *DX Bulletin* finds WA3HUP still trying to coax log transcripts out of ex-7G1CG, last heard from en route Sierra Leone. The same organ hints that 5Z4KS is a stamp fan who may go for propaganda-style postage inappropriate elsewhere .–.–.– While your ARRL QSL Bureau handles QSLs for League members and non-members without distinction, some overseas bureaus are franchised on a members-only basis. Geoff Watts's *DX News-Sheet* states that CR6s BX CA DA DB DX FY GO HL and IK want their cards via a nonbureau address, Box 10408, Luanda, Angola.

OCEANIA—VE6AO notifies, "I have logs for VE6-AJT/KB6, VRs 1P 2FR 5AE and 5W1AE and would like to close the books as soon as possible. Who wants to make out QSLs on balmy summer evenings? Fellows who neglect to supply s.a.s.e. may still be sweating out return cards. U.S. stamps, by the way, are n.g. in Canada and my nearest U.S. post office is 210 miles away." George also tends XW8CS QSL chores but *not* those of club station XW8CAL .–.–.– "I handle ZL3ABJ/c QSLs for North America QSOs only," qualifies W5RBO. "Others should write Bruce direct with s.a.e. plus IRCs." .–.–.– "Effective immediately VR1L QSLs are to be handled by W6NJU," confirms the latter. "I have all logs through November 3, 1968, and will catch up on the backlog shortly." .–.–.– VR6TC tells W1BGD/2 that IRCs are redeemable at only a nickel each on Pitcairn, a point to keep in mind when QSLing Tom .–.–.– West Coast *DX Bulletin* hears that ex-VKØWR collected seven sacks of Heard isle mail on putting into Mauritius, also that K6KA took prompt care of s.a.s.e. receipts in QSLing his own February QSOs from FO8AA. Non-s.a.s.e. petitioners should keep in touch with their local bureaus as usual.

EUROPE—DL4FS says April-May QSOs with PA9IF and OE2ZON can be confirmed through his station at CMR Box 4488, APO, New York, N.Y., 09057 .–.–.– "I estimate that the pirate who bootlegged my call last August worked some 600 stations," writes 3A2EM to DL4IZ (WA5PAE) .–.–.– No QSL from SK9WL without supplying at least three IRCs, specifies SM7CRW .–.–.– Northern California DX Club's *DXer* affirms that 9H1BL is another philatelist .–.–.– International Short Wave League's *Monitor* testifies that Corsican FC6ABP also signs F6ABP/FC when the mood strikes him .–.–.– WA8ZJM pushes pasteboards for SM4CJY's QSOs with W/K/VE/VO/XE stations, and SM4CJY does the same for WA8ZJM's European contacts .–.–.– OK3DT, at 26 confirmed, pleads for more answers to QSLs sent to W/Ks in other states he needs for WAS. This via WA1FHU.

HEREABOUTS OX5BE (W3BIN) observes from Thule, "*Callbook* addresses for XP1s AA and AB are okay but we like to get our OX5 cards direct instead of through the MARS director. We also get QSLs for the KG1 call formerly used by XP1AA but no cards are available to send out. Just received a new batch of XP1AA cards courtesy OX5BK, and my own OX5BE blanks should arrive from the printer shortly. XP1AA QSLs 100 per cent in response to all received." .–.–.– DARC's *DX-MB* newsletter warns that Brazilians may pop out with PQ PR PS PT or PU prefixes at any time, suffixes unchanged .–.–.– Long Island DX Association's *DX Bulletin* subscribers marvel at the rapidity of HKØTU QSLing for that springtime Malpelo venture .–.–.– "ZP9AC has authorized me to QSL for him only to those W/Ks who include s.a.s.e. with their cards," stresses K1HDO .–.–.– "I handle HI8XRM's QSLs for QSOs beginning February 1, 1969," says WA2RSX, dealing only with the s.a.s.e. types .–.–.– VE3BS/VP9 promises thorough QSLing for his March contest work. "Will send them via bureaus. No QSLs are required at my end unless direct mail is desired, in which case send s.a.s.e. to VE3BS." .–.–.– OH3UQ/W6 reminds us he's a resident alien, not a "visitor". Gee, visitor sounds a lot better, somehow. Your new *Callbook* now includes addresses for such reciprocal-operation authorizations, as well as several pages of Extra Class switcheroos. For newer readers we should also point out that our own QTH listings, when stating "via RSGB", "via HKARTS", etc., refer abbreviatedly to specifications appearing in the QSL bureau directory found in the "I.A.R.U. News" section of each June and December *QST* .–.–.– Elp! The following italicized DXers seek suggestions toward running down QSLs from holdouts mentioned: *W2CVW*, FA9s IO VN 1957-'58, UF6s FB KPA '59, VP5BL '58, VQ2AB '59, ZP5HK '61, 4U1ITU '67, 6O1ND '63; *W6EAY*, ZD8J; *K1HDO*, CT3AS, ST2SA, TI4FCH, VP2DAE, ZD8JL; *K6IDV*, EL2AD (Tony), 9M2LO; *K8DHT*, VP2YL; *K8SYH*, KH6GLY; *WA6KGP*, VQ9B; and *WA9SQY*, HKØBMO. Maybe WA5PPZ can help. Larry writes, "I'm willing to try to provide info on QTHs to anyone sending s.a.s.e. as I have an extensive library of directories. No pre-'67 inquiries, please." .–.–.– K6TWT, WAs 2BHJ 6IEB and R. Murphy, 112 Pine St., Greenville, Ohio, 45331, volunteer to serve as QSL managers for overseas DX ops in need of Stateside agencies .–.–.– "QSLers of the Month", heartily commended in mail from "How's" correspondents Ws 1SWX 3HNK 8IBX, Ks 1HDO 4TTA 8DHT 8SYH, WA9SQY and F3VN/W2, turn out to be CPs 1HW 6HB, CR6s KV ML, CT2AR, EA9AQ, EP3AM, FP8AP, GC3-UJE, JH1BRI, KZ5JW, OAs 4ACF 9G, PJ8AA, SVØs WI WP, UA3UY, UP2KBA, VK2BRJ/VK9, VPs 2MO 8KL 9NA, XE2JS, YK1AA, YN1AA, ZL2OM, 5H3JR, 6W8BJ, 7P8AR and 9H1BG, plus QSL aides W2SNM, Ks 8EHU and 9GZK, each nominated for especially snappy sheepskin shipment. Any quickies out your way worth saluting here? .–.–.– Let's see what the mail-bag turns up in the line of individual recommendations this trip, keeping in mind that each item is necessarily neither "official", complete nor accurate. . . .

CR6s BX CA DA DB DX FW FY GO HL IK (see text)
CT2AR, W. Warker, Box 169, 1936th AFCS, APO, New York, N.Y., 09406
EA8GI, Box 860, Tenerife, Canary Islands
Fs 5CZ ØFZ (via WB2QXX)
FY7YR, P.O. Box 93, St. Laurent-du-Maroni, French Guiana
G3UHR/VO2, C. Noakes, P.O. Box 176, Labrador City, Newfoundland, Canada
I1ZL, L. Zenti, P.O. Box 20, Asti, 14100, Italy
JT1AK, Box 92, Ulan Bator, M.P.R.
LX1RG, P.O. Box 107, Luxembourg, Luxembourg
MP4BHK, Box 14, Bahrain, Persian Gulf
MP4s TCQ TCR (via RSGB)
OK2BEN, P.O. Box 50, Zdar, Czechoslovakia
OX5BE, R. Lannen, CMR Box 1844, APO, New York, N.Y., 09023
PK1BI, Box 315, Djakarta, Indonesia
PK8YAE, Udjang Tarwi, Radio Kabupaten, Bandung, Indonesia
PY2s PA PE (via W2GHK)
SM4s CJY TN (via WA8ZJM; see text)
TA3s AB CC (W/K/VE/VOs via W5RBO)
TG4TL, Box 115, Guatemala City, Guatemala
TI3FAV, Aptdo. 167, Cartago, C.R.
UP2NX, R. Zakarevicius, Box 289, Kaunas, Lithuanian S.S.R., U.S.S.R.
VK9LB, Berry Research, Box 287, Norfolk Island
VP2KC, Box 86, St. Kitts, W.I.
VP2LB, c/o Agriculture Dept., Castries, St. Lucia, W.I.
VP5NF, US NavFac, Grand Turk, NPO 558, c/o Patrick AFB, Fla., 32925
VP7NN, Box 1432, Nassau, Bahamas
VR1O, D. Appleton, 22 Maldon Rd., Goldhanger, Maldon, Essex, England
VS6AD, Box 97, Hong Kong
VS6s AI BF (via HKARTS)
VU2VZ, M. Vasudavan, 10/1 Queens Rd., Bangalore 1, India
WA4PUC/HS (to WA4PUC)
WB2NCS/VP9 (via WA5GFS)
XE1NNR, Dr. M. Alfani, Box 349, Veracruz, Ver., Mexico
YA1AR, U.S. Eng. Team, c/o U.S. Embassy, Kabul, Afghanistan
YB1s BC BM, Box 8, Bandung, Indonesia
YV2NY, Box 187, San Cristobal, Venezuela
ZC4s AK TK (via WA2CMV)
ZD7DI, P.O. Box 8, St. Helena (or viaRSGB)
ZL3ABJ/c (W/K/VE/VOs via W5RBO).
ZP9AC (W/Ks via K1HDO)
4W3BS, F. Koller, Bremgertenstrasze 70, 8953 Dietikon, Switzerland
4Z4FH, Box 16108, Tel-Aviv, Israel
5L2BJ, c/o U.S. Embassy, AID, APO, New York, N.Y., 09155
5W1AD, D. Swift, P.O. Box 63, Apia, Western Samoa
5Z4KS, Box 488, Kitale, Kenya
6O1MT, Box 61, Mogascio, Somalia
9J2JN (W/K/VE/VOs via W5RBO)

CX2CO (via W2GHK)
DJ7RU/YBØ (via DJ1OJ)
DL4FS (to W8IMZ)
EA8FD (via WA2CMV)
EL2BI (via W3HNK)
FØFV/FC (to DL7BV)
FØRW/FC (via K1IMP)
FG7XJ (see text)
GC3UML (to G3UML)
GD3VNQ (to G3VNQ)
HS3RB (via DL7FT)
IS1LIO (via WA2CMV)
JA6BEE (via W3HNK)
KA9MF (see text)
KG6SM (via W2CTN)
LG5LG (via LA4YF)
OA4DX (to W4TKN)
OE2ZON (to W8IMZ)
TG9GF (via 1HHL)
VE3BS/VP9 (see text)
VP2KK (via W3EVW)
VR1L (via W6NJU)
VR1Q (via ZL2AFZ)
VS6DO (see text)
VU2BX (via WA2CMV)
W8IMZ/LX (to W8IMZ)
YU7LDB (to OK2DB)
YV7BI (via WB2CGE)
ZB2VF (via G3VCN)
3AØEJ (to DK1KH)
3V8AD (via DL1DA)
5A1TN (via DL8OA)
5L2BA (to EL2BA)
5Z4KL/5X5 (to 5Z4KL)
9H1BN (via W2CTN)
9M2RH (via MARTS)

PA9IF (see text) **9Q5LC** (to ON5PQ)
TF2WLM (to K4SAK) **9Y4LSG** (to K8LSG)

You're indebted to **W**s 1BGD/2 1CW 1SWX 3KNG 4ORK 4YOK 9SKR, **K**8SYH, **WA**s 1FHU 2BHJ 3ATX 5PPZ, **F**VN/W2, **KH6**BZF, **VE7**BST, Canadian DX Association *Long Skip* (VE3HJ), Columbus Amateur Radio Association *CARAscope* (W8ZCQ), DARC's *DX-MB* (DL3RK), *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich, Nor. 72 T., England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (K4GRD), 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), Southern California DX Club *Bulletin* (WA6GLD), Utah DX Association *Bulletin* (K7DEQ), VERON's *DXpress* (PAØs FX LOU TO VDV WWP) and West Coast *DX Bulletin* (WA6AUD) for the preceding suggestions. Any similar scoop in *your* log to help the boys along?

Whence:

HEREABOUTS—RSB (Bermuda) invites U.S. and Canadian amateurs to frolic in its 1969 Bermuda Amateur Radio Contest, a single-operator shindig, using phone from 0001 GMT June 22nd to 0200 the 23rd, and c.w. July 20th-21st, same times. W/K/VE/VOs give RS or RST reports to VP9s, and the latter send RS or RST plus parish names. Scoring for non-VP9s: Each Bermuda station worked per band counts 3 points, this total to be multiplied by the number of band-parishes contacted (watch for these parish abbreviations on c.w.—Dev., Geo., Nam., Pag., Pem., San., Smi., Sou. and War.). To be eligible for certificate awards of merit, plus a grand trophy guaranteed to get you a tan, GMT-only logs must be postmarked no later than August 15, 1969, and mailed to RSB Contest Committee, P.O. Box 275, Hamilton, Bermuda, together with a signed statement that all rules and regulations have been observed. VP9BY points out that this affair is No. 10 in the series—have fun! ._._._ Northern Illinois DX Association, host for the 17th annual W9-DXCC Dinner upcoming September 20th, will fete the most active 1969 DXer in the ninth call area at that shindig. Bring along your QSLs confirming different any-mode countries captured since the first of the year and see what happens ._._._ "There are about ten of us Americans active at Thule air base," calculates OX5BE (W3BIN), "including RCA, Philco and Air Force personnel. I work for the Army Engineers and will sign OX5BE at least until my present contract is up in September. I operate mostly 20 c.w. with an HT-40, a quarter-wave vertical and an NC-125. OX5s AP and BA are active on s.s.b. The OX4 prefix is used by Americans at Sondrestrom air base. XP1AA, the Thule base MARS station, has its own special call to permit third-party traffic. XP1AB is similarly assigned to Sondrestrom but is unused due to operator shortage there. Of the Danish hams in this area OX3HM seems most active with s.s.b. on 15 and 20 meters." Bob also signed DL4DC and DL4XC in Germany during the '50s ._._._ F3VN/W2 races reciprocal neighbor F2YS/W2 for sideband DXCC, the latter slightly in the lead ._._._ "This summer I'm joining the ground-plane club on 80 meters," announces W1BGD/2. "Horizontals are great for S9 local reports but the vertical boys have the edge on DX. 5B-DXCC sure put the 3.5-MHz. bug into many a 20-meter man's ear!" ._._._ W3KNG admits, "Though mainly a builder, the bad influence of local DX men has me trying the stuff. With a simple end-fed wire I find myself at the bottom of each pile-up." Jim sneaks through for goodies, though ._._._ W1BB and fellow 160-meter buffs thank HKØTU and VP2KK for 28 and 52 top-band contacts respectively. The properly-equipped DXpedition includes 1.8-MHz. provisions nowadays ._._._ Southern California DX Club announces Jan. 31 and Feb. 1, 1970, as dates for the next joint SCDXC-NCDXC meeting and West Coast DX Convention. WA6GLD suggests early inquiry to chairman W6AOA ._._._ HI8XRM (WAØNZI) tells WA2RSX he's readying a pair of 813s to go with his HX-20, HR-20 and quad. "Don't need much power on 10 and 15, though." ._._._ WN8CKB says W7PUL has accumulated lots of 7-MHz. states with a four-watt 6L6 rig ._._._ VP5NF's new operator is K4FTN, according to W8IBX/2, and John intends much 20-meter s.s.b. activity from the Navy's Grand Turk layout ._._._ K1IMP has North Eastern DX Association's *DX Bulletin* rolling again after completing his military stint ._._._ Watch the low c.w. edges of 40 and 80 for KV4FZ's sudden trips to rarish Caribbean points, 160 as well. KV4AM also gets around adroitly.

OCEANIA—ZL3ABJ/c may continue active till next month from the Chathams on 10, 15 and 20 meters, according to W5RBO ._._._ "Canadian DXpedition South Pacific is awaiting favorable transportation conditions in that region," advises VE6AO in behalf of VE6-AJT & Co. "Travel is not permitted between certain points during the hurricane season. This is specifically mentioned as a condition in granting licenses to operate from ZM7 ZK1 FO8M and other areas." George expects Don to have things going again about now ._._._ YJ8RG has a new New Hebrides helper in YJ8JM of near-by Santo ._._._ "It is true that most Indonesia operation at present is from the Djakarta YBØ locale," notes VE7IR, "but YB1s AB and AK in Bogor and Bandung are on 20 and 15 meters, YB2AJ in Semarang is on 20, and a YB6 is coming on soon from north Sumatra. I expect to visit YB-land again prior to going to South Africa later this year." ._._._ Pacific pointers courtesy club newshawks: VR1O (G3NRA) opens a two-year Tarawa tour with a KW-2000A and rhombic on 10, 15 and 20 meters, 160 to follow. Ex-ZL1AI signs VR1Q near by. . . . 5W1AP is a joint effort by 5W1s AA AD AR AS and AV around 14,225 kHz. at 0500-0700 GMT. 5W1AD, also active on his own, is ZL1AAP's son. . . . VK9LB expects to be hitting 14-MHz. s.s.b. from Norfolk isle through '69. . . . VK2BFI likes a venture to Ball's Pyramid, a speck near Lord Howe isle. . . . W9EXE, K6KA and others try to help CR8AI cut thick QRM near 14,245 kHz. at 1400 GMT. . . . 9V1OI is all set for his YB-land lark. . . . A new staffer has Kure's KH6EDY back on 20 sideband albeit hesitantly. . . . KR8s DK DL DU and EA are among Okinawa nationals busy on 10, 15 and 20 c.w.

AFRICA—VQ8CCR worked G3XAQ, heard W1BB and KV4FZ on 160 meters during the Rodriguez romp of VQ8CC and W4BPD. A 50-ft.-high 270-ft.-long wire helped at the Indian Ocean end. Blenheim, Geyser, Desroches, Chagos, Aldabra, Agalega, Farqhar and other DXotic nifties are mentioned as early Gus possibilities, W4BPD joining forces with VQ9B in the VQ8-9 and FR7 bailiwick ._._._ WA4ATX says 5A4TY gets a kick surprising guys on 28-MHz. s.s.b. and c.w. with his SB-101 and 12-element log-periodic ._._._ W9SCD hears of a real Biafran station, clandestine 5N2XX supposedly operated by a European mercy worker ._._._ African oddments via the clubs press: 5T5AD should be back at it this month after French leave, aided by XYL 5T5YL on several bands. . . . CR5SP starts a six-month vacation away from Sao Thome. . . . 5Z4KL signed 5Z4KL/5X5 on three bands at the East African Safari Rally in early April with an NCX-5 and dipoles. 9J2NW also heads for Uganda where 5X5 tickets are hard to come by. . . . 9G1GO tries his luck at ZD3D on occasion, 15 s.s.b. preferred. . . . A worthy SCDXC project is the procurement of a c.w. transceiver for gear-shy Mauritius Amateur Radio Society.

ASIA—Hong Kong Amateur Radio Transmitting Society's *Newsletter* welcomes newly active VS6s AI and BF, the former with a high quad on c.w., the latter with a Heath rig and 14-AVQ. Among other VS6s, BE enjoys a 32S-1 and 75A-3B combo, BS practices his Japanese with a new tower, DR has 241 countries in nine months on the air, and AL tries 15 and 20 again after a TVI bout ._._._ W1ARR finds MP4BBA returning to Wales after a long RAF stint in Bahrain ._._._ W6EAY must have some sort of record, working his first YL, UAØKCA's Anna, since getting his ticket 40 years ago. "Never did much local or national work, always DX," explains Eric. W6EAY also relays Wrangel islander UAØKIP's plea for Ga., Wyo. and R.I. QSOs to clean up his WAS around 14,005 kHz. at 0300 GMT daily, and K1LWI says JA4XW, 14,040 kHz. around 1200 GMT, seeks S. Dak. and W.Va. for the same reason ._._._ "I've been active with c.w. and s.s.b. on 10, 15 and 20 lately," pens VU2VZ, "working quite a few W/Ks. Watch for me daily near 21,300 kHz. at 1430-1530 GMT." ._._._ KA7CS (W7TNZ) with XYL K7BGS sails from Japan for Guam abroad trihulled *Chamaru* hoping to hit ZL-land by Christmas. An SB-34, DX-100 and FL-100 will go along ._._._ K4JC hears that VU2DK expects to sign a VU4 call next month or next ._._._ W9FIU works mobile-to-mobile sideband with YA1DAN on 14,204 kHz., an SB-101 and Hustler in Flip's vehicle, a 350 and Lancer-1000 at the far end ._._._ W1EII, formerly KZ5TC, F7FT and HI8XTF, heads for Vietnam. "Really enjoyed working the gang from the C.Z. on 20 and will be sorry to be QRT for the next year or so," regrets Tim ._._._ Asian addenda via literature of aforementioned clubs, groups and individuals: MP4TCR issues 5B-DXCC credits on 10 through 75 meters with his 32S-1, HA-14, RA-117, quad and assorted dipoles. . . . WA4PUC/HS gave Thailand to many a sidewinder in March under special FCC okay. . . . VS6AA hopes to sign a 9M6 call this month or next, while VS6DR and associates consider a go at Spratly or Minerva, isles not too far from Hong Kong.

. . . "I find 21 MHz. more exciting than 14 MHz. these days," opines AP2AR.

EUROPE—WER (Worked European Regions) is an ambitious certification offered by SM5WI and colleagues based on working stations in 500 areas of 25 countries, 1000 areas of 40 countries, etc. Zip s.a.e. with three IRCs to Harry if you're a keen EU collector . . . . . Morokulla, a fanciful tunland on the common border of Sweden and Norway, was the site of April operation by SMs 5CZY 5EAC 5FC 7CRW and 7DQC as SK9WL. Around the same time G3s NMR and UML put GC3UML on the air from Guernsey with a TR-4, quad and some inverted Vees . . . . . Fs 3KT 8YY and ON5FD collaborate on occasional multiband Andorra DXcursions, while 11s BNM BUP and ZL drop in on such places as the isle of Elba where they signed 11ZL in April . . . . . Czechoslovakia's Central Radio Club, in a mailing to K3CUI, indicates that this year's OK DX Contest will come off as scheduled on the second Sunday in November . . . . . International Amateur Radio Club's *Newsletter No. 11* is an impressive 24-page production chock full of DX tidbits and photos, another big signal from the 4U1ITU gang . . . . . Continental comment culled from club periodicals: The OH2AM combine may try the Alands again next month. . . . HB9TL and W1PRI plan a two-week Corsica caper in July as FOs CH and RW. . . . LZ1ZO, gunning for c.w. DXCC on 40 and 80 with a homespun 50-watter and long-wire, intends to try s.s.b. ere long. . . . Newcomer OH2BFY radiates 40 and 15 c.w. after a 10,000-card s.w.l. career. . . . 11s BNU and HL publish a comprehensive Trieste DX Club *News*. . . . Sealand, anyone? It's a bit of rock, concrete and steel a few miles off England ruled by a rugged individual named Bates who issues his own passports as prince of the realm.

SOUTH AMERICA—LCRA announces this year's all-mode Independence of Colombia DX Contest slated to run from 0001 GMT July 19th to 2359 the 20th on 10 through 80 meters. North American stations earn three points per HK contact, 1 point per non-HK contact, and for final score multiply contact-point total by the sum of HK call areas and band-countries worked (no crossmode allowed). Trade the usual RS- or RST001, RST002, etc., serials. Logs, a separate sheet for each band and mode, go to Colombia Independence Contest, c/o LCRA, Box 584, Bogota, Colombia, for arrival no later than September 30, 1969, to be eligible for trophy and certificate awards. You can puncture those summer DX doldrums with this one—good fishin'! QST

ARRL QSL Bureau

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

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

W1, K1, WA1, WN1[1] — Hampden County Radio Association, Box 216 Forest Park Station, Springfield, Massachusetts 01108.

W2, K2, WA2, WB2, WN2 — North Jersey DX Assn., P.O. Box 505 Ridgewood, New Jersey 07451.

W3, K3, WA3, WN3 — Jesse Bieberman, W3KT, RD 1, Valley Hill Rd., Malvern, Pennsylvania 19355.

W4, K4 — *H. L. 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.O. 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 60126.

WØ, KØ, WAØ, WNØ — Alva Smith, WØDMA, 238 East Main St., Caledonia, Minnesota 55921.

KP4 — Alicia Rodriquez, KP4CL, P.O. Box 1061, San Juan, P.R. 00902.

KZ5 — Gloria M. Spears, KZ5GS, Box 407, Balboa, Canal Zone.

KH6, WH6 — John H. Oka, KH6DQ, P.O. Box 101, Alea, Oahu, Hawaii 96701.

KL7, WL7 — Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.

VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N.S.

VE2 — John Ravenscroft, VE2NV, 353 Thorncrest Ave., Montreal 780, Quebec.

VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.

VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.

VE5[1] — A. Lloyd Jones, VE5JI, 2328 Grant Rd., Regina, Saskatchewan.

VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.

VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.

VE8 — George T. Kondo, VE8 ARRL QSL Bureau of Department of Transport, Norman Wells, N.W.T.

VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.

VO2 — Goose Bay Amateur Radio Club, P.O. Box 232 Goose Bay, Labrador.

SWL — Leroy Waite, 39 Hannum St., Ballston Spa, New York 12020.

[1] **These bureaus prefer 5 × 8 inch or #50 manila envelopes.**

Strays

Concerning Motorola plastic-cased JFETs, we have learned recently that the MPF103 through MPF107 types have been assigned new numbers, though their physical and electrical characteristics remain unchanged. The MPF102, for the present at least, carries its old number. The u.h.f. FETs, MPF106 and 107 are now broken down into three types, each with a different value of transconductance. Here are the new numbers which Motorola has registered:

Old No.	*New No.*
MPF103	2N5457
MPF104	2N5458
MPF105	2N5459
MPF106, MPF107	2N5484, 2N5485, 2N5486

Indications are that the prices for the new types are the same as for the MPF-type units. — *W1CER*

Remember Expedition Kon-Tiki back in 1947? The crew for the voyage was headed up by Thor Heyerdahl, a Norwegian ethnologist. Now, 22 years later, Heyerdahl is organizing another expedition, this time to cross the Atlantic in a reed boat. The purpose is to try and prove the possibility that the ancient Egyptians made a similar voyage from the Old World to Central and South America.

Heyerdahl is applying for the old Kon-Tiki radio call, LI2B, for use on the amateur bands during the expected 100- to 120-day voyage. The departure date is scheduled for the middle of May. Listen for W1AW bulletins and watch *QST* for information on the project as it progresses.

[1] "Kon-Tiki Communications — Well Done!" *QST*, December 1947, p. 69.

The World Above 50 Mc.

CONDUCTED BY BILL SMITH,* K4AYO

Sunspot Numbers Grow

CYCLE 20 isn't shaping up to be the record-buster that Cycle 19 was, but then, who thought it would be? Not many, that's for sure. Some of the experts began writing off this cycle several months ago. A smoothed count of about 115 last October was said to be the top, and that there had been a decline since. But those of us keeping close watch on the bands from 50 to 432 MHz. are not willing to accept that as fact.

In the March column I misquoted the possibility of a *smoothed* 200 count. What I should have said was a *daily* count of 200, and in fact there were many days during March and April when this did occur. It *does* appear we are headed for a smoothed count of up to 130, possibly later this summer.

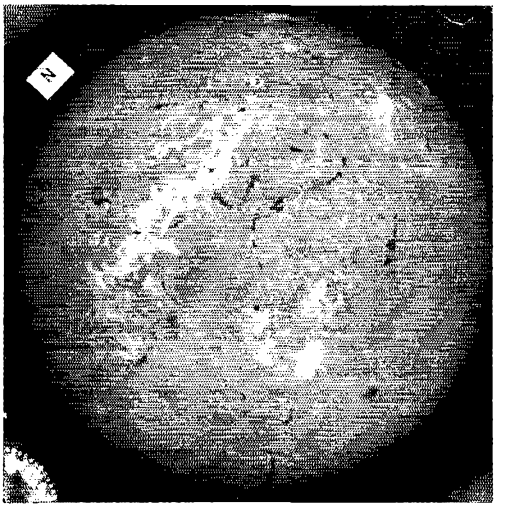
This month we dispense with the usual format and go directly to the operating news. Much has been happening as you will read from the reports of many contributors this month. My thanks to you all.

Europe Heard on Aurora

Elsewhere in this column appears a stripchart recording made during the February 2 aurora. Previous reports of *F*-layer, backscatter and aurora DX worked during the disturbed conditions were reported in April and May, but here is the first report of transatlantic aurora DX. The reception was by Mel Wilson, W2BOC, well-known for his propagation observations in the 30- to 50-MHz. region for more than three decades. Mel says to his knowledge this is the first recorded aurora reception of the BBC 41.5 MHz. t.v. in North America.

The stripchart shows the intensity of the BBC channel 1 t.v. on chart 'A', and American and Canadian t.v. channel 4 on chart 'B'. Strong auroral backscatter is apparent on channel 4 from 1840 GMT until the end of the stripchart shown, about 0200 GMT, February 3. The recording shows typical auroral signal behavior. Since the time of reception was so late in the day, the likelihood of F_2 reflection is remote. Mel suggests the skip mechanism is associated with the aurora and that the mechanism is a form of field-aligned ducting at the height of the *E*-layer, 50 or 60 miles.

During the same time period, VE2AIO, near Montreal, also received the British television transmission on 41.5 MHz.



This is a March 20 ESSA photograph of the sun. The light areas are the hotter portions of the lower solar atmosphere, called the *chromosphere*. The brighter portions are called *plages*. They often have a close spatial relation to the spots. These regions did not produce any activity commensurate with their size and magnetic complexity until they had rotated over the sun's west limb and were hidden from the earth. Then it apparently flared and caused what is probably the most intense radio burst ever seen from the sun, March 30, 0248 GMT. Two and one-half hours later energetic electrons and protons began reaching the earth.

OVS and Operating News

50-MHz. DX news this month is quite heavy. To help compare your notes with those of our reporters, I list the reports in chronological order, beginning in mid-March. All openings are F_2 unless otherwise noted.

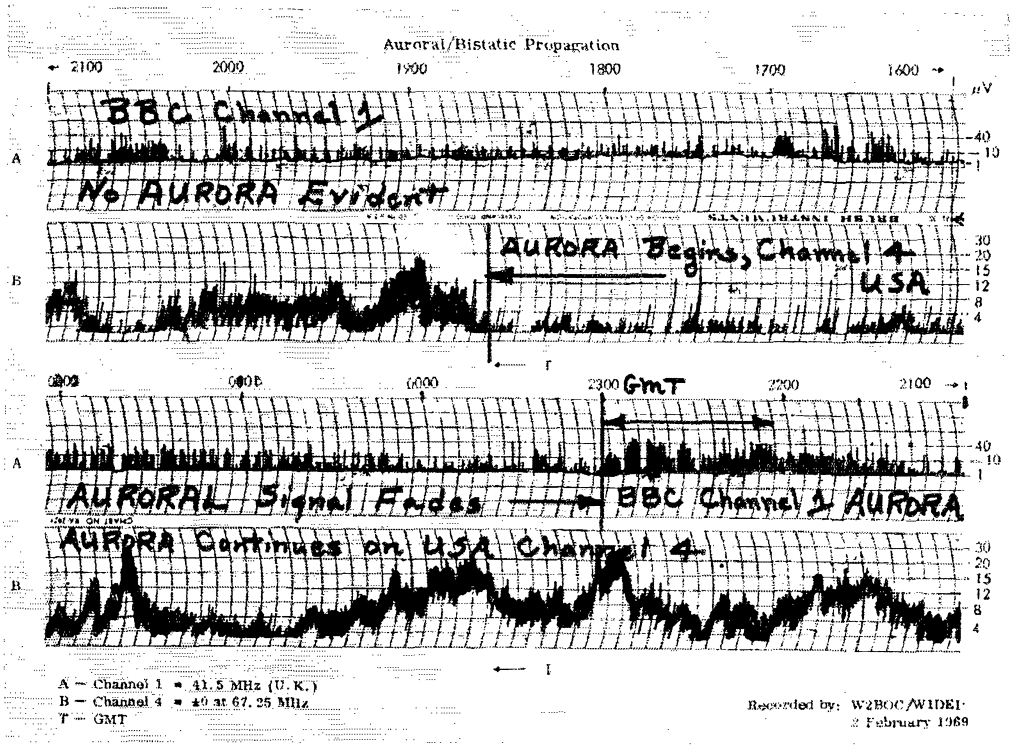
March 20: K5AGI, Louisiana, worked XE1PY, Mexico at 2026Z on F_2 backscatter. W6ABN reports the m.u.f. at 50 MHz. to the Caribbean and South America, but no amateur signals. He did copy the ZK1AA beacon from 2045 to 2112Z.

March 21: KX6HK, Marshall Islands, worked 7 Japanese stations between 1818 and 1915Z. Stateside little was doing except E_s reported by WA5TTH, Louisiana, to southwestern states.

March 22: KX6HK worked 10 Japanese stations, 1740 to 1840Z. K7HIX/KG6, Guam, contacted 16 JAs and a lone Australian, VK4ZAZ, between 1550 and 2340Z. WB6UYG worked CX3AA and CX6BW, Uruguay, and seven LUs, Argentina, 2000 to 2300Z. W6ABN heard the South Americans. WA5TTH reports E_s, again to southwestern states.

March 23: This is the date of the major magnetic storm. 50 MHz. came alive in the late afternoon local time, early GMT (Z) March 24.

* Send reports and correspondence to Bill Smith K4AYO, ARRL, 224 Main St., Newington, Conn. 06111.

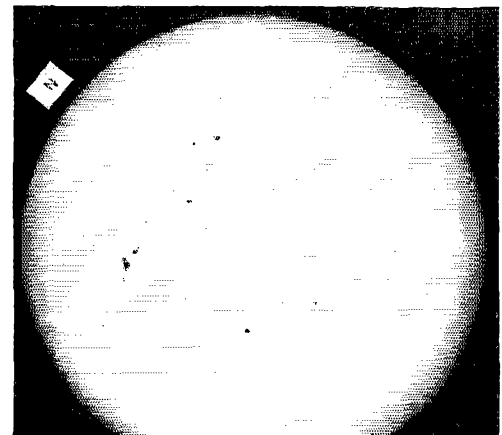


Stripchart recording of auroral backscatter received at W2BOC, February 2, 1969. Chart 'A' is the BBC t.v. channel 1 on 41.5 MHz. Note reception period from about 2130 to 2300 GMT, and the abrupt end of that reception. Chart 'B' is U.S. and Canadian channel 4, 67.25 MHz. Note the aurora reception begins at 1840 GMT and extends beyond the end of the stripchart recording at 0200 GMT, February 3.

March 24: K4AYO worked LU3s DCA and EX at 0020Z and was heard by VP2MJ, *TE*. The opening lasted three hours. VP2MJ, Montserrat, worked South Americans, including OA4BR, Peru, at 0240Z, *TE*.

During the same time, K7BBO, Washington, was working VE6, VE7 and KL7GLL at Sitka, Alaska on aurora. Dave worked Ws as far east as Iowa. In Michigan, W8NOH and W8CVQ were hearing Colorado to North Carolina on aurora. In New England, WA1DFL and WA1DPX worked aurora signals from VE1 to Iowa. From South Carolina, WB4BVF noted signals from New England to Illinois. VE2AIO, Quebec, logged VE4AS, Manitoba, W5SFW, Texas, Colorado and Louisiana. WA2ELD reported similar results.

As would be expected following a major magnetic storm, 50 MHz. opened for *F*-layer DX a few hours later. KX6HK worked KH6ERQ at 1550Z. At 1855Z, backscatter began in the U.S. with K5AGI working VE7XF. On regular F_2, KH6GHC copied K5AGI at 1930Z. KH6s NS, EQA and GHC worked stateside from California to VE7, east to Utah and south to Arizona, as reported by WA7GFP, K7ZOK, W6ABN and WB6UYG. Later in the evening, the KH6s worked 5W1AR, Samoa, KX6AH and K7HGI/KG6. KX6HK reports working another dozen JAs between 1900 and 2030Z. In addition to two Hawaiian contacts, K7HIX/KG6 worked Australia. In Alaska, KL7GLL heard his first *F*-layer DX of Cycle 20, KH6NS from 1955 to 2045Z, but couldn't make himself heard through the W6s.



This white-light photograph of the sun shows several large sunspot groups near the central meridian on March 20–21, just before the major March 23 aurora. The large spots, which are completely black, are surrounded by fuzzy-looking portions called *penumbra*. The photo was taken at the NASA/ESSA Carbarvon, Australia observatory. Note in the propagation reports what happened on 50 MHz. during this storm.

March 25: LU3DCA was heard in Australia by VK2BFI. According to KH6GHC, the Australian also logged LU3DCA on March 17. VK2BFI said both times the signals exhibited auroral and flutter characteristics. Perhaps this is similar to the reception of European t.v. as reported by W2BOC.

KX6HK worked three more JAs, ZL1AA, New Zealand, and ZK1AA, Cook Islands. This is one of the few actual contacts made with ZK1AA by anyone.

50 MHz. was quiet from March 25 to 29, following the end of the solar event.

March 30: K7HIX/KG6 logged JAs for two hours. Stateside, W5WAX, W6ABN, WB6UYG, WA6HXW and WB6UWY worked South Americans and heard W5s, 6s and 7s on backscatter, 2045 to 2245Z. W6YDF logged ZK1AA at 2315Z. ZK1AA was also heard at LU9MA. WA5TTH heard WA6HXW working LU6EAM at 2049Z, and Texas to Arizona on backscatter.

March 31: Quiet stateside, but K7HIX/KG6 worked VK4ZAZ, KR6TAB, Okinawa, and VK6VV in a roundtable, and VS6DR, Hong Kong.

April 1: Exceptional backscatter began about 2000Z. WA5TTH worked VP2MJ, heard California, Texas, Arizona, Florida and Kansas. At 2232Z, WA5TTH heard the KH6EQF beacon on backscatter and a telephone call to Hawaii alerted KH6GHC. Both WA5TTH and K5AGI worked KH6GHC in the thirty minutes before the Hawaiian signals faded. W6ABN heard and worked stations from Florida to Missouri to Arizona on backscatter until 2310Z. VP2MJ worked K6MIO and WB6UYG, and heard Texas and Louisiana, all on backscatter. K4RNG and WB4BND heard LUs weakly at 2000Z, regular F_2. XE1GE heard the ZK1AA beacon and what he believes was New Zealand television above 51 MHz. around 2120Z. K7HIX/KG6 worked VK4ZAZ.

April 2: WA6HXW worked CX9AJ and heard other South American stations, 2055 to 2115Z. This opening also observed by W6ABN who says signals were very weak. K7HIX/KG6 again worked VK4ZAZ.

April 3: WA5TTH noted South Americans on *TE* at 0230Z. She and K5AGI worked OA4C and CE3QG. K5AGI also worked OA4BR. At 1950Z, LU3EX answered a K4AYO CQ, regular F_2. WA5TTH and K4AYO worked CX9AJ. W6ABN and WA6HXW likewise heard CX9AJ and several LUs. VP2MJ had contacts with W4GDS, Florida, W5SFW, Texas, and K3GAU/KP4, Puerto Rico. Monty heard stations as far west as W6ABN. KX6HK worked JA2HMO.

April 4: Outstanding backscatter began at 1755Z. WA5TTH and K5AGI worked HI8XDS, Dominican Republic, and heard Florida, Georgia, Oklahoma, Texas and California. W6ABN and WA6HXW worked HI8XDS. WB4KUN, Florida, worked Oklahoma, Louisiana, Georgia and Alabama, and heard California, VP2MJ and HI8XDS. Band closed at 2200Z, a 4-hour backscatter opening! In the Pacific, K7HIX/KG6 worked VK4NG, VK6VV, VK8ZKA and KR6TAB.

April 5: Exceptionally good propagation on F_2, backscatter and to a lesser degree, on *TE*. WA5TTH and K4AYO noted weak *TE* to Chile at 0200Z. K4AYO copied ZK1AA from 0230 to 0258Z, F_2. CE3QG heard at K4AYO working *TE* to South Carolina until 0315Z. At 1815Z, a backscatter and F_2 opening began at WA5TTH. Stations heard or worked by Mary and K5AGI included CX9AJ, CX3AA, LU4DFN, HI8XDS, VP2MJ, W5WAX and K4AYO. WA5TTH heard both ends of contacts between HI8XDS and VP2MJ, and LU4DFN and VP2MJ. K4AYO worked VP2MJ on backscatter from the Pacific at 1846Z while also hearing ZK1AA. Other contacts included LUs and CX9AJ. W6ABN and WA6HXW heard South Americans, but signals were not good. XE1PY *worked* ZK1AA at 2310Z, while the KH6EQF beacon was being copied in Hong Kong. That beacon is beamed towards the U.S. mainland. K7HIX/KG6 worked three VKs.

April 6: Weak *TE* to South America heard at K4AYO, 0130Z. WA6HXW and W6ABN heard CE3QG on F_2, and backscatter from W6s, 2000 to 2330Z. KX6HK found conditions better in the Pacific. He worked five JAs, and K7HIX/KG6 had another VK opening.

April 8: K2OLS began a 2-week vacation on Grand Cayman, signing ZF1AA. He reportedly worked several South Americans and heard ZK1AA from 1945 to 2225Z.

April 9: W4GDS, Florida worked CX9AJ at 2000Z during a 15 minute F_2 opening. Bob also worked ZF1AA on ionospheric scatter.

April 10: K4RNG, Florida, copied ZK1AA from 2200 to 2235Z, again no contact.

April 11: W6ABN copied LU9MA from 1944 to 2037Z. WA5TTH logged ZK1AA from 2100 to 0030Z, sometimes well over S9. ZK1AA was likewise heard by XE1AAN.

April 12: WA5TTH heard ZK1AA again at 0107 and until 0210Z. On this date, and April 11, WA5TTH heard ZK1AA for 4½ hours! K4RNG, K4AYO, WB4KUN and WB4BND, all Florida, worked OA4C from 0145 to 0200Z. LU3EX was worked by K4AYO, 0230Z. These South American contacts were on *TE*. ZK1AA was copied at K4AYO, 1915 to 1945Z, F_2. XE1PY again worked ZK1AA at 2030 Z.

April 17: WB4BND worked CX3AA and LU6EAM, heard many other South Americans from 2145 to 2310Z.

April 18: K4AYO worked CX9AJ at 0200Z, *TE*.

April 19: ZK1AA-ZF1AA QSO, 2030Z. K2OLS, operating ZF1AA, had heard the ZK1AA beacon for about 2 weeks.

Amid reports that ZK1AA's beacon was being heard in many areas, but appearing the station unworkable, we placed an overseas phone call to Stuart on April 12. He apparently was surprised to learn that his signal was so widely heard.

Stuart is not available at the times the beacon is most likely to be heard in the U.S., 2100 to 2300 GMT and 0100 to 0200 GMT. He said however, he is present on weekends and that calling him plus or minus 500 cycles of the beacon frequency may be successful. The beacon is at a different location than his home station, so he can hear replies even while the beacon is operating. Keep this in mind if the beacon continues to be heard during the late spring and into the summer months.

The reception of ZK1AA in the U.S. well after nightfall is apparently on F_2 and due to a short-lived surge in the m.u.f. over that particular path just before the darkness demise of the *F* layer.

Literally dozens of reports indicate reception of the ZK1AA beacon, but that of HI8XDS in the Dominican Republic is especially noteworthy. Swany heard the beacon every day between March 1 and April 16, except two. April 16 was the last report I had from Swany at deadline, but it is quite likely he continued to copy ZK1AA on a near-daily basis after April 16. The path is more than 7,000 miles.

ZB2BO, on Gibraltar, bemoans no trans-Atlantic openings, but says the F_2 and *TE* to Africa has

ZL1AZR used this array of sixteen 6-element slot-fed Yagis during his recording-breaking 144 MHz. moonbounce QSO with SM7BAE, March 4. The contact was repeated on March 31. The phasing lines are made up of numerous ¼-wave transformers and three adjustable matching stubs. John says the s.w.r. is nearly 1:1. His transmitter delivered 520 watts to this 96-element array.

been good. He and ZB2BC have regular contacts with ZS3B, Southwest Africa, and Rhodesians ZE1AN and ZE7JX. ZB2BO says ZS3E is inactive due to antenna trouble. John also reports G3JVL, near Portsmouth, England, has copied the ZE1AZC beacon on what was apparently *TE*, but John didn't include the date. And he says that March 23 aurora caused highly disturbed conditions on March 24 and 25 to Africa.

Before closing down VP2MJ on Montserrat in the Caribbean, Monty had these observations. He says it is quite an eye opener to operate 50 MHz. from the Caribbean after being accustomed to six meters in Canada where he signs VE3EVW. Under average conditions the South American *TE* signals are much like 10-meter signals except for the flutter. Monty found it quite easy to work stations for more than an hour on *TE* with consistent signals. He says it is unfortunate that so many South American stations are unable to work c.w., having to depend upon a.m., which is difficult to copy on a selective receiver because of the *TE* flutter. Monty shares our feelings that it is likewise unfortunate more 50 MHz. activity apparently can not be encouraged in the Caribbean.

We understand that TG9JW may return to 50 MHz. Perhaps a note to him would indicate our eagerness to have Guatemala once again on 6 meters.

Ken, K7HIX/KG6, writes from Guam that he finds many Japanese stations active on six, mostly a.m. Ken says 50.3 is a very popular frequency, but that the JAs also operate around 52 MHz. to work Australian stations confined to that segment of the band. Ken closed his letter saying, "time now to tape some more JA QSLs to the wall." He knows how to hurt a guy!

Mary, WA5TTH, wife of K5AGI, sent one of the most detailed reports I've had the privilege of receiving. The meat of that report you've already read. She calls herself an "average housewife" — and then goes on to mention having worked 49 states and 15 countries on 50 MHz. in the past year! She and John share a Swan 250, Swan kw. amplifier and a 10-element Yagi at 70 feet.

The possessor of one of six meters finest signals, W6ABN, has promised a look at that antenna. Stan modestly says it is only a pair of 30-foot 9-element Yagis vertically polarized and separated 34 feet. Between them he has an 11-element Yagi on a 49-foot boom. Stan has found that the vertically polarized array outperforms the horizontal Yagi on some long-haul paths.

XE1PY's potent signal emits from a kw. followed by a pair of 6-element Yagis, and OA4C's widely-worked signal is 5 elements wide-spaced and 300 watts.

John, KH6GHC, says the KH6EQF beacon comes from an audio tape feeding the vox of a SB-110. John says the transceiver has been operating 24 hours per day for more than 7 months without a failure. The antenna is a 3-element Yagi pointed at the U.S. mainland.

Gary, W3ZGI, who became well-known during his operation of club station W3KWH, has now been licensed as W6KJD. He promises much activity on 50 and 432 MHz., and eyes moonbounce possibilities on 144.

Bob Cooper, exKV4FU, may now be found at 4007 North Pennsylvania; Oklahoma City, Oklahoma 73112, signing W5KHT.

In the 50-MHz. WAC list printed in the April column, the calls W5BXA and W5SFW were inadvertently omitted. Did I miss any others?

KH6BZF says he and KH6EEM should have been included in the list of Hawaiian station active on 50 MHz. KH6BZF, the Hawaiian SCM, has a SB-110A, kw. amplifier and a 4-element Yagi. KH6EEM, Hawaii's V.h.f. PAM, runs a kw. and a 6-element Yagi.

WB6UWY observes the constant appearance of some calls in this column. Bud is right, they are the ones who are active — and report their activity. More reports from the western states, and especially those in the 7th call area, would be most welcome.

144-MHz. activity is highlighted again this month with news of two additional moonbounce (e.m.e.) contacts. To prove their March 4 record-breaking contact was repeatable, ZL1AZR again worked SM7BAE on March 31. The distance between these stations is slightly farther than previously reported. Let the record stand at 11,370 miles.

Two days later, ZL1AZR and K0MQS made the first New Zealand to United States 144-MHz. contact. That path is 9,015 miles. K0MQS said his echoes were quite weak during the contact, but that the signals from ZL1AZR were the best Dick had received from him to date. W0LER, Minneapolis, using a modest Yagi array, also detected the ZL's e.m.e. signals as the moon was setting on the Minnesota horizon.

On April 13, K0MQS received full calls from ZL1AZR during a subsequent schedule, but was not enough satisfied with the signal report reception to claim another contact.

We also take note of an article in the *New Zealand Herald* shortly after the initial New Zealand to Sweden e.m.e. contact. The article heralded the contact as an outstanding accomplishment. Amateur radio could use more of that kind of publicity.

There is at least one other Swedish station interested in e.m.e. Sam, SM5DDX, south of Stockholm, writes he will soon be ready for schedules on 144 and 1296 MHz. He owns an antenna manufacturing firm so should have no problems in that area. Anyone interested may write Sven Hubermark, SM5DDX; Jaervagatan 2; 171-50 Solna, Sweden.

Aurora played a large role in 144-MHz. DX during the last reporting period. On March 11, W3BDP, Delaware, worked K1MTJ, Maine, and W8IDU, Michigan, but March 23 was *the* date. A preliminary report from W1HDQ appeared last month.

K4GL says, "finally an aurora that reached into South Carolina." The visible aurora was reported as far south as Alabama and Louisiana. K4GL worked two new states, Delaware and Indiana, bringing his total to 33. Jack worked seven states that night and apologizes to those he didn't work before the aurora faded. He will, however, accept schedules with anyone needing South Carolina.

W2CRS, New York, heard K4GL briefly, the most southern station he has ever heard on aurora. From the west, W2CRS heard Minnesota's WØRLI, 950 miles. All together, Doug logged 22 states during the evening.

W3TFA, Maryland, heard 15 states from Maine to Illinois, plus Ontario. Stan worked W9YYF in Illinois. That was Stan's 18th state worked with 25 watts input. Jack, W9YYF, also reported the aurora. He worked K4GL for his state number 33 — and then worked stations in Connecticut, New York, New Jersey, Maryland, Delaware, Virginia, West Virginia, Ohio, Michigan and Oklahoma. His antenna was a Yagi leaning against the side of his new home near Joliet!

From Massachusetts, WA1KOR worked K4QIF, Virginia, (who hasn't?) and heard K4MHS, North Carolina. K4QIF says he never heard stronger 144 aurora signals than on March 23. Rusty spent most of the evening on 432, as reported later.

W1HDQ has some observations on the aurora. Ed heard strong auroral buzz on signals with his beam in the southwest. He says he believes the aurora could have been worked on almost any beam heading. Visually there was a concentration of red glow all the way from southeast to southwest, and another large red patch in the northeast. Green-white streamers were everywhere, shooting right up to the zenith. W1HDQ says W4HJZ's signal from Raleigh, North Carolina was as loud as any 2-meter aurora signal he has ever heard from that far south.

The season's first report of good tropo comes from WØLER, near Minneapolis. On April 6 John worked, among others, WØDRL, Kansas; W5ORH, Oklahoma, and W5GVE, Texas.

Rusty, XE1PY, in Mexico City says he will accept meteor scatter schedules and is listening for tropo into the United States. He has a 6281 driving a kw. amplifier which will probably be completed by the time you read this. Rusty's antenna is a 28-element array of four 7-element Yagis.

In Hawaii, KH6EEM has kw. finals on 144, 220 and 432 feeding 56-element arrays on 144 and 220, and 88 elements on 432. He also expects to have a 30-foot dish operational on 1296 MHz. soon. KH6EEM is scheduling WB6KAP on 144, and perhaps would accept other schedules.

WA8TYF says he has poor luck getting stations listed in the boxes to run schedules, and that he hasn't done much better on 3.980. Anyone want a schedule with Ohio on 144 or 432? WA8TYF is available.

And finally, don't forget the 144 MHz. E_s-watch frequency, 144.10. When conditions appear favorable, stations on the west and east coasts will transmit the second 30 seconds of each minute. Stations in the mid-west transmit the first 30 seconds. W5LO, New Mexico has a 24-hour beacon on 144.10 aimed toward the northeast, and XE1PY, Mexico City has a 15-watt beacon, also on 144.10. The antenna is a ground plane 112 feet in the air.

220-MHz. activity was bolstered by the March 23 aurora. K2DNR, New York, heard eight stations from Ohio to Massachusetts. Sam brought his 220 standings to 13 worked by contacting K8AXU, Ohio, and W3UJG, Maryland. Sam's rig includes 100 watts and four 6-element Yagis at 55 feet — and he wants schedules.

W2CRS also worked K8AXU and heard W3UJG, but the Marylander faded before a contact could be made. The aurora peaked on 220 between 1900 and 1930 EST.

K4GL had to turn down schedule requests that night from K2RTH and K8AXU. There is a channel 13 repeater 4 miles from Jack's location. Can't blame a guy for being cautious. Jack will accept 220 schedules 0100 and 0800 EST.

From Chicago comes word of renewed interest in 220. W9OVL says several of the old-time 220 buffs are coming back and that 2200 CST Wednesdays is 220 night around the Windy City.

420 MHz. and Up news also features aurora this month. On March 23, K4QIF, near Norfolk, Virginia, worked K8DEO and K8REG, both near Dayton, Ohio, between 1900 and 1930 EST. This was the same time auroral signals were peaking on 220. Rusty says both stations were S8 and that the signal quality was identical to 144. He also heard auroral signals from many radars operating in the 420-MHz. band along the east coast. Other amateur signals heard at K4QIF were from W4FJ, WA2EMB and K2UYH.

K8DEO reports the aurora as worked from Cedarville, Ohio. Don contacted K4QIF, W4FJ, WA2EMB, W3RUE and heard many CQs from K2UYH, but couldn't raise Al. Don says he briefly heard an unidentified W1. Don's neighbor, K8REG reports working K4QIF, W4FJ, WA2EMB and W3RUE. K8REG is surprised not to have heard any of the W9s known to be active during the auroral peak. He reports hearing two signals from K8DEO, 20 miles away, during the height of the aurora. The signals were 2 KHz. apart. K8DEO noted the same effect on K8REG.

Tropo also figured in 432 DX. April 6 saw exceptional tropo conditions over a north-south path between Minnesota and Oklahoma. WØLCN and WØLER, both Minneapolis, worked W5ORH in Oklahoma City, about 700 miles. The contacts were new states for each.

Along the east coast, 432 opened between Florida and Virginia on April 8 and 9. K4IXC, Melbourne, Florida had contacts with K4QIF, K2GGA/4 and WB4GVY, all in the Norfolk vicinity. The path is about 625 miles. These are the first contacts on 432 between the two states. K4IXC also worked W4HJZ, North Carolina. Another Florida station K4NTD, also worked K4QIF. Rusty, K4QIF, said he was hearing many W2s on both evenings, but they were unable to hear the Florida stations. Apparently the opening followed the coast. W4FJ at Richmond, Virginia, some 50 miles inland from the Atlantic, could not hear the Florida stations either. Ted spent frustrating hours searching for K4IXC, only to listen to 432 rival K4QIF easily work Florida with S8 signals. W4FJ caught another opening on April 13. Ted worked several W2s and W1s as far north as Rhode Island.

WA9HUV, Illinois, says he wants 432 and 1296 schedules. Norm has good power and antennas on 432, and on 1296 runs 50 watts output and a 7-foot dish. WA8VHG, Michigan, is likewise searching for 432 schedules.

Rumored, but unconfirmed reports say W1FZJ/-KP4, Puerto Rico, is now scheduling several stations on 432 e.m.e., including VE3NA and W1BU. Sam is reported to have worked the latter in mid-April. We hope to have the facts next month. QST

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

Those DX "First Ladies"

RADIO, or "wireless" as it was called then, was not very old when the first European YL received her license. A dozen years after Marconi listened for the letter "S" that was transmitted from Poldhu, and only three years after FN, and OHK, had introduced their feminine fists on the huge spark keys as the first women to become amateur radio operators, Europe's first YL was licensed. The publication, *A Directory of Experimental Wireless Stations in the United Kingdom licensed by the Postmaster General*, published by A. W. Gamage Ltd., in 1913, lists over 400 persons who were granted "Transmitting Licenses," and one of them was a YL, Mrs. C. E. Ingram, with the call letters IXI.

Mrs. Ingram is a mystery woman in the story of amateur radio, for there is no record of her doing any operating, nor does anyone recall working her. Nevertheless, to keep the record accurate, she holds the distinction of being the first-known licensed woman amateur radio operator in England, and in Europe.

While the number of YLs were increasing in the United States, IXI remained the only hint of feminity on the other side of the Atlantic Ocean until 1927, when Barbara Dunn received her license as G6YL. Unlike the mysterious Mrs. Ingram, G6YL is well known throughout the United Kingdom as well as the entire amateur fraternity.

In the late 1920s France came up with her first YL operator. Mme. Schotte, of Poitiers, became interested in her husband's activity as F8GB in 1928, and she, in turn, received the call F8YL. There is another YL in this story of the first woman operator in France. A lady by the name of Mme. Memeint, the XYL of F8OM, was not only very interested in amateur radio, but worked with her husband in the OMN activity. However, at that time the government would issue licenses to men only, so she was unable to secure a license or any call letters. So, actually Mme. Memeint *was* the "first lady" of amateur radio in France, but due to circumstances at the time was unable to be listed, and thus Mme. Schotte receives the credit with her officially assigned call.

Here the picture becomes spotty as to just who were the YLs who were fortunate enough to be the first of their sex to receive amateur radio licenses in the many countries around the world. Gwen Burnette was the first Canadian YL with the call letters VE3AYL issued in 1930. The November 1934 issue of *R-9* magazine mentions a Miss Sugita, with the call J21X, as the "only YL operator in Japan," and that she was extremely active in the pre-WW2 period.

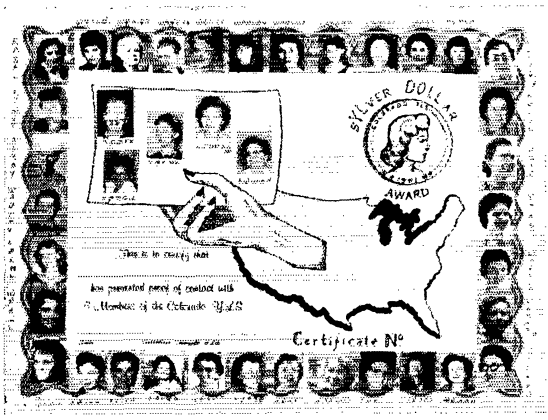
In South Africa in the thirties Iris Hayes, ZS2AA, added the so-called "distaff side" of the hobby to the list of calls in that country in 1937. In July 1949, Carol Combs visited the Canal Zone, and nothing short of a governmental ban stops a ham from operating even if she is traveling, so Carol applied for and received the call KZ5PC, the first time a KZ call was assigned to a woman. Carol holds another "first" operating with OM KZ5AC, they became the first OM-YL team in the Canal Zone.

Another YL from the United States became a member of the "FIRST YL" club, when Ginny Busch of Kansas, was issued the call PJ5CH while she was visiting in Curaçao. The numeral 5 indicates that she was issued a non-citizens call.

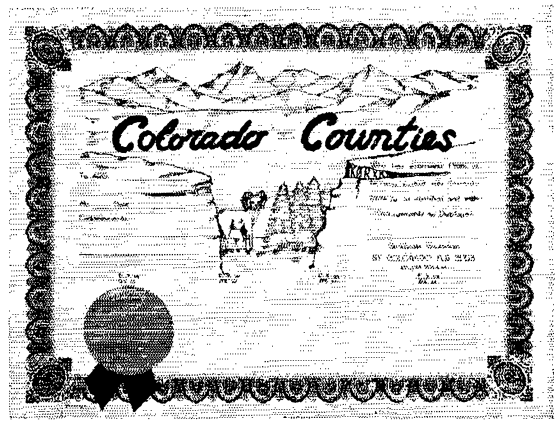
Of the over five-hundred million people in India, only twelve women hold amateur licenses. It is believed that Mrs. Leela Chowdappan, VU2CP, has the distinction of being India's first YL. Farther to the south, 4S7YL, Mrs. Soma Wickramasinge, is the only YL in Ceylon.

Carol Combs, KZ5PC.

*YL Editor, *QST*. Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, Calif. 91001.



Colorado YLs' Silver Dollar Award.



Colorado Counties Certificate.

Some day it may be possible to present all the ladies who first graced their particular country's list of amateur calls in order to have a complete record of the YL story. "YL News and Views" is interested in finding just who *was* first around the world. The only requirement would be that, for absolute accuracy, we must have the date of license as well as the call of the lady.

Loaded Clothes Line Net Officers

The Loaded Clothes Line Net announces the 1969 officers.

President, K5ECP, Helen, Albuquerque, New Mexico.
Vice President, K7WVT, Phyllis, Cedar City, Utah.
Secy/Treasurer, WØESD, Estelle, Gunnison, Colorado.

This active YL net meets each Monday, on 7260 kHz., at 1700 GMT. All YLs are invited to participate.

Anyone for C.W.?

"It seems that there are quite a number of YL phone nets and no YL c.w. nets that I know of," writes WA4BVD.

Carol is hoping to get a YL c.w. net started, so any of the gals who would enjoy pounding brass with other YLs, please contact her on the air, on the GSN traffic net, or as NØ RCA in Navy MARS, or write to Carol Lynch, WA4BVD, Route 2, Cochran, Georgia, Zip 31014.

Date, time, and frequency will be announced when *and if* enough gals show interest in this activity.

Meet the Club — Colorado YLs

If you hold an amateur radio operator's license, are a YL, and live in Colorado, you are eligible for membership in this extremely active organization.

The Colorado YLs were organized in July 1961, by KØEPE, KØBTV, KØRGU, KØWZN, and K5OPS. The club became affiliated with YLRL in November of that year.

March 1962 saw the first issue of their quarterly bulletin *Loose Change*, with Marte Wessel, KØEPE, as editor. The next order of business was securing the club call, WAØESM, and Betty Lindsay was appointed custodian.

Carol Lynch, WA4BVD/NØRCA, enjoys c.w., and has been NCS on Navy MARS c.w. net for over five years. Carol is hoping to get a YL c.w. net started, so any YL who would enjoy participating in such a net is encouraged to contact her.

WN4IIF, Phyllis Webb, holds the rather rare distinction of earning WAS while still a Novice. She works 80, 40, and 15 meters. The OM is W4YOK.

The activity and interest in YLRL has resulted in some of the membership becoming officers in that organization, and two of them have served as president of this oldest of international YL clubs. Their dedication to YLRL was obvious when they hosted the International YLRL Convention in Denver in 1968.

The club issues two certificates: the Silver Dollar; and the Colorado Counties certificates. Requirements for both may be secured by contacting any of the members, or the officers.

The club meets at the homes of the members on the second Saturday of each month at 1 P.M. MST.

KP4WT, Maria Luisa Mateo de Fernandez. (Photo courtesy of the Puerto Rico Amateur Radio Society)

KP4WT

Mrs. Maria Luisa Mateo de Fernandez, KP4WT, began her radio career in the year 1932. She was the first SWL of Puerto Rico, but when her husband became a citizen of the United States, she went to FCC and passed Novice, Technician, and General Class in 1953. Since that date she has been exceedingly active on the air and has become a member of ARRL, Red Cross, Civil Defense, AREC, MARS, CAP, the Antilles Emergency Weather Net, and handles traffic on all bands both a.m. and c.w. In 1955 she was the first in Puerto Rico to receive the BPL medallion.

Maria has received many Public Service Awards from the Red Cross, Civil Defense, and from the government of Puerto Rico, and the Puerto Rico Radio Club has given her many honors on various occasions.

As if this weren't enough for this lady of 73, she has also been elected Mother of the Year, Grandmother of the Year and even Mother-in-Law of the Year, as well as receiving other honors from Civic organizations. That Grandmother of the Year award is really deserved for Maria and OM KP4BMZ have 16 grandchildren.

Strays

Feedback

KL7FJW was omitted from the 1968 YLAP list. She was the only KL7 who qualified in the phone portion of the contest with 2,244 points.

Silent Keys

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

WA1BZM, William Moran, Pawtucket, Rhode Island.
W1FKH, Everett M. Gilmore, Belfast, Maine.
WA1GIY, Lawrence R. Lowd, West Falmouth, Maine.
W1HTG, William F. Hagan, West Quincy, Mass.
W1JAH, William J. Barrett, Adams, Mass.
W1JBA, Arthur Lattime, Raymond, N. H.
K1KWC, Delia A. Hobart, West Roxbury, Mass.
W1LYH, Guy A. Bixby, Everett, Mass.
W1NAX, Philip H. Sherman, Hopedale, Mass.
W1RAR, Percy W. York, Farmington, N. H.
W1SAT, Noble Craft, Newport, Vermont.
WA2AII, Don Farmen, Pultneyville, N. Y.
W2ARI, Norman H. Gaffrey, Little Falls, N. J.
W2AYU, Walter V. Turner, Glens Falls, N. Y.
W2BPM, Walter Kokola, Bayonne, N. J.
W2BSN, Milton N. Bisha, W. Carthage, N. Y.
WA2LDL, Michael F. O'Neil, Binghamton, N. Y.
WB2LIV, William Smedley, Astoria, N. Y.
W2NUY, Matty Jankowski, Brooklyn, N. Y.
WB2NXR, Jose A. Castaldi, Jersey City, N. J.
W2SEE, Arthur H. Vondy, Bordentown, N. J.
W2VSU, WA6TII, Victor P. Alfonsi, Los Angeles, Calif.
K2YMV, Theodore Y. Mott, Levittown, N. Y.
W2ZA, Elmer Kumpf, Alden, N. Y.
W3AI, Paul D. Mohr, East Greenville, Pa.
W3JDD, Franklin Ortman, Conestoga, Pa.
W3KOQ, John R. Pickering, Jr., Langhorne, Pa.
W3KXQ, Samuel L. Hahn, Oil City, Pa.
W3OYX, Samuel S. Hansbrough, Hagerstown, Md.
W3ZVV, ex-W1QDO, G. James Storms, Laurel, Md.
W4EWC, La Frenia E. McCraw, Memphis, Tenn.
K4IDC, John Wesley Davis, Tavares, Florida.
W4IT, Charles Williamson, Jr., Hampton, Va.
W4MSH, Louis C. Heyl, Palmetto, Florida.
W5AFJ, Robert C. Allen, Comanche, Texas.
W5KTC, Marsh F. Canion, Port Lavaca, Texas.
WA5LUF, Eve Levitt, Dallas, Texas.
W5MBI, William S. Hornbeck, Dallas, Texas.
W5PPV, Robert E. Barnett, Pasadena, Texas.
W5QQZ, Henry H. Snell, Houston, Texas.
WB6AIS, Harold Stewart, Point Reyes Station, Calif.
WB6BBL, W3WRC William F. Moreau, Altadena, Calif.
K6HQK, Donald E. Kitchen, Oxnard, Calif.
W6KAY, Paul Williams, San Francisco, Calif.
W6KZM, Philip J. Faulkner, Jr., Irvine, Calif.
W6NNY, Rev. Louis C. Werts, S.J., S. Pasadena, Calif.
W6REK, James L. Holmes, Santa Barbara, Calif.
W6SR, Art W. Fonseca, San Francisco, Calif.
WB6UXH, George Willard, Cupertino, Calif.
W7ANO, Daniel B. Lamb, Mesa, Arizona.
K7QFC, Quinten A. Jackson, Myrtle Creek, Oregon
W7RIL, Gaile Schmidt, Missoula, Montana.
K7SKX, John K. Young, Phoenix, Arizona.
ex-W8MID, Theodore Braybrook, Grand Rapids, Michigan.
WA8VMG, Guy E. Smith, Battle Creek, Michigan.
K8YAV, Jack Raccosta, Detroit, Michigan.
W8ZHH, Mary L. Baker, Wheeling, West Virginia.
K9EDG, Garth Older, Pennville, Indiana.
W9PAL, Chris Sonnicken, Orlando Park, Ill.
W9QHR, Erwin Buchert, Watertown, Wisc.
W9RE, Wilber E. Monigan, South Bend, Indiana.
WØAQD, Woodrow Ballard, Plains, Kansas.
WØATF, Earl V. Pallas, St. Louis, Missouri.
WAØSWA, Dr. John W. McDonald, Sterling, Colo.
VE1ASS, Burton M. Brown, Campbellton, N.B., Canada.
VE1JD, E. D. MacPherson, North Sydney, Nova Scotia, Canada.
VE3JO, H. W. Kenmare, Kirkfield, Ontario, Canada.

Operating News

GEORGE HART, W1NJM,
Communications Manager

ELLEN WHITE, W1YYM,
Deputy Comms. Mgr.

Administration: LILLIAN M. SALTER, W1ZJE

DXCC: ROBERT L. WHITE, W1CW
Contests: ROBERT HILL, W1ARR

Training Aids: GERALD PINARD
Public Service; WILLIAM O. REICHERT, WA9HHH

Field Day Time. Ask any ham what June is famous for and what will he say? Brides? Roses? Laurel in bloom? Shucks no, he'll say that June is the month of the annual ARRL Field Day, and during that month many states have designated an Amateur Radio Week, usually the week preceding or following the FD weekend. This year in particular we have a National Convention at a central location that could hardly be centraler (oops!) followed a week later by the annual Field Day (June 28-29). To many families throughout the U.S. it's going to be Amateur Radio Week whether officially proclaimed or not!

Speaking personally (which we're not supposed to do in this column, yet nobody but the editor ever seems to object), we wouldn't miss it — and haven't, since about 1935. Each July, bitterly nursing our sunburn, sore muscles, mosquito bites, skinned knees and knuckles, we have vowed "never again," but each June, just as the birds fly south in the fall, just as the ground hog sleeps during winter, as though mesmerized W1NJM starts dragging out the boxes full of precut antennas, loading cot and mast sections and miscellaneous pieces of gear into the station wagon, and *away we go*, full of high hopes and resolves to do better this year than ever before.

Last year's new "twist" (the limited-setup-time rule) made the whole thing more enjoyable. Loafing in the sun was the order of the day while one of the mobile receivers monitored time signals on CHU (7335 kc.) When the sonorous voice of the announcer said it was "fourteen hours exactly" the scene was suddenly transformed into one of action. One crew dragged two precut antennas out of the back of a station wagon and quickly strung them between predesignated trees, and within ten minutes two temporary rigs were firing away. Other crews went into action setting up the kitchen, hauling the generator into place, putting up mast sections, assembling beams, laying out coax and electrical control cables, wrestling various nondescript pieces of gear into place. From a casual group of picnickers sitting around drinking beer and telling stories, we became quite suddenly a hustling, swearing, sweating bunch of fanatics intent on just one thing — getting two "permanent" emergency-powered installations on the air and keeping them that way until the CHU announcer the following day intoned the information that "Eastern Standard Time is 17 hours exactly." Within 45 minutes one of the "permanent" installations was ready to go and one of the temporary units was shut down. The other one took a little over an hour and was resoundingly booed. You can bet that Team No. 2 will be out to reverse that succession this year.

The rules this year leave it to club option to observe the limited-setup-time rule or not. All you lose if you do not is possibly some operating time. If you are going out to win, this can be a lot; otherwise, it makes little difference, materially.

But spiritually you lose a lot more. A great

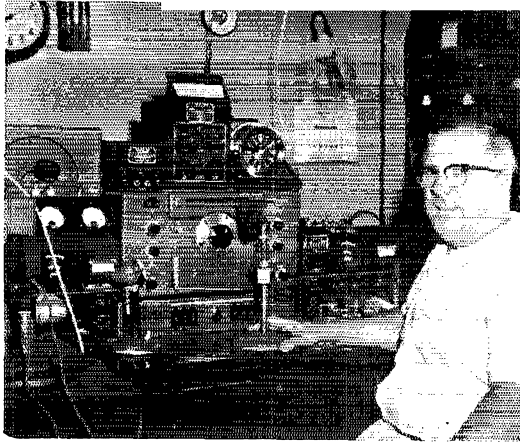
OPERATING EVENTS (Dates in GMT)
ARRL-SCM-IARU-Affiliated Club-Operating Events

June	July	August
4 **Qualifying Run, W6OWP**	3 **Qualifying Run, W6OWP**	2-3 Illinois QSO Party
7 New York State QSO Party (p. 111, this issue).	12-14 **CD Party** (c.w.)*	5 **Qualifying Run, W6OWP**
14 **Qualifying Run, W1AW**	15 **Qualifying Run, W1AW**	13 **Qualifying Run, W1AW**
14-15 **VHF QSO Party** (p. 57, last issue).	19-20 Ontario QSO Party	23-24 All Asian Contest
28-29 **Field Day** (p. 58, last issue).	Independence of Colombia Contest	
28-July 7 W.A.R.C. Centennial QSO Party (p. 114, this issue).	12-21 **CD Party** (phone)*	
	20 Minnesota QSO Party	Sept. 13-14 VHF QSO Party
	26-27 New Hampshire QSO Party	Nov. 8-9 SS, phone
	* League Officials and Communications Dept. appointees, only.	15-16 SS, c.w.

NOTE: Possible W6OWP Qualifying Run "alternate" (same times and frequencies) is W6ZRJ.

Meet Your SCM

Its second time around for E. Pa. SCM **W3HK** (yes, he *was* W3ELI). This leader in the Field Organization also is an active ORS, OPS and an Assistant Director. His versatility includes traffic as well as contest operation in the quarterly ARRL CD (Communications Department) Parties, Field Day and V.H.F. contests (along with the renowned Pack Rats of the Mt. Airy V.H.F. Radio Club. George is a fine c.w. operator of the 35-plus w.p.m. range and holds both commercial first phone and second class radiotelegraph licenses. When time permits, photography and boating rate high on his list of other-than-ham radio interests. He says his favorite sport is loafing in the sun for which (according to W3HK's xyl) he has earned an "expert rating."



deal of the adventure and excitement of FD goes out the window when you do a lot of advance setting up. Ideally, you should pick your location for its radio qualities rather than for its material facilities such as shelter and utilities. The latter can be man-made, and any enterprising club or group should be able to arrange something, even if it's tents and slit trenches. This business of renting lodge halls and other existing buildings located in hollows or TV-infested areas, complete with modern plumbing facilities and all the comforts of home is for old people and sissies. Taking your portable gear really out in the field and undergoing some hardships provides conversation material at club meetings for months. Winning the battle against nature's elements is part of the game.

Each of us has his own thing about Field Day. The above is really just one man's opinion. But however, wherever and with whomsoever you prefer to go out, don't miss it. It's the "event of the year" and worth every miserable minute.

What Privileges? This will be the first year in which Field Day will be operated under conditions of "incentive licensing" and many groups are asking about which privileges they can observe under what conditions or circumstances. The answer is absurdly simple, as most rules are; only in interpretation and in searching for loopholes do they become complicated.

The operating restrictions which must be observed are those of the owner (or trustee) of the call you are using or your own class of license, *whichever are more restrictive*. That is, only if you are an extra operating a club station whose trustee is an extra may you use extra class privileges. If the trustee is a general class licensee, then *no* one may use more than general class privileges. Thus, in order to make full use of the extra and advanced portions of the bands by those members who hold the highest class of license, it would be advisable to select a trustee who has an extra class license or to use the call of one of the extra class members (with his consent, of course). Sorry if this is an inconvenience, but that's the way the rules are interpreted — *WINJM*.

CLUB COUNCILS AND FEDERATIONS

British Columbia Amateur Radio Association, Mr. Ken Garman, VE7ABS, Secy., 12530-103 Ave., North Surrey, B.C., Canada.

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

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

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

Federation of Long Island Radio Clubs, Mr. Warren Mayer, W2OUQ, Secy., 25 Aldred Ave., Rockville Centre, L.I., New York 11570.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for March Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K5TEY	1	1673	1651	3	3328
W7BA	14	1508	1415	90	3024
K5BNH	4	1348	1279	31	2662
WA2UWA	48	1295	1223	4	2570
K3NSN	631	874	210	16	1731
K9UNK	132	673	622	18	1445
WA9CNV	0	678	672	4	1354
WA7HKR	1	622	597	16	1236
K9FZX	5	566	550	7	1128
WA2BHN	25	485	470	9	989
W9JYO	703	125	111	14	953
WA9AKR	7	411	385	30	833
W5OBD	4	407	404	2	817
KH6GHZ	64	362	259	103	788
W3EML	21	440	302	3	766
W8UPH	0	383	345	36	764
W1OJM	7	368	365	3	743
W3IVS	10	386	317	21	734
WA4DYL	7	382	323	2	714
WA9MHU	55	331	265	62	713
K7RQZ	15	343	321	23	702
W6GYH	170	268	257	3	698
W9CXY	8	338	315	23	684
W6RSY	37	323	234	82	676
K7KBX	1	321	315	5	642
WA4IJH	4	273	265	5	557
WA6LWE	16	261	193	84	554
K8LNE	12	276	254	5	547
W4SQQ	17	258	246	8	529
WA8ETX	65	194	234	20	513
WØZWL	5	280	5	216	506
WB2RKK	23	251	211	18	503
WØLCX	14	282	200	4	500

More-Than-One-Operator-Stations

KØWBD	2750	1310	905	405 5370

BPL for 100 or more *originations-plus deliveries*

K1BCS 210	WA9VOB 128	W1BTV 106
W3MLF 197	WA8DWL 124	WB2WFJ 105
WA9QOQ 160	W1TXL 122	WA3IUV 103
W3CUL/4 159	W8KVQ 113	WAØTHQ 104
WA3JWF 157	WA1GGN 112	W9EQO 103
W9HOT 153	WAØHTN 110	KØJGI 102
WAØMZW 139	WA2CWU 108	WA5UJY 100
WA3IHV 138	K8ZJU 107	WA6BYZ 100

More-Than-One-Operator-Stations

W4SKH 278

Late *Veport*:
W6CXO (Jan.) 112

BPL Medallions (see July, 1968 *QST*, p. 99) have been awarded to the following amateurs since last month's listings: W1DKD, WA3IUV, WB4HUS, WA6AUD, W6IPW, WA9QXT, WA9TUM, WAØLBB, VE2ADE

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 400 or a sum original on 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.

RESULTS, FEBRUARY FREQUENCY MEASURING TEST

The February 8, 1969 FMT, open to all amateurs, brought entries from 287 participants who made a total of 1133 measurements. Of these 65 ARRL Official Observers submitted 273, and 222 Non-OOs made 860 readings. All taking part have received individual reports of their readings. The standings accredited to the more precise in each group appear below; all listed show ability of the highest order in Frequency Measurement.

Following is a report of the standings of the FMT leaders in this test. In consideration of the minimum possible error, due to 'doppler' and unavoidable factors, we accredit as of equal merit all reports where computations show 4/10ths parts per million or higher accuracy. Our direct comparisons with the umpire's readings otherwise establish this order of listing.

August *QST* will announce details on the September 13 ARRL FMT, open to all amateurs.

Observers	*Parts/ Million*	*Non-Observers*	*Parts/ Million*
W1BGW W2AIQ		W1PLJ W2BHH	
W3BFF W4JUI		W2DU/W8KHK	
W5FMO W6RQ		K2HWS K3LPP	
W7UXZ W9DY/GFF		W4FUI K5EVK	
	(0 to .4)	WB6AAL W6FFC	
W2CY	1.1	WA6ZOY K6MZN	
W6CBX	1.1	W7FNA K7UWT/	
K9WGN/WØUSL	1.2	CT2AT K8JZW	
W4NTO	1.5	W8LZY W8RMH	
W8GRG	2.0	W9BCY W9DGV R.	
VE6HM	2.1	Ireland	
W9HSD	3.6	KØVQM (0 to .4)	

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

Michigan Council of ARCs, Mr. Merton A. Henry K8ETU, Secy., 4626 Stillwell Ave., Lansing, Mich. 48910.

Ohio Council of ARCs, Mr. James W. Benson, W8OUU, Secy., 2463 Kingspath Drive, Cincinnati, Ohio 45231.

The Puget Sound Council of ARCs, Mr. Jerry Seligman, W7BUN, Secy., Drawer A, McChord AFB, Wash. 98438.

Radio Society of Ontario Inc. UE3RSO, Box 334 Toronto 18, Ontario, Canada.

San Diego County Amateur Radio Council, Louise Davis, W6NSR, Secy., 150 S. Anza, 103, El Cajon, Ca. 92020.

Tennessee Council of Amateur Radio Clubs, Mr. James G. Skeen, WA4NEC, Secy.-Treas., 213 Stafford St., Bristol, Tenn. 37620.

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*
Western Mass.	June 10, 1969	Norman P. Forest	Aug. 11, 1969
Kansas	June 10, 1969	Robert M. Summers	Aug. 18, 1969
Oregon	July 1, 1969	Dale T. Justice	June 10, 1969
South Dakota	July 1, 1969	Seward P. Holt	July 3, 1969
Arkansas	July 1, 1969	Curtis R. Williams	Resigned
West Virginia	July 10, 1969	Donald B. Morris	Sept. 18, 1969
San Diego	July 10, 1969	J. E. Emerson, Jr.	Nov. 1, 1969
Delaware	Aug. 11, 1969	John L. Penrod	Oct. 10, 1969
Manitoba	Aug. 11, 1969	J. Thomas Stacey	Oct. 10, 1969
Virginia	Aug. 11, 1969	H. J. Hopkins	Oct. 11, 1969
Rhode Island	Aug. 11, 1969	John E. Johnson	Oct. 12, 1969
Indiana	Aug. 11, 1969	William C. Johnson	Oct. 14, 1969
Vermont	Aug. 11, 1969	E. Reginald Murray	Oct. 17, 1969
Canal Zone	Sept. 10, 1969	R. L. Oberholtzer	Nov. 10, 1969
Hawaii	Sept. 10, 1969	Lee R. Wical	Nov. 11, 1969

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.

Santa Clara Valley	Albert F. Gaetano, W6VZT	Mar. 10, 1969
North Carolina	Calvin M. Dempsey, WA4UQC	Apr. 10, 1969
Los Angeles	Harvey D. D. Hetland, WA6KZI	May 18, 1969
Maine	Peter E. Sterling, K1TEV	June 9, 1969
Tennessee	Harry A. Phillips, K4RCT	June 14, 1969
Eastern Penn.	George S. Van Dyke, Jr., W3HK	June 15, 1969

In the Minnesota Section of the Dakota Division, Mr. Larry J. Shima, WØPAN, Mr. Clarence Ritari, WAØMMV, and Mr. Thomas Kulas, WAØIAW, were nominated. Mr. Shima received 240 votes, Mr. Ritari received 209 votes and Mr. Kulas received 157 votes. Mr. Shima's term of office began Mar. 15, 1969.

In the Missouri Section of the Midwest Division, Mr. Robert J. Peavier, WØBV, Mr. Lowell G. Lueders, WØRTO, and Mr. Larry W. Strain, WAØEMS, were nominated. Mr. Peavler received 230 votes, Mr. Lueders received 164 votes and Mr. Strain received 125 votes. Mr. Peavler's term of office began Mar. 18, 1969.

In the Washington Section of the Northwestern Division, Mr. Harry W. Lewis, W7JWJ, and Mr. William R. Watson, W7BQ, were nominated. Mr. Lewis received 614 votes and Mr. Watson received 358 votes. Mr. Lewis' term of office began May 3, 1969.

ARRL AFFILIATED CLUB HONOR ROLL

In order to be officially affiliated with the League, an amateur radio club must contain not fewer than 51% ARRL members. This is only right and just, considering that affiliation entails the club's subscription to the aims and purposes of the League and that it realizes a number of special privileges through affiliation. Yet, for many clubs this is not enough. Some even require ARRL membership as a prerequisite to membership in the club. Others, some without realizing it, find that their membership is 100% ARRL.

Each year, as annual affiliated club questionnaires are received, those showing 100% ARRL membership are noted and put aside for special honors. This includes an honorary listing in *QST* and a special certificate each year this is accomplished. We take pleasure in presenting herewith the first installment of 100% ARRL affiliated for year-end 1968. The second installment will appear in December *QST*. Ladies and gentlemen, our Affiliated Club Honor Roll!

Amateur Radio Transmitting Society, Inc., Louisville, Ky.
Arkansas DX Assn. Little Rock, Ark.

Athens Amateur Radio Club, Athens, Ga.
Bristol Amateur Radio Club, Bristol, Tenn./Va.
Bronx AR Telephone Organization, Bronx, N. Y.
Brush Creek Plaza Bird Watching and V.H.F. Society, Kansas City, Mo.
Central Kansas Amateur Radio Club, Inc., Salina, Kansas
Chicago Radio Traffic Association, Chicago, Ill.
Chisholm Trail Amateur Radio Club, Inc., Duncan, Okla.
Cincinnati Buckeye Netters, Cincinnati, Ohio
Columbia Amateur Radio Club, Columbia, Miss.
Connecticut Wireless Assn., Newington, Conn.
Delaware County Amateur Radio Assn., Delaware, Ohio
Enid Amateur Radio Club, Inc., Enid, Oklahoma
Friendship Amateur Radio Club, Baltimore, Md.
IRC Amateur Radio Club, Philadelphia, Pa.
Johnson City Radio Association, Inc., Johnson City, Tenn.
Larkfield Amateur Radio Club, East Northport, L..I., N.Y.

Here are two versions of QSLs confirming multiband QSOs (with the same station) by two masters of this particular art, **W1AX** and **W1RAN.** W1RAN's card, on the left, carries the call of the station worked at the upper right of the card and also carries HIS RST, which seems to be particularly valuable to the DX station. The card is high gloss, but not Kromekote, a major $ savings. This data (mimeo'd) supplements the face side which carries a single-QSO format plus Ned's handsome sketch of "The Joseph Conrad" at the world famous Mystic Sea Museum. W1AX (right) handles his confirmation in slightly different style. Rog (ex-W1JYH) had the cut made from hand-pasted letters with the face side carrying his call in large letters. Either way should be a real convenience when confirming for 5BDXCC or other awards.

DX CENTURY CLUB AWARDS

Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given including deleted countries. All totals shown represent submissions received through March 31, 1969 and are shown alphabetically by call.

G3FKM....322/340
W6AM.....322/348
W7GUV....322/341
W8JB1....322/342
HB9J.....321/346
HB9MQ....321/339
OE1ER....321/344
W1GKK....321/347
W3GAU....321/345
W4VPD....321/339
W5ABY....321/339
W7GBW....321/346
W8BF.....321/343
W8JIN....321/347
W8UAS....321/343
W9NDA....321/346
WØQVZ....321/343
DL1IN....320/337
K6ENX....320/338
LU6DJX...320/345
VE2NV....320/338
W1HX.....320/341
W1MV.....320/338
W2WZ.....320/344
W3KT.....320/345
W4AIT....320/344
W4GXB....320/342
W4OM.....320/343
W4PLL....320/336
W5PQA....320/339
W6BZE....320/341
W6GYV....320/339
W6KZL....320/337
W6WWQ....320/338
W6ZO.....320/343
W7AC.....320/345
W7PHO....320/339
W8EWS....320/345
W8KIA....320/345
W8MPW....320/339
W8POQ....320/338
W9SFR....320/334
G8KS.....319/338
K2BZT....319/337
LU4DMG...319/336
ON4DM....319/339
PAØFX....319/340
W1BIH....319/344
W1CLX....319/343
W2BQM....319/333
W2CTO....319/340
W2JVU....319/341
W2NUT....319/336
W2SAW....319/337

W3LMO....319/333
W3WGH....319/335
W4BJ.....319/332
W4LRN....319/332
W4ML.....319/340
W4OPM....319/335
W5KC.....319/343
W5MMK....319/341
W5UX.....319/335
W6CUQ....319/345
W6EPZ....319/341
W6GPB....319/341
W6KUT....319/340
W8DAW....319/344
W8NGO....319/337
WØDU.....319/342
WØELA....319/343
WØQGI....319/336
WØSYK....319/338
CE3AG....318/343
DL3RK....318/336
K4TJL....318/328
K6EC.....318/333
K7GCM....318/327
W1DK.....318/336
W1FZ.....318/338
W2AGW....318/343
W2BXA....318/343
W2HQ.....318/335
W2JT.....318/338
W2RGV....318/335
W2SSC....318/335
W2SUC....318/336
W2TP.....318/328
W3RNQ....318/337
W4DQS....318/326
W4MR.....318/338
W4TM.....318/341
W5KBU....318/337
W5QK.....318/330
W6NJU....318/333
W6RKP....318/333
W6TZD....318/340
W6UOV....318/333
W7AQB....318/332
W8PHZ....318/334
W9YFV....318/343
WØMLY....318/335
WØPGI....318/335
G3HGT....317/329
G3HDA....317/330
G4MJ.....317/335
K2LWR....317/331
K2OEA....317/334

K6AN.....317/339
K6LGF....317/330
K6VVA....317/327
VK3KB....317/341
W1BAN....317/331
W1GYE....317/333
W1JYH....317/341
W2BOK....317/335
W2CP.....317/324
W2DXX....317/324
W2EXH....317/324
W2HTT....317/334
W2LAX....317/335
W2PCJ....317/335
WA2IZS...317/334
W2RDD....317/332
W2ZX.....317/337
W3CGS....317/337
W3GRS....317/330
W3LMA....317/340
W3NKM....317/335
W4BYU....317/336
W5CKY....317/337
W5LGG....317/338
W6DZ.....317/331
W6FOZ....317/336
W6HX.....317/341
W6ID.....317/337
W6OSU....317/330
WA6EYP...317/332
W7CMO....317/329
W7GNW....317/336
W7ENW....317/342
W8IRN....317/336
W8QJR....317/335
W8WZ.....317/340
W9DWQ....317/331
W9GFF....317/331
WØPNQ....317/340
ZL1HY....317/342
DJ2BW....316/334
DL6EN....316/332
DL9OH....316/328
G2BOZ....316/335
HB9TL....316/333
I1ZL.....316/329
JA1BK....316/325
K8IKB....316/328
VE3CFG...316/331
W1CKA....316/327
W2CRM....316/334
W2CYS....316/339
W2FXA....316/330
W2FXN....316/331

W2LV.....316/336
W2MES....316/325
W2OKM....316/335
W2QM.....316/332
W2WMG....316/328
W2YTH....316/335
W2ZGB....316/332
WA2RAU...316/318
W3ECR....316/334
W3EVW....316/339
W4AVY....316/329
W5OLG....316/338
W5UKK....316/331
W6LN.....316/337
W6ZJY....316/321
W6WX.....316/325
WB6OOP...316/322
W9RCJ....316/329
WØAIH....316/332
WØBMQ....316/330
WØNLY....316/333
CR6BX....315/333
DL1KB....315/335
DL7AA....315/338
DL7BA....315/333
G2BVN....315/334
GI3IVJ...315/331
ITITAI...315/332
JA1DM....315/331
K2DCA....315/333
K4ICK....315/328
K4LNM....315/338
LA7Y.....315/338
OH2NB....315/337
VK4QM....315/339
W1AZY....315/331
W2FZY....315/329
W2GKZ....315/318
W2QHH....315/337
WA2OJD...315/330
W3AFM....315/326
W3MWG....315/330
W4AAU....315/335
W4RLS....315/320
W5OGS....315/332
W6HYG....315/328
W6MVL....315/327
W6REH....315/322
W7UMJ....315/324
W8GUT....315/323
W8KPL....315/334
W8YCP....315/328
W8ZCQ....315/330

W9AMU....315/332
W9HUZ....315/336
W9ILW....315/323
G5VT.....314/336
K1IXG....314/322
K4AIM....314/329
K4TWF....314/321
K8LSG....314/326
K8ONV....314/324
K9KYF....314/323
KØEZH....314/317
W1CBZ....314/330
W1HBH....314/326
W2GQN....314/316
W2MJ.....314/327
W2TQC....314/334
WA2ELS...314/320
W4LVV....314/335
W4NJF....314/318
W5AFX....314/340
WA5EFL...314/317
W6HOC....314/328
W6PUY....314/336
W6YY.....314/335
W8BRA....314/338
W8DMD....314/337
W8EVZ....314/318
W9LNM....314/338
W9WYB....314/330
YV5AB....314/334
4X4DK....314/333
G2PL.....313/337
I1AMU....313/333
K1SHN....313/318
K2YLM....313/314
KP4RK....313/324
W1FH.....313/340
W2UVE....313/332
W3DJZ....313/322
W3MQ.....313/319
W4LYV....313/334
W5GC.....313/323
W5KTW....313/319
W5WZQ....313/329
W6BSY....313/330
W6SQP....313/330
W8HGW....313/339
W8ONA....313/330
W9GIL....313/331
W9HB.....313/330
W9IUV....313/334
WØLWG....313/326
YV5BOA...313/315

Radiotelephone

W8BF.....321/343
W8GZ.....321/345
W6GVM....320/342
W3RIS....319/345
W6AM.....319/344
W7PHO....319/338
W8PQO....319/337
LU4DMG...318/335
ON4DM....318/338
W2BXA....318/341
W2TP.....318/325
W4PDL....318/329
W9NDA....318/339
WØJYW....318/336
W2HTI....317/333
W2ZX.....317/337

W6BAF....317/328
W9WHM....317/334
DL1IN....316/332
G3FKM....316/331
G8KS.....316/331
K4TJL....316/326
W2JT.....316/331
W2RGV....316/331
WØQVZ....316/332
5Z4ERR...316/339
DJ2YI....315/331
DL9OH....315/327
K8RTW....315/325
PY4TK....315/333
TI2HP....315/338
VK5MS....315/336

W1JFG....315/331
W1ONK....315/332
W2YY.....315/318
WA2RAU...315/317
W3WGH....315/325
W5KBU....315/333
W6REH....315/318
W6RKP....315/325
W6ZJY....315/320
W8QJR....315/333
W9ILW....315/323
ZP5CF....315/332
GI3IVJ...314/327
HB9YL....314/330
K9KYF....314/323

K9LUI....314/322
W1BAN....314/327
W2BQM....314/328
W2EXH....314/319
WA2IZS...314/322
W6YY.....314/335
W8JIN....314/330
W8MPW....314/324
W8UAS....314/333
W9NZM....314/319
YV5AB....314/344
I1AMU....313/333
K1IXG....313/321
K4AIM....313/328
W2PTE....313/331

W3NKM....313/330
W4ANE....313/329
W5GC.....313/323
W8HGW....313/336
4X4DK....313/332
DL6EN....312/326
G5VT.....312/334
K6LGF....312/323
OE1ME....312/326
W2VCZ....312/322
W4NJF....312/316
W4OM.....312/329
W5PQA....312/328
WA5EFL...312/314
WA8AJI...312/314

ARRL membership are noted

W1RAN MULTI-BAND CONFIRMATIONS

-CW-

Day	Mo	Yr	GMT	mHz	Your RST	My RST
				1.8		
				3.5		
				7.0		
				14.0		
				21.0		
				28.0		

Ned Raub - 207 Thames St. - New London - Ct. - 06320 - U. S.

Pleased to confirm our QSO

MC.	DATE	GMT	RST	MODE	QSL
1.8					
3.5					
7					
14					
21					
28					

ARRL FOC 73 Roger E. Corey, W1AX
RSGB HSC 60 Warwick Drive
NORFOLK COUNTY Westwood, Mass. 02090
U. S. A.

From March 1, through March 31, 1969, DXCC Certificates based on contacts with 100-or-more countries have been issued by ARRL Headquarters to the amateurs listed below.

New Members

OZ1LO....237
F9GL.....224
WA4MSU...207
K2RDM....154
CT3AS....149
VE2BGD...147
WB6HUW..138
ZL3BG....137
SM7SX....136
9J2HZ....136
OH1WF....135
SU1IM....126
LU1SE....122
DM3UEA...120
OZ2X.....119
SM5AKH...118
DM3XUE..114
YA1AN....113
WA8UFW...110
WB4LEH...109
WAØLKL...109
SM4CEZ...108
W4IG.....107
G3FTP....105
WB2UQK...105
F3YE.....104
G3SOI....104
W2UZL....104
K4MRZ....103
WA4QPL...103
VK2AND...102
WA5DOS...102
W6UJ.....102
WA9SVZ...102
GW3INO...101
OK1AOR...101
WA2CFA...101
WB2TBP...101
WA3JDA...101
WØYVA....101
ZE3JX....101
DL5LB....100
DM2AFH...100
GC5ACI...100
K9YRA....100
KC6SZ....100
VE2AYQ...100
W1WEE....100
WA1ION...100
WB2MKD..100
WA3BAT...100
W4NZR....100
WA4WJJ...100
WA8NNK..100
WA9QBM..100
WØIBZ....100
9G1KG....100

Radiotelephone

F9GL.....193
DL8QW....145
I1AHO....139
W3IQK....138
VE7BQF...133
7Z3AB....132
CT1UA....125
JX6RL....124
CT1UE....123
I1RKY....123
K2BVY....117
YV5BPU...110
WB6VCM...109
WA6VSF...108
VE3AJY...106
W1DWQ....106
TA2BK....105
VP1LL....105
W4QQ.....105
W9NUH....105
WA3EQY...104
SM7SX....102
WA9SVZ...102
WA4ZXO...101
WA5DOS...101
HC1MH....100
VE3DBT...100
W2VDE....100

Endorsements

Endorsements issued for confirmations credited from March 1, 1969 through March 31, 1969 are listed below. Endorsement listings through the 300 level are given in increments of 20, above the 300 level they are given in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

320
W8KIT

315
K4EZ
K4JC
W7GXA

310
W2ZTV
W8ARH

305
JA1AND
WB2FMK

W3YZI
W8LUZ

300
VE3ACD
W2HSZ
W4EEO
W4HOS
WØCKC

280
EP3AM
K1GAX
W6DYJ

W7DY

260
VE3MR
W1EW
W1JMT
WA2FQG
ZL1HW

240
I1ARS
K4RSY
OK2OP
VE3AIU

W3HTO
W8ELE
W8GGE

220
OZ6MI
VE2AYY
W1MX
WA1HHN
W2LNB
WA4PFD
W8MFW

200
DJ8FW

F2NB
G3ETU
I1ZBS
SM7CSN
SP2HL
VE5GG
W4CQI
W4JK
XE2IH

180
OZ3GW
OZ3PO
K5YUR

K6KQN
K6ZIF
VE3CDP/W9
WA2CCF
W3LUD
W6HPG
W9VCQ
WØIH
WAØNTC
YU2NFJ

160
G3AWP

K1SUB
OK2DB
SM5BFC
WB2RBG
W3UC
W4EZ
W4JUK
W4WSF
WB4EWU
WA6THG
W8MKE
WA8CIA
WA9NSR

140
DL8QP
K2JFE
K2MHE

120
DJ9AL
DL1CW
KØVSH
OE3HOW
KG6AQI
W4IQO
W6PTF
WA8EWT
WAØPKX

WØBUL
WAØKQQ

Radiotelephone

330
W9RNX

315
W7CMO
W8NGO

310
K2YLM
W2ODO
W2ZTV

305
W2GQN
W9HB

300
EA2HX
F2MO
K4JC
K6ENX
K8IKB
VE3ACD

W8CUT

280
EP3AM
KA1ADN
OA4CV

260
KØBUR
W1SEB
W4TRG

W5RNG
W8LUZ

240
VE3AIU
W1JMT
W1QQO
W4HOS
W9HPS
W9WYB

220
DJ4TZ
EP3RO
W1MLM
WA1IHN
WA4WTG
W8GGE

200
I1ZV
VK4QM

W1OKG
W3MP
WA3BYS
W9DOR
XE2IH

180
DJ3WW
I1ZBS
SM7CSN
K5TGJ

KØGSV
W1PCD
WA2CCF
W3HTO
W6HPG

160
K6KQN
VS6DR
WA1BJY

W1DO
W2ESC
W7EKM
YU2NFJ

140
K7UXS
SM5BFC
W1MX
W3GTX
WA4RQD
WAØPKX

WB4EWU
WB6MVK
YV7AV

120
I1DAB
K3CNN
W3IF
W4WSF
WB4EEM

Laurentian DX Club, Dollard-des-Ormeaux, P.Q., Canada
LERC Amateur Radio Club, Burbank, Calif.
Limestone Amateur Radio Club, Athens, Ala.
Lower Columbia Amateur Radio Assn., Longview, Wash.
Magic Valley Radio Amateurs, Inc., Pharr, Texas
Mason County Radio Club, Ludington, Mich.
The Massillon Amateur Radio Club, Massillon, Ohio
Mike & Key Radio Amateur Club, Camarillo, Calif.
Minnesota Wireless Association, Bloomington, Minn.
Nassau College Amateur Satellite Tracking Astronomy and Radio (NASTAR), Syosset, L.I., N. Y.
Norfolk County Radio Association, Norwood, Mass.
Norfolk Radio Club, Norfolk, Neb.
Northern Illinois DX Association, Arlington, Ill.
Northern New Jersey Radio Assn., Hackensack, N. J.
Northern Virginia Radio Club, Falls Church, Va.
O.B.P. #1 Radio Club of St. Louis, St. Louis, Mo.
Oh-Ky-In VHF Radio Society, Cincinnati, Ohio
128 Contest Club, Chelmsford, Mass.
Radio Amateur Transmitting Soc., Nashville, Tenn.
Radio Club of Brooklyn, Inc., Brooklyn, N. Y.
Rock River Radio Club, Dixon, Ill.
Rome Radio Club, Inc., Rome, N. Y.
Sarasota Amateur Radio Association, Sarasota, Fla.
Southern Calif. VHF Radio Club, Norwalk, Calif.
Southern Nevada ARC, Boulder City, Nevada
Sunrise Radio Club, Laurelton, N. Y.
The T9 Club, Beverly, Mass.
Triangle ARC of North Carolina, Chapel Hill, N. C.
Union Carbide Caribe Amateur Radio Club, Ponce, P. R.
Virginia Century Club, Norfolk, Va.
Wichita Amateur Radio Club, Wichita, Kansas
Windblowers' VHF Society, Paterson, N. J.
The Winnipeg DX Club, Winnipeg, Man., Canada

Qualifying Runs

Any person can apply for an ARRL code proficiency award. Neither League 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 (10-35 w.p.m.) you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers. Each month the ARRL Activities Calendar notes the qualifying run dates for W1AW and W6OWP (W6ZRJ, alternate) for the coming 3-month period.

W1AW will transmit a qualifying run on all listed c.w. frequencies at 0130 GMT June 14. (In converting, 0130 GMT June 14 becomes 2130 EDST June 13.)

W6OWP (W6ZRJ, alternate) will transmit a qualifying run on 3590 and 7129 kHz. 0400 GMT June 4. (In converting, 0400 GMT June 4 becomes 2100 PDST June 3.)

Code Practice

W1AW transmits daily code practice according to the following schedule. For practice purposes, the order of words in each line may be reversed during the 5-13 w.p.m. transmissions. (Each tape carries a checking reference.)

Speeds	Local times/days	GMT times/days
10, 13, 15	7:30 P.M. EDST daily 4:30 P.M. PDST	2330 daily
5, 7½, 10, 13, 20, 25	9:30 P.M. EDST (SnTTh 6:30 P.M. (Sat	0130 MWFSn
35, 30, 25 20, 15	9:30 P.M. EDST MWF 6:30 P.M. PDST	0130 TThSat

The 0130 GMT practice is omitted four times a 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 over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and texts to be sent in the 0130 GMT practice on the following dates:

Date Subject of practice text from April *QST*

June 13: *It Seems to Us*, p. 9
June 17: *The Evolution of an Amplifier*, p. 20
June 25: *The Delta-Loop Beam On 144 MHz.*, p. 34
June 26: *Amateur Radio Public Service*, p. 76

Date Subject of practice text from *Understanding Amateur Radio*, First Edition

July 2: *Quarter- and Half-Wave Resonance*, p. 106
July 11: *Why Open- and Short-Circuited Lines?*, p. 107 QST

W1AW SCHEDULE, JUNE 1969

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.

	Sunday	*Monday*	*Tuesday*	*Wednsday*	*Thursday*	*Friday*	*Saturday*
0000	.....	←		C.W.-OBS[1]		→	
0020-0030[4]	.....	.....	3.700[6]	14.020	14.020	7.150[6]	14.020
0030	.....	.....	3.700[6]	14.100	14.100	7.150[6]	14.100
0100	.....	←		Phone-OBS[2]		→	
0105-0130[4]	.....	.....	3.820	50.120	145.600	1.820	21.270
0130	←	CODE PRACTICE DAILY[1] (35-15 w.p.m. TTHSat), (5-25 w.p.m. MWFSn)					→
0230-0300[4]	.....	.....	3.555	.....	1.805	.....	3.555
0300	RTTY-OBS[3]	.....	←		RTTY-OBS[3]		→
0310-0330[4]	.....	.....	3.625	14.095	7.095	14.095	3.625
0330	Phone-OBS[2]	.....	←		Phone-OBS[2]		→
0335-0400[4]	.....	.....	7.220	3.820	7.220	3.820	7.220
0400	CW-OBS[1]	.....	←		C.W.-OBS[1]		→
0420-0430	.....	.....	3.700[6]	7.020	3.945	7.150[6]	3.520
0430-0500	.....	.....	3.700[6]	7.080	3.945	7.150[6]	3.555
1700-1800	.....	21/28[5]	21/28[5]	21/28[5]	21/28[5]	21/28[5]	.....
1900-2000	.....	14.280	7.255	14.280	7.255	14.280	.....
2000-2100	.....	14.100	14.280	14.095	21/28[5]	7.080	.....
2200-2330	.....	21/28[5]	21.100[6]	21/28[5]	7.255	14.280	.....
2300-2330	.....	.....	.....	RTTY OBS[3,7]	.....	.....	.....
2330	←	CODE PRACTICE DAILY[1] 10-13-15 w.p.m.					→

[1] C.W. OBS (bulletins, 18 w.p.m.) and the code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145.6 MHz.
[2] Phone OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.6 MHz.
[3] RTTY OBS (bulletins) 3.625, 7.095, 14.095, 21.095 and 29.015 MHz.
[4] Starting time approximate. Operating period follows conclusion of bulletin or code practice.
[5] Operation will be on one of the following frequencies: 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.
[6] W1AW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.
[7] Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.
Maintenance Staff; W1s QIS WPR, K6OSO. *Times-days in GMT. Operating frequencies are approximate.

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

ATLANTIC DIVISION

DELAWARE—SCM, John L. Penrod, K3NYG—SEC/PAM: W3DKX. RM: W3EEB. Renewals: WA3DYG as N.C. EC. K3JLY has been appointed Radio Officer for Kent County. K3GKF has been appointed by the Governor of Delaware as commissioner on the new state Authority for Radiation Protection. The U. of Del. Radio Club is now an ARRL affiliated club. K3ZKD is a member of the ARRL's Intruder Watch. We welcome W3CMR and W3CFA back on the bands. Those upgrading their licenses in March were WA3IOQ and WA3IIX. W3DEO reports that his low-pass filter went west. WA3HWC is experimenting with the new Delta loop on 2 meters. W3MK has been working the Delaware gang on 20 from Las Vegas. W3FEG is vacationing in Florida. Net reports: DEPN, QNI 78, QTC 6; KCEPN, QNI 51, QTC 3; DSMN, QNI 29, QTC 0; DTMN, QNI 40, QTC 1. Traffic: W3DKX 39, W3EEB 36, W3TRC 10, WA3HWC 4, W3HKS 1, K3NYG 1.

EASTERN PENNSYLVANIA—SCM, George S. Van Dyke, Jr., W3HK—SEC: W3ICC. RMs: W3EML, K3MVO, W3MPX, K3SLG. PAMs: K3WAJ, K3MYS. V.H.F. PAM: W3FGQ. OBS reports were received from WA3EEC, WA3AFI, K3WEU, W3CBH, W3ID; OVS from WA3EEC, WA3BJQ, WA3IOB, WA3IAZ, WA3KTP, K3WEU, WA3FCZ; OO from W3KEK, W3BFF, WA3IUV, WA3EEC, K3RDT, W3NNC, K3HNP, K3WEU, W3FGQ.

Net	*Freq.*	*Operates*	*QNI*	*QTC*	*RM/PAM*
EPA	3610	Daily 6:45 P.M.	404	387	W3MPX
PTTN	3610	Daily 6:00 P.M.	284	191	W3MPX
EPAEP&TN	3917	Daily 6:00 P.M.	600	327	K3WAJ
PFN	3960	Daily 5:30 P.M.	536	409	K3SLG
VHF (6)	50.25	Mon.-Fri. 7:00 P.M.	107	46	W3FGQ
VHF (2)	145.35	Mon.-Fri. 8:00 P.M.	78	39	W3FGQ
ENTN	3740	Mon.-Wed.-Fri. 7:15 P.M.	34	88	WA3IUV

Hazleton High School ARC's new officers are WA3KKB, pres.; WN3KLS, vice-pres.; WA3GYT and WA3GYU, mgrs. Abington ARC's new officers: W3GF, pres.; K3SQO, vice-pres.; WA3EYU, secv.; W3QGE, treas. WA3FCP, W3VAP and WA3EYU got their big "E" tickets. K3NSN is teaching a blind boy to become a ham. W3EML reports his linear does make a difference! WA3INC's indoor loop won a prize at school. WA3IUV got his WAC. W3CID is moving to 5-Land. K3MVO got an Eico 753. WA3AOJ is back from Florida. WA3AFI is awaiting his "E" ticket in the mail. K3WEU is busy with seasonal traffic. WA3ATQ is busy with long-haul traffic. WA3JKB found a way to make his SB-401 work on a.m. K3HNP reports the Penn. Wireless ARC is starting an incentive award program. For more dope contact K3BNS. WA3CNM has a new all-band vertical but says his dipole is better. WA3BSV got his "A" ticket. W3RV has his vertical in the clear and its working FB. W3EU joined the Intruders Watch. WA3FCZ is building a 2-meter rig. W3ID says he is petitioning Congress for a 28-hour day to make ends meet. A lot of traffic is not being carried in the NTS because we are begging for liaison stations that can go the NTS nets. W3MPX, WA3CTP and a few new members are trying to carry the entire load. The Hazleton High School ARC now has an SR-400, DX-60 and a quad. WA3KKB is half way to his DXCC. WA3KLS got his "A" ticket. K3OQK has been appointed c.d. director for Langhorne. The deputy director is now WN3MAH. WA3CNM is Montgomery County EC. Traffic: (Mar.) K3NSN 1731, W3EML 766, W3IVS 734, W3MPX 448, WA3INC 304, K3SLG 234, WA3IUV 224, K3BHU 218, WA3IHV 199, W3CID 198, WA3JWF 194, K3MVO 179, W3FGQ 161, WA3EXW 160, K3OIO 128, WA3AOJ 87, WA3AFI 78, WA3FMI 76, K3WAJ 62, K3WEU 60, W3HK 55. WA3ATQ 53, WA3JKB 53, WA3GLI 47, WA3IYC 46, W3FPC 42, K3YVG 41, WA3JWL 35, K3HNP 33, K3RUA 29, WA3IOB 28, W3VAP 27, W3JSX 23, WA3GUK 21, W3CBH 20, WA3EEC 19, WA3BSV 14, WA3CNM 14, WA3GAP 14, K3HNK 14, W3BUR 13, W3BNR 11, WA3JLF 9, W3RV 9, WA3CKA 8, K3HKW 3, WA3HGX 7, W3OY 7, WA3KKB 5, W3JKX 5, W3VA 4, W3ADE 3, WA3EMQ 3, WA3GYT 3, WA3HIT 3, WA3KTP 3, WA3BJQ 2, WA3IAC 2, WA3IAZ 2, W3OML 2, WA3FCZ 1, K3FOB 1, W3ID 1, W3KEK 1, W3YPF 1. (Feb.) W3IVS 398, WA3BSV 15. (Jan.) W3IVS 157.

MARYLAND-DISTRICT OF COLUMBIA—SCM, John Munholland, K3LFD—SEC: W3LDD.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI Ave.*	*Mgr.*
MDD	3643	0000Z	Daily				WA3HTQ/RM
MDDS	3643	0130Z	Daily	22	27	4.8	W3CBG/RM
MEPN	3920	2300Z	MWF	20	50	20.3	K3IAG
		1800Z	SS				
MDCTN	3920	2300Z	STTS	18	88	4.9	W3ATQ
MTMTN	145.206	0200Z	T-S	25	41	9.0	W3IFW
MSTN	50.400	0100Z	M	5	19	11.8	WA3EOP
CVTN	145.620	0300Z	M.-Th-Sa	12	6	5.5	WA3JPI

New appointments: W3DYA as ORS; WA3GUI as ORS; WA3IYS as OBS; W3LQY as EC for Anne Arundel County. WA3HTQ and W3CBG have scheduled the MDD-MDDS Picnic for July 27 in Patapsco State Park Areas 358, 359 and 360. The Foundation for Amateur Radio has set Sept. 21 for its Annual Hamfest at Gaithersburg Fairgrounds. FAR also reports that AMSAT, a new corporation formed for handling upcoming Oscar projects, is looking for radio amateurs interested in assisting with future planning. EC K3RGB reports Baltimore City AREC members enjoyed an informative tour of the C.D. Operations Center at Pikesville. W3MSN is keeping busy in retirement building a new shack. W3JPT has worked 100 countries and is watching the mails for QSL cards. WA3KNJ should be happy now that school is out and he can do more hamming. Son W3VGZ is following in the footsteps of father W3GEB on the traffic trail in MDDS. W3ECP spent Mar. in Florida and Georgia wondering where the warm southern sunshine was. WA3AJR has completed his 2-meter converter and is operating mobile on 6 meters now, if he kept his building schedule. WA3EOP, WA3GGO and other v.h.f. traffic men are determined to put MSTN on the fifty point four frontier or fight! W3CZ/OO is back from W4-Land. K2TNO/3 has modified his HW-100 and is sporting a new trap dipole. Traffic: W3TN 159, WA3IYS 144, WA3ATQ 120, K3GZK 116, K3LFD 114, WA3ADO 104, WA3GUI 73, WA3IRQ 70, K3OAE 57, WN3KAA 50, W3CBG 48, W3GEB 45, WA3ERL 40, W3FU 35, W3EOV 33, W3FA 32, W3PRC 32, WA3EOP 23, WA3IAQ 22, WA3IJR 21, W3ZNW 21, WA3GXN 20, K3QDC 14, K3LFN 9, W3ECP 8, WA3GGO 8, WA3CEK 6, WA3KNJ 3, K1PKQ/3 1, WA3AJR 1, WA3DWF 1, K3NCM 1.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—Asst. SCM: Charles E. Travers, W2YPZ. SEC: W2LVW. RMs: WA2KIP, WA2BLV. PAMs: WA2UVB, W2ZI. NJN reports QNI 507, traffic 419, different stations 49. NJEPN reports traffic 264, QNI 656 and sessions 31. W2ZI recently was elected 1st vice-pres. of OOTC. He has received his 50-year pin from ARRL. SEC, W2LVW has a new 32 S-3 transmitted and is a regular check-in to the NJPEN. WB2WHB is a new OPS from Bridgeton. W2POC now has the call K2AI. K2AT, at Princeton Junction, is enjoying his new HT-37 and is getting out very well. The *NJPEN Roster*, issued by the new net mgr. W2PEV, made its appearance and is a real nice job. WA2BLV, NJN Net Mgr. reports for Feb.: 10 originations, 138 received, 66 relayed, 16 delivered for a total of 311 traffic and a QNI of 531. WB2SFX is back on the air. W2ZI and his

XYL are on a 45-day trip to New Zealand and Australia via the South Sea Islands. WB2DRG is really doing a swell job in learning c.w. traffic-handling. The DVRA station, W2ZQ, is working all kinds of DX with the new Hunter linear amplifier recently purchased. Among the new NJPEN members are WA2BAN, WA2BAU, WB2WID, K2DEL, WB2IJS and WA2IOY. W2DNF recently returned from a business trip. W2YPZ and his XYL flew to Spain and Portugal for a spring vacation. W4RLY, a member of the NJPEN for many years, has retired to Florida. Traffic: WA2BLV 287, W2YPZ 55, W2BLM 45, W2PU 42, WB2FJE 29, W2ZI 23, W2JI 16, WA9PRE/2 15, WB2SFX 10, W2DNF 9, WB2VMQ 6, W2IU 5, W2CDZ 4, WA2KIP 4, K2SOL 4.

WESTERN NEW YORK—SCM, Richard M. Pitzeruse, K2KTK—Asst. SCM, Rudy W. Ehrhardt, W2PVI. SEC: W2RUF. RMs: W2FR, W2RUF, W2MTA, K2KIR. PAM: WB3VSL. Section nets:

Net	*Freq.*	*Local Time*	*Days*
NYPON	3912	1645	Daily
NYSPTEN	3925	1800	Daily
NYS	3675	1900 and 2200	Daily
ESS	3590	1800	Daily
NYSCN	3675	1000	Sun.
NYSCN	3675	1945	Mon., Thurs., Fri.

Renewals: WA2BEX and K2SSX as ORSs, WB2ZDP as OVS, W2RQF as OO, W2RQF as OPS, WA2DNC as EC. OPS WB2NZA has a new HD-10 keyer. W2EMW, at 300 confirmed or so finds he likes DX ragchewing now. WB2WGF has a new SB-101 and is working on an 813 linear. WB2YQH reports having a ball in the ARRL Phone DX Test. WB2RHJ got his feet wet with his first FMT. W2OE, missing the BPL for the first time in eons, was away half the month. W2JR is celebrating his 56th year of having a ham ticket. NYSPTEN reports Jan. traffic at 450 with 1698 check-ins and Feb. at 354 with 1604 check-ins. W2RWY has 28 for 28 in the check-in department. WB2WGF is active as a new OPS. OVS WA2BSG, now General Class, reports numerous 6-meter auroras in Mar. WA2ILH holds skeds with son WA2GHN in KC4-Land. WB2VVZ is working on 6-meter s.s.b. gear. WA2AWX is working on a blast tube linear, whatever that is. The RAGS Hamfest was thoroughly enjoyed by all who attended. W1ICP gave an excellent talk on the Delta Loop beam and then showed a humorous slide show at the banquet. On 80 meters towards 5-band DXCC, W2FR has 72, K2KTK has 70 and K2KIR has 69 countries worked. W2RQF qualified for an ESS Net certificate. K2IMI has a string of several months on ESS with perfect attendance. W2RQF QSYs QTH to *Moravia*. If interested in OBS and OO appointments, please let me know. K2DNN and WA2TCZ have been endorsed as OVS. W2MTA reports that the late session of NYS has started to take shape and is effective in clearing incoming traffic. Don't forget the upcoming ARRL Field Day. Traffic: (Mar.) W2MTA 358, WA2BEX 314, W2OE 242, WB2SMD 240, WA2CAL 222, W2RUF 156, W2HYM 95, WB2VND 89, WB2WGF 64, W2FEB 58, W2UIR 44, W2PRY 42, WB2ZDK 33, W2PVI 24, WB2YEE 22, K2KIR 19, K2QDT 18, W2CFP 17, WA2IYB 15, WB2YEM 13, WA2GLA 12, K2IMI 11, K2VCZ 11, WA2IYB 10, K2KTK 8, WA2HSU 7, WB2NZA 6, W2FCG 4, W2EMW 1. (Feb.) WB2OYE 159, WB2RHJ 112, W2FCG 19, K2KIR 6. (Jan.) K2KIR 43.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—SEC: W3KPJ. PAM: W3WFR. RMs: WA3AKH, W3KUN, W3MFB, W3NEM. Traffic nets: WPA, 0000 GMT 3585 kc. daily. Ex-W3WRC, OM of former W3WRE, passed on to the land of Silent Keys on the West Coast. Our condolences to Louise, WB6BBO. New officers of the Penn State ARC are WA3CFU, pres.; WA3KAC, vice-pres.; WA3LTW, secy.-treas.; K3BPL, sta. dir. W3ETD made Extra Class. It's an SB-301 and an SB-401 at the QTH of W3SDV. WA3AKB also was upgraded to Extra Class. WA3GMF campaigns for Justice of the Peace at Jeannette. K3SHU experiments with a colinear antenna on 2 meters. The Allegheny County AREC Net ran a test drill with 21 stations checking in. Included in the total were 8 mobiles and 1 portable. 34 messages were handled and simulated emergency methods discussed. WA3LDZ and WN3KXO compete for WAS certification. Dust off the gear and emergency power supply and be prepared for Field Day, the summer high spot of amateur radio. Elected officers for 1969 at the Skyview Radio Society are K3SYW, pres.; K3VAS, vice-pres.; W3IWG, secy.; W3IHS, treas.; W3LPQ, radio officer. The 6-Meter AREC Net, under the command of W3BWU, meets Mon. at 0200 GMT on 50.4 Mc. W3RFH has gone mobile. The Western Penna. Mobileers meet each Wed. at 2100 GMT on 29 Mc. Alternate frequency is 29.360 Mc. Stations using phone patch facilities, remember that the new regulations are in effect wherein you must pay $5.00 for the interface installation, $5.00 for modification of the telephone where required and 50 cents per month rental rate. To stay within the law, contact your telephone company representative. W3NRU operates on 2 meters with a twoer. New appointment: W3CFC as EC for Indiana County. Endorsements: W3ZUH as OO. Traffic: (Mar.) WA3IPU 173, W3MFB 155, K3ZNP 128, W3LOS 114, K3HKK 98 ,WA3AKH 94, WA3AKB 62, K3SMB 62, W3GJY 57, WA3HCG 55, W3KUN 50, K3EXE 20, W3IYI 20, K3SOH 19, K3SJN 10. WA3LDZ 7, W3LOD 7, WA3HSI 5, W3YA 4. (Feb.) WA3HSI 13.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. PAMs: WA9CCP and WA9PDI (v.h.f.). Cook County EC: W9HPG. Net reports:

Net	*Freq.*	*Times*	*Days*	*Tfc*
IEN	3940 kc.	1400Z	Sun.	47
ILN	3760 kc.	0100Z	Daily	181
NCPN	3915 kc.	1300Z	Mon.-Sat.	646
NCPN	3915 kc.	1800Z	Mon.-Sat.	
Ill. PON	3915 kc.	2245Z	Mon.-Fri.	1024
Ill. PON	3915 kc.	1430Z	Mon.-Fri.	
Ill. PON	145.5 Mc.	0200Z	M.W.F.	194
TNT Net	145.35 Mc.	0300Z	Sun.-Fri.	248

The 75-Meter Interstate Single Sideband Net handled 286 pieces of traffic during Mar., according to W9NWK, asst. Net Mgr. The Ninth Regional Net had a traffic count of 876 during the same period. The ILN has a slow-speed traffic session on Sat. at 7:00 local time. A new Novice heard is 12-year-old WN9AUR, of the Palentine Radio Club. The 12th Annual Breakfast Club Hamfest will be held at Terry Park, Palmyra, Ill., Sat. and Sun., July 19 and 20. Our sympathy to the family and friends of W9AIK, of Stanford, who recently passed away. The Rock River Radio Club Hamvention was held at Amboy, Ill., Sun., May 18 with many an eyeball QSO. Central Division Director Phil Haller, W9HPG, was guest speaker at the Apr. 9 meeting of the Rockford Amateur Radio Assn. W9EY is rebuilding for full QSK. W9IWI and K9VBK were elected officers of the Amateur Radio News Services, the national association of amateur radio club editors. A grand time was had by the gang who attended the Apr. 19 Banquet of the Chicago Suburban Radio Assn. The 4th Annual Mini-Hamfest will be held Sun., Aug. 17 by the Rockford Amateur Radio Assn. at the Boone County Fairgrounds. The Lee County Civil Defense amateurs have received a 10 KVA generator on wheels. WA9LHU is now mobile on 2 meters. W9ACU received Illinois first place in the Old Old Timers QSO Party. WA9ZSY is now a General Class licensee. The Starved Rock Radio Club Hamfest will be held in Ottawa Sun. June 8, at the 4H Club Grounds. WA9CNV, WA9AKR, WA9MHU, W9HOT and WA9VOB are recipients of the BPL award for Mar. traffic. Traffic: (Mar.) WA9CNV 1354, WA9AKR 833, WA9MHU 713, W9HOT 378, W9NXG 298, WA9OTD 272, WA9VOB 256, W9KII 254, WA9TUM 246, W9YH 110, WA9BRQ 88, WA9WNH 82, WA9NZF 68, W9DOQ 59, K9AVQ 50, W9LDU 36, WA9LDC 34, W9PRN 34, WA9ZUE 31, WA9UXF 24, WA9SFB 19, WA9QXT 18, W9ACU 10, K9HSK 10, W9LNQ 10, WA9LHU 9, K9TXJ 9, *W9IDY* 2, K9IFE 2, W9SXL 2. (Feb.) WA9BWH 157, W9KII 49, WA9OXT 6, WA9VJ 2, WN9ZXV 1.

INDIANA—SCM, William C. Johnson, W9BUQ—Asst. SCM: Mrs. M. Roberta Kroulik, K9IVG. SEC: W9BUQ.

Nets	*Freq.*	*Time*	*Mar. Tfc.*	*Mgr.*
IFN	3910	1330Z Daily 2300Z M-F	202	K9IVG
ISN	3910	0000Z Daily 2130Z M-S 2300Z S-S	528	K9CRS
QIN	3656	0100Z Daily	151	W9HRY
Ind. PON	3910	1245Z Sun.	60	K9EFY
Ind. PON V.H.F.	50.7	0200Z M-T	179	WA9NLE

W9PMT, mgr. of Hoosier V.H.F. Nets, reports Mar. traffic as 86. WA9VVI passed the General Class exam Feb. 2 and received his ticket Mar. 20, then he and the XYL drove to Chicago Mar. 21, took the Advance Class exam and passed. W9HWR, Gibson County EC, is doing a very good job. WA9PQM is working on a digital readout frequency meter, and digital readout modulation monitor. W9HXW and WA9SSV have moved to a new QTH. WA9BUA has moved to Florida. W9WIB has a Drake 4A and a matching T4X. PON has a North Central V.H.F. Net on 50.4 at 0130Z. This is a

new net to handle traffic in the North Central area. WA9ABI has his receiver working on 432. W9QLW resigned as net mgr. of 9RN, and W9HRY will be the new net mgr. W9HRY resigned as RM of QIN and WA9FDQ will be the new RM. Don't forget Field Day. Now is the time to get your equipment ready. I will be at the ARRL National Convention at Des Moines, Iowa, June 20 to 22. Hope to see you there. ARRL membership has started to increase in Central Indiana. QIN Honor Roll: K9VHY 30, W9JBQ 25, W9BDP 23, K9DHC 22, W9EPZ 18, WA9KAG 18, WA9FDQ 16, K9HYV 16, WA9FDQ, QIN RM, welcomes more checkins to move more traffic state-wide. *Amateur radio exists* because of the service it renders. BPL certificates went to K9FZX, W9JYO, W9EQO and WA9QOQ. Traffic: K9FZX 1128, W9JYO 953, K9LVG 406, W9EQO 351, WA9QOQ 243, W9HRY 229, W9ICU 151, K9CBY 110, W9VAY 88, W9UEM 84, K9CRS 75, K9EFY 66, K9VHY 63, W9BUQ 60, WA9RNT 42, W9FWH 41, K9QVT 35, K9KTB 32, K9ILK 26, WA9OHX 26, WA9TJS 24, W9DOK 23, W9LG 22, W9SNQ 20, WA9VBG 17, W9DZC 15, W9PMT 15, K9FUJ 13, W9HWR 12, WA9IPS 12, W9ZZR 11, WA9AXF 10, WA9BHG 10, W9FJI 10, WA9DBK 8, WA9OAD 8, WA9VVI 8, W9ALM 6, WA9SBR 4, K9UHQ 4, K9IIV 3, WA9BVL 1.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9NGT. PAMs: K9DBR, WA9IZK, W9LVC, W9NRP, WA9QNI, W9AYK. RMs: K9KSA, K9GSC.

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Mgr.*
BWN	3985 kc.	1245Z	Mon.-Sat.	425	280	W9AYK
BEN	3985 kc.	1700Z	Daily	599	176	W9LVC
WSBN	3985 kc.	2200Z	Daily	1589	334	WA9QNI
WIN	3662 kc.	0015Z	Daily	301	113	W9DND
WSSN	3780 kc.	0030Z	Daily	152	27	K9KSA
WRN	3620 kc.	0030Z	Sun.	20	3	K9GSC
SW2RN	145.35 Mc.	0230Z	Daily	265	472	WA9IZK
SWRN	50.4 Mc.	0200Z	Mon.-Sat.			K9DBR

Net certificates: WA9THF and W9LFH for WSBN; W9LFH and W9LVC for BEN. Renewed appointments: K9KJT as OBS; K9FPM as OVS. Manitowoc Co. Radio Club officers reelected: W9KQB, pres.; K9RFZ, vice-pres.; WA9EZU, secy. A BPL certificate for March traffic went to W9CXY. K9GDF led the OOs with 30 notices sent. WA9UNN is running a Galaxy V and is active in Navy MARS. The Annual WNA Picnic will be held in Madison, Wis., July 13. Traffic: (Mar.) W9CXY 684, K9CPM 449, WA9QKP 262, W9ESJ 151, W9DND 150, WA9RAK 123, WA9QNI 98, K9TBY 76, WA9UMT 62, K9FHI 60, WA9QQM 53, W9AKY 52, W9IRZ 51, WA9TXN 50, W9KRO 36, WA9UUN 36, K9KSA 34, W9DXV 33, WA9PKM 33, W9DM 27, W9NRP 26, W9BCH 23, K9PKQ 11, K9WRQ 8, K9GSC 5, WA9HFB 5, K9GDF 4, WA9SAB 2. (Feb.) WA9QKP 412.

DAKOTA DIVISION

MINNESOTA—SCM, Larry J. Shima, WØPAN—SEC: WAØMZW. PAMs: WAØMMV, WAØHRM, WAØOEJ. RMs: WAØIAW, WAØRRA. V.H.F. PAM: WAØDWM. QSL Mgr.: WØDMA.

Section Nets	*Freq. (Mc.)*	*Time (GMT)*	*Days*
MSPN (noon)	3.945	1705Z	Mon.-Sat.
MSPN (noon)	3.945	1400Z	Sun., Holiday
MSPN (evenings)	3.945	2315Z	Daily
MSN	3.685	2330Z	Daily
MJN	3.685	0000Z	Tue.-Sun.
MSTN	50.400	0330Z	Daily
Minn RTTY	3.620	0100Z	Sun.
Minn AREC (ECs)	3.910	2200Z	Sun.
SCM INFO Net	3.945	2130Z	Sat.
PICO Net	3.934	1800Z	Sat.-Sun.

Net information will be published every other month. Our sincere thanks to WØTCK for his contribution to the section during 4 years as SCM. The SCM Info Net is to be a forum for gripes/comments/questions about section activities. K7UGA was presented with Honorary Membership in the St. Cloud Radio Club. Northstar Hibander's new officers are KØEDS, pres.; WAØLIS, vice-pres. and treas.; WAØLIT, secy. Hibanders provided communications for the Winter Carnival Road Rally. WØTIV has a new Swan 500C. New hams as a result of the Viking Amateur Radio Society code and theory classes are WAØWQI, WAØWTA, WNØWTC, WNØWTD, WNØWQY, WNØWWD. Mankato ARC's new officers: WAØUAH, pres.; WAØTUU, vice-pres.; WØCSC, secy.-treas. Appointments renewed: WØTIV as OO; KØCNC as ORS. New appointments: WAØ-/MMV as over-all PAM; WAØDWM as v.h.f. PAM; WAØIAW as over-all RM. Don't forget the National Convention at Des Moines June 20-22. Traffic: (Mar.) WAØTHI 314, WAØIAW 264, KØRD 229, WAØMZW 186, WAØVAS/Ø 172, KØMVF 114, WØKYG 92, WAØRRA 77, WAØMMV 70, WAØTQT 70, WØTCK 66, WØPAN 62, WAØONS 52, WAØHRM 51, WØBUC 48, KØGYO 40, WAØODB 39, WAØRKV 37, WAØOEJ 34, KØIJL 32, KØCNC 28, WAØPOC 24, KØFLT 23, WØHEN 19, WAØJPR 19, WAØRKF 19, WAØUNS/Ø 17, WØPZY 14, WAØEWK 12, WAØGMX 12, WAØJRA 12, WØKLG 12, KØAYU 10, WØBE 10, WAØDFT 9, WØKNR 9, KØWXH 9, WØAAU 8, WØBUO 8, KØICG 5, WAØPMM 5, WAØDWM 4, WØIYP 4, WAØTSU 4, KØZBI 4, WØFHO 2, WAØGAZ 2, WNØWDX 2, WØSZJ 1. (Feb.) WØKYG 27.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—WAØOVW was selected to represent the N.E. Section of N. Dak. in the International Science Fair in Ft. Worth, Tex. WØDXC has the new Drake Line operating. WAØGRX and WAØIKS are putting out sigs from new Swan 500s. WAØAIN is leaving Colfax. KØPYZ has left the hospital and expects to come back to his home QTH soon. WØRTK has been on jury duty. WAØIQJ and WØNLF, from Iowa, stopped awhile at WAØGRX-WØGB. WØTXQ came up from Detroit Lakes to spend Easter with WØDM and relatives in Grand Forks. WØAYA and family were in Grand Forks for Easter, too. The Forx Radio Club set up an amateur station at the District Exposition held by the Boy Scouts of the Red River District at the Field House of the UND. Contacts were made on 15 and 2 meters. WAØBIT and WAØTXZ set it up while WAØAVE, KØOSL and WØDM helped to keep them busy. KØSPH and WAØAYL have been busy organizing the amateurs in a reporting network to report the height of the various rivers in the Red River area to the Army Corps of Engineers and has been progressing well. The YL WX Net discontinued work the middle of Apr. Thanks to all who participated in this fine work. WAØHUD leads the brasspounders in N. Dak. out of 41 sessions on TEN Net, he was in 36. WAØOVW reports 5 and WØBF 1.

Nct			*Sess.*	*Ck-ins*	*Tfc.*	
Goose River 160M	0900	Sun.	5	72		WØCDO
NDPON Net	0900 1730	Sun. Sun. & Sat.	15	308	35	WAØHUD
YL WX Net	0730	Mon.-Fri.	21	428	24	WAØGRX, WAØMND
NDRACES Net	1730 1830	Mon.-Fri.	40	890	154	KØSPH
ND CW Net	2100	Mon.-Fri.	28	40	13	WAØRSR

Traffic: WAØHUD 125, WØNMV 100, WAØAYL 73, WAØRWM 72, KØSPH 34, WØDXC 20, WAØJPT 18, WØDM 15, WAØTBR 15, WØBF 14, WØHBR 12, WØWWL 12, WAØRSR 7, WØCDO 2.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW—SEC: WAØCPX. RM: WØIPF. PAM: WAØCWW. A new call in Sioux Falls is WAØTRS. WØZWL completed another successful WX Net season and is now taking a much deserved vacation in California and Hawaii. The Eastern South Dakota floods have increased interest in communications. It is a pleasure to see the response when needed. Net reports: NJQ Net, QNI 423, QTC 44, 54 informals. Early Session Phone Net, QNI 294, QTC 24, informals 32. Late Session Phone Net, 1370 QNI, QTC 52, informals 141. Traffic: WØZWL 506, WAØPNB 204, WØIG 62, WØDVB 16, WAØFUZ 12, WAØRIQ 8, WAØBZD 6.

DELTA DIVISION

ARKANSAS—Acting SCM, Robert D. Schaefer, WA5IIS—SEC: W5PBZ. PAM: WA5PPD. RM: W5NND. For latest DX information check the Arkansas DX Information Net, which meets on 3.860 at 0030Z every Mon. W5RIT, in Fayetteville, has been inactive for almost two years and hopes to get back on soon. Ex-WA5CBL is now chasing DX from New Hampshire as WA1JTM. Net reports for Mar.:

Net	*Time*	*Freq.*	*Tfc.*	*QNS*	*Time*	*Mgr.*
OZK	0100Z	3790	25	203	565	W5NND
RN	0030Z	3995	24	603	448	WA5PPD
APN	1200Z	3930	10	502	1518	W5VFW
PON	2130Z	3925	106	545	726	W5ELF
Teenage	2330Z	3995	30	299	524	WA5QMQ

Traffic: W5OBD 817, W5NND 173, WA5QMQ 41, W5SMS 39, WA5KEF 32, WA5RCK 29, WA5TJB 15, WA5IIS 3.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: K5ANS/5. V.H.F. PAMS: WA5DXA, W5UQR.

Net	Freq.	Days	Times/GMT	Net Mgr.
LAN	3615	Daily	0030/0400	K5ANS/5
Delta 75	3905	Sun.	1330	WA5EVU
LaPON	3915	Sun.	1300	W5KC
LaRTTY	3612.5	Sat.	0100	W5GHP
CenGCHN	3935	Daily	0015	WA5NRG

WA5SIK says over 8 OTs check into the OT Net each morning on 3900 kc. Don't forget the Central Louisiana Radio Club's Hamfest Aug. 2 and 3 at Harold Miles Park, in Alex. W5BUK and yours truly will be there. Army MARS held a State Meeting at Lake Charles. W5JYA visited Miami on his return from Jamaica. WA5WBZ, one of LAN's *big guns is using* a home-brewed keyer. WN5YGI, WN5YGJ, WN5YGK and WN5YGP are all new up Monroe-way. New Jefferson ARC officers are WA5MHM, pres.; W5WZE, vice-pres.; K5HEK, treas.; WA5SBA, secy. K5ANS/5 has two projects in mind and requests anyone interested in either to contact him or W5GHP: One, a LAN point system fashioned to the BRAT system in Los Angeles. Two, an RTTY Autostart Net. WA5PWX/5 works LAN and RN5 when time permits. W5GHP does a lot of RTTY with Navy MARS. WA5OJG is planning to go mobile. The GNOARC recently had a new wrinkle for a club meeting called "Funniest thing that ever happened to me in Ham Radio Night." Each member present related his funniest anecdote. The S.W. La. ARC is having a Fish Fry at Prien Lake Park near Lake Charles June 28 and 29. W5BBV has a six-element beam up 55 feet! W5AJY has been forced to give up the editorship of the CLARC *Spark*. W5NGA has been experimenting with an augmented Inverted Vee for 75. WA5UEG wrote a dandy technical piece on a small signal generator for the Ozone monthly publication. The Ozone ARC gang deserves high praise for its handling of health and welfare traffic from Gulfport during the recent tornado. K5YPS, K5UYL, W5GZR, W5WMU, W5IOU, W5KC and W5BUK made smoke during the recent ARRL DX Contest! WN5WXD is very active on 80 and 40 while WN5WRF is very active on 40 and 21. Traffic: W5MI 250, W5MXQ 136, W5CEZ 130, K5ANS/5 112, W5GHP 87, WA5WBZ 62, WA5PWX/5 36, W5MBC 31, W5EA 18, WA5QVN 5, W5YJA 1.

MISSISSIPPI—SCM, Clifton C. Comfort, WA5KEY—SEC: WA5JWD. The delayed winter picnic of the MSBN was held near Hattiesburg Mar. 2, attended mostly by the fellows from South Miss. WA5JWD has agreed to take the job of SEC. The updating of the ARRL field organization is in progress and by the time you read this most of the paper work should be done. Mississippi is working to join those states known as "Tornado Alleys." We had two more touch down recently both in rural areas with little damage. Glad to have K5MFY back on the air after hospitalization. WA5TUD has a job transfer to La. WA5SIM is the new net mgr. for MSBN. Navy MARS is on a new footing in Miss. with credits to WA5FII and WA5WJP. A belated welcome to Mississippi is extended to WA5WAJ, formerly WA4FER. W5HTV and WA5IXC are trying to work 70-mile groundwave on 2 meters.

MSBN	3990 kc.	0015Z	Daily	WA5SIM	Net Mgr.
GCSBN	3925 kc.	2330Z	Daily	W5JHS	Net Mgr
RACES	3987.5 kc.	1345Z	Sun.	W5IZS	RO.

Traffic: K4RIN/5 155, WA5FII 113, WA5JWD 37, WA5-WJP 27, W5BW 24, WA5KEY 13, WA5IXC 8, WA5-SIM 8.

TENNESSEE—SCM, Harry A. Phillips, K4RCT—SEC: W4WJH. PAMs: W4PFP, WA4YBT, WA4EWW, WA4CRU. RM: WB4GSS.

Net	Freq.	Days	Time	Sess.	QNI	QTC	Mgr.
TSSB	3980	Mon.-Sat.	2330Z	26	1170	146	WA4YBT
TPN	3980	M-Sat.	1145	31	1272	85	W4PFP
		Sun.	1300				
ETPN	3980	M-F	1040	21	531	32	WA4EWW
TCN	3980	Thurs.	0100	(Wed. night CDT)			W4TYV
TPON	3980	Sun.	2330	5			K4RTA
TTN	7290	Daily	2100	31	534	143	WA4CRU
TN	3635	Daily	0000	31	249	112	WB4GSS
TSN	3635	M-W-F	2300				WB4GSS

The Tn. Slow Net has been set up to operate on 3635 kc. at 2300Z Mon., Wed. and Fri. The Delta ARC has initiated message service at the Interstate 55 rest area in Whitehaven. The Coffee and Franklin County AREC supplied communications for the Cerebral Palsy Fund Drive and were highly commended. RO/EC WA4YFG reports the Gibson County Civil Defense station now is operational with a receiver for all bands and police/highway patrol liaison. WB4JDD got his WAS. W4IGW has his Advanced Class license and is working on his Extra. Appointments: WB4JDD as OPS; WB4JFT, WB4DJP, WB4HBH as ORSs. Traffic: W4SKH 290, K4AT 223, W4OGG 199, WA4UAZ 141, WB4GSS 114, WB4JFT 95. WB4DJP 73, W4WBK 68, K4MQI 62, WA4CRU 47, WA4GLS 39, WB4DGI 37, K4UMW 33, W4PFP 24, W4CYL 23, WA4ZXZ 23, WA4AJB 21, WA4-YEM 21, WB4JDD 20, WB4ANX 19, WB4HLH 19, WA4CGK 16, K4LTA 15, WA4WVW 15, WB4DYJ 13, W4TYV 12, WA4HGN 10, WA4YFG 10, WB4EHK 7, W4VJ 7, WA4YON 7, WA4EWW 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, George S. Wilson, III, W4OYI—SEC: W4VYS. Appointment: WB4HQW as ORS. Endorsements: W4ISF as OVS and OPS, WA4GHQ as EC, WB4AIN as ORS, K4YZU as EC and OPS. BPL: WA4DYL. New Intruder Watcher: W4YOK.

Net	QNI	QTC	Net	QNI	QTC
KRN	402	29	KYN	388	625
MKPN	461	83	FCATN	131	64
KTN	980	226			

The Louisville Kenvention (Aug. 29-30), under the chairmanship of K4YZU, has been officially designated "Great Lakes Division Convention." The Henderson gathering (chairman WA4RHO) will be Sept. 14. The 2-meter f.m. repeater in Louisville is going great guns despite a conflict between the antenna and the wind. The constitution of Ma Bell's Ham Club at Louisville has been approved. WKU had G3AYL as guest speaker. Thirty-four of 45 Kentucky cities over 5000 are regularly served by ham nets with 29 more smaller towns covered regularly. If you're the closest station to addressee, please take it even if you have to deliver by mail. WB4HTN is on RTTY. Owensboro again expanded 2-meter versatility with a group purchase of f.m. walkie-talkies. Traffic: (Mar.) WA4DYL 714, W4-BAZ 289, WB4HQW 187, WB4KPE 178, WA4VUE 117, K4MAN 96, W4OYI 93, K4AVX 85, WA4AGH 81, WB4-HUS 64, WB4EOR 57, K4TRT 55, W4UK 55, K4YZU 50, W4NBZ 47, W4OTP 45, W4KJP 38, WB4HYV 36, WB4DQM 32, WA4GHQ 31, WA4VZZ 30, K4FPW 27, K4HOE 26, WA4MXD 24, W4VYS 19, WA4WWT 19, WA4UHR 12, W4SZB 11, K4UMN 11, K4YCB 8, K4-VDO 7, WB4FLA 5, WB4HTN 5, W4BTA 4. (Feb.) WA4GMA 51, W4VYS 19, K4FPW 2. (Jan.) WA4GMA 9.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: W8MPD. RMs: W8FWQ, W8RTN, WA8OGR, K8KMQ, W8IXJ. PAMs: K8GOU, K8JED, V.H.F. PAMs: W8CVQ, W8YAN. Appointments: W8AUD, W8DET, WA8IAQ, WA8MAM, K8MXC, WA8VBL, W8ZJE, W8-ZLK as ORSs; WA8GVK, K8HPO, K8KJL, WA8STV W8LUH as ECs; WA8GRI, WA8LPI as OVSs. Net reports:

Net	Freq.	Time	Days	QNI	QTC	Sess.	Mgr.
QMN	3663	2300	Dy	1115	484	92	W8FWQ
WSSB	3965	0000	Dy	824	206	31	K8WRJ
PON-Day	3935	1600	M-Sat.	534	621	26	K8LNE
BR/MEN	3930	2230	M-Fri.	965	191	26	K8LJS
GLETN	3932	0230	Dy	929	141	31	WA8ONZ
M6MTN	50.7	0000	M-Sat.	500	71	26	WA8LRC
PON-CW	3645	0000	M-Sat.	101	27	26	VE3DPO

After 10 years this is the last SCM report from W8FX. Thanks for all the cooperation. Silent Keys: W8HNU, W8IDL, W8UGO. BPLers: K8LNE, K8ZJU. WB8DHU is the Ascientia AR Club, Birmingham High School. The Metro Ragchewers Club is now the Metropolitan ARC. W8TEY retired to handling a gas station in Colorado Springs. K8HKM (your new SCM) now has a second daughter. W8CVQ needs "flit" to get the bugs out of the SB-301 he built. The CMARC had a fine club auction. W8MRM, the MCRC club station, is manned Sun. at the Henry Ford Museum. W8GG now is convalescing. W8JXU had a successful cataract operation. WB8BDY is home from the hospital and on 2. Same for WA8BUX. W8JTQ (EC and RO, Genesee) puts W8ACW on QMN. W8IXJ is back home after a stroke. W8SWF has an NCN-2000 going. W8MPD/8 will teach at W.M.U. this summer. W8RHF, Roosevelt High ARC, is on the 40 Novice band daily. K8HXW and his YF have a new Jr. operator. To avoid conflicting dates let's clear the dates of future hamfests, conventions, picnics and swap-shops through W8JXU, who keeps close check on these things. Traffic: (Mar.) K8LNE 547, K8KMQ 306, K8NAW 260, W8JTQ 244, K8ZJU 228, W8NOH 194, W8GAI 170, W8UM 143, W8IZ 142, K8MXC 108, W8EU 100, K8JED 92, WA8QGI 92, K8TIY 74, W8RTN 63, W8FX 55, WA8SQC 50, K8GOU 43, W8BEZ 41, WA8VGQ 37, W8MO 36, W8YAN 31, W8DSE 27, WA8ONZ 26,

RL membership are noted

Hafstrom Technical Products' heavy duty BTI LK-2000 linear amplifiers complements extra class design with compact modern circuitry built around an Eimac 3-1000Z high-mu power triode. The amplifier achieves full 2 kW PEP SSB input and 1 kW input on CW, AM and RTTY.

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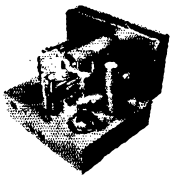

For more information on the 3-1000Z and other Eimac tubes for advanced transmitters, write Manager, Amateur Services, Eimac Division of Varian, 301 Industrial Way, San Carlos, Calif. 94070, or contact your nearest Varian/Eimac distributor.

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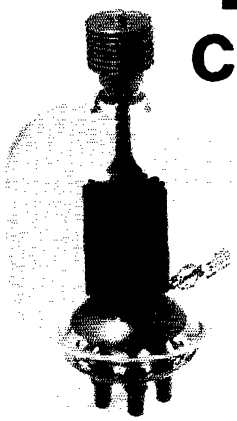

1

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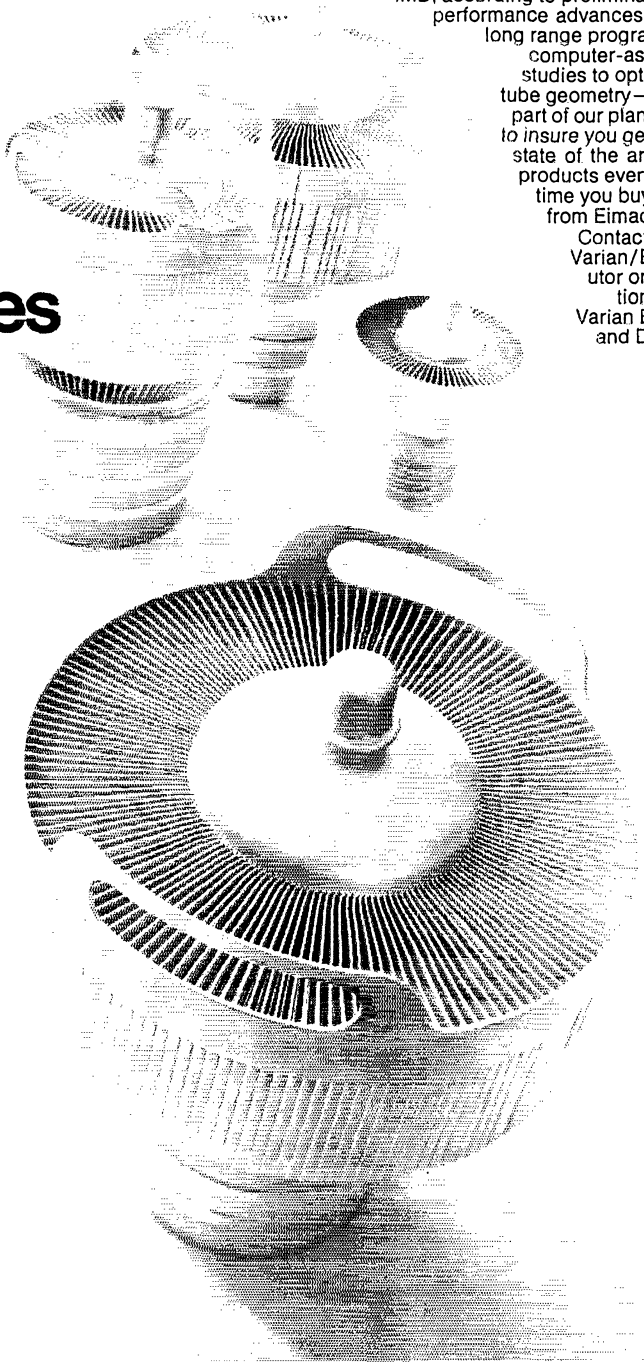

W8TDA 26, W8ACW 24, WA8OGR 23, WA8WGM 23, WA8UPB 22, WA8MAM 19, WA8NLC 16, W8FWQ 13, W8RHF 13, W8MPD 12, WA8GRI 11, W8SWF 8, W8WVL 8, W8TBP 6, K8VDA 6, W8SS 5, W8HKT 4, WB8ANR 3, K8QLL 3, WA8VBL 1. (Feb.) W8IXJ 408, WA8ZAV 57, W8ACW 23, W8SWF 3.

OHIO—SCM, Richard A. Egbert, W8ETU—Asst. SCM: Roger Barnett, K8DDG. SEC: W8OUU. RM: W8IMI. PAM: K8UBK. V.H.F. PAM: WA8ADU. Mar. net reports:

Net	*QNI*	*QTC*	*Sess.*	*Freq.*	*Time*	*Mgr.*
OSSBN	1823	1008	61	3972.5	1430 & 2245Z	K8UBK
BN	629	485	62	3580	2300 & 0200Z	W8IMI
06MtrN	393	77	53	50.61	2300Z	WA8ADU
OSN	171	70	29	3580	2225Z	WA8VNU
Apricot				51.0	0000Z	K8ONA

The 06Mtr Net is putting on a new session at 0100Z on 50.16 Mc. This session in the s.s.b.-favored part of the band is a good bet for those looking for outlets not available on earlier nets. The trip to Thailand was enlightening, enjoyable and successful. Many thanks to K8DDG, who did his usual excellent job in holding down the fort for me. Mar. appointments: WA8SHP, W8FCF and K8PBE as ECs; WA8ETX as ORS; WA8ETX and WA8ETW as OPSs. W8BZX advises that W8JTF has been named Miami Co. Civil Defense Director. W8AN has been OBS continuously for 24 years. OVS WA8GPX reports good results with W8QID on 440-Mc. f.m. WA8TYF worked state no. 33 during the aurora opening in Mar. Congratulations to new Extra Class W8EZO and WA8TKW (age 13) and to new Advanced Class W8WOL and WB8APJ. New officers of the Lima Area ARC: WA8NFY, pres.; WN8ARJ, vice-pres.; WA8YOW, secy.; W8WEG, treas. Chippewa ARC's officers are WA8TTZ, pres.; K8UIE, vice-pres.; WA8GLX, secy.-treas. W8ELE moved to a new QTH with about 3 acres of antenna space. WA8OCG now is on the air with a full gallon. OSN certificates went to WB8AKU, WA8ZTV and WA8WAK; BN certificates to WA8ETX and WB8AKW. Observer WA8RUO sends along cards of thanks from those to whom he sent notifications. Franklin Co. AREC conducted a mobile "effectiveness" test on 10, 6 and 2 meters. Mobiles were scored on communications coverage, gear and flexibility. Columbus's CARA is adding a Heath HW-16 to club station W8TO for Novice operation. The *Buckeye Net Bulletin* reports Dayton, Cincinnati, Toledo and Columbus operated on BN during the SET on emergency power. Lucas Co. EC K8LFI now includes the Toledo RC-Red Cross station W8FO among his AREC resources. Observer W8BU remarks that the more "Intruders" he reports, the more seem to show up. Notice the changes in the Field Day rules, and don't forget the messages for extra points. SEC W8OUU still is on the prowl for ECs. How about it, gang? Effective Mar. 1969, Technician Class licensees who are qualified are eligible for EC appointment. Traffic: (Mar.) W8UPH 764, WA8ETX 513, WA8DWL 252, WB8BZX 229, W8IMI 157, WA8LAM 154, WA8VNU 137, W8QCU 136, W8QZK 135, W8LRE 103, K8DDG 101, WA8ETW 88, WA8ZTV 85, W8SUS 83, W8UDG 82, W8CHT 75, W8PMJ 74, WA8UPI 72, K8EHE 70, K8UBK 69, W8NAL 65, W8SZU 64, WA8SED 58, W8FGD 57, WA8ADU 56, WB8CHW 56, W8ERD 56, WA8PPK 52, WA8AJZ 51, W8UX 49, K8DHJ 48, WA8DUL 48, W8GVX 47, K8ONA 47, W8OUU 46, WA8SHP 45, WA8GRR 42, WA8YIB 42, W8GOE 38, WB8AKW 36, W8DAE 36, W8GNL 34, W8OE 34, WA8JSW 33, WA8MHO 33, W8IO 31, K8BPE 29, WB8AHY 28, WA8JEH 28, W8GRT 27, WA8QFK 26, WA8FSX 25, K8BYR 22, W8TV 22, W8ETU 21, WA8CXV 19, W8HII 18, WA8WJR 16, K8ZBL 15, WA8VVN 14, WA8VVP 12, WA8YHN 12, W8WEG 11, W8AJW 10. W8EFB 10, WA8KPN 10, WA8NTA 10, W8QXQ 9, WA8SXI 9, W8CXM 7, K8LFI 7, K8CKY 5, K8IIF 5, WA8OCG 5, WA8RUO 5, K8THT 4, W8EEQ 3, WA8MCR 3, K8QYR 3, W8LZE 1, WA8OFT 1. (Feb.) WA8ZGC 65, K8QYR 22, K8EHE 17, W8AJW 6.

HUDSON DIVISION

EASTERN NEW YORK—SCM, Graham G. Berry, K2SJN—Asst. SCM and RM: WA2VYS. SEC: W2KGC. PAM: WB2VJB. Section Nets: NYS on 3675 kc. nightly at 2300Z; ESS on 3590 kc. at 2300Z nightly; NYSPT&EN on 3925 kc. nightly at 2300Z; Late Session NYS at 0300Z. Appointments: The section now has a well-qualified V.H.F. PAM—WB2YQU. Anyone wanting appointment as OVS, please apply through him. Apply for appointment as ORS through the RM and OPS through the PAM. WA2BUF has been appointed ORS. WB2UUD renewed as OVS. On the club circuit: Westchester ARA is honoring W2ASF at start of his 23rd year of WARA membership. The club is palnning a trip to Hq. in early June. Contact WB2MOI for details. At its Mar. meeting the WARA had a speaker from Audio tape Corp. who spoke on the many uses for magnetic tape. The New Rochelle Club (CCNR) has 30+ students in its theory classes, including seven ex-Novices coming back to the hobby via "Operation Retread," sponsored by ARRL at the suggestion of Division Director W2TUK and others. The RPI Club is planning possible 4-bay stacked five-element quads for its 2-meter setup. Albany reports its soon-operative 6-meter repeater is a first for the area and one of the half-dozen anywhere. The records show 11 affiliated clubs in E.N.Y., so let's have your activity report each month for the column. Individual station reports: WB2VJB has a new quad on the low bands. WB2ZEC now is mobile. WA2WGS is on 20-meter s.s.b. with a new HW-32A. WA2BHN is going RTTY soon, and now is in TCC week ends. WN2FDG reports joining the ARRL to celebrate his first QSO. WA2RBG and WB2YQU both worked aurora in late March, along with WB2GXF. WB2YQU has No. 18 for his states list. Many stations report monitoring ECARS on 7255. Come aboard—any time. For further information, write W2CFP. WB2NVJ is back from trip to the CTI area. WA2OJD joined the DXCC Honor Roll. WA2RAU is next to the top spot and is looking for more worlds to conquer. Your SCM will be looking around 3925 on the FD week end for Field Day messages from clubs and individual stations. Traffic: WA2BHN 989, WA2VYS 173, WA2VYT 150, W2EAF 127, WA2CRW 67, W2TPV 23, W2ANV 20, K2SJN 20, WB2ZEC 18, WB2RBG 16, K2HNW 12, WA2WGS 12, WB2VJB 11, WB2FOA 10, WB2YQU 3.

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

NLI*	3630 kc.	1915/2200 Nightly	K2UAT	RM
NLIVHF*	145.8 Mc.	1930 MTWTF	WB2RQF	PAM
NLIPhone*	3932 kc.	1600 Daily	WA2UWA	PAM
Clear Hse	3925 kc.	1100 Daily	WA2GPT	Mgr.
Mic Farad	3925 kc.	1300 Ex. Sun.	K2UBG	Mgr.
East US	3683 kc.	0001 Nightly	K2UBG	Mgr.
All Svc	3925 kc.	1300 Sun.	K2AAS	Mgr.
NYSPTEN	3925 kc.	1800 Daily	K2SPO	Mgr.

**Section Nets. All times shown above are local.*

WB2RQF is fixing to move into good old Suffolk County as soon as the closing is accomplished on the new QTH. W2AHV and WA2AVF are new members of the NLIVHF. WA2HBP is on 15 meters with a brand-new beam. The secretary job over at the Mid-Island ARC and Intruder Watching has WB2MBU all wrapped up these days. W2BCB sashayed off to Hollywood, Fla., last Apr. W2PF reports that amateurs from all parts of the country heard W4ETO, of Signal/One, speak at the 5th Annual Amateur Radio Luncheon held in N.Y.C. during IEEE Week. K2UBG allows that the aurora didn't help the nets very much, but hopes

(*Continued on page 114*)

NEW YORK QSO PARTY

June 7-9, 1969

The South Shore Amateur Wireless Association invites all amateurs to participate in the 1969 New York QSO Party.

Rules: 1) The contest period is from 1700 GMT June 7 to 0100 GMT June 9. 2) Exchange QSO number, RS(T), state, country or county. 3) For scoring purposes, out-of-staters multiply QSOs by the number of different N.Y. counties worked; New York stations multiply the QSOs by the total of different states and countries worked. Stations may be worked once per band and mode. 4) Suggested frequencies are 3560 3900 7060 7225 14060 14250 21060 21300 28060 28600 kHz. 5) Certificates will be sent to the high scorer in each state, New York county and country (provided that a minimum score of 100 points is attained 50 for DX, including KL7 and KH6). 6) Logs must show date/time in GMT, station worked, exchanges, band, mode and total claimed score. Each entry should be accompanied by a self-addressed stamped envelope if a result sheet is desired. All entries should be postmarked by July 15 and mailed to the South Shore Amateur Wireless Assn., 116 Locust St., Valley Stream, N. Y. 11581.

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CN-144 Conv(50-54) 29
CN-220 Conv(14-18) 29
CN-220 Conv(50-54) 29
PCLP Preamp 19
PS-1 AC Supply 8
TX-86 Transmitter 39
TX-62 VHF Xmtr 109

AZTEC
876 DC Supply $ 25

B&W
5100 Transmitter $ 89
6100 SSB Xmtr 275

CENTRAL ELECT.
QT-1 Anti-Trip $ 6
100V Transmitter 325

CLEGG/ SQUIRES-SANDERS
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Thor 6 (RF only) 99
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Interceptor Rec. 325
Interceptor B Rec. 349
Allbander tuner 69
Venus 6m Xmtr 249
416 AC Supply 75
Apollo Linear 175

COLLINS
75A-3 Receiver $269
75A-4 (ser. #601) 349
75A-4 (ser. #3159) 425
75A-4 (ser. #4244) 449
Speaker(A1,A2,A3) 9
75S-1 Receiver 325
75S-3 Receiver 425
75S-3B Receiver 495
R-390A Receiver 995
32S-1 Xmtr 395
32S-3 Xmtr 575
30L-1 Linear 375
KWM-1 Xcvr 249
KWM-2 Xcvr 750
351D-2 Mount 75
516F-1 AC Supply 75
516F-2 AC Supply 115
516E-1 DC Supply 75
516E-2 28v Supply 95
PM-2 AC Supply 95

R. L. DRAKE
2A Receiver $159
2B Receiver 189
2BQ Combo 29
2C Receiver 175
2CS Speaker 12
R-4 Receiver 275
R-4A Receiver 299
R-4B Receiver 325
TR-3 Xcvr 375
AC-3 AC Supply 65
DC-3 DC Supply 95
MN-4 Matcher 69
2NT Xmtr 99

EICO
720 Xmtr $ 49
723 Xmtr 34
753 Xcvr 139
751 AC Supply 49
752 DC Supply 49

GLOBE/GALAXY/WRL
SB-175 SSB Xmtr $ 59
755A VFO 34
PSA-300C AC Sup 40
Galaxy V Xcvr 249
Galaxy V Mk II 269
Galaxy V Mk III 299
AC-400 AC Supply 75
AC-35 AC Supply 65
DC-35 DC Supply 69
SC-35 Speaker 12
DAC-35 Console 75
F-3 300cy. filter 24
UM-1 Modulator 29
SC-530 Speaker 29

GONSET
Comm I 6m $ 79
Comm IV 2m 199
6m Linear II 69
6m Linear III 85
G-50 Xcvr 175
910A 6m Xcvr 199
G-77 Xmtr 45
G-77A Xmtr 59
GSB-100 Xmtr 169
GSB-101 Linear 169
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SX-62A Receiver $225
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SX-100 Receiver 139
SX-101 Mk I Rec. 125
SX-101 Mk III Rec. 149
SX-101A Rec. 189
SX-110 Receiver 99
SX-111 Receiver 129
SX-115 Receiver 299
SX-117 Receiver 225
SX-122 Receiver 225
SX-130 Receiver 149
SX-140 Receiver 69
SX-146 Receiver 199
R-47 Speaker 9
R-50 Speaker 12
HT-32 Xmtr 225
HT-32A Xmtr 249
HT-32B Xmtr 299
HT-37 Xmtr 225
HT-44 Xmtr 225
SR-150 Xcvr 289
SR-160 Xcvr 175
SR-42A 2m Xcvr 139
SR-46 6m Xcvr 79
HA-26 2-6m VFO 39
HA-10 LF tuner 19

HAMMARLUND
HQ-100C Rec $109
HQ-100AC Rec 139
HQ-110C Rec 129
HQ-110AC Rec 169
HQ-110AC/VHF 219
HQ-145C Rec 149
HQ-160 Rec 189
HQ-170 Rec 169
HQ-170A Rec 239
HQ-170A/VHF Rec 289
HQ-170AC/VHF 299
HQ-170AC/VHF w/immunizer 325
HQ-180C Rec 249
HQ-180AC Rec 349
HX-50 Xmtr 199
HX-50A Xmtr 225
HXL-1 Linear 225

HEATHKIT
GR-64 Receiver $ 39
SB-300 Receiver 225
SBA-300-3 6m Conv 15
SBA-400-4 2m Conv 15
MT-1 Xmtr 39
DX-60 Xmtr 59
DX-100 Xmtr 99
TX-1 Xmtr 125
SB-10 SSB Adaptor 75
HX-10 Xmtr 225
HA-10 Linear 175
HX-20 Xmtr 139
HA-20 6m Linear 95
HW-12 75m Xcvr 89
HW-32A 20m Xcvr 89
HW-100 Xcvr 225
SB-100 Xcvr 325
SB-101 Xcvr 349
SB-110A 6m Xcvr 295
SB-400 Xmtr 275
SB-200 Linear 219
HP-14 DC Supply 75
SB-630 Control 59
VF-1 VFO 19
HG-10 VFO 29
HW-10 6m Xcvr 139
VHF-1 Seneca 149
HP-10 DC Supply 24
HP-13 DC Supply 49
HP-23 w/SB-600 50
HP-23 AC Supply 39
MP-1 DC Supply 29
UT-1 AC Supply 25

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Adventurer $ 29
Challenger 54
Viking II 69
122 VFO 19
Ranger I 89
Valiant I 139
Valiant II 189
KW Amplifier/desk (store pick-up) 595
Audio Amplifier 49
Invader 200 249
Invader 2000 525
Thunderbolt Linear 275
275w Matchbox/SWR 69
6N2 VHF Xmtr 89
Mob.Xmtr(as-is) 25

KNIGHT
X-10 Calibrator $ 9
TR-106 6m Xcvr 99
V-107 2-6m VFO 19

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HE-45 Xcvr $ 59
HE-45B Xcvr 75
HA-410 10m Xcvr 99

LAKESHORE
Phasemaster II $ 89
P-400GG Linear 99

LINCOLN
6m Xcvr $ 34

LINEAR SYSTEMS
LSA-3 Mob. Linear $ 49
500-12 DC Supply 95
250 AC Supply 49
350-12 DC Supply 69
400 Century DC Sup 75

MOSLEY
CM-1 Receiver $ 99

NATIONAL
NC-109 Receiver $ 89
NC-183D Receiver 139
NC-300 Receiver 149
NC-303 Receiver 249
NC-300-C2 2m Conv. 29
VFO-62 VFO 34
HRO-50 Receiver 125
NCX-3 Xcvr 179
NCX-5 Xcvr 349
NCX-5 Mk II Xcvr 395
NCXA AC Supply 75
NCXD DC Supply 75
200 Xcvr 249
AC-200 AC Supply 59
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DB-23 Preselector $ 24
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SBE
SB-33 Xcvr $189
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SWAN
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400 Xcvr 225
410 VFO 75
410C VFO 89
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SW-117C AC Supply 75
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14-117 DC Supply 100
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XC-50N(30,5-34,5) $ 29

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SBT-3 Xcvr $189
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Balance	Monthly Payment
Up to $300.	$10
$300.01 to 340.	11
340.01 to 370.	12
370.01 to 400.	13
400.01 to 430.	14
430.01 to 460.	15
460.01 to 490.	16
490.01 to 520.	17
520.01 to 550.	18
550.01 to 580.	19
580.01 to 610.	20
610.01 to 640.	21
640.01 to 670.	22
670.01 to 700.	23
700.01 to 730.	24
730.01 to 760.	25
760.01 to 790.	26
790.01 to 850.	28
850.01 to 910.	30
910.01 to 970.	32

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Ship me the following New Equipment.

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I enclose $_____; I will pay balance (if any)

☐ COD (20% deposit) ☐ Revolving Charge Plan

Name _____

Address _____

City _____

State _____ Zip _____

☐ Send Reconditioned Equipment Bulletin

the VHF DXers enjoyed it. W2NXB reports that 160 meters still is pretty lively. WB2DRW says he'll see all you v.h.f. buffs from Slide Mountain with W2SZ/2 in the June V.H.F. Party. K2CON is on 75 meters from the new QTH using an HW-100 and a sneaky long wire. WA2QJU has completed all his job interviews and now he promises to go to work. WA2SDI, of the Suffolk County ARC, sends c.w. practice (14 to 22 w.p.m.) every Tue. and Thurs. from 2100 to 2200 EST on 3700 kc. Congratulations to WN2IEM, who passed the General Class exam. New officers of the Radio Club of Brooklyn are W2RSC, pres.; WA2JIP, 1st vice-pres.; W2PF, 2nd vice pres.; K2IRK, treas.; W2-MTD, secy. The New York Radio Club's March Auction turned out some 325 people and a tidy sum was donated by them to the Braille Technical Press for the Blind. Congratulations to WN2GMD, of the Larkfield ARC, who passed the General Class exam. W2OQI, Suffolk County Radio Officer, and the whole c.d. bunch have a monthly 2-meter transmitter hunt which is specifically tailored to c.d. activities. Listen, June 28 and 29 brings good old Field Day around once more. Are you and your guys ready? Recheck this year's rules in May *QST*. Take another look at the equipment situation, the operator situation and the food situation. Then, go get 'em. If you're planning to send a Field Day message to the SCM, you can send it to W2YKQ/2 at Oyster Bay. Traffic: WA2UWA 2570, WB2WFJ 467, K2UAT 202, K2UBG 202, WA2HBP 72, WB2DRW 63, WA2LJS 63, WB2YKU 56, WB2RQF 44, K2AAS 38, W2BCB 24, WB2AEK 22, W2EW 19, W2DBQ 15, W2EC 12, WB2QIL 12, W2PF 5, WB2MBU 4, WA2QJU 2.

NORTHERN NEW JERSEY—SCM, Louis J. Amoroso, W2ZZ—SEC: WA2ASM. RM: WB2RKK. PAMs: W2PEV, K2KDQ, WA2KZF, and WA2TBS.

ARPSC Section Net Schedules

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*Tfc.*	*Mgr.*
NJN	3695 kc.	7:00 P.M.	Dy.	31	394	300	WA2BLV
NJN	3695 kc.	10:00 P.M.	Dy	31	113	119	WA2BLV
NJSN	3740 kc.	8:00 P.M.	Dy	17	57	23	WB2RKK
NJEPTN	3929 kc.	6:00 P.M.	M-Sat.	31	656	264	W2PEV
NJPON	3929 kc.	6:00 P.M.	Sun.	5	121	42	WA2TEK
NJAN	50,300 kc.	8:00 P.M.	M-F	22	259	55	WA2KZF
PVETN	145,710 kc.	7:30 P.M.	dy	31	279	155	K2KDQ
ECTN	146,700 kc.	9:00 P.M.	Dy	28	125	119	WA2TBS

New appointments: W2CU as ORS; WB2FEH as ORS and WB2DDQ as OBS. Endorsements: WB2NSV as EC for Belleville. W2EWZ as ORS. WA2IGQ is now a member of the A-1 Operator Club. WN2DGO, WN2FRZ and WN2GHM all passed the General Class exam. WB2WID received his Advanced Class license. WA2DQE is building an electronic keyer. WB2YXY is putting up a tower. WA2CUE joined Air Force MARS. WN2HPM is now on 80 c.w. W2DLT is installing 2-meter f.m. in his car. WA2BLB and WA2ATO are chasing 10- and 15-meter DX. WN2FRZ is using an HW-16 and an Inverted Vee at his station. The new officers for the Monmouth Regional High School ARC are WA2BCT, pres.; WN2DHO, vice-pres. The W2FCL group provided the communications for the Bergen Explorer Safe Driving Road Rally. The ECTN Meeting and Dinner was a big success with over 40 attending. W2ZZ presented the ARRL Charter to the East Brunswick ARC. Your SCM is available for club meetings. A few weeks prior notice is OK. Good luck to all on Field Day. Your Field Day traffic can reach your SCM through any of the section nets listed above. Traffic: (Mar.) WB2RKK 503, WA2BAN 211, WA2TBS 181, WB2FEH 176, K2KDQ 153, WB2DDQ 151, WB2WID 142, WA2CWU 116, WB2NSV 115, WA2EUO 91, K2DEL 76, W2PEV 60, WA2ACP 59, WA2EUX 57, WA2CCF 45, WB2ZSH 44, WA2BAU 36, WN2FRZ 35, WB2BXK 29, WA2NJB 29, W2ZZ 29, WB2WNZ 28, WA2BCT 22, WB2CXR 21, WA2GLI 21, WB2YXY 20, W2BVE 12, WA2HSJ 12, K2MFX 11, W2EWZ 9, K2ZFI 9, K2PBP 8, W2JDH 7, WA2KZF 7, WA2TAF 7, WB2AMV 6, W2ABL 4, WB2DRJ 4, K2JSJ 4. (Feb.) WA2ASM 6.

MIDWEST DIVISION

IOWA—SCM, Wayne L. Johnson, KØMHX—SEC: KØLVB. PAM: WØPZO. RM: WØLGG. OBSs: WØLCX, WØJAQ, WØCXN, WØSEF, WAØMIT. WØEEG was hospitalized recently. Cecil was getting along fairly well at last report. New Extra Class licensees include WØMCK, WØMOW, WØNFL, KØUJJ. Recent Advanced Class are WAØWDY, WAØWJG, WAØSVC, KØYCO, WAØRXQ, WAØPTV, KØZAL, WØCGG, WØDFA, WAØFYB, WAØLPK. WØSEJ reports 53 amateur exams taken in March at Des Moines. The next examinations will be at Tech. High in Des Moines June 20, the first day of the National Convention. June 10 is the deadline for advanced registration for the National Convention. Address inquiries to Convention '69, Box 1051, Des Moines 50311. KØGEY worked two Minnesota stations on 432 Mc. Two-meter f.m. is fairly consistent between Waterloo and Des Moines and Marshalltown. WØDDW reports the Waterloo group expects its repeater station to be in operation by June 1. WØPKH and WØDDW visited the MARS installation in Washington, D.C., in late March. They mobiled practically constantly during their trip.

Net	*Freq.*	*Day*	*GMT*	*QNI*	*QTC*	*Mgr.*
Iowa 75	3970	M-Sat.	1730	1481	288	WØPZO
Iowa SSB	3970	M-Sat.	2300			WØYLS
Iowa 160	1815	Daily	0000	815	6	KØTDO
PON	3915	Tu.-Th.	2330	89	4	WAØDYV
PON-C.W.	3697	M-F	2330	31	2	WAØDYV
TLCN	3560	Daily	2330	229	68	KØAZJ

Traffic: (Mar.) WØLCX 500, WØUPX 404, WØKB 339, WØPZO 232, KØJGI 222, KØAZJ 167. WØLGG 55, WAØBSF 42, WAØDYV 32, KØTDO 28, KØEVC 25, WAØOTE 25, WAØJUT 19, WØJPJ 15, WAØMIT 13, KØJMA 12, KØTFT 12, KØRRW 11, WAØAIW 9, WAØPPW 7, WØBW 6, K1AII/Ø 4, WAØOTQ 2. (Feb.) WAØROM 13.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. PAM: KØJMF. RMs: KØMR, WAØJFV. V.H.F. PAMs: WAØCCW, WAØLSH. Wichita ARC will hold a QSP Party in connection with the Wichita Centennial, June 28 through July 7, 1969. All hams are invited to participate. Other events at the WARC are the Novice License class and participation in the city-wide Blood Drive. The club's publicity director is WAØPYP. Ex-WØYCT, now WØJJ, is operating WØJJ/mm aboard the *SS Del Mar* cruising between the Gulf of Mexico, Mexico, Barbados, Curacao, Brazil, Uruguay and Buenos Aires, Argentina. Bill will be operating s.s.b. on 20 and 15 and c.w. on the low end of 40, 20 and 15 meters. WØPB has returned from a 3-day seminar at Stanford Research Inst., Menlo Park, Calif. WØINH has received an A-1 Operator certificate. All clubs should take the opportunity to nominate its candidate for the Kansas Amateur of the Year award, to be presented to a deserving amateur Aug. 3 at Concordia. Nominations should be referred to Earl Hoover, KØLPE, Concordia, Kansas 66901. Am looking forward to another chance to continue serving you as SCM with your continued support. Net reports:

		Freq.	*CST*	*Mgr.*	*QNI*	*QTC*	*Sess.*
HBN	M-F	7280	1230	KØICB	624	70	20
KWN	M-Sat.	3920	1800	WAØLLC	730	59	30
Ks EC	Sun.	3920	1300	WAØCCW	52	4	5
QKS	Daily	3610	1900 2200	KØMRI	393	245	
KPON	M-Sat.	7255	1230	WØLXA	1095	927	31
	Sun.	3865	0830				
KSBN	M-Sat.	3920	1820	KØJMF	955	245	32
KPN	M-W-F	3920	0645	KØJMF	274	30	19
	Sun.	3920	0800				
Zone 1	75 mtr				54	0	5
13	75 mtr				54	0	4
Zone 1	2 mtr				71	5	4

W.A.R.C. CENTENNIAL QSO PARTY

June 28-July 7

The members of the Wichita Amateur Radio Club will celebrate the beginning of the Wichita City Centennial with a QSO Party, starting 0001 GMT June 28 and ending 0600 GMT July 7. DX stations must work 3 Wichita stations; stations outside Kansas must work 7 Kansas and 3 Wichita stations; Kansas stations must work 10 out-of-state and 5 Wichita stations; and Wichita stations must work 25 out-of-state stations in order to qualify for the Centennial Award.

Club members may be found on these frequencies: c.w. 14.08 7.08 3.650 and (Novice) 7.17 and 3.720 MHz; phone 14.340 7.28 and 3.920 MHz. The club station WØSOE will operate during the party and contacts with it will count as 3 Wichita contacts.

Send full log date (PLUS an s.a.s.e.) to the Wichita Amateur Radio Club, c/o John Bandy WAØUTT, 2810 Euclid, Wichita, Kansas 67217.

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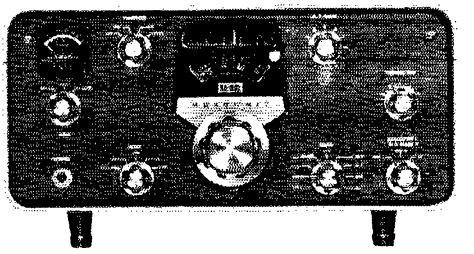
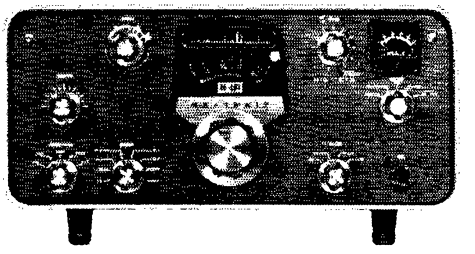


and transmitter . . .



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Kit SBA-300-4, 2-Meter Plug-In Converter, 2 lbs...**$19.95***
Kit SB-600, Communications Speaker, 5 lbs.....**$18.95***

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Traffic: (Mar.) WAØTHQ 287, WØINH 253, WØHI 197, WAØLLC 164, KØMRI 135, WAØNFP 133, KØJMF 118, WØQQQ 112, WØPSN 111, WAØLBB 108, KØPSD 68, WØCGZ 64, KØBXF 60, WAØOWH 45, KØLPE 41, WAØSWC 34, WAØSHG 30, WAØCTL 23, WØGCJ 20, WAØKDE 20, WØBGX 16, KØFIG 16, WAØJOG 14, KØGII 12, WAØSEV 11, KØGZP 9, WAØOZP 9, KØUVH 9, WØPB 4, WAØUTT 2. (Jan.) KØMRI 135.

MISSOURI—SCM, Robert J. Peavler, WØBV—Although my term ended Mar. 15, the election results did not appear until later, so WØBV asked me to do the column this month. KØONK renewed EC and PAM appointments. The following were active in the Feb. FMT: WØBL, WAØENI, WA5GNV, WAØFLL, WAØHTN, WØIBZ, KØORB, WØRWH, WAØUPA and KØZQD. WØRWH was top for Missouri with an average error of 8.6 p.p.m., while KØZQD was close behind with 9.9 p.p.m. New Gen. Class licensees reported by the PHD ARC are WAØSOK, WAØTAY and WAØUVB. New on MON and TEN is WAØRPV. WØBUL blew his TR-3 and is now using a new TR-4. WAØITU reports that the K.C. ARC has a 6-meter repeater with receiving antenna on the KCMO tower and transmitting antenna on the KCJC tower. The repeater is on 24 hours daily with input on 52.880 and ouput on 52.525. WAØITU has a new 2-meter quad. WØIBZ is chief engineer at WIL/WIL-F.M., St. Louis. WØEEE, UMRARC, has redecorated the operating room with panelling on 3 walls. It gets rough sometimes doing the monthly column when news is scarce, so please help your new SCM by sending in news and traffic reports before the 7th of each month. Again, my thanks and 73 to all of you—WØGS, WAØSNE, ex-WØTPK. Net reports for Mar.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNS*	*Tfc.*	*Mgr.*
MEN	3885	2330Z	M-W-F	12	154	14	WØBUL
MON	3585	0100Z	Daily	30	217	249	KØAEM
MNN	7063	1900Z	M-Sat.	25	104	25	WØOUD
SMN	3585	2200Z	Sun.	4	16	8	WØOUD
PHD	50.45	0130Z	Tue. (GMT)	5	146	10	WAØKUH

Do not forget that Daylight Saving time changes the GMT of each net but local time remains the same. Traffic: (Mar.) KØWBD 5370, KØONK 1445, WAØHTN 217, KØAEM 150, WØOUD 87, WØBUL 28, WØBVL 19, WØJKF 17, WAØKUH 10, WAØRPV 10, WAØIHV 8. (Feb.) KØREV 64.

NEBRASKA—SCM, V. A. Cashon, KØOAL—SEC: KØODF. Congrats on a job well done to WAØEMC and KØLFA for the prompt manner they relayed information on the finding of the downed aircraft near Anselmo. WAØGVJ plans to move to Cedar Rapids. Congrats to WØLVO on the N. J. Counties Award.

Net	*Freq.*	*GMT*	*Days*	*QNI*	*QTC*	*Mgr.*
NSN I	3982	0030	Daily	1169	93	WAØLOY
NEB I	3590	0100	Daily	70	33	WAØFGV
NSN II	3982	0130	Daily	1021	45	WAØLOY
Nebr 160	1995	0130	Daily	882	34	WAØCBJ
NEB II	3590	0400	Daily	51	18	WAØHWR
NMN	3982	1330	Daily	1230	43	WAØJUF
WNN	3590	1400	M-Sat.	573	29	WØNIK
AREC	3982	1430	Sun.	237	6	WØIRZ
NEN	3982	1830	Daily	1085	217	WAØGHZ
DEN	3982	2100	Daily	476	20	WØFBY

Traffic: WAØIBB 93, WAØJIH 76, WAØCBJ 70, WØBFV 56, KØOAL 55, KØJFN 53, WØHTA 52, KØJTW 48, WAØPGJ 36, KØKJP 35, WØBFN 32, WAØHWR 31, KØAIE 30, WAØEEI 30, WAØFGV 29, WØYFR 28, WAØOMY 27, WAØBOK 26, WAØGHZ 24, WAØTMG 24, WØFQB 22, WØGEQ 19, WAØFIQ 17, KØFJT 17, KØHNT 14, WAØOQX 14, WAØPCC 14, KØFRU 13, KØDGW 10, KØECH 10, WAØGVJ 9, WAØHFH 8, WØRJA 8, KØJPP 7, WØNIK 7, WAØPIF 7, WAØQEX 7, WAØRPB 7, WØVEA 7, WØHOP 6, WAØJTU/Ø 6, WAØNYM 6, WAØJUF 5, WAØJAV 4, WAØLOY 4, WØRAM 4, KØUDW 4, WAØIXD 3, WØLSI 3, KØODF 3, WAØIBL 2, WAØKGD 2, WAØMHW 2, WØPHA 2, WØSWG 2, WAØTET 2, WAØBIJ 1, WAØJKN 1, WØWZR 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John McNassor, W1GVT—SEC: W1PRT. RM: WA1HSN. PAM: W1YBH. V.H.F. PAM: K1SXF. Activity report for Mar.:

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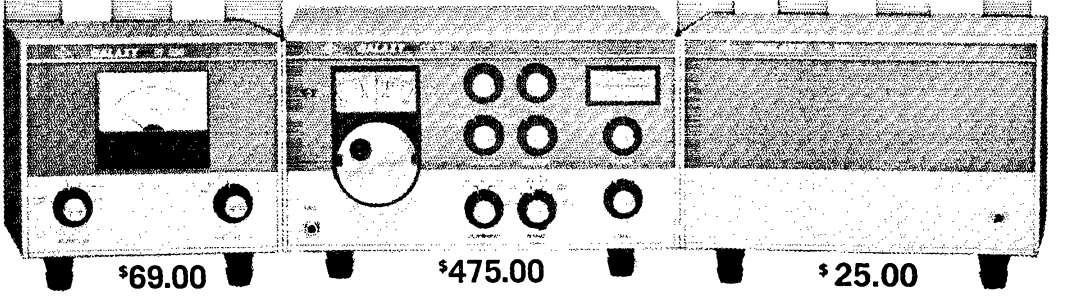

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CN	3640	Daily	1845	31	359	398
CPN	3880	M-S 1800 Sun.	1000	30	547	184
VHF 2	145.98	M-S	2200	21	124	33
VHF 6	50.6	M-S	2100	21	183	47

High QNI: CN—WA1HOL, WA1HSN, WA1HEW, WA1HLP. CPN—K1SXF 30, W1NBP 29, W1GVT and WA1IGF 28, WA1HEW 26, W1YBH 25, WA1HOL 24, WA1HLP 23, WA1FXS 22, WA1JYK 20, WA2HMX 19, W1DHP 16. SEC W1PRT would appreciate club promotion of the AREC program to assist Statewide EC. Be sure your area is included. N.E. Division Director W1QV is active again after returning from KH6-Land. Club bulletins are an asset to all clubs. Suggest your secy. request exchange copies of the *Nutmeg Net News* from WA1HSN and the *CARA Bulletin* from W1ADW. Affiliated clubs get the ARRL club bulletin—be sure it's circulated at meetings. Appointees get the CD bulletin. These are professional publications that would welcome your comments and pictures! Let's go! W1WHR is updating the Southington AREC. A N.E. Division Net Map is available from K1CCW. W1BDI is busy as secy. of the CWA. WA1JYU is building an SB-401. W1WEE is continuing c.w. classes and has made DXCC. Congratulations to: WA1GGN for Mar. BPL, his twelfth in a row; WA1GEK, WA1HSB and WA1IQJ for Advanced Class; WN1KYE, WN1KZJ and WN1JZC for Novice Class; WA1HOL for WAS. It's Field Day time again—a wonderful opportunity for club activity and publicity. Hope to work you and your club during the Field Day week end. Traffic: WA1HSN 305, WA1IGF 286, WA1GGN 269, WA1HEW 195, WA1HOL 184, W1WCG 136, WA1FNJ 85, K1XSF 85, W1AW 68, WA1GIX 65, WA1KMR 54, W1GVT 47, WA1JGA 47, W1NBP 42, K1TKS 41, W1ARR 31, WA1HLP 22, WA1FXS 19, W1YBH 16, W1CUH 15, W1BNB 13, WA1GWS 10, W1QV 10, W1BDI 9, WA1GFW 9, WN1JZC 9, WA1IQJ 8, K1YGS 8, W1CTI 7, WA1IEG 6, W8CWE/1 6, WA1IYW 5, WA1GEK 1.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received reports from K1DZG, W1RPF, WA1s DXI, JLX, our new Burlington EC. EMNN had 11 sessions, 33 QNIs, 8 traffic, reports RM K1PNB. Silent Keys: W1QT, W1HTG. New YLs: WN1KSX Needham, WN1KUQ Boston, WN1KVQ Saugus. WA1KPU is on 6. W1PO now is in Marshfield. WA1ION has DXCC. K1OJQ made WAS on 3.9 Mc. W1KXP is on the air with a new SB-101. W1NF has a new antenna for 2. W1AEC has a new TH6 beam. WA1FNM made an s.w.r. meter. W1FKJ and K1OIY joined W1AEC. WA3ITR/1 has his 37th state. W1ALB still is traveling. W1AKY's brother, SM5APF, and his XYL are coming over in July. Three new Novices in one family in Pepperell are WN1s KSO, KSP, KSQ, K1YKT, at Dartmouth, operates W1ET. WA6CQF sends a card from Japan. W1NUP is active in several nets. K1BUF was in the YL-OM C.W. Contest. W1SMO is in the hospital in Brockton and hopes to operate K1STK. K1SMT is in the Navy at Great Lakes, Ill. WA1DFL, on 6 during the aurora, worked W2s and W8s. See announcement of the Mass. Amateur Radio Week, June 15-21. The Wellesley c.d. group meets Sun. at 0900 on 145.56 Mc. W1IPZ is on 10. W1FJJ still is busy with school and the National Guard. Appointments endorsed: W1s HKG, IPZ, QFN, DBY, PST. WA1EVD, K1ZUP as ECs; K1BUF, W1BB, K1YKT, WA1ECY, W1FJJ as ORSs; W1AAR, W1BB, as OPSs; K1OKE as PAM for 6.; W1NF as OO. The T9 RC met at W1ISX's QTH. WA1IZF joined. W1IIB has an SB-101 kit. W1KGH is DXing on 15. The Framingham RC had an auction. WA1KOR worked K4QIF on 2. W1MX worked out well on 2 during the aurora. K4GGI, WA4TTG, WB2GLQ also are at W1MX. W1LQU now is on 6 RTTY. WN1KBE won first prize at the Chelmsford High Science Fair and WA1ECN won second place at the Lowell Tech. Inst. Fair. W1IIU spoke on and demonstrated his Autovolt Alphacoder which transmits code. WA1KRN, secy. of the East Coast Amateur Radio Service on 7255 Mc., spoke at the Middlesex ARC. The 6-Meter Crossband Net had 19 sessions, 57 QNIs, 3 traffic. WA1HNS is on 6. The Yankee RC had W1HKG speak on FAAs Control Center at Nashua, N.H. We now have the North Shore Repeater Assn. A few members are W1s GAN, AQP, RJF, RCA, MCX. W1OJM made the BPL. K1ESG in NCS of early 1RN Sat. The N.E. Emerg. Phone Net for three months had 13 sessions, 229 QNIs, 7 traffic. W1DFS spoke at the North Shore RC. WN1KTA has his Advanced Class license. K7JRE/1 has an antenna for 80-15. KH6IJ spoke at the Quannapowitt RA on DX. WA1ETC is in the Coast Guard for 4 years. W1BB's c.d. group still is hanging together. The EMN had 31 sessions, 229 QNIs, 210 traffic. WA1ECY still is in Germany.

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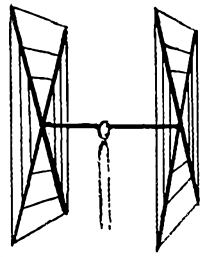

CUBICAL QUAD ANTENNAS—these two element beams have a full wavelength driven element and a reflector(the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators)—absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!

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: Aluminum 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
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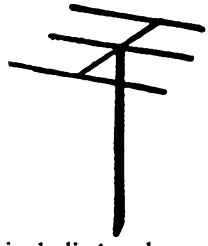
TEN METER CUBICAL QUAD	23.00

(all use single coax feedline)

BEAMS

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



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2 E1 20	$19	4 E1 10	$18
3 E1 20	25*	7 E1 10	32*
4 E1 20	32*	4 E1 6	18
2 E1 15	15	8 E1 6	28*
3 E1 15	19	12 E1 2	25*
4 E1 15	25*		
5 E1 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, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2-FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1-MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2-KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

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

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K1OKE reports the 6-Meter Cross Band Net has registered with the ARRL. The EM2N had 21 sessions, 148 QNIs, 103 traffic. F9LT, ex-PAØLU, visited WA1FHU. Those present at the 128 Contest Club meeting were F9LT, KH6IJ, K1s DIR, JGD, YZW, NOL, KTH, UHY, W1s WAI. FJJ, BPW, YRC, DXB, PYM, WA1s FHU, IRG. W1AEC has been endorsed as OPS and ORS. Traffic: (Mar.) W1OJM 743, WA1EYY 367, W1PEX 303, K1ESG 257, WA1FAD 203, W1EMG 115, WA1GXC 105, K1PRB 101, W1HKJ 68, W1EAE 64, W1BUF 63, W1NUP 48, W1CTR 43, WA1FHU 41, WA1IJL 26, W1ATX 22, WA1DPX 21, WA1IFE 21, W1AOG 16, WA1HHK 11, WN1KTA 11, WA1DEC 10, K1OKE 6, K2GLQ/1 6, W1CZB 5, K1BUF 4, K1LCQ 4, W1ALP 2, K7JRE/2. WA1JKZ 1. (Feb.) WA1FAD 379, WA1GXC 50, W1DKD 10. (Jan.) WA1GXC 151, W1HKJ 67.

NEW HAMPSHIRE—SCM, Donald Morgan, K1QES —SEC: K1RSC. PAM: K1APQ. RM: K1BCS. GSPN reports 861 check-ins and 126 traffic. We are pleased to welcome the following: WN1LAF Nashua; WN1KTD Rye: WN1KUX, WA1KTL, WA1KTK, Portsmouth; WN1KTX Farmington; WA1KTM Milton; WN1KVO Manchester; WN1KVP Meriden. Endorsements: K1SHC as EC; W1JB, W1SWX, K1NBN as OOs; W1JB, W1BYS, W1RCC as OPSs; W1BXM, W1JY, W1QKA as OVSs. W1RCC is engineering the construction of 2-meter walkie-talkies at the Nashua Mike and Key Club, to be used for emergency work. He also has a new 3/1000Z homebrew final. K1APQ, K1BCS and K1QES met with Governor Walter Peterson for the signing of a proclamation for Radio Amateur Week in N.H. to coincide with activities on June 22-28, 1969. Gov. Peterson was presented with a certificate by K1APQ, the PAM, making him an honorary member of the GSPN. K1HDO is working 100 countries on 10 meters before going s.s.b. Code classes are in progress at the Nashua Mike and Key Club. Will other active clubs send a resume to me? Traffic: K1BCS 249, K1PQV 74, K1RSC 16, W1MHX 13, K1QES 11, W1SWX 5, K1IIK 2.

RHODE ISLAND—SCM, John E. Johnson, K1AAV —SEC: K1LII. RM: W1BTV. PAM: W1TXL. V.H.F. PAM: K1TPK. RISPN report: 31 sessions, 491 QNI, 223 traffic. The Providence RA, W1OP, reports that K1LPL is now at Lackland AFB in San Antonio, Tex., in Officer Training School. On Field Day he will be active on K2EIU/5. WA1EJQ passed the Extra Class exam and is active from W1YK at Worcester Poly-technical Institute. K1BKM passed the Advanced Class exam, bringing to 13 the active club members with Advanced or Extra Class tickets. WN1DOG has a new call, WN1LAD. W1EYH and W1QLD are on 2-meter f.m. W1EYH demonstrated the f.m. capability by triggering the Falmouth repeater, running 20 watts on a whip. W1OP invites interest in the 2-meter f.m. repeater activity and would like all hams interested to contact them. The W1AQ Club of Rumford continues with its renovation of the club. New wiring was completed by W1WAC and new windows were added by WA1IYF. K1AGA and K1AMG worked on Field Day plans. WA1CVF visited the club while on school vacation. W1YKQ became a member of the Transcontinental Corps. Traffic: W1TXL 320, W1BTV 225, W1YKQ 209, K1TPK 80, K1VYC 58, K1QFD 44, WB2HPW/1 27, WA1BLC 9.

VERMONT—SCM, E. Reginald Murray, K1MPN—

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Net Mgr.*
Gr. Mt.	3855	2130Z	M-S	26	454	W1VMC
Vt. Fone	3855	1330Z	Sun.	113	0	WA1EDI
VTNH	3685	2230Z	M-F			K1UZG
VTCD	3990½	1400Z	Sun.	58	17	W1AD
Carrier	3945	1300Z	M-F	196	11	W1KKD
VTSB	3909	2130Z	M-S	688	91	KL7DVP/1
		1230Z	Sun.			

Note new frequency (3945) for the Carrier Net May 1. All nets are on EDT locally. K1MXQ has a new HW-100. We welcome new Novices WN1KTH (Essex Jct.), WN1KTR (Enosburg Falls), WN1KUW (Warren), WN1KWP (Springfield), WN1KXC (Waterbury) and WN1KXG (S. Burlington). We regret to advise that K1EQI, Irving Reynolds, Rutland, is a Silent Key. K1BQB is back from hospital and handling more traffic every day. Traffic: K1BQB 57, W1FRT 57, WA1GKS 46, K1MPN 31, WN1KTH 26, W1MRW 10.

WESTERN MASSACHUSETTS—SCM, Norman P. Forest, W1STR—RM W1DVW reports WMN attendance was up (31 sessions) in Mar. over Jan. A real help in the Worcester area was W1IHI, with phone outlets with other nets. WA1LXO also was active. IRN representation

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- ☐ Enclosed is Money Order
- ☐ Check
- ☐ Charge it

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from WMN was 100% during Mar. We are happy to have K1IJV back into NCS and 1RN rep., replaing W1EOB who has gone to Japan on assignment with three years to go. W1NY and K1AEC also are welcome back after a lengthy absence. WN1KLQ is a new Southwick call. WA1BXQ did well during the DX Contest and came up with rare calls like ZD8Z, GC3, EP2 and HP1. WA1ITL reports a new club being formed at Smith Vocational School in Northampton. K1EIC and K1EIR visited WA1ITL from the U. of Mass. recently. W1JQ passed along their best regards during a recent S.S.B. QSO with yours truly. WA1GBB will study EE at Northeastern. W1LS, ex-W1BCI, is heading up Field Day for HCRAI to be held at Middlefield Fairgrounds. All are welcome to help. Operators are needed. WA1FKE, K1YQQ and WA1IUI are instructing about twenty prospective amateurs at the Y Amateur Radio and Electronic Club, recently formed as a joint project of the VARC and HCRAI at the new YMCA in Springfield. K1PMK reports a successful first year for the QSL Bureau. Traffic: W1ZPB 168, W1STR 83, W1IHI 69, W1DVW 64, W1BVR 57, K1WZY 47, W1KK 40, W1IC 39, K1IJV 2, W1UPH 6, WA1DNB 1.

NORTHWESTERN DIVISION

ALASKA—SCM, Albert F. Weber, KL7AEQ—Via *No Name*, the paper of the Anchorage Club, it is reported that KL7FSF is promoting a moonbounce and satellite program for the v.h.f. bunch. This is a right fine paper, with editor KL7CKV at the console. KL7BJD and KL7FLS report that the Alaska Lassies "convention" in Fairbanks was a resounding success. KL7FNW is back in Anchorage and on the air. The Fairbanks net frequency has been changed to 3905 kc. and the Lassies Net also is occupying that spot. KL7FLS reports that she is looking for Novice band rocks which seem to be in short supply periodically. KL7GCU and KL7F1D are being heard from the North Slope area. The Anchorage AREC Net operates on 28.6 Mc. at 8:00 P.M. AST every Wed. Won't someone send us the club papers from Southeastern Alaska. Traffic: KL7CAH 159, KL7EKZ 5.

IDAHO—SCM, Donald A. Crisp, W7ZNN—SEC: K7THX. The FARM Net convenes week days on 3935 kc. at 0200 GMT; the Idaho C.D. Net week days on 3991 kc. at 1515 GMT. W7DQU is organizing an EC in the Idaho Falls area. WN7MCX, WN7JEM and WN7LJI are new hams in the Lewiston area. WA7DNK is recovering from a leg operation. WA7EWV is working 160 meters with a surplus rig. WA7FFZ has installed a two-element 20-meter beam and WA7ETO reports excellent results using a new 3-band quad. OO W7FIS reports a lot of poor c.w. signals. K7KBX earned a BPL award. WA7FFZ upgraded his license to Advanced Class. FARM Net report: 745 check-ins, 21 sessions, 382 traffic handled. Traffic: K7KBX 642, WA7BDD 52, W7GHT 49, W7ZNN 37, K7CSL 6, W7IY 2.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. PAMs: W7ROE, WA7DMA.

Section Nets	*Freq.*	*Time*	*Day*	*QNI*	*QTC*
Montana Traffic	3910 kc.	0100	M-F	660	105
Montana PON	3950 kc.	0245	D	580	283
Montana Section	3950 kc.	1700	Sun.	44	2

Appointment: WA7JWZ as OPS. It is with great regret that we report W7IHA as a Silent Key. The Glacier Hamfest will be held July 19 and 20. Check with K7DCH, Kalispell, for registration details. W7JFR has moved to San Jose with the IRS. A dinner was held at the QTH of W7BC in Jack's honor. W7ZEM still is in the hospital at Butte. WA7FLG has been in school with the Navy. W7CBY was active during the recent RTTY Contest. W7GKF, ex-WB6NDG, is a new call in the Missoula area. Bill is a professor in the Chemistry Dept. at the U. of M. K7ABV has a new T4X-B and has been very active working DX. If you are interested in an appointment in this section please write your SCM. Traffic: (Mar.) K7EGJ 35, WA7HDD 32. (Feb.) W7LBK 10.

OREGON—SCM, Dale T. Justice, K7WWR/WA7KTV —RM: W7ZFH. PAM: K7RQZ. Section net reports: W7ZFH reports for the OSN, sessions 29, check-ins 144, high 10, traffic 60, high 13. K7YQM reports for the AREC Net, sessions 29, check-ins 730, traffic 35, contacts 103, maximum number of counties 18. K7IFG reports for the BSN, sessions 62, check-ins 1193, traffic 205, contacts 305. The Beaver State Net Noon Session now meets on 7280 kc. for the summer months. WA7DCC is now manager of the Portland 2-Meter AREC Net. WA7CPI sends a fine letter from his

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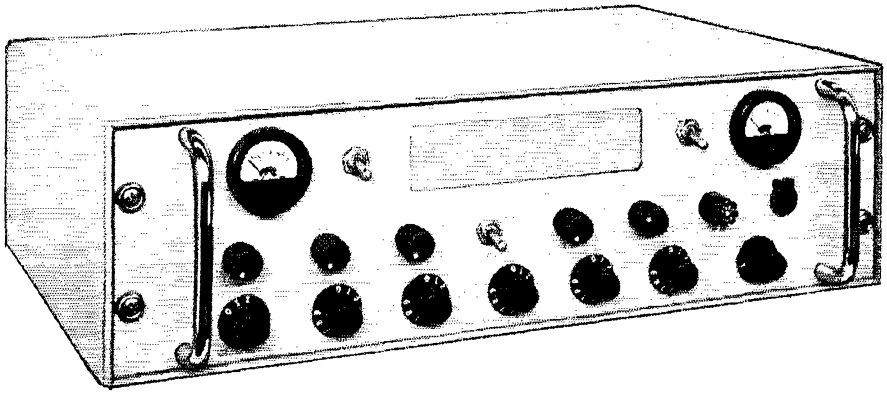

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station in Viet Nam and says he hopes to be on the S.E. Asia end of some telephone relaying very soon. WA7JMD is moving his shack into the house, and has a new phone patch. WA7JQK and WA7JMY have their Conditional Class licenses. W7DEM has a new Galaxy rig. WA7GCS is building a 6-meter kw. rig. WA7GFP worked Hawaii on 6 meters. WA7JAV has his Advanced Class ticket. WA7FTN handled 882 phone patches to S.E. Asia during the month. New appointment: W7HLF as OBS. Traffic: K7RQZ 702, WA7EQE 118, WA7IFS 102, K7IFG 92, W7ZFH 65, W7PJO 54, WA7KIU 42, K7OUF 40, W7BNS 36, WA7HKV 28, WA7HJV 25, WA7ICD 25, K7YQM 23, WA7GMP 22, K7KPT 21, K7GGQ 18, K7WWR 17, W7ZB 16, WA7JAU 14, W7MLJ 14, WA7AHW 12, WA7IXX 12, WA7BOO 10, K7RFO 10, WA7GMI 8, W7ZUL 8, W7CPK 6, W7DEM 5, WA7JAW 4, WA7JMD 4, K7TWD 4.

WASHINGTON—SCM, William R. Watson, W7BQ—SEC: W7UWT. Asst. SEC: K7WTG. RM: K7CTP.

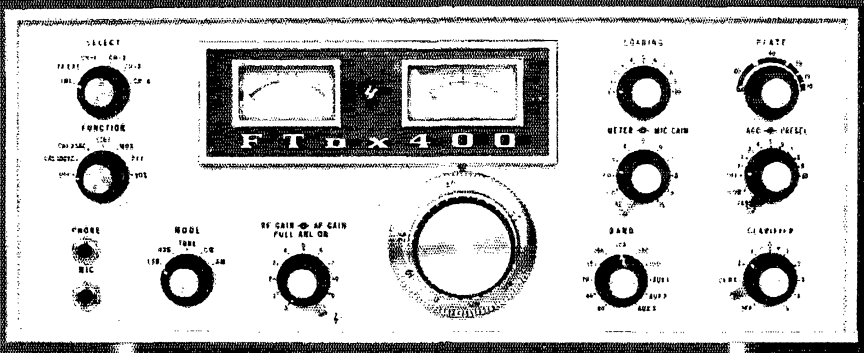
AREC	3930 kc.	Sun.	1800Z	QNI 58	QTC 12	Sess. 5
WSN	3590 kc.	Daily	0245Z	QNI 311	QTC 155	Sess. 31
NTN	3970 kc.	Daily	1930Z	QNI 913	QTC 763	Sess. 31
WARTS	3970 kc.	Daily	0200Z	QNI 1454	QTC 175	Sess. 30
NSN	3700 kc.	Daily	0300Z	QNI 331	QTC 90	Sess. 31

By the time this column is printed. Amateur License Plates should be 5 instead of 30. A good report was received from the U. of W. Radio Club with v.h.f. propagation and using W1AW 20-meter code practice sessions. Advisor W7OI received his Amateur Extra and the new 2-letter call. WA7FVD is the club secy. OVS K7MWC reports 50 Mc. opening to KH6-Land following the Mar. Aurora and 50 Mc. RTTY now is in operation. The v.h.f. sports group will be on hand at the Kent Raceways in Apr. with 2-meter gear. W7BQ attended meetings of the Clark County ARC and Cascade ARC with slides and tape of the AREC program under the ARRL. The BEARS announce the 1969 QSO Party will be held the week end of Sept. 6-7. PSCARC again will offer certificates during the week of Sept. 1-7, scheduled to be Amateur Radio Week in Washington. The second Annual State Hamfest will be held in Tacoma in July. The Apple City Radio Club is planning a Ham Jamboree in June open to the public. The Rodeo City Radio Club has acquired an HW-12 for use in search and rescue work in conjunction with the local Boy Scout Explorer Post. K7YGX is the new pres. W7GYH has a new QTH in Richland. Walla Walla reports its Annual Hamfest will be held Sept. 23. W7BTB returned from a vacation trip and will resume skeds with KL7-Land. New appointment: K7GZI as OPS. WSN certificates went to W7USO and WA7ACQ. ARRL's Amateur Radio Public Service Corps (ARPSC) includes the AREC, NTS and RACES. All amateurs are invited to participate in these programs. Traffic: W7BA 3024, WA7HKR 1236, W7KZ 261, W7PI 230, W7DZX 167, WA7DZL 122, K7CTP 112, W7BQ 104, W7JEY 85, W7JWJ 79, W7AXT 74, K7KPA 67, K7JXO 60, W7GVC 57, W7ZIW 50, W7GYF 49, W7BTB 42, W7BUN 42, K7SNG 41, WA7ACQ 40, W7IEU 35, WA7JEB 35, W7APS 29, K7TCY 29, WA7CYY 26, W7RXH 26, K7OXL 25, K7SUX 25, WA7JEG 15, WA7BDB 13, W7AIB 12, W7ZHZ 11, K7YFJ 10, K7EFB 9, W7UU 9, K7MGA 8, W7OWT 8, W7OEB 6, W7FQE 5, K7GZI 5.

PACIFIC DIVISION

EAST BAY—Asst. SCM, Paul J. Parker, WB6DHH—K6DMI, in Pinole, says activity reports seem to be coming in slowly these days. New hams in the area are WA6RJP, WN6QHE, WN6QHR, WA6RMS, WN6-RIN, WA6REJ, WA6RJP, WA6RLI, WA6ACU, WN6-ARK, WN6AFE, WB6BDF, WN6ASO, WN6ASP, WN6-AUA, WN6AQL, WA6AQE, WN6AMT. Keep an ear peeled for these new people and if you hear them give them a shout. K6DMI is trying hard for his Extra Class license. WA6DIL participates in 5 nets and says that there is a new net on 7120 kc. at 2000Z called the Pacific Coast Net. This is a new traffic net and everyone interested should look into it. W6IPW says 20 still is good during the day for traffic. K6OSO got a new job at W1AW. Look for Bill on c.w. from Headquarters! K6IRB is putting up a new tower and beam. K6JZR finally is settled in the new house. W6LGW was back in the hospital for a quick stay. W6CX finally is situated on its new site, and works most of northern Calif. with 200 watts d.c. input. Highlight of Mar. was the annual Director's Convention at the Edgewater Inn in Oakland. Many controversial topics were discussed and I am under the impression that this section is in very good hands with the able officers the League has. Let's get behind the League and give it all the support we can. Remember

TOP OF THE YAESU LINE



THE FT DX 400 TRANSCEIVER

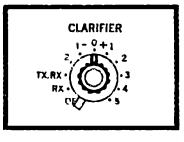
Conservatively rated at 500 watts PEP on all bands 80 through 10 the FT dx 400 combines high power with the hottest receiving section of any transceiver available today. In a few short months the Yaesu FT dx 400 has become the pace setter in the amateur field.

FEATURES: Built-in power supply • Built-in VOX • Built-in dual calibrators (25 and 100 KHz) • Built-in Clarifier (off-set tuning) • All crystals furnished 80 through the complete 10 meter band • Provision for 4 crystal-controlled channels within the amateur bands • Provision for 3 additional receive bands • Break-in CW with sidetone • Automatic dual acting noise limiter • and a sharp 2.3 KHz Crystal lattice filter with an optimum SSB shape factor of 1.66 to 1.

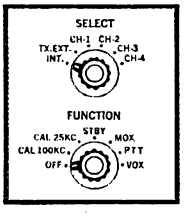
Design features include double conversion system for both transmit and receive functions resulting in, drift free operation, high sensitivity and image rejection • Switch selected metering • The FT dx 400 utilizes 18 tubes and 42 silicon semi-conductors in hybrid circuits designed to optimize the natural advantages of both tubes and transistors • Planetary gear tuning dial cover 500 KHz in 1 KHz increments • Glass-epoxy circuit boards • Final amplifier uses the popular 6KD6 tubes.

This imported desk top transceiver is beautifully styled with non-specular chrome front panel, back lighted dials, and heavy steel cabinet finished in functional blue-gray. The low cost, matching SP-400 Speaker is all that is needed to complete that professional station look.

SPECIFICATIONS: **Maximum input:** 500 W PEP SSB, 440 W CW, 125 W AM. **Sensitivity:** 0.5 uv, S/N 20 db. **Selectivity:** 2.3 KHz (6 db down), 3.7 KHz (55 db down). **Carrier suppression:** more than 40 db down. **Sideband suppression:** more than 50 db down at 1 KHz. **Frequency range:** 3.5 to 4, 7 to 7.5, 14 to 14.5, 21 to 21.5, 28 to 30 (megahertz). **Frequency stability:** Less than 100 Hz drift in any 30 minute period after warm up.

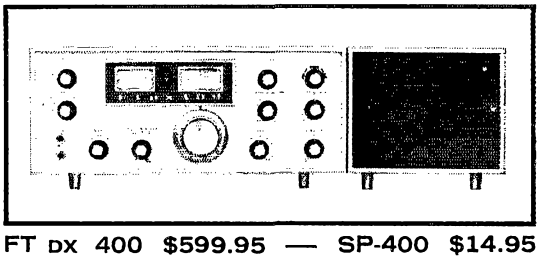


CLARIFIER CONTROL — Does the work of an external VFO — allows operator to vary receive frequency 10KHZ from transmit frequency, or may be used as an extra VFO combining transmit and receive functions.



SELECT CONTROL — Offers option of internal or outboard VFO and crystal positions for convenient preset channel operation.

FUNCTION CONTROL—Selects crystal calibration marker frequency and desired transmit mode of operation.



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that the ARRL is by hams for hams, not against them. Traffic: W6IPW 401, WA6DIL 218, WB6DHH 2.

HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: KH6GHZ. PAM: W4UAF/KH6. RM: KH6AD. V.H.F. PAM: KH6EEM. QSL Mgr.: KH6DQ. RACES nets: (40, 10, 6 and 2 meters). Coordinate with KH6AIN.

Nets	*Freq.(Mc.)*	*Time(GMT)*	*Days*
Friendly Net	7.290	2030Z	M-F
Pacific Interisland Net	14.320	0830Z	M-W-F
Boy Scout Ham Radio Net	21.360	1800Z	Sat.
S.E. Asia Net	14.320	1200Z	All
Marianas Islands Net	3.850	0830Z	2, 3, 4 Tue.
Gecko Net (Marianas Is.)	14.240	0930Z	Tue. & Thurs.
Pacific DX Net	14.240	0700Z	Fri.
Marine Corps Net	21.380	1900Z	All
Confusion Net (phone patches)	21.400	0200Z	All

Plan to attend the Pacific Division Convention June 13, 14 and 15 at the El Dorado Hotel in Sacramento, Calif. Field Day is upcoming June 28-29. K6ZXS was recently on Oahu and brought his SBE-34 for working the CQ WPX/SSB Contest. The annual Pacific Division meeting was held at the Edgwater Hotel in Oakland Mar. 29. The minutes of this meeting are available from your SCM. Drop him a line and an SASE. KH6FRO has returned from a tour in XV5-Land. Welcome aboard to our new OO, WØQBW/KH6GQW. KH6BB has a new Drake TR-4/R4B combo to a Henry 2K-3. KH6AHD is now KH6AG. KH6DQW recently was cited for his contributions toward passing many MARS patches putting Vietnam servicemen in touch with their families. Ex-KH6BFV is now 5Z4LO; ex-KH6CRV, now 9Y4CRV; ex-KH6CJY now HC2WN. KH6GKI recently returned from an 8-week business trip to XV5-Land. KL7YK now is portable near Wahiawa. VKØWR, on Heard Is., stirred most of the local DXers. W9BFI/KH6 is now KH6GRQ. W4ID writes he's still on the lookout for old copies of the former *Ham-Aloha* and other club papers that were produced in the "islands." Anyone with old copies is asked to please forward them to W4ID or your SCM. Traffic: (Mar.) KH6GHZ 788, KH6BZF 9, W4UAF/KH6 1. (Feb.) KH6SP 153, W4UAF/KH6 4.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. HH2PR NARA pres., has the Sierra Hamfest committees working hard for a bigger and better picnic hamfest at Bowers Mansion Aug. 30. Bring the children for a day of cool fun in the swimming pool and fenced playground area. QSP QSL to NARA, Box 2534, Reno, Nv. for additional details. Your SEC, WA7BEU, and SCM, W7PBV, attended the Pacific Division Director's Meeting and a meeting with Sixth U.S. Army MARS personnel. The SNARS reports increased 2-meter f.m. activity and 26 have applied for their FCC license examination papers. For additional details contact K7UGT, P.O. Box 7808, Reno, Nv. Plans still are being worked out for the Nevada QSO Party. The Las Vegas-Boulder City area has several active stations on 2-meter RTTY, some with an eye on 6-meter RTTY. The QCWA chartered in Southern Nevada with W7CSB, chairman, and W7CMV, secy. W7AKE is now W7OK and W7DDB is now W7AKE.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—The Mar. 29 Director's meeting at Oakland had as representatives from Sacramento Valley the following: K6TWE, K6FO, WA6CXB, W6TEE, W6FRE, W6IDR, W6GDO, W6BLW and WA6JDT, who represented the RAMS, NHRC, Sacramento Army Depot RC, Sacramento ARC, Oroville ARS and Golden Empire ARS. If you haven't sent in your reservation for the Sacramento Convention, do it now before it is too late. To all prospective hams in the Placerville area, the El Dorado Co. ARC is holding classes at the Pinewood School in Pollock Pines Wed. 7-9 P.M. WN6HTT has been appointed secretary of the Oroville ARS to fill the vacancy created by W6SLS, who became a Silent Key. The RAMS claim a membership of about 65 paid-up members, which is probably the largest club in the section. GEARS being the second largest. Former SVer W6CIS has sufficiently recovered from a second heart attack and has taken to the road again. WB6WJO will be operating WA6HZS in the Sierra June through Aug. K6RPN of Grass Valley hopes the snow, high wind and broken antenna season is over since he is getting too old to climb pine trees. Your SCM thanks the following clubs for sending their club bulletins: GEARS, OARS, Nevada Co. ARS, El Dorado Co. ARC, Sacramento ARC, RAMS and NHRC. Traffic: K6YZU 34, W6LNZ 24, WB6WJO 21, WB6ZJV 15, K6RPN 9, WB6MAE 3, W6VUZ 3.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD

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—SEC: W6WLV, K6JFY returned to the bands after a long lay-off. WA6JUV hoisted a TH6DX beam to improve the signal reports. W6EAJ is working on an all-solid-state 160 transmitter and got the output up to 20 watts before things blew. WA6BYZ made the BPL again. Joe is rather consistent in making the list, with a total of 18 BPL certificates. Seen at the Pacific Division meeting were W6GGC, W6URA, WA6DJI, W6PTS, W6WLV, K6ZWB and WA6AUD. K6NF invites anyone interested in Morse or Pomsat to listen on 7110 kc. at 8:00 A.M or 7044 kc. at 7:00 P.M. for a bit of Morse and on 7060 kc. at 9.00 A.M. and 7044 kc. at 4:00 P.M. for some Pomsat, all times local times. W6JWF reports that the traffic handled during the Jan. SET at Western Red Cross Hq. amounted to 55 outgoing messages with 57 pieces of incoming traffic handled. Several clubs are well along with Field Day preparations with the San Francisco, Marin, Tamalpais, Sonoma, Valley of the Moon, Petaluma and the Humboldt County Radio Clubs indicating they will be in the field. Traffic: (Mar.) WA6BYZ 378, W6WLV 285, W6KVQ 226, W6BWV 28, WA6AUD 19, K6TZN 8, K6TWJ 6. (Jan.) W6CXO 169.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—It is with deep regret that I have to report W6AXI among the Silent Keys. I remember hearing W6AXI on the air as long as I have been a ham. He will be missed. W6ZNX is back on the air with an S/Line. The Delta Amateur Radio Club is conducting code and theory classes. Anyone interested should contact WB6SPT. WB6OPQ has a twenty-element in operation. W6ASV is in charge of FD for the Tulare County Amateur Radio Club. WA6MWX is heard on 75-meter s.s.b. WA6IVM is on 75-meter s.s.b. W6NKZ is vacationing in Europe. WA6WXP is the TVI chairman. WB6TFU is the radio interference chairman. WB6ETQ still is in Mexico using XEØETQ. WB6ZBX is thinking of high power, and beams. WB6UYG is working much DX on 6 meters. W6DPD also is working DX on 6. I know that summer is here, but that is no excuse for not sending a small card at the end of the month—Form 1, that is. Traffic: (Mar.) W6IPC 203, WA6SCE 139, WB6ZBX 85. (Feb.) W6IPC 168.

SANTA CLARA VALLEY—SCM, Albert F. Gaetano, W6VZT—SEC: W6VZE. RM: WA6LFA. W6YBV is working on 2-meter gear. WB6ZSE was the only YL at the Director's meeting in Mar. W6DEF has been very active handling traffic on the 2-meter nets. W6MMG has been working DX on 10 meters. K6DYX has been quite active with slow-scan TV and is forming a net for same. W6ZRJ presented the *QST* cover plaque to W6FFC at the SCCARA meeting. W6MVL has worked 81 countries mobile on 10 and 15 meters. The West Valley Amateur Radio Assn. is having very good luck with its auctions, which are held periodically. This looks like a good way for clubs to make money. The Foothills Amateur Radio Society had a field trip to the U.S. Coast Guard Station NMC and was shown some real operating. W6BPT has a new electronic keyer and has been practicing with it. WA6LFA has been elected manager of NCN, taking the place of WB6HVA who, after three years of doing a good job, has resigned. Stan deserves a well-earned rest, as being a traffic net manager takes a lot of hard work and time. W6RSY has been very busy taking MARS traffic and putting it into the RN6 Net for distribution to the other NTS nets. W6CAA has put up a new tower and beam for 20-meter DX. The Coastside Amateur Radio Club has become affiliated with the ARRL. Welcome. Traffic: W6RSY 676, W6YBV 276, WA6LFA 140, W6DEF 132, WB6ZSE 40, W6ZRJ 20, W6AUC 18.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: James O. Pullman, W4VTR. SEC: WA4LWE. RM: W4IRE. PAM: W4AJT. W.H.F. PAM: W4HJZ. With this, the seventy-second and final report of your outgoing SCM, I wish to thank each and every amateur in the section for the assistance and cooperation in making the job as easy and pleasant as it has been. I especially want to thank the Asst. SCMs, SECs, RMs, PAMs, net secretaries, station appointees and all net members (past and present), who gave so unstintingly of their time and talents in the interests of the communications organization in this section. I am sure that your new SCM, Calvin Dempsey, WA4UQC, will receive the cooperation and assistance that you gave me, and the North Carolina communications organization will go forward to bigger and better nets under his capable leadership.

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
THEN	3923 kc.	0030Z	Daily	115	W4ZZC
NCN (E)	3573 kc.	0000Z	Daily	63	W4IRE
NCN (L)	3573 kc.	0300Z	Daily	38	WA4CFN

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Traffic: W4EVN 204, W4IRE 185, WA4VNV 48, K4VBG 42, W4FDV 35, WA4GMC 30, WA4AKX 24, WA4UQC 20, WB4GHK 19, W4ZZC 14, K4TTN 13, W4HUL 10, W4VTR 9, WB4BZE 7, K4ZKQ 4, WA4KWC 3, WA4RVI 3.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: WA4ECJ. PAM: WB4BZA. RM: K6QPH/4.

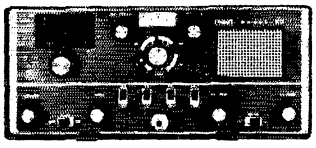
SCPN	3930 kc.	0830 and 1530 EST Sun., 12 Noon Daily
SCN	3795 kc.	2345Z and 0300Z Daily Mar. Traffic 43
SCSSBN	3915 kc.	0001Z Daily Mar. Traffic 74

WN4MMS is a new Novice in Sumter, thanks to the help of WB4BZA. WN4LAJ and WN4MJB are new licensees in Anderson. WB4EOC has a new 5-kw. generator going and WA4ZBB is off on a month of Navy duty. K6QPH/4 will be back in K6-Land by the time this is published. Our thanks to Alan for an FB job as RM while in S.C.! W4JA and his XYL are both recovering from hospitalization. K4WJR has returned from Army duty and is with DuPont in Camden. Another SCN stalwart, WA4AKN, is QRL getting his PhD thesis finished and promises to return to the air after he does. Last minute reminder: Director W4KFC will be in Columbia for the Meeting and Hamfest on May 31/June 1. Try to be there. Traffic: K6QPH/4 76, W4PED 39, W4FVV 9, W4JA 6, W4BJE 5.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB. RMs: K4MLC, WA4EUL. PAM: W4OKN. W4SQQ made the BPL again, the hard way. WB4FDT is now a member of the PVRC. Southeastern Virginia Wireless Association is a new club presently composed of, but not restricted to, the younger generation. The members hope to become ARRL affiliated and obtain a club call. Contact WB4GMC for details. WA4YVQ offers a special QSL card if you worked him aboard ship during the recovery of *Apollo 9*. W4EXI/4 operated mobile from 13 counties during the Virginia QSO Party. Traffic-hound W4SQQ earned a 4RN certificate. K4TSJ is QSL Mgr. for OD5LX. The 1969 Roanoke Division Convention will be held in Oct. at Huntington, West Virginia. Firm up your plans to participate in Field Day with your club or group. Operators still are needed on all nets. Experience is not required. Listen on 3680, 3860, 3935 nightly. Traffic: (Mar.) W4SQQ 529, K4KNP 211, W4NLC 208, WB4CVY 193, W4UQ 183, K4KDJ 107, WB4FDT 95, WA4EUL 90, W4RHA 90, W4ZM 88, K4JM 77, K4FSS 76, K4TSJ 75, WB4DRB 71, WB4DOY 55, K4MLC 44, W4OKN 38, WA4YBV 34, W4KX 30, W4YZC 27, WB4GDO 26, WB4JEZ 26, K4VCY 25, WA4JJF 23, W4HE 15, W4TE 15, WA4PBG 14, W4SHJ 14, W4THV 14, K4GR 13, W4IA 9, W4MK 8, W4OP 8, WA4WQG 8, W4YZT 8, WA4NJG 7, WB4GTS 6, W4KFC 6, K4LMB 5, K4PQL 5, W4ZAU 4, WA4FIJ 3, W4ZJG 3, K6ZQB/4 3, W4GEQ 2, WA4YRH 2. (Feb.) WB4GTS 48, WA4HQW 14.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8EV. RMs: K8MYU, K8TPF. PAMs: K8CHW, W81YD. Net mgrs.: C.W.—W8SQO. Phone—WA8YOF. WVN C.W. meets at 0001Z, phone on 3890, at 2330Z. WA8YHH reports the following new Novices in the Elkins, Randolph County area: WN8DCL, WN8DCM, WN8DCN, WA8DCS, WN8DCT, WN8DCU, WN8DCV. WA8WCK presented a program on amateur radio for the Wesleyan College Women's Club. Buckhannon ARC's Novice class is completed with 15 Novices-to-be. The club will operate 5 talk-in stations at the State Convention on 30-6-2. WA8NDY is interested in 6- and 2-meter nets, state-wide. WB8BBG reports 242 contacts in 59 sections in the West Va. QSO Party. W8DUV attended the LO meeting in Greensboro, N.C. W8SQO, the new WVN C.W. Net mgr., reports 31 sessions 181 stations, 99 messages. WVN Phone Net with 31 sessions, 966 stations, handled 164 messages. K8SXO moved to Huntington and joined the Tri-State ARC. The W.V.U. ARC Club officers are WA8IHZ, pres.; WA8TLT, vice-pres.; Lester Shields, secy.; K3ZAP, treas.; W1CDS, stn. mgr. W8OIV, now ON8VQ, schedules W8MLX. Ex-W8UFQ, now WN8DFJ, is active on 40. WA8DOY and K8QYG, with K8OQW helping, operated mobile from Morgan Co. Traffic: W8SQO 108, WA8RQB 76, W8HZA 63, W8CKX 59, WA8POS 50, W8DUV 48, WA8YSB 43, WA8ZZI 40, WA8YOF 37, WA8NDY 33, WA8BBG 31, K8MYV 30, WA8WIX 20, W8JM 19, WA8YHH 12, W8HVB/8 11, WA8TWR 9, WA8WCK 9, W8AEN 8, K8CFT 8, K8QEW 5, WA8LFZ 4, WA8LFW 3, W8AHZ 2, W8ETF 2, WA8FIE 2, K8MYU 2, WB8AVQ 1, W8ETE 1, W8EV 1, WA8FJA 1, WA8MRI 1, W8QEC 1, K8QYG 1, WA8QZO 1, K8RLC 1, WA8TLT 1, K8ZDV 1, WA8ZNH 1.

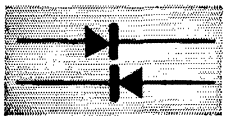
SBE



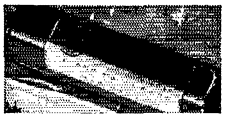
mobile features for the future...

solidly stated...

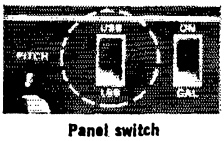
and all present.



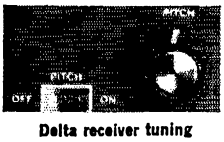
No relays—
Solid-state switching.



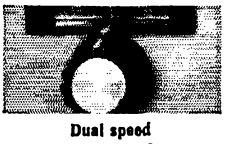
Collins
Mechanical Filter.



Panel switch
selects USB or LSB



Delta receiver tuning
plus/minus trans. freq.



Dual speed
receiver tuning

One knob controls band-
switch and exciter tune.

A SSB transceiver for **mobile?** If money is a consideration along with uncompromising performance, first check out panel controls and switches on the Linear Systems **SB-34**---find all those built-in "extras" that do so much to make mobile operation a real pleasure. Note also, the rear receptacles for the available options---the 25 kHz xtal calibrator (to spot those new sub-bands)---or the VOX. **Then** compare prices. But reflect a bit, you mobile-wise perfectionists.

Remember back before solid-state when mobile transceivers **had** to, by necessity, use big strings of vacuum tubes? Recall those needless, useless tube heater amperes that used to keep the car battery in a continual state of near collapse? Remember the first time you had to shell out for a new set of tubes? And when you first really counted and found how many were actually used. And how much each of them cost?

As any truly modern designed transceiver should, **SB-34** will spare you such shocks. **It has only 3 tubes** but these are ably and capably assisted by 42 solid-state helpers that will be doing their "thing" for years to come. (And solid-state switching spares you those arcing relays).

Compared prices? Then think about the higher price that gives so many features as **standards**---not extras. Consider also how long any price difference will stand up after the first full tube replacement. And then about the second replacement cost---and the third---and---

A big string of tubes can be like a used car.

LS

LINEAR SYSTEMS, INC.

220 Airport Boulevard, Watsonville, Calif. 95076

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Charles M. Cotterell, WØSIN—Asst. SCM: Neal S. Morris, KØTIV. SEC: WAØHLQ. RM: WØLRN. PAM: WØCXW. V.H.F. PAM, Denver area: WAØLIK. The RM is preparing a Colorado traffic guide. The RM and ORS KØJSP have organized a slow-speed c.w. net on 3745 kc. Speeds will be between 5 and 10 w.p.m. Try it. KØTIV will NCS an information, question and comment LO and Members Net each Sun. evening on 3988 ± kc. at 0200Z Mon. Section LOs will try to be on hand most of the time. WAØKAQ, of Haxtun, is the new EC for District 21. WØHEP is looking for help in manning an amateur station in the new Denver Convention Center for several conventions this year. My thanks to the many, many members of our nets who have earned SNCs and AMPS awards. New or endorsed appointments: KØHWB, WØGIL as OOs; WAØKOQ, WAØPGM as OPSs; WØUAT, KØJSP, WAØMNL, W4MXU, WØMYB, WØLRW, WØLRN as ORSs. OVS WAØSIK has a new 2-meter handy-talkie. WØWYX sports a new 110-ft. tower on top of 11,500 Squaw Mtn. KØJSP has a new 140-watt c.w. rig. W4MXU again is pounding brass. WØLRN has the 2-Meter f.m. mobile gear going. Nets: CCN, QNI 196, QTC 115. Hi-Noon, QNI 992, QTC 167. Columbine, QNI 1120, QTC 142. We need news and reports from all other areas of the state. Traffic: KØJSP 120, WØKAU 95, WAØMNL 73, WØLRN 67, WØWYX 64, WAØPGM 36, KØMNQ 33, KØTIV 30, WØUAT 30, W4MXU 27, KØECR 17, WØSIN 16, WAØKOQ 1.

NEW MEXICO—Acting SCM, James R. Prine, W5NUI—The New Mexico C.W. Net report from K5MAT; QNI 135, traffic 60, for another good month. Consistent participants were W5OTO, WA5UJY, W5DER and WA5JXU. The approach of summer is a good time to plan simulated exercises in preparation for Field Day or the real thing. The narrow-band 2-meter f.m. repeater network is improving throughout the state. Have you tried 2-meter f.m. yet? Traffic: WA5UJY 162, K5MAT 128, W5DMG 40, WA5FJK 38, WA5JNC 17, WA5MIY 16, WA5BLI 7.

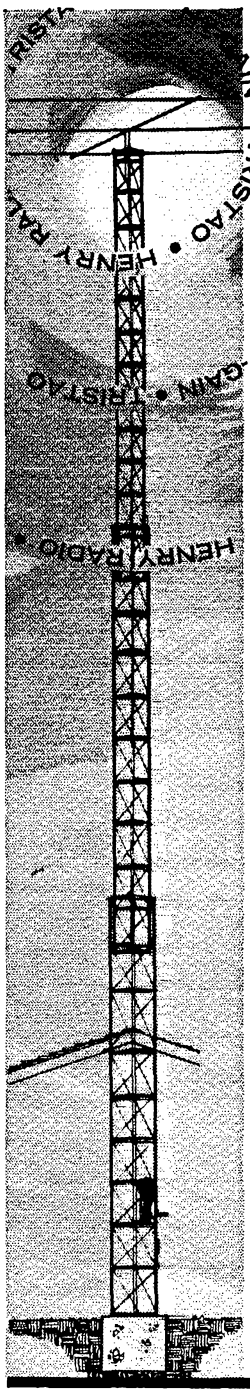
UTAH—SCM, Thomas H. Miller, W7QWH—SEC: W7WKF. RM: W7OCX. ORSs: W7OCX, W7EM, K7HLR, K7RAJ. New officers for the Utah DX Association are W7LEB, pres.; W7CYH, vice-pres.; and K7DEQ, secy.-treas. W7EM has returned from school in Oklahoma and is back in the swing again. OO K7ZJS sent out 44 cooperative reports during Mar. K7POZ has been awarded BUN certificate No. 67. W7OCX made a presentation of the BUN certificate to the operator of W7LQC at the Defense Depot in Ogden. The ceremony was given coverage in the Defense Depot paper. BUN changed to Daylight Saving Time Apr. 27. Remember the Rocky Mountain Division ARRL Convention to be held at the Hotel Utah on July 4, 5, 6. Some outstanding speakers have already been lined up for this event. *Don't miss it!* Traffic: W7EM 107, W7JSS 107, W7OCX 31, WA7GTL 8.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: K7NQX. RM: K7KSA. PAMs: W7TZK, K7SLM. OBSs: K7SLM, K7NOX, W7SDA, K7TAQ, WA7FHA. Nets: Pony Express, Sun. at 0800 on 3920; YO, daily at 0130 GMT on 3610; Jackalope, Mon. through Sat. at 1215 on 7260; Wx Net, Mon. through Sat. at 0630 on 3920. Glad to hear that K7OWX has recovered from a very serious operation and is back on the air again. K7TAQ spent some time in Portland recently. K7LOH has a very good art display at the Casper College.

IMPORTANT NOTICE

Changes 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.



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Basic package No. HR-1

***Tristao CZ-337 New concept 40 ft. crank-up tower w/mast**
CDR TR-44 rotator
100 ft. RG-58 A/U Coax
100 ft. Control cable

Complete with one of the following:

Hy-Gain TH-3 Jr. antenna	**$325.00**
Hy-Gain TH-2 Mk 3 antenna	**$325.00**
Hy-Gain DB 10-15A antenna	**$325.00**
Hy-Gain 203BA antenna	**$330.00**
Hy-Gain TH-3 Mk 3 antenna	**$375.00**

A savings of approximately $70.00

Basic package No. HR-2

***Tristao CZ-454 New Concept 60 ft. crank-up tower w/mast**
CDR TR-44 rotator
100 ft. RG-58 A/U Coax
100 ft. Control cable

Complete with one of the following:

Hy-Gain TH-3 Jr. antenna	**$480.00**
Hy-Gain TH-2 Mk 3 antenna	**$480.00**
Hy-Gain DB 10-15A antenna	**$480.00**
Hy-Gain 203BA antenna	**$485.00**
Hy-Gain TH-3 Mk 3 antenna	**$520.00**

A savings of approximately $90.00

Basic package No. HR-3

***Tristao CZ-454 New Concept 60 ft. crank-up tower w/mast**
CDR Ham-M rotator
100 ft. RG-8/U Coax
100 ft. Control cable

Complete with one of the following:

Hy-Gain TH-3 Mk 3 antenna	**$560.00**
Hy-Gain 204 BA antenna	**$565.00**
Hy-Gain 402 BA antenna	**$575.00**
Hy-Gain TH-6 DXX antenna	**$590.00**
Hy-Gain DB-24B antenna	**$620.00**

A savings of approximately $120.00

***Free standing tower $10.00 extra**

All complete packages are priced freight prepaid to your door in the continental U.S.A. Substitutions may be made . . . write for prices. And remember, you can buy on time. You can trade your used transmitter or receiver. You can rely on Henry Radio to supply the finest equipment and the best value.

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"World's Largest Distributor of Amateur Radio Equipment"

K7ITH moved to higher ground after the high water about got his feet wet and is back on the air again. The Casper Club had the pleasure of having W7OGT for the Apr. program. The club now has a tower with beam and as soon as weather permits will have a new tri-bander in operation for more competition on Sweepstakes, etc. Traffic: K7NQX 405, W7SDA 112, W7TZK 85, WA7AUV 61, K7ITH 28, K7AHO 26, K7VWA 26, W7YWW 20, W7HLA 14, K7OVD 8, K7BTE 2, WA7BFV 1.

SOUTHEASTERN DIVISION

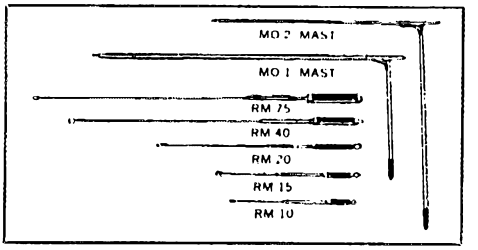
ALABAMA—SCM, Donald W. Bonner, W4WLG—SEC: K4KJD. RM: K4BSK. PAM: WA4EEC. Congrats to W4MKU on the high section SS C.W. score and to W4CBG on the high phone score. The 3725 C.W. Net is in full swing now, with WB4EKJ as NM. WN4MRD is the first XYL Novice in Athens. I regret to announce the passing of W4SXW. We sure appreciate the traffic outlets to Georgia and Florida on AENM. Thanks, fellows. Madison County had the highest traffic count during the SET with Lauderdale a close second. Let's have some good Field Day participation this year. The HARC is trying to be the national champ. I have some blank application forms for OO and all other field appointments. If you are interested let me know. W4ZWE is back with us after being QRX after a tonsillectomy. W4NML is in Denver now. WB4JRR is building a transistorized s.s.b. exciter and WAØKZP/4 is having a go at ATV. Facsimile, anyone? Traffic: W4USM 116, K4BSK 101, WB4EKJ 89, K4AOZ 79, WA4FYO 76, W4HFU 73, WA4VEK 47, WA4ROP 39, WN4KSL 32, K4WHW 19, WB4KDN 17, W4WLG 17, WA4AZC 16, WA4GGD 14, K4KJD 14, WN4JMH 12, WN4MIN 8, W4DGH 6, K4UMD 6, K4ADK 5, WB4LAO 5, WA4TMY 2.

CANAL ZONE—SCM, Russell E. Oberholtzer, KZ5OB—KZ5PE was elected new Act. mgr. for the CARC because of the reassignment of KZ5SG. A farewell party was given at the Elks Home in honor of SG. KZ5PE is the proud owner of a TR-4. Recent visitors to the Canal Zone included YN4DLS, HP3XQB, WA6JTM and W9CDQ. Traffic: KZ5SF 377.

EASTERN FLORIDA—SCM, W. G. Blasingame, WA4NEV—SEC: W4IYT. Asst. SEC: W4FP. RMs: W4ILE, K4EHY, W4RWM. PAM 75M: W4OGX. PAM 40M: W4SDR. V.H.F. PAM: WA4BMC. Official Bulletin reports were received from K4DAX, K4LPS, W4OGX, W4LEP and WA4EYU. W3CUL is operating portable from a new QTH in Sarasota. It certainly would be nice if Mae and Al made Florida their permanent home. W4EHW reports that the Gator Net has moved to 40 meters. The net now holds forth on 7115 kc. at 1330 GMT. It now looks as though the Orlando Hamfest has really caught on with registrants from as far away as Kingston, Jamaica. W4ILE is spending his hamming time helping his XYL get ready for the General Class exam. WN4MPG and WN4MPN are graduates of the first Novice class of the Dade County ARPSC. W4LEP reports the Vero Beach ARC has nine students enrolled in the Novice code and theory class. The club is located in temporary quarters and plans to have its new club house complete in the fall. K9VSO/4 has an NC-200 on 80-40 s.s.b. and a Ranger and 75A-4 on 80 through 10. W8BZY/4 reports that his antenna became a victim of the March winds, but he now has them back in the air. WA4LZV is the newest member of the growing list of ECs. He hails from Nassau County. Traffic: (Mar.) WA4IJH 557, WA4SCK 376, WB4HJW 308, WA4FGH 290, WA4NEV 282, WB4AIW 278, W3CUL/4 201, WB4JNI 166, W4SDR 119, WB4IER 112, W4DFU 109, W4LSR 105, WB4EPD 96, K4DAX 89, WA4HED 73, W4EHW 72, WA4TWD 57, K4LEC 45, WB4ADL 44, W4FP 44, WB4FLW 42, WA4CIQ 35, WA4NBE 32, W4TJM 31, K4IEX 30, W4OGX 29, WB4GUH 28, W4SMK 27, W4ZAK 27, W4LK 23, W4NGR 20, W4BKC 19, K4EBE 19, K4LPS 17, WA4EYU 16, K4OER 16, W4IAD 15, W4ILE 15, W4IYT 15, W4LEP 11, W4PBK 11, K4SJH 11, W4VPQ 9, WB4DSP 6, W4SOM 6, KØVSO/4 4. (Feb.) W8BZY/4 36.

HUSTLER MOBILE ANTENNA

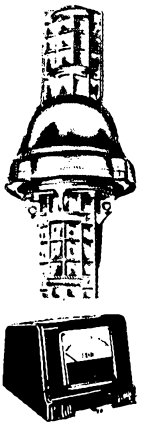
10-15-20-40-75 METERS



MOBILE ANTENNA

10-15-20-40-75 METERS

Model	Description — Mount or Height	Net
MO-1	54" mast folds at 15" Fr. Base Rear deck or fender	$ 8.95
MO-2	54" mast folds at 27" Fr. Base Bumper	$ 8.95
RM-10	10 meter resonator 80" max.-77" min.	$ 7.50
RM-15	15 meter resonator 81" max.-76" min.	$ 8.50
RM-20	20 meter resonator 83" max.-78" min.	$ 9.50
RM-40	40 meter resonator 92" max.-87" min.	$11.50
RM-75	75 meter resonator 97" max.-91" min.	$13.50



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Antenna Rotor System

Model TR-44

TR-44 is designed specifically for amateur applications. Surpasses all TV-FM antenna rotors in wind resistance, torque and dead weight load carrying capability. Built-in braking system insures holding the antenna in position. With the motor de-energized, the brake is engaged and holds the antenna in position. Zener regulated meter indicating system displays precise antenna direction. TR-44 Rotor and indicator complete with 100' of Rotor cable **$69.95**

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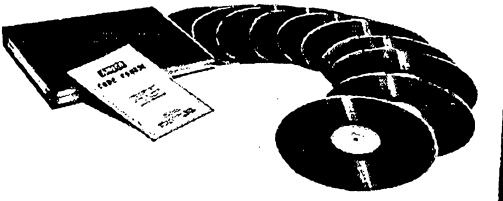

LEARN CODE & THEORY FAST

No. 1—Junior Code Course. Consists of 10 recordings (alphabet through 7½ WPM). Includes typical FCC type code exams. Free instruction book on learning how to send and receive code the simplest, fastest way; plus charts to check your receiving accuracy.

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No. 103-33 Advanced Code Course—33⅓ rpm. Net Each **$3.95**

No. 104-33 Extra Class Code Course. Increases code speed from 13 to 22 WPM in ten lessons. Prepares for Extra Class Code examination. Sample FCC-type examinations given. (33 RPM, 1 LP) **$3.95**

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SOLID STATE CODE PRACTICE OSCILLATOR

Solid state, 2 transistor, code practice oscillator, built-in speaker. Tone control and headphone jack. C-cell powered. CW monitor optional. Size: 6¼"x3¾"x2½", Wt.: 2 lbs.

	Net		with CW Monitor
OCPK (kit)	$ 7.95	OCMK	$ 9.95
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GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: WA4WQU. RM: W4FDN. PAMs: K4HQI, W4YDN. K4HQI reports the 50-Mc. band was very quiet during March except for the auroral opening on the 23rd. WB4EMF is running a Thunderbolt and a fever (DX type).

Net	*Freq.*	*Time*	*Mgr.*	*QNI*	*QTC*
GSSB	3975	0100 Dy.	WB4DMO	976	98
GSN	3595	0000 & 0300	W4FDN	363	151

Many other nets operate either statewide or local. Will net managers please report so we can list full activity? K4HQI is sporting a new SB-101. WA4ARS has a new 22er and WB4HCT a Venus. WA4AON is back on 6 and 2. W4FEW lost his quad in an ice storm but hopes to return to RTTY soon. W4LRR reports nine stations on the 2-meter net and says his time is spent studying for the Extra Class ticket. K4TXK now is flying supersonic jets. He repaid the XYL for the Christmas f.m. rig with a new Heath color TV. (Remember when he couldn't get on the air, let alone in it?) Congratulations, Craig. W4CZN has been under the weather accounting for the low traffic total. Wish you good health and BPL. Allen, Traffic: W4FDN 114, WA4RAV 102, K4TXK 85, W4DDY 37, WA4UQQ 34, W4CZN 18, W4RZL 16, WA4BVD 14.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4IKB. PAM-V.H.F.: K4NMZ. RM: K4UBR. RM-RTTY: W4WEB. Nets:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3957 kc.	2300Z	Daily	31	682	82
QFN	3651 kc.	2330/0300Z	"	62	—	—

Pensacola: New hams in the area include WN4MED, WB4MHJ and WN4MKQ. WB4DVM was appointed OPS. 8RIY/W4 is a regular on QFN now. New officers of the FFARA are W4ETE, pres.; K4OSE, vice-pres.; K4LAN secy. and editor. Fort Walton Beach: K4AQO, WA4YCO, W4YUT, WA3CUO and W5YOW are new in the area. W4MMW went mobile on 2-meter f.m. WA4PUC/HS, the first station granted permission to work the U. S. from Thailand, is looking for FWB stations around 14.290 kc. at 1400 GMT. A county 6-meter net has been formed, meeting on 50.4 Mc. at 7 P.M. local time every Tue. with W4APR as NCS. W4RKH added several 2-meter antennas to his 80-ft. tower. Port St. Joe: K4RZF got a new HW-100. Apalachicola: K2UGV's new call is K4BDY. Marianna: WN4MBL is a new ham in Alford, near here. Tallahassee: K4YSQ graduated from FHP Trooper school and is assigned to the Sunshine State Parkway. Traffic: K4VFY/4 262, K4LAN 192, WB4DVM 104, WB4HKM 68, W4WEB 51, W4IKB 31, WA4EOQ 17, WA4JIM 16, W4RKH 12, WB4EQU 10, W4KCA 4.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Gary M. Hamman, W7CAF—SEC: K7GPZ. RM: K7NHL. PAM: W7UXZ. Radio club activities have taken to the outdoors now that the warm weather has arrived. On May 4, the Old Pueblo ARC had a picnic and swapfest in Tucson, and the Arizona Repeater Assn. had a picnic and transmitter hunt at Estrella Park. The Scottsdale ARC had a picnic Apr. 27, the Phoenix V.H.F. Club a picnic Apr. 13 and the Arizona ARC a campout at Canyon Lake and transmitter hunts in Phoenix. The next big event is Field Day on June 28, 29. Usual club participants include the Old Pueblo ARC (W7GV), Scottsdale ARC (WA7APE) and the Arizona ARC (W7IO). Tucson has a 2-meter a.m. group meeting on 145.35 Mc. on Tue. at 8 P.M. The Arizona Repeater Assn., WA7CEM, repeater on 146.34 and 146.94 Mc., has a net on Tue. at 7:30 P.M. K7ZMA is now in Kingman operating h.f., 2-meter f.m. and 440 Mc. W7CFJ made over 3,000,000 points in the C.W. ARRL DX Contest when he operated as XEØGEN in Mexico. The Ft. Tuthill Hamfest will be held July 25, 26, 27. Copper State Net handled 194 messages. Traffic: W7GEP 256, K7NHL 179, WA7IIF 44, K7KFI 28, WA7CYB 26, W7OUE 26, W7LLO 25, W7DLF 24, WA7ISP 21, W7KYM 20, K7NOS 20, WA7AVR 14, WA7EQC 14.

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	Type	Sale
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☐	2N3565	5 for $1
☐	2N3568	5 for $1
☐	2N3638	5 for $1
☐	2N3641-3	5 for $1
☐	2N3645	5 for $1
☐	2N3662	5 for $1
☐	2N3683	5 for $1
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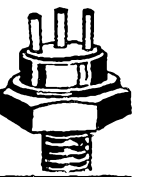

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LOS ANGELES—SCM, Donald R. Etheredge, K6-UMV Traffic: (Mar.) W6GYH 698, WA6LWE 554, W6-MLF 356, W6QAE 161, WB6OUD 160, WB6BBO 147, W6HUJ 91, WB6ZVC 90, W6MN 76, K6CDW 64, WB6-YSG 63, W6EUV 48, W6JPH 28, K6CL 26, WB6OLD 24, WB6WDS 23, W6DQX 18, W6MLZ 15, WB6KGK 11, WB6SXY 10, WB6UHF 10, W6DGH 9, K6EA 8, W6FD 8, W6INH 7, W6OEO 7, WB6GGL 6, WA6KZI 6, W6-USY 5, K6ASK 4, WB6SLG 2, W6TN 2. (Feb.) WB6-TQS 68, WB6ZVC 58, W6OEO 15, WB6YSG 15, W6HPH 10. (Jan.) W6JPH 28, WB6YSG 18.

ORANGE—SCM, Roy R. Maxson, W6DEY—K6OT says that W6EOZ is going into the hospital in Riverside. We wish him a speedy recovery. WA6GVD advises that because of an antenna clause in his housing area he has put up a submarine-type antenna and is on the air. W6EIY received an RN6 certificate from WA6ROF, net mgr. W8ELW/6 is a new ORS. WA6ROF passes along the information that the Autonetics Radio Club MARS station, AFC6YPX, is operated for phone patches to Viet Nam every Wed. night. The station is manned at all times that the bands are open to SEA and they ran over 2000 patches in Mar. The AREC welcomes WN6MMX. If you are not a member why not sign up and be prepared to help in emergencies? Traffic: WA6ROF 152, W8ELW/6 107, W6EIY 54, K6OT 27, W6WRJ 16, WA6TAG 14, W6GB 3, W6PQA 2.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6-OKN—SEC: K6GV. RM: W6UJ. New officers of the Simi Valley ARC are WB6DWM, pres.; WA6EDZ, vice-pres.; WB6WAF, secy.-treas. W6ORW is editor of the Simi ARC paper, in addition to other net activities. New amateurs to the Conejo Valley are K6BCE and WA6TIM. WB6SVM is now a student at U.C. Berkeley and is using the rig of W6BB (UCARC) to keep his skeds. WA6DEI has been appointed ORS for the San Luis Obispo area. K6TOE sends a nice report on the Estero ARC. The Estero ARC is located in Morro Bay and has a membership of about 23. For information about the Estero Club write to P.O. Box 56, Morro Bay, Ca. 93442. W6ZRR provided equipment, house and coffee for the emergency communications center during the recent floods in San Luis Obispo. WN6ZWM has a new QRP rig suitable for installation on his new motorcycle. K6AAK has a new Hallicrafters SR-400 transceiver. K6GV got his cliff-dweller antenna back up after the big storm.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. E. Harrison, W5LR—Asst. SCM: Gene Pool, W5NFO, SEC: W5JSM, PAM: W5BOO, RM: W5QGZ, LTV Radio Club Pres. W5RHI is working on a world-wide net similar to RCA, Ford and Altec Svc. Corp net. Our new SEC issued 5 new appointments and cancelled several. W5NFO, Brownfield, reports Operation Snowatch caused the West Texas Emergency Net to be activated Mar. 15-16 because of a 17-inch snowstorm in Southern South Plains. Participants included K5RZN, W5BFX, WA5LWT, WA5IUC, W5LOS, WA5KGF, W5DXT, W5ALL, K5DCR, K5-RGA, K5MBS, K5LFI, W5BEY, K5MTM, W5WB, K5-OIF, W5JSM, W5GBS, W5HDU and W5NFO. New AREC members are W5KYD, W5PBM and W5QBX. OOs show an increased work load during the contest period, including a total of 47 observations for Mar. The Abilene Swapfest is set for May 24-25 at the Exhibit Bldg. Fair Grounds. The Irving Ham Club has scheduled a transmitter hunt to be held soon and the Garland Club is planning for Field Day June 28-29. The Arlington RC membership is awaiting initiation in the Royal Order Wouff Hong during the West Gulf Division Convention in Amarillo come August. W5CF, former West Gulf Division Director, is in Ft. Worth Hospital. WA5QQR reports a new net, the Handicappers

Information Net, meets M-W-F, 2000 to 2100 GMT on 7270 kc. PAM W5BOO sends a report covering all activities and says he may have a list of APO numbers for use by NCS traffic people. CenTexEmgcy Net, formed May 1956 on 3970, recently was changed to 3910 kc. Central NCS and 4 Area Nets are used and the spring shindig is held in Huntsville State Park yearly. Recent SCM mailing results show bad QTHs on W5ZTB, W5KNA, W5FPH, W5SPN and W5YDL. Can anyone help me locate these folks? W4GJW sets forth a proposal that CBers be made Associate ARRL members. The following ECs have been cancelled: W5TUW, W5BSX, W5NFO, W5GSL and W5MBR. W5GWF, Waco, has been appointed OO Class III and IV. W5QGZ has a fine c.w. net on each morning at 0630 M-F and 0830 S-S on 3770 kc. and accomplished 85 check-ins in 31 sessions in Mar. The following ORSs have resigned: W5BKH, W5CVW, W5DW and K5PXV. Traffic: (Mar.) K5BNH 2662, W5QGZ 121, W5HVF 112, WA5PPF 52, W5FCX 38, W5CTJ 30, W5JSM 22, W5RHF 22, W5PBN 17, W5LR 12, WA5EVS 8, WA5QWA 6, W5QPX 1. (Feb.) WA5QWA 8.

OKLAHOMA—SCM, Cecil C. Cash, W5PML—Asst. SCM: W. L. (Smoky) Stover, K5OOV. SEC: WA5FSN. RM: W5QMJ. PAMs: W5MFX, K5TEY, WA5JGU, K5ZCJ. V.h.f. is not all v.h.f. these days for a little birdy told me that K5KHA, Mr. V.H.F. himself, picked up a new Swan 500-C at the Lawton Hamfest. K5TCG is back home in Bartlesville after two months on the road. WA5TSJ and WN5UCQ have the RTTY bug. The NORA Club of Vinita has installed a tri-band transceiver in its county EOC in addition to 2 meters. Thanks to K5ZPM, the Lawton-Fort Sill ARC, is the proud owner of a complete Johnson kilowatt with pedestal and chair, also Central Electronics 200-V exciter, National NC-303 along with a Johnson Ranger II, Johnson KW matchbox, Low-pass filter, phone patch, v.s.w.r. bridge, scope, coax switches and complete running spares. New net certificates for the Sooner Traffic Net were issued to WA5LKS, W5OZA, WA5TBB, WA5THQ and W5UZX. Congratulations to new Novice WN5YGQ, the YF of WA5MDN, and WA5VKT (Tech.) I think. She is the YF of WA5TVY. Net reports.

Net	*Freq.*	*Time*	*Sess.*	*QNI*	*QTC*
OLZ	3682.5	0100Z	16	28	68
SSZ	3682.5	0345Z	15	30	22
OPEN	3915	1400Z (Sun.)	5	204	3
STN	3855	2330Z	26	687	224
OPON	3920	2300Z	21	348	86

Traffic: K5TEY 3328, K5OOV 54, W5FKL 53, W5QMJ 44, WA5IMO 41, WA5SEC 38, WA5KFT 36, WA5FSN 33, K5SWL 30, WA5LKS 27, W5MFX 17, WA5DZP 14, WA5LWD 10, WAØCTL/5 10, W5IQ 8, WA5AOB 6, W5PML 6, K5CBA 5, K5WPP 4, K5OCX 3, W5JJ 1.

SOUTHERN TEXAS—SCM, G.D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. OBS W5ABQ advises that the Novice transmission will be on 3750 kc. Mon. and Tue. at 2130 CDST. EC W5TFW advises that the new officers of the Beaumont ARC are K5SUY, pres.; W5QIC, vice-pres.; W5VDM, secy.; WA5NXP, treas. According to K5HZR, repeater organizations are working hard. San Antonio has a new site location and most equipment operational now. Victoria and Amarillo also have new repeaters on the air. Population is so sparse in East Texas that ECs WA5KHE/WA5KIV have to build starting at the grass roots. From EC W5KR's *Off Resonance Bulletin*: Victoria ARC used 2 meters to help the Jaycee Stock Show Parade. Those participating were EC W5OXQ, K5DJD, K5ZAM, WA5ONC/M, WA5WMY, W5ONG, K5ZOD and WA5VUQ. SEC K5QQG and SCM W5AIR plan a trip to Magnolia, Tex., soon to present EC certificates to WA5FJN and WA5TXI. Both are very active in Southern Texas traffic and other activities. Your traffic reports are needed. Please mail or radiogram them to the SCM at the end of each month. Also news of any other activities of interest will be welcome. Traffic: W5QJA 171, K5HZR 139, WA5QKE 96, WA5MXY 86, W5BGE 63, WA5AUZ

57, WA5KIV 56, W5TFW 47, WA5WFR 46, WA5TXI 44, W5ABQ 43, W5EHM 18, WA5PUQ 13, W5AC 7, W5KLV 6.

CANADIAN DIVISION

ALBERTA—SCM/SEC, Don Sutherland, VE6FK—PAM: VE6ADS. ECs.: VE6SS, VE6XC, VE6AFQ, VE6AWM. ORSs: VE6ATG, VE6ATH. OPSs: VE6HM, VE6SS, VE6ATH, VE6AFQ. OOs: VE6HM, VE6TY. OBS: VE6AIF. OVS: VE6MX. Preregistration for the Alberta Hamfest in Edmonton on Aug. 2 and 3 is now available. The mailing address is Box 2692, Station A, Edmonton 15. The preregistration fee is $10.00. VE6VD is moving to Vernon. VE6TG is doing a nice job as alternate NCS on the Aurora Net. VE6MX has been appointed OVS. VE6BR is giving up the job as editor and printer of the *Alberta Amateur*. I wish to thank VE6BR on behalf of the amateurs of Alberta for his four years of fine endeavor. The Calgary Public Service Nets on 3740 kc. and 147 Mc. keep the CARA posted on club news and local events. I enjoyed my visit to so many of the Alberta clubs while with Noel Eaton, Canadian Division Director. Thanks from both of us for your fine hospitality. Traffic: VE6FK 26, VE6XC 6. VE6TY 4, VE6ABW 3, VE6DT 2.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB—Silent Keys: VE7EJ, born July 1889 and was operating long before call signs were issued as 4CH and official as VE4HS. VE3CJ paid us a visit, and Trail managed to snow him in so he had to cancel his Victoria visit. The Auro Net meets at 0145 GMT on 7200 kc. and the second session 0330 GMT 7185 kc. This is a new net and is building up with check-ins all across Canada. HW-100s new owners are VE7BCV and VE7BVB, our net mgr. for the BCARPSC Net. Officers of the North and West ARC are VE7BVU, pres.; VE7BYY, vice-pres.; VE7BTL, secy. VE7MQ/VE2 is in the East as navigator for CPA. East Kootenay ARC reports c.d. hq. has advanced funds for an HW-100 and two GT45s to convert. Totem ARC's officers are VE7AWB, pres.; VE7AYI, secy. They report the Phone Net on 28.2 Mc. 1900 GMT also is active on 6 meters Sun. mornings. Burnaby ARC's officers are VE7RR, pres.; VE7BRF, vice-pres.; VE7BVG, secy. VE7AFJ, Parksville, has been granted the call VE7AFR as the repeater, in 441.99 Mc., out 147.33 Mc. EC for the Islands, VE7CB, is more active on all bands now that he is the owner of an FTDX-400. Traffic: (Mar.) VE7CB 20, VE7LL 19. (Feb.) VE7LL 18.

MANITOBA—SCM, John Thomas Stacey, VE4JT—The University of Manitoba, VE4UM, is now active on 80 through 2 meters and maintains skeds with CP5BX, who is working with CUSO. Station affairs are under the guidance of VE4IA. VE4AY is the licensee. The UMARS has a membership of 30 of which 11 are licensed. VE4NE is active in the North Dakota RACES Net and is contemplating a new antenna when the weather is favorable. VE4UP is the proud owner of a new HW-100. VE4BC and VE4IW gave a lecture demonstration to a Young People's group at Manitou. Traffic net reports: Manitoba Evening Phone Net, Sessions 31, QNI 767 and QTC 11. Manitoba Traffic Net, Sessions 31, QNI 137 and QTC 71. VE4RO is doing FB as liaison to the Tenth Region. Traffic: VE4EI 68, VE4RO 35, VE4QJ 11, VE4NE 9, VE4RL 9, VE4EG 8, VE4EF 7, VE4JA 6, VE4XN 6, VE4JF 4, VE4WT 2, VE4JT 1, VE4RB 1.

MARITIME—SCM, William J. Gillis, VE1NR—SEC: VE1HJ. Our sympathy to the family of VE1NA, who passed away suddenly Mar. 19. Murray was well known throughout the section. With regret we also record the passing of VO1CR, who held his call for 35 years. The NSARA plans to sponsor the Atlantic Amateur Radio International Convention in the City of Dartmouth. Dates are Aug. 30 and 31 and Sept. 1. Watch for further news. VE1AI was active in the ARRL DX Contest. VE1ABS is off the air temporarily planning for new equipment. VO1FX invites all interested stations to call in on the Nfld. Net nightly at 2230 GMT at 3785 kc. VO1s DI, AB and FU are temporarily on the sick list.

VE1ASJ will be operating as HB9FC/MM aboard research vessel *Vema*. APN: Traffic 64, QNI 570, sessions 62. Traffic: VE1AUD 81, VE1IRO 75. VE1AMR 52.

ONTARIO—SCM, Roy A. White, VE3BUX—VE3FOI tells me that VE3OL passed away in Mar. and VE3BYQ advises that VE3GY also is a Silent Key. The ten dollar license fee has been confirmed but the six dollar amendment fee has been dropped. The RSO will hold its Annual Convention in Toronto Nov. 14 and 15. Don't forget the RSO QSO Party in July. It commences at 1700Z July 19 and ends at 2400Z July 20. The Skywide ARC had a booth at the recent Sportsmans Show in Toronto. All our nets, c.w. and phone, are looking for controllers, so how about giving a hand? Every qualified amateur should, in my opinion, have a stab at this interesting and rewarding job. The Peel ARC has a net going on 7195 kc. at 1500Z every Sun. Your SCM is glad to see more use being made of the 7150 to 7200 segment by phone stations. Hamilton ARC, and many others too, are doing an excellent job in helping White Caners become hams. Field Day discussions now seem to be the order of the day and all indications point to "a real big shew." VE3ERU, who recently made the BPL three months in a row, is running an FTDX-400 and is busy on 20, 40 and 80. The Lakehead Search and Rescue Unit (Lakehead ARC) is doing a very worthwhile job, and so is VE3BZT and his group around Mazinaw Lake. This is the sort of activity that enhances our public image. The CARF is steadily gaining ground and may have its Hq. in Ottawa. *RTTY News* (VE3GK) has an excellent series of articles running on modern telephone equipment, etc. This write-up is being mailed a little early to permit your SCM a little vacation, so traffic counts will be carried over until next month.

QUEBEC—SCM, J. W. Ibey, VE2OJ—SEC: VE2ALE. RM: VE2DR. VE2PJ still is plagued by antenna problems. VE2ANK visited DJ9DG. VE2CMB is located in Ste. Angele de Laval. VE2DAH is the leader at VE2CTR. VE2ALE is doing a fine job supplying crystals and 2-meter rigs under the auspices of the 2-meter club and aided by equipment from VE2AUD. VE2DEA, VE2DFE and VE2AUU attended the Syracuse, N.Y. Hamfest. VE2WM reports from the Gaspe area that nine code class regulars should be ready for amateur exam. They plan for a 2-meter repeater in May or June to be located at Mont Joli. VE2XR and his XYL visited VE7XN, Burnaby, B.C., who was the first holder of VE2XR in Montreal. VE2MS has been appointed asst. director. VE2AZF and VE2DIG are welcome Emergency Corps members. Les parties de sucre des clubs de Québec et Thedford Mines ont remporté un franc succès. VE2ADF est de retour sur l'air. VE2DIJ est actif sur le 15 mètres en c.w. VE2APF est entendu régulierèment sur le 80 mètres on c.w. VE2ED expérimente différentes antennes sur le 40 mètres. VE2ACP de Gagonville est actif sur le 75 mètres. Merci à VE2AFJ et VE2LD pour leur excellent travail dans l'organisation du réseau de téléphonie du Québec. Traffic: (Mar.) VE2BVY 87, VE2DR 62, VE2BRD 60, VE2OJ 57, VE2AJD 55, VE2CP 30, VE2ALE 24, VE2EC 17, VE2ADE 15, VE2WM 14, VE2DKJ 4, VE2PJ 1. (Feb.) VE2ADE 46.

SASKATCHEWAN—SCM, Gordon C. Pearce, VE5HP—Remember the Hamfest in Moose Jaw, Sat. and Sun., July 5 and 6. The locale is the Wild Animal Park south of the city. Considerable noise is beginning to come through the 2-meter repeater station in Regina. This summer the 144-Mc. band should be hopping. The frequencies are 146.460, 146.940, 147.330 transmitting 146.940, 147.330 receiving. Fellows and gals, how about keeping the various bands occupied at times—40 meters for instance? You will be surprised at its possibilities. 75-meter mobiles are conspicious by their absence. But they tell me 2-meter mobiles are going strong. Any RTTY news? Visiting some shacks in our travels we discovered many well equipped with RTTY rigs. Traffic: VE5GL 123, VE5PX 34, VE5LQ 12, VE5SC 11, VE5XL 10, VE5JZ 8, VE5KI 7, VE5UT 5, VE5BO 4, VE5EE 4, VE5QS 3, VE5RE 2, VE5YR 2.

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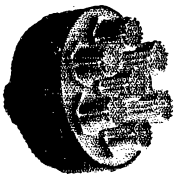

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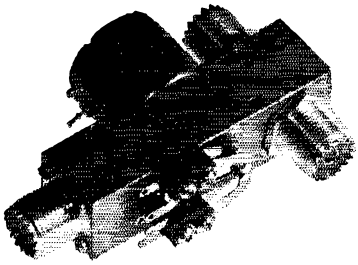

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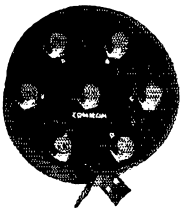

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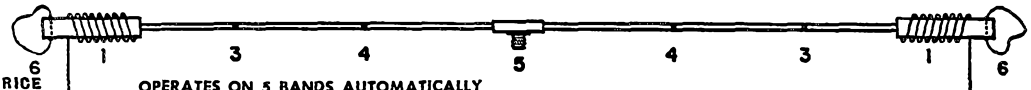

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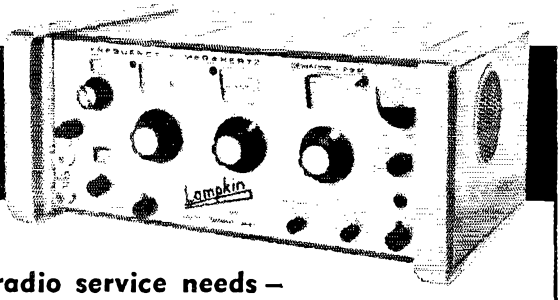

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(Please see the other side of this page for an application for membership in ARRL and 12 issues of QST)

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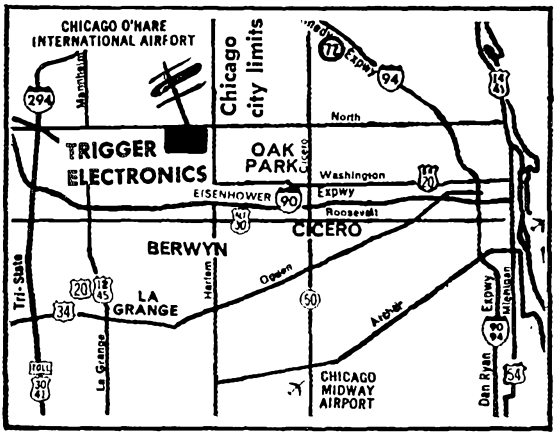

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DRAKE R4	269	SR46A	139	HEATH HW32	79
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HAM-ADS

(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 post office box or telephone 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 invertions. 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.

AUCTION: June 8th Manchester Radio Club at Tower Hill, Candia, N.H.—Map and information S.A.S.E. W1HPM, Post Office Box 661, Manchester, N.H. 03105.

SOMERSET County Hamfest—June 8th, Casebeer Church Grove, Route 219, 7 miles north of Somerset, Pa. (9 AM-5 PM) Write Theodore J. Leonberger, K3RCI, Rd 2, Rockwood, Pa. 15557.

A.W.A. National Amateur Radio Historical Conference, Oct. 3, 4, and 5th, East Greenwich, Rhode Island. A weekend of nostalgic memories: Spark transmitters, Crystal sets, Hartley oscillators, and Regenerative Receivers. Everyone welcome! Writ e W2QY.

"SEE your picture and a thumbnail sketch of your life in wireless along with many of your old buddies in Spark Gap Times magazne published by the Old Old Timers Club. Charter membership is offered to all pre-World War I operators, regular membership to any operator licensd 40 years or more ago. Be a recognized pioneer, join the Old Old Timers by writing the Secretary W5ZC, Bert E. Gamble, 402 Beck Building, Shreveport, Louisiana 71101."

INVITATION: New York Radio Club invites New York Area hams and SWLS to its regular monthly meetings, the second Monday of each month at the Hotel George Washington, Lexington Ave. and 23rd St. at 8 PM. W2ATT, New York Radio Club.

HAMFEST: June 8th. Save this date for Annual Starved Rock Radio Club Hamfest at Ottawa, Illinois. Write: George E. Keith, W9QLZ, RFD #1, Box 171, Oglesby, Illinois 61348, or see Hamfest Calendar in May QST.

WELCOME To Maritime Mobile service net. 14313 KHz, daily 2130Z. Amateur Radio's service to the Fleet. Vic Barry RDC USS Corry, DD817 FPO, N.Y., N.Y. 0950.

HAMFEST sponsored by Lancaster and Fairfield County ARC at Derby Downs one mile south of Lancaster, Ohio, on BIS Road, Rte 793, June 8th. Gigantic Swap Shop $1.00 Registration. Good food at reasonable prices. W. C. Beach, 268 Peters Ave., Lancaster, Ohio 43130.

39th-ARRL West Gulf Division Convention August 15, 16 & 17, Amarillo, Texas. For an ideal summertime weekend of ideas, fellowship, entertainment, fun (and maybe good luck), you can't miss at $10.50 for registration. W5WX Panhandle Amateur Radio Club, Box 5453, Amarillo, Texas 79107.

SIX Meter Club of Chicago, Inc. 12th Annual Hamfest. Sunday, August 3 1969. "Picnic Grove" on U.S. #45, in Frankfort, Illinois. $1.50 in advance; $2.00 at gate. Val Hellwig, K9ZWV, 3420 S. 60th Ct., Cicero, Illinois 60650.

HAMFESTERS Radio Club, Chicago, Illinois, proudly announces its 35th Annual Midwestern Hamfest, Sunday, August 10th at Santa Fe Park, 91st & Wolf Road, SW of Chicago. The Hamfest features manufacturer and distributor exhibits, swappers row, awards, clowns and games for the children, and activities for the XYL. Featuring the Swan 500C with AC, PS, the Hamfest climaxes "Illinois Amateur Radio Week August 3rd thru 10th". For info and tickets, write Tom Ondriska, WN9YZW, 6609 South Kedvale, Chicago, Illinois 60629.

QSL Cards?? America's Finest!! Personalized made-to-order. Samples 35 cents. DeLuxe, 50 cents. Religious 25 cents. (refunded). Sakkers, W8DED, Box 218, Holland, Michigan 49423.

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

QSLS "Brownie" W3CJI, 3111 Lehigh, Allentown, Penna. 18103. Samples 10¢. Catalog 25¢.

QSLS stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md. 21733.

QSLS—SMS. Samples 25¢. Malgo Press, Box 375, M. O. Toledo, Ohio 43601.

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

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

QSLs, Free samples, rubber stamps, address labels, stationery. Quality with service. R. A. Larsen Press, Box 45, Fairport, N.Y. 14450.

QSLS. Free samples, attractive designs. Fast return, W7IIZ Press, Box 2387, Eugene, Oregon 97402.

QSL, SWL, cards that are different. Quality Card stock, Samples, 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio 45015.

QSLS. Radio Press, 15008 Orchid Ave., Poway, Calif. 92064.

CREATIVE QSL Cards. Personal attention. Imaginative new designs. Send 25¢. Receive catalog, samples, and 50¢ refund coupon. Wilkins Printing, Box 787-1, Atascadero, Calif. 93422.

QSLS SWLs Hundred $2.00, samples dime. Garra, 414 Mahoning St., Lehighton, Penna. 18235.

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

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. Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, WA4FJE/W3COP, 905 Fernald, Edgewater, Fla. 32032.

QSLS, SWLS, WPE. Samples 15¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz. 85017.

QSLS: 100. $1.25 and up, postpaid. Samples, dime. Holland R3, Box 649. Duluth, Minn. 55803.

MINI QSLS, Eye-Ball cards. Free information. A. A. 2833 Irving Ave., South, Minneapolis, Minn. 55403.

QSLS, samples 10¢. Fred Leyden, W1NZJ, 454 Proctor Ave., Revere, Massachusetts 02151.

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.

QSLS. Neat, quick, 10¢. Filmcrafters, Box 304, Martin's Ferry, Ohio 43935.

QSLS Kromkote glossy 2 & 3 colors, attractive, distinctive. Choice of colors, one hundred—$3.00 up. Sample 15¢. Agent for Call-D-Cals. K2VOB Press, 457 Chancellor Ave., Newark, N.J. 07112.

EMBOSSED QSL's. Free Samples, with cut catalog 25 cents. Ace Printing Service, 6901 Clark Ave., Cleveland, Ohio 44102.

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

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

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

QSL cards Finest quality. Economical prices. Fast service. Free samples. Little Print Shop. Drawer 9848, Austin, Texas 78757.

LOW PRICED QSLs!! Free samples!! K.L.L. Press, Box 258, Martinsville, N. J. 08836.

QSLS, WSLS, XYL-OMS (Sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing, eyecatching, sedate, fabulous, comic, DX-attractive, prototypal, snazzy, unparagoned cards (Wow!). John Patterson carries on in the spirit of the late Warren Rogers, KØAAB, adding his own. Patterson Printing, 961 Arcade St., St. Paul, Minn. 55108.

QSLS. With all this competition, you've gotta have something different. Try us. Samples 10¢. Alkanprint, Box 5494, Minneapolis, Minn. 55408.

3-D QSDS—The modern concept that makes all others old-fashioned. Samples 25¢ (refundable). 3-D QSL, Co., Monson 2, Mass. 01057.

RUBBER Stamps, 3-line address $1.50. J. P Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

QSLS 3-color glossy 100, $4.50. Rutgers Vari-Typing Service Free samples. Thomas St., Riegel Ridge, Milford, N.J. 08848.

QSLS by K1FF: $200 for 100. Others at reasonable prices. Samples 25¢ (deductible). K1FF QSLS, Box 33, Melrose, Mass. 02177.

RUBBER Stamps, badges, nameplates. Fast, accurate delivery. Request price info and style charts from Fulton Rubber Stamps, Route 216-A, Fulton, Maryland 20759.

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.

3-LINE engraved badge, any color, $1.25. Special rates to clubs. Fallert's Engraving, 121 N.C. St., Hamilton, Ohio 45013.

CANADIANS! The best selection of new and used gear in stock at all times. Drake, Swan, Yaesu, Hy-Gain and others. It will pay you to check our deals. The Ham Shack, 1566A Avenue Road, Toronto 12, Ontario (Tel: 416-789-1239).

ATTENTION Canadian and New England Hams! The annual convention sponsored by Radio Amateur of Quebec Inc. will be held in Granby, Que. on the 27, 28, and 29th of June. Information and advanced registration from VE2BLP, Box 523, Granby, Que.

NOMINATIONS are due for the 1969 Illinois Amateur of the Year Award to be presented at the 35th Anniversary Hamfest. Hamfesters, 6000 South Tripp, Chicago, Illinois 60629

QCWA—Quarter Century Wireless Association is a non-profit organization founded 1947. Any amateur radio operator licensed 25 or more years is eligible for membership. Write for information. A. J. Gironda, W2JE, 1417 Stonybrook Ave., Mamaroneck, N.Y. 10453.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0803 to 1730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan 48104. Tel. NOrmandy 8-8262.

PROP Pitch rotor, WW2, small, excellent, $45.00. Link, 1081 Aron St., Cocoa, Fla. 32922.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

NORTHERN California hams: best deals, new and reconditioned equipment. Write, call or stop for free estimate. The Wireless Shop, 1305 Tennessee, Vallejo, Calif. 94590. Tel: 707-643-2797.

HAM Transformers rewound, Jess, W4CLJ, 411 Gunby Ave., Orlando, Florida 32801.

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

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

POLICE Fire Radio Dispatcher directories! Exclusive official directories: Call signs, frequencies of local, county, state agencies. National. For all VHF fans, CD, AREC, RACES, MARS, VFD's. Catalog for stamp. Communications, Box 56-T, Commack, N.Y. 11725.

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. (Note new address, fellas!)

MANUALS for surplus electronics. List 15¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

HAM'S Spanish-English manual $3.00 Ppd., Gabriel, K4BZY, 1329 N.E. 4th Ave., Fort Lauderdale, Florida 33304.

WANTED: For personal collections: Learning the Radiotelegraph Code, Edition 4; How to Become a Radio Amateur, Edition 9; The Radio Amateurs License Manual, Editions, 11, 12, W1CUT, 18 Mohawk Dr., Unionville, Conn. 05085

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 WST'S 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. 11551.

CASH Paid for your unused Tubes and good Ham and Commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, N.Y., N.Y. 10012. Tel: (212) 925-7000.

TOROIDS. 88 mh uncased. 5/$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

WANTED: Tubes and all aircraft and ground radios. Units like 17L, 51X, 618T or S. R388, R390, GRC. Any 51 series Collins unit. Test equipment, everything. URM, ARM, GRM, etc. Best offer paid. 22 years of fair dealing. Ted Dames Co., 308 Hickory St., Arlington, New Jersey 07032.

INTERESTING Sample copy free. Write: "The Ham Trader," Sycamore, Illinois 60178.

HEATHKIT SB-300 w/SSB, CW crystals. Mint condx. $219.00 WB2EYZ, 2154 57 St., Brooklyn, N.Y. 11204.

RTTY gear for sale. List issued monthly. 88 or 44 Mhy toroids, five for $2.50 postpaid. Elliott Buchanan & Assoc., Inc. Buck, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

WANTED: Model #28 Teletype equipment, R-388, R-390A. Cash or trade for new amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101.

1000 PIV @ 1.5 amp, epoxy diodes includes disc bypass, caps and bridging resistors, 10 for $3.75. Postpaid USA. With diode purchase. 125 Mf. at 350 volt electrolytic capacitors, 50¢ each. Postpaid USA, no limit. East Coast Electronics, 123 St. Boniface Rd., Cheektowaga, N.Y. 14225.

WE'RE Trying to complete our collection for 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.

SELL, trade or buy Call Books, handbooks, magazines, and old radio sets and parts. Erv Rasmussen, 164 Lowell, Redwood City, California 94062.

SELL: Hallicrafters 18AVQ, in superb shape. Looks like new, $170.00. Will pay postage. WAØDXL, 514 North Washington, St. Peter, Minn. 56082

SAVE. On all makes of new and used esuipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts. 617-598-2530 for the gear u want at the prices u want to pay.

3000 V @ 3mf brand new GE Pyrano oil capacitors, $3.00 each. Can mail, 3-lbs. each shipping weight. FOB P. Wandelt, RD #1, Unadilla, New York 113849.

TELETYPE Wanted—M28 typing units, any condx, keyboard perforators—repertoforators, cast aluminum TD bases, all unused parts. Sell, too, Typetronics, Box 8873, Ft. Lauderdale, Fla. 33310.

R. L. DRAKE Co. Notice: come say hello to the fellows from the R. L. Drake Company at the following conventions: Swampscott, Mass., New England Div. ARRL, May 24-25; Indianapolis, Indiana, Indianapolis Ham Convention, May 24; Sacramento, California, Pacific Div. ARRL, June 13-15; Des Moines, Iowa, National ARRL, June 20-22; Jackson's Mill, W. Va., West Virgina State, July 5-6; Amarillo, Texas, West Gulf Div. ARRL, August 16-17; San Diego, California, Southwestern Div. ARRL, October 17-19. The R. L. Drake Company will be closed for summer vacation on Thursday, July 3, and will re-open on Monday, July 21.

TEST Equipment wanted: Any equipment made by Jewlett-Packard, Tektronix, General Radio, Stoddart, Measurements, Boonton. Also Military types with WRM-( ), USM-( ), TS-( ), SG-( ) and similar nomenclatures. Waveguide and coaxial components also needed. Please send accurate description to Tucker Electronics Company, Box 1050, Garland, Texas 75040

FOR Sale: Hammarlund HQ-170A-VHF, xlnt. cond. $250. (213) 375-1731. 5519 Calle De Ricardo, Torrance, Calif. 90505.

R389, R390, R390A, 51J4, 75A4, 75S3A, NC101X, HR050-T1, HR060T1, SP600, KWM-1, KWM-2, 62S1, 312B5, HA-2, and others. List for SASE. W2ADD.

VHF-UHF Digest . . . Sample 30 Cents. M. Goldman, Box 5001, Milwaukee, Wisconsin 53024.

INVITATION To form a Town Hall group for open discussion, debate and dissent on amateur radio matters. Write WA5TSN, 4023 Mackland Ave., Albuquerque, N.M. 87110. INVITATION. Voudrais 'vous un group les francais aider dans l'etudies pour reseau des emetteurs francais' Ecrit WA5TSN, 4023 Mackland Ave., Albuquerque, N.M. 87110.

REPAIR and calibration service. Write before shipping. Pantronics, Inc., 6608 Edsall Road, Alexandria, Virginia, 22312.

HEATHKIT GW14A, 23 Channel Transceiver, $75.00; S.X. 117-Speaker $225.00; SB 200 Linear $495.00. TH6DX Tribander $85.00; Tristao CZ-454-FS Tower expecting fixture $280.00; Both like new. Ham "M" Rotator $75.00. Tri-ex 60' crank-up tower $125.00. W4MVC, 10 Carien Ave., Asheville, N.C. 28804.

LINEAR, new, pair of 4-1000A, in Class B, grounded grid, vacuum capacitor, adjustable filament and plate voltage. 10 thru 80 meters. Bill Brown, WØSKY, 28 Marine Lane, Hazelwood, Mo. 63042.

SELL: Portable, gas driven D.C. Generator, 16 volt/150 amp. Boonton mod 202-D FM sig. gen. H-P mod ZOZ-B audio osc. all excellent with manuals. $125 each, shipping paid. WB2PLY, Box 207, Princeton Jct., N.J. 08550.

TORIOD Coils 88 mh uncased postpaid 5/$2.00. LaVon Zachry, PO Box 845, Apple Valley, Calif. 92307.

HT-37 perfect condition, $220 & shipping. Lachterman, 3 Archer Ln. Scarsdale N.Y. 10583.

CHICAGO area Hams, complete 6N2 meter station. Seneca-Mohawk extras. WA9DHD, 849-4450 Riverdale, Ill. 60627.

MUST sell immediately: Swan 500 P/S, VOX, D104, all perfect condition, year old. Best offer over $400. Charles Lambert, 314 Jamestown, Williamsburg, Virginia 23185.

WANTED: An opportunity to quote your ham needs. 30 years a ham gear dealer. Collins, Drake, Swan and all others. Also $25,000.00 inventory used gear! Request list. Chuck, W8UCG, Electronic Distributors, 1960 Peck, Muskegon, Mich. 49441.

KWM-2 PM-2 $750. 75A4 Matching speaker $375. HT-32 $275, Jones Micromatch $25, Eico 147AK tracer $25, K2SRO, RFD 1, Millville, N.J. 08332.

EXCEPTIONAL NCX-5 and NCX-A supply/speaker for sale. Was factory-converted to Mark II six months ago, and is in prime electrical and mechanical condition, all manuals service bulletins, Mark II tech sheets and original cartons. Has never been mobile, and absolutely no modifications $429.00 f.o.b., Williamsburg, Virginia 23185. Larry Guenther, W4UJT, 2 Foxcroft Road.

STEREO. Harman Kardon Citation I preamp; Heath AA-121 80w amplifier, AJ-13 tuner AA-32 amplifier. Package only $210 shipped. R. Wanat, 443 Atlas Dr., Madison, Alabama 35758.

BEAM, Hy-Gain TH-4, 2 kw, 4 element tri-bander, like-new, has two coats of zinc chromate and aluminum paint. $65. WA2AEI/1, 48 Offutt Road, Bedford, Mass. 01730.

COILS: Want old plug in type coils, 150W, 500w, 1000 w, fixed center link: all bands: Cash: K6OB, 2007 17th, Bakersfield, California 93301.

HT37/SSX-111 package only $300 HW12A $100. BC221-AK Frequency meter $65. New Johnson 250-38 TR Switch $15. K4EOF.

WANT: Early issues Pioneer Wireless Magazines for W4AA Historical Library. Wayne Nelson, Concord, N.C. 28025.

SELL Hammarlund HQ-170AC w/noise immunizer and Eico 720 transmitter. Will sell separately. WA2GQW, 63 Park Drive, Warwick, New York 10990.

FOR Sale: Heath HW-10 6-meter transceiver, $100; HX-20 and HR-20 with a.c. supply, $225.00. Frank McJannet, 11557 Evanston N., Seattle, Wash. 98133.

SELL Viking II, 122 VFO, new 8298A finals, $85.00. Hallicrafters SX-96, clean, $95.00. Tapetone XC-144 2-meter converter, $40.00. Donald Conley, 90 Donahue Drive, Manchester, N.H. 03103.

CHRISTIAN Ham Fellowship is now organized for Christian fellowship and witness among license amateurs. Free gospel tracts and information on the organization is available on request. Christian Ham Callbook listing members for $1 donation. Write Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Michigan 49423.

COLLINS: 75S-3C 28 bands. Factory wired 3.1 KHz filter. Also SSB and .8 KHz CW filter. New $1000. Want $675. Trade Volkswagon or Jeep. Dave Reichelt, P.O. Box 354, Miramar Bh. Destin, Florida 32541.

FOR Sale: Heath tener, twenty dollars, HW32 Sixty Five, Johnson match box Thirty, Reflected power meter, Five Dollars. W3CBN-18013.

DRAKE 2-B $165. C E 600L $150. both mint, like new SB 200 $225. C E 20A and VFO $70. just fair condx, no promises. K3NFL, 4 Stones Throw Rd. Wilmington, Dela. 19803.

COLLINS 30L-1 linear, $350; KWM-2 (sn. 10377) with Waters Rejection Tuning & 516F-2, $795; hardwood cabinet/desk custom-made for above, $50. Jim Catlin, 813 W. Fern, Fullerton, Calif. 92632.

HT44 Transmitter, SX-117 receiver PS150 Power supply, 454xss mike-200 watts, with all cables for transceive, manuals, extra tubes, excint condx. $530 complete. Ship REA. WB2CKU. 7 Bowen Pl. Stony Brook, NY 11790.

HEATHKIT HW-17 with 47.7 crystal. Perfect condition. Cush-Craft 11 element beam. Will deliver within 75 miles. $150. WA9LUG, 3826 N. Hoyne, Chicago, 60618.

AMATEUR Paradise Vacation: Livingstone Lodge, Mascoma Lake, Enfield, N.H., 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. Al O. Livingstone, W2QPN.

HW-22, Mobile speaker and mike, $70.00. HP-13 $40.00. WAOID/4, 2825 Guyton St., Goldsboro, N.C. 27530.

DRAKE T4XB/R4B. Mint condition. Factory cartons and manuals. $650.00. H. Woerner; WA8UXJ; 2256 Mission Ln. Bellbrook, Ohio 45305.

SBE-33 zero hours since factory overhaul and updating, AC and DC power supplies. $185. Lester Harlow WB6ZNW, 5015 Cape May, San Diego, California 92107.

FOR Sale; Mobile 2 meter FM RCA carfone 150 35 watts-12 or 6 volts-Vibrator supply 146.94 and 146.67-test meter included. All cables-controls-manuals-etc. Ship REA collect-$165.00. Excellent condition WA9MRG, 15898 Belleview Blvd. Menomonee Falls. Wis. 53051.

WANTED: For HRO-60 coils B.C.&D. Also crystal calibrator and NBFM adaptor. L. McCowan, K2CEH, 81 Anytrell Drive, Webster, New York 14580.

SELL: HT-44 and 120 AC supply. Factory recondition $265.00 HT-41 linear, mint condition $170.00. Will ship. WAGKHT, Manfred Siegert, 2224 W. Fletcher, Chicago, Ill. 60618.

WRL's used gear has trial-terms-guarantee! KWM-1 $299.95; Swan 240 $179.95; TR-3 $399.95; SB34-$319.95; Galaxy V-$229.95; Galaxy V1k2-$279.95, HX50-$199.95; Invader 200 $249.95; Galaxy 2000 plus linear $329.95; Ameco R5-$59.95, HR20 $79.95; Hundreds more. Free "blue-book". WRL, Box 919, Council Bluffs, Iowa 51501.

10 Meter amateur band linear R.F. amplifiers for base or mobile use. Base units: "Hornet"-200 watts PEP output-$104.95; "Raider" 400 watts PEP output-$149.95; "Maverick" 800 watts PEP input $244.95. Mobile: "Scorpion"-200 watts PEP output-$99.95; "Bandit II"-up to 500 watts PEP output-$169.95. Electronic relay switching. All units designed for transceiver operation. State drive power when ordering. Dealer inquiries invited. D & A Manufacturing Co., 1217 Avenue C. Scottsbluff, Nebraska 69361.

WANTED: HRO-50 coils also narrow band FM adapter. Send list and price. Ed Wagner WA9SZH, 6307 East Gate Rd. Monona, Wis. 53716.

ESTATE Sale: HT-32A and Turner Mic, $225.00. 75A4 No. 3234, 3 filters, 312A1 station control with patch, $450.00 for both. HQ-129X and speaker $90.00. TS-382 A/U Osc. $125.00. EICO 667 checker, mint. $80.00. All items excellent cond. Also misc. parts and test eqpt. SASE for list. W5LA, 1725 Valmont St. New Orleans, La. 70115.

COLLINS 75S-3 (Serial No. 12,341) Front end modified by VCZ, mint condition, $390. W2VNA, 361 Old Roaring Brook Rd. Mt. Kisco, NY 10549 Tel: (914) MO-6-7378.

10' x 15' foot dish comes apart in 2 sections $100 or best. New 250 watt UTC multitap modulation xmfr. $25. Bob Riese, K3DJC, 868 S. Albemarle, York, Pa. 17403.

SELL: Brand new YAESU Ft-DX-400 transceiver and FL-DX-2000 linear. W8AO, 2912 Riverview Boulevard, Silver Lake, Ohio 44224.

SELL: Like new Drake TR-4 with RV4 and AC supply and DC supply $600. Tom Arseneau, WB2TEJ, 113 Sherwood Rd. Dumont, N.J. 07628.

SELL: Hammarlund HQ-170 $200 Heath DX-60B. $60. Perfect condition. Will ship collect. Richard Carter, 17024 Faysmith Torrance, Calif. 90504. Tel: 213-324-1227.

2x6 meter transmitter, Ameco TX-62 $95. Will ship. W9QHW 230 Weblos Trail. Valparaiso, Ind. 46383.

DX-60A $55. SX-99 $40. H6-1D VFO $10. TA-33 Jr. $50. Reggie Haseltine, 5404 Lambeth Road, Bethesda, Md. 20014.

EICO 753K Transceiver w/transistor VFO, Matching AC Power Supply (AC751). $160 K3MYI/3 P. O. Box 62, College Park, Md. 20740 tel: 301-474-7325.

COLLEGE: Drake T4X. and AC3, mint 20 hr. $365; 2B and 2BS, excellent, late model, $165. WB6REH, Dale Huffman, 5626 Revelstok Drive, Sacramento, Ca. 95842.

7500 PIV Diodes 500 MA mfgrs spec sheet included. $4.95 postpaid. Registered check or M.O. K1AGB, 92 Grove, Plainville, Mass. 02762.

B.T.I. 2,000 watt linear, latest model, 3 months old, very little use. Has 3-1000 Z and works FB. $520, post paid. C. R. Crowley WA4EDW, 2310 Manatee Ave. W. Bradenton, Fla. 33505.

QUITTING Hobby: Sell Squires-Sanders SS-1R receiver. A classic receiver in excellent condition. Recently aligned and checked at the factory, $1000 when new; asking $390. K8QHJ, 3882 Carnegie N W, Massillon, Ohio 44646. Tel: (a.c.) 216-832-8500.

HEATH HR-10B. In excint condx, used less than 7 hours: $65.00 or your best offer. Kenneth Greenfield, Crestview Drive, Watertown, Conn. 06795.

OLD QSTs for sale: 103 QSTs 1929-1949; "CQ", 1947-1957; 16 "Radio" 1938-1941. All good to excellent condition. 25¢ each you pay postage, or make bulk offer. W6SN.

NOVICES: Heath HW-16 tcvr, mint, $85.00. Only used 8 months. Also will consider trade. Make offer. Jim Emerich, WA3JYO, 308 East Derry Road, Hershey, Penna. 17033.

FOR Sale: Collins converter 62S-1 for 6 & 2 meters. In absolute mint condx, four filament hours. $600. W1MZB.

SELL: Heath HR-10B, calibrator, used very little. Just factory-overhauled, aligned. Asking $85.00 or cash offer. John Linn, Jr., 24 Stuart Place, Manhasset, N.Y. 11030.

SELL: Model 15 Teleprinter, with converter, d.c. power supply, and table. In excint condx. $225.00. 707 Kitchell Ave., Pana, Illinois 62557. Lary Craig, tel: a.c. (217)-562-4134.

PASSED General! Heath Novice station, $150.00. HR-10B, DX-60B, GR-64, three xtals, xtal cal., spkr, key es CPO. Prefer not shipping. WB6YZO, 521 Potter, Fallbrook, Cal. 92028.

JOHNSON Invader 2000 and two spare PL175s, $600; Hammarlund HQ-180C and noise blanketer, $300; 2M transmitter, $50.00. 2M converter, $50.00; electronic key, $50. James Long, WA4LYK, 1690 Fairview Ave., San Luis Obispo, Calif. 93401.

HALLICRAFTERS SX-88, anodized front panel, gud condx, $165.00; Millen grid dip meter #90651 $50.00; Millen Transmatch Junior #92201, $50.00. Both Millen units new, never used. All gear with manuals. W. H. Wiley, W6OWD. P.O. Box 659, El Granada, Calif. 94018.

NOVICES. Hammarland HQ-145C w/matching speaker, Eico 720 w/many crystals, relay, Transmatch, in excint condx. WN2HPP. Ed Stafman, 84-15 161 Ave., Queens, N.Y.C. 11414. Tel: a.c. (212)-835-1278.

HALLICRAFTERS SR-160: clean with both power supplies, cables and mike. $175.00. C. W. Galbreath, W6BWA, 3235 Jaylee Dr., Santa Rosa, Calif. 95404.

V-E-R-Y Interesting sample sent free. WØ Bargains Galore, 1949 Van Reck Lane, St. Louis, Mo. 63131.

TRADE Or sell: Britannica Great Books, bookcase, Reading Plan, Gateway: 74 vols. In perf. condx (value $590). Delivered 150 miles radius. Sell to best offer over $400. Trade on// for gear: Collins S/Line or KWM-2; Heath SB-Line. Selling new Vibroplex Original, std. $18. Paul Twomey, Hayden Planetarium, N.Y.C., N.Y. 10024.

SX-111, want $120; write KØFYL, 1805 S. Shields, I-7 Fort Collins, Colorado 80521.

EICO 753I factory-wired, power supply, Euphonics mike, $170.00; Quad 811-A linear, with supply (needs work), $30. Pair 4CX250B, $30. Will ship (at your cost) or deliver in S. Calif. area and in 3-element 20 M beam with 753. J. Stettler, 3806 Euclid Ave., Orange, Calif. 92667. Tel: 639-4438.

ATTENTION Virginians! Wanted, copies of the VA Ham/Va Section Bulletin previous to 1967. Need for my personal collection. Does anyone have any? Phil Sager, WB4FDT, 3827 N. Abingdon St., Arlington, Virginia 22207.

FOR SALE: Eimac 4CX-1000 As, $49.90. K. Park, 18321 Hood Ave., Homewood, Ill. 60430. Tel: a.c. (312)-799-6022.

COLLEGE: Eico 720, Eico 730, SX-99 (As is), Twoer, HE-45A, misc. list. Best offer. WA3JDT, 4 Homer St., Greenville, Penna. 16125.

STEAL! In mint condition! Hallicrafters SR-42A transceiver, 714 mike, CDR rotor, Cush Craft beam: 2 meter station, $100. James Mozzillo, 3144 Schley Ave., Bronx, N.Y. 10465.

FOR Sale: Heath HX-10 Marauder Tran. Factory wired, mint condx, $175.00. James Stafford, K3FCN, 478 Oriole Ave., Philadelphia, Penna. 19128.

SB-401 and SB-301, CW-AM Filters, little usage, in perfect condx, $525.00. MN-2000 match, practically new, $125.00. Will ship. WA2BZY, 55 Deepwood Dr., East Aurora, N.Y. 14052.

SELL Or trade: Heath SB-10 Sideband adaptor, $45.00; Heath Tenner HW-19, $25.00, Harvey-Wells Bandmaster TBS-50D, $35.00. Manuals included. Will ship. K4SXS, 9101 Patterson Avenue, Apt. 2, Richmond, Va. 23229.

GONSET 6-meter Sidewinder (#910A), with A.C. and D.C. supplies, $225.00; Gonset Communicator IV, $175.00; Hallicrafters HA-5 VFO, $50 or you make offer. Vic Mattern 1200 S. Hough St., Barrington, Illinois 60010.

FOR Sale: Atwater Kent, Model 20 in mint condition and operating. HRO5TA1 with coils, also operating. Western Electric 1930 clock condenser mike with new transistor amplifier, operating. Make offers. Wells Chapin, W8GI, 2775 Seminole Road, Ann Arbor, Michigan 48104.

4CX1000A, unused, $109. HA-1 type mercury relays: $5.00 p.p. K3MNJ, 8361 Langdon St., Philly, Penna. 19152.

SALE: Transmatch Sr., Millen 92200, 2 KW, XCL, $119.00; Swan 400, 420VFO, 117X pwr., XCL, $375.00. John H. Bardon, W4RHC, 2238 Morgan Lane, Dunn Loring, Va. 22027.

UNIVERSAL Power Transformers: 115 volts a.c. and 12 VDC primaries. Perfect power for Field Day and/or vacation rig. Transformer only $3.95 each. Available withh complete parts kit. Your QSL will bring details on this excellent item, as well as a list of other available bargains in electronic components and hardware. Bonanza Electronics Div., P.O. Box 62, Florham Park, N.J. 07932.

RESISTORS. Resistors, resistors, resistors. Only 8¢ each. 10/60¢ postpaid. May be assorted. Garrett Industries, 4504 Nunnswood, Lakeland, Fla. 33803.

SB-300 mint condx, all filters and noise-limiter. $215.00, plus shipping. Lt. Doug Henry, OMR, Box 282, Keesler AFB, Mississippi 39534.

FOR Sale: 399C-1 VFO/Spkr (KWM-2) $175.00; HW-12-A, $85.00; KWM-2 (late) 516F-2, $850; 312B-4, $135.00; 75S3-C, $600. James Craig, 29 Sherburne Ave., Portsmouth, N.H. 03801.

SWAN 250-C, Swan 117XC, Swan noise-silencer, Astatic D-104 mike. All in new cartons, two months old. First $450 takes all. Tel: a.c.(412)-243-8140. Jack Salada, K3KGC.

SELL: Drake 2C with 2 CQ, $195.00; Drake MN-4 Matchbox, $50.00; HG-10 VFO, $20. Dick Moench, WA9VDJ, 131 South 24th, Terre Haute, Indiana 47803. Tel a.c. (812)-234-2163.

HOSS Trader Ed Moory says if you don't buy your ham gear from him, you might pay too much. Shop around for your best price and then call the "Hoss" before you buy! New equipment: factory warranty: New early Mod. Swan 500C, $495; SB-34, $349; NCX-500, $329; FTDX-400 xcvr, $479; Galaxy V Mk III, $329. New Rohn 50 ft. foldover twr, prepaid, $188; New Mosley TA-33 and demo Ham-M rotor, $195. Used equipment: HQ-170A, $199; Drake 2A, $149; "Mint" 75-A-4, $325; TR-4, $419; T4-XB, $349; R4-B, $339; Ham-M rotor, $88; Hallicrafters SX-117, HT-44 & supp., $379; Collins S-3 line, complete, $899. Galaxy GT-550, $349. Swan Cygnet, $329. Ed Moory Wholesale Radio Co., Box 506, DeWitt, Arkansas 72042. Tel: (501)-946-2820.

RTTY Model 15, matching table, naugehyde cover, $60; TH-3 Tribander and TR-44 rotator, $90.00. Jones power-SWR meter in custom cabinet, with coupler, $25.00; new Waters hybrid coupler (phone patch), $45.00. Prefer local deals. Jim, K9YVV, 908 Country Lane, Mount Prospect, Illinois 60056.

NATIONAL NC-400 rcvr, near mint condx, with speaker, $400. Triggered sweep oscilloscope, perfect, $100. Glenn Brinks, Granite Springs, N.Y. 10527.

TECHNICAL Manuals wanted for U.S. Navy equipment: radio receiving equipment RDO (Navships 900527). Panoramic adaptor RDP (Navships 900555). Would prefer to buy manuals, but would be glad to borrow (against a deposit if desired). J. Barry-Peters, Blue Coat School, Wavertree, Liverpool, England, U.K.

F.M. gear for sale. Send SASE for list. Melvin Leibowitz, W3KET, 1401 Philadelphia Pike, Wilmington, Delaware 19809.

FOR Sale: Johnson Viking 500 transmitter, manual included. Excellent condition, best offer accepted. Tim Harrington, Jr., WB4 IVP, 9916 Channing Lane, Richmond, Va. 23235.

SELL: Late model Collins 75A-4, serial No. 5173, with 500-cycle and 3 kc. filters, in gud condx, $400. Hallicrafters HT-37, $149.00. Joe Johnson, 300 North Walnut, Clinton, Ill. 61727.

SELL: WØYKA SX-71 receiver, 300 watt 813 home-brew 10 to 160 meters, AM xmtr, QST and CQ 1942 to 1966. Misc. parts and tubes. SSAE for list. G. Lawrence, 615 Woodland, Crookston, Minn. 56716.

SELL Or trade: Rhon #6 meter halo-new, $10.00. 5 element 6 meter beam, new $10. WA4WIA, 1132 So. 18th St., #9 Birmingham, Ala. 35205.

AUTRONIC Keyer w/paddle $45 Webcor regent three-speed two-track tape recorder $45.00; SR160 HBAC c.w. filtr, $75.00. Matchbox w/meter, new condx, $50. RME 4350 $80. CE-100V, $295; Swan 175 w/HP13, $125; CDR TR2, new w/cable, $30. F.O.B. Art Ford, 6 Stoothoff Rd., East Northport, N.M. 11731. Tel: (516)-FO8-6136.

SELL: Viking II and VFO with instruction books, $85.00; Viking 6 and 2 with VFO and instruction books $50; N.C. 300 with crystal calibrator and National 6 & 2 meter converters and converter cabinet and Ameco pre-amplifier, perfect condition, $200. Vibroplex, new $6.00; BC-221 frequency meter with calibration book, $50; T-G 34 keyer, no tapes, $20; Drake phone patch, new, $20. Will trade the above for guns or sell for cash. All of the above in good condition. K5GFB, G. M. Anderson, 520 Pasadena Ave., Metairie, Louisiana, 70001.

HALLICRAFTERS FPM-200 transistorized transmitter-receiver-transceiver, completely self-contained, compact station incorporating advance features not found in any amateur radio at any price. 41 transistors, two VFOs for transmitting and receiving on different frequencies. AM, SSB, CW-VOX. Complete coverage from 10 through 80-meters, plus WWV. 16" wide, 5" high, 11" deep. Complete with AC unit and self-contained mobile bracket. Can be moved in seconds. This magnificent piece for less than half-price. Also linear amplifier HT33B. WA6TLS, 7549 East Fourth Place, Downey, California 90241.

REAL Antenna-Tower security! Stainless, Brass, Bronzes, threaded, washer, hardware. Many antenna accessories. Boom tilting mount, guying hardware, insulators. Lists 20¢. 15¢ credited first order, or basic list only, 6¢ stamp. W8BLR, Walt, Ham Hardware Headquarters, 29716 Briarbank, Southfield, Mich. 48075.

RTTY Gear. Retiring to apartment living. #19 w/perf. auto line feed and carriage return and p.s., $120; #14 type, rep., $35; #14 TD $30. #26 needs motor $20; Demodulators, AFSK, tuning indicators 3", test equipment. Send SASE for complete list. WB4MUB/9, 15 Ohio Dr., Decatur, Ill. 62526.

DRAKE R-4A/MS-4, both in mint condx, plus five SW xtals, all for $300. Jim Kittel, 508 Rosetta Miamisburg, Ohio 45342.

SQUALO for six meters, $7.00. Hy-Gain DB-62 for six and two, $15.00. Jack Elias, 2416 S. 7th St., Philadelphia, Penna. 19148.

GALAXY 2000 Linear and PS, $320; Galaxy DAC-35 deluxe console, $49. Both $350. In excint condx. Buyer pays shipping. Jim Myers, WB6DGJ, 2419 Spring Street, Eureka, Calif. 95501. 443-2817.

HEATH HW-16, only 5 months old, in mint condx. $100 or your best offer. KØWGY/4, 42 Culpeper St., Warrenton, Va. 22186. Tel: (703)-347-7325.

HEATH: Apache Transmitter: $85, manual; Johnson TR switch: $15. Both immaculate. Earl Dridge, WB2GRB, 14 Duryea Place, Lynbrook, NY. 516-LY9-3440. 11563.

JOHNSON Invader 200 watts SSB-CW-AM $200. Drake 2A, 2AC Calibrator, 2AQ Speaker, Q-Multiplier $140. Both good condition with manuals. Cal Birdsall, WA5OVC, 7735 Chelsea, Beaumont, Texas 77706.

HEATH HX20, HR20, ACXDC supplies and mobile mount for all band SSB, CW, fixed, or mobile. $200. Jim Sharp, WØGZH/4, 304 Second Ave., Selma, Ala. 36701 Phone: 205-872-3784.

BEST Offer: BC-779, 14AVQ Antenna, 0-11 Oscilloscope, model 19 teletype set, HH Scott 222 stereo amplifier, AJ-14 FM tuner, 6-meter equipment: LW-80, LW-61, LW-51, HW-29A, 5 element beam. All equipment in good condition. WIEJC, Box 263, Essex, Vermont 05451.

SWAN 500, 117XC, 484X, TH3A-mk3, accessories, excellent condition, $600 complete: student, will sell separately. WA3-EYM, 347 East 37th, Erie, Pennsylvania 16504.

OPENING discount sale on all makes of new amateur gear. Call or write for that special deal-Syncom Electronics, 726 Cypress Drive, Franklin Square, N.Y. 11010 516-489-7662.

WANTED GSB 201 good condition give best price FOB my QTH. L. F. Hess, K5GBR, 522 E. Wichita, McAlester, Okla. 74501.

ANTENNA Bargains-Mosley TA-32, 2 element beam for 10-15-20 meters, used and disassembled, but complete with all hardware and assembly instructions—$25.00. Mosley X-15, 2 element beam for novice 15 meter or general 10 meter use, unpacked, but never assembled, complete—$20.00. Hy-Gain Model 28-8 element 2 meter beam used 6 months complete—$10.00. Pickup at my QTH. Ed Abbot, Phone (212) 641-0502.

FOR Sale: New components for R-390A, one BFO, one VFO, and one RF deck, also tubes for R390A and tubes 416B(6), 2C39A(3), CRC6161(3). Make offer, Ingrassia, WB6ONW, 1047 Jay Street, Marysville, Calif. 95901.

COLLECTORS Item: IRE Proceedings, run 1950 thru 1954, broken 1945 thru 1948. SASE list. Consider Kennedy 110 trade; interested in SR-2000. 1314 Holly Glen, Dallas, Texas 75232. W5LR.

VALIANT: $90.00. You pay shipping. WAØJLD, Rte. 1, Box 866, Alexandria, Minn. 56308.

HALLICRAFTERS HT-32 for sale: $195.00. WB2KBR, Allen Wilson, 15 Wight Place, Tenafly, N.J. 07670.

SELL: NCX-3, NCX-A, linear systems DCPS, Turner SR-90D Mc., coils and whips for 80-40-20, $250.00. Want Johnson Valiant I and Drake 2B with 2BO and 2AC. Will trade. Jim Cary, 1859 Old Meadow Road, Apt. 204, McLean, Va. 22101.

B&W 5100S, 51-SB/B, SSB generator, together, $175.00; HR-10 xcint condx, just realigned, $50. Want: Heath supplies, HP-23 or HP-13. Don Falk, Burton Hall, Oberlin, Ohio 44674.

DISCOUNTS! Big discounts: Antenna tower packages, savings to 20%. Foam/RG8/U .08/ft. w/purchase, Ham-Ms, $99; TR-44, $59; AR-22, $29; AR-33, $39. Save! New displays: Swan 250-C, $459.00; 500C (used), $389; Galaxy GT-550, $399; TR-4, $489; T4XB, $389; R4B, $369; L4B, $650; BTI, $695; Gonset GSB-201-MK III, $339; Swan MK II, $589. Prices F.o.b. Send SASE for listing of used equipment and quotes. We undersell those who won't be undersold! A.R.I. West (L.A. Amateur Radio Inc.) 2302 Artesia, Redondo Beach, California 90278, A.R.I. Midwest (Evansville Amateur Radio, Inc.) 1311 N. Fulton, Evansville, Indiana 47710.

SELL: Station accessories. All in xcint condx: Galaxy V Mk II speaker console, $14.00; Galaxy Crystal calibrator, $14.00; Galaxy DC power supply (mobile), best offer over $65.00; Turner 360 mobile mike, $6.00; 454X fixed crystal mike, $12.00; 454C mike, $6.00; Hustler antenna mast, $6.00; Hustler traps, 75 meters, $9.50; 40 meters, $7.50, 20 meters, $6.50, 15 meters, $5.50, 10 meters, $4.50; Monarch SWR Bridge, $7.50; earphones for Galaxy, $4.00; Homebuilt Preselector for any old recvr, $9.00. Postage not paid. Will mail within 3 weeks. Write: KØVR, Ray Thompson, Jr. 337 52nd St., Des Moines, Iowa 50312.

SELL: Heath HA-14 compact linear, AC and mobile supplies, Mosley Tote-Tenna, Cush Craft 15M, Beam, AR-22 rotor, parts for homebrew linear and supply, home smoke-detecting fire alarms for ur shack, K8IMZ, 1625 North Park, Cleveland Hts, Ohio. Tel: (216)-229-3755.

DX Awards Log, 150-page book gives number and type contact for over 100 major ham and SWL awards. Individual log for each award. $3.95 postage paid ($4.95 foreign). McMahon Company, 1055 So. Oak Knoll, Pasadena, Calif. 91106.

SBE-34 Xcvr, in excint condx, $265.00, "Adventurer", $20.00; Clegg 99'er, $65.00 KØOST, Labor, 6017 Penn Ave., South, Minneapolis, Minn. 55419.

FOR Sale: Hallicrafters HT-37 and HT-41 linear, both are in xclnt wkg condx: $125.00 each. Also Drake 2B and 2BQ spkr, with xtal calibrator in vy gud condx, $185.00. All of them for $400. C. S. Kortman, Morningside Gardens, Apt. 6-F, Norwalk, Conn. 06850.

SWAN Cygnet 260 transceiver 80-10. Never used. In original carton. Won as a prize at Harrison SSB show in New York: $350.00. WA2GXG, 15 Grafton Court, Malverne, N.Y. 11565. Tel: (516)-599-7839.

SELL: HT-37, $175.00 or your best offer; SSB xmtr, also SX-101 rcvr, $130.00 or your best offer. WA1JCT, 83 E. Maine St., Williamstown, Mass. 01267.

JOHNSON 500, 10 thru 80 AM, 500 watts, $275. Lafayette HA-460 6-meter trans. receiver, AC or DC, $85.00. All in exclnt condx. Prefer pick-up deal. Elmer Turner, W1TF, Box 87, Melvin Village, N.H. Tel: (603)-544-3421.

DRAKE T4X and R-4 with power supply. In perfect condx: $625.00 WB2QKG, Saul Slonim, 2727 Ocean Pkwy, Brooklyn, N.Y. 10035. Tel: (212)-891-0222.

HQ-170C. In exclnt shape, 160M to 6M hamband SSB receiver with the following extras: Clock, speaker, factory noise-blanker, 6M preamp, manuals, $145.00. HE45B 6M fixed/mobile transceiver with transistorized vibrator, better than new: $50.00. W2UPC, Forrest E. Gehrke, 75 Crestview Road, Mountain Lakes, N.J. 07046.

QSTS: Odd copies 1946-1967, 4 for $1.00 ppd. B&W 5100 transmitter. Hammarlund HQ-150 spkr, xclnt condx. Both $200. John G. Tate, W3FYW, 9 Diane Dr., Malvern, Penna. 19355.

CLEANING Out: Heath AV-3 AC VTVM, $20.00; Jackson tube-tester, meters, $1.00 each. Also have many capacitors, dial drives, cabinets, hardware items, parts, books, magazines, TM's, and many other Army surplus items. You pay shipping. Send for free seven-page listing. SASE. John Yurcik, 163 Main St., Millburn, N.J. 07041.

SELL: Heath KW linear, Drake 2-A receiver, Heath monitor scope. Leon Steinberger, W2EVV/1, 301 Buckminster, Norwood, Mass. Tel: (617)-762-2353.

KANSAS City area, moving and selling out. SB-Series, HA-14, Comdel, Magnecorder, Sp-400SX, many other items. W9ECV/0. Lawrence, Kansas. Tel: (913)-843-6057.

FILTER-Condensers: Acrovox oil-filled 100 mfd. @ 3000vdc condensers, $30.00 each. Basil J. Weaver, 1821-C Ave. M, Lubbock, Texas 79401.

NOVICES: Used Globe HG-303. Only $50.00 for a modern, compact, grid block keyed, 90-watt transmitter. Ed Knobloch, WB2BDF, 160-33 Highland Ave., Jamaica, L.I., N.Y. 11432.

JOHNSON Valiant Factory-wired, like new, with manual: $110.00. QST, all issues 1948 thru 1958 run. In original mailing jackets. Best offer. W2MGN, 30 Princeton Drive, Dix Hills, L.I., N.Y. 11746. Tel: (516)-FO8-4529.

NCX3 NCXA, mint condx, best offer over $175.00; 4 pos. surplus coax switch with type "W" connectors, $15.00; Monarch TM-18 dynamic mike w/stand, $15.00; Rotron fan $8.00; 100 Kc. cal., $7.00; everything excellent, Norm, WA2ZXM, 33 Ruth Place, Staten Island, N.Y. 10305.

NCX3, NCXA, mint, best over $150.00; Ameco 6 mtr., converter, 12v, $15.00; TX86, 80-6 transmitter, HB supply, $40.00; HE-45, $30.00. Vanguard 6 mtr. transistorized transmitter and converter, $15.00. HB linear 811As, beautifully made, $75.00. Dave, WA2VLF, 1570 Schenectady Ave., Brooklyn, N.Y. 11234.

HAMMARLUND HQ-100 receiver with matching speaker, $89.00. Percy C. Noble, W1BVR, Box 5, Lanesboro, Mass. 01237.

HEATH GR-64 xcvr, like new, manual, $45.00 or will trade for HR-10 Turner CX mike, $5.00. Charles Costa, 1219 Holly, Lodi, Calif. 95240.

SELL: Hy-Gain TH-3, $35.00; AR-22, $18.00. Manuals included. Pick up deal, no shipping, sry! WA2IXG, Theodore Bennett, 23 Hampton Road, Lynbrook, L.I., N.Y. 11563.

SELL: Swan-350, 117-C p/s, $305.00; Valiant I, f/w, $110.00; HW-32, scratchless, $75.00; Adventurer, screen/mod., you make offer. K. Meyers, W81BX/2, 2732 Pearsall, Bronx, N.Y. 10469.

HEATH HR10B, factory-checked, $50.00; Eico 720, $45.00. Both in top condx. Dow-Key 60-262842 relay, new condx, $14.00; Ameco OM monitor, $5.00. 14 Novice xtals, $1.00 each. Lenny Kafka, 133 Bay 31st St., Brooklyn, N.Y. 11214.

SUPERB Drake 2B, 2AC calibrator, Heath Q-Multiplier, $180.00; Mint SB-200 linear, $180.00; GK60G2C relay, $7.00; B&W 550A coax switch, $7.00; Knight SWR, $10; 24-hour digital clock, $10.00. Handbook keyer and paddle, $10. Manuals and original boxes. Tel: (914)-698-7329. Ralph Katz, K2AJA, Glen Lane, Mamaroneck, N.Y. 10543.

SPIDERS For boomless quads. Heliarc welded aluminum. Al's Antenna Accessories, 1339 South Washington St., Kennewick, Washington 99336.

WRITE, Phone or visit us for the best deal on new or reconditioned Collins, Drake, Swan, Galaxy, Hallicrafters, Hammarlund, Hy-Gain, Mosley, Waters, SBE, Henry Linear, BTI linear, towers, Rotators, other equipment. We meet any advertised cash price on most equipment. We try to give you the best service, best price, best terms, best trade-in. Write for price lists. Your inquiries invited. Henry Radio, Butler, Missouri 64730.

FIVE Band DXCC-WAS. Summary tabulation log. Instant check band/country/state contacts. Record both Fone/CW 80 thru 10. Date. Also 160/6. All states/current DXCC countries. Separate listing deleted countries for all-time DXCC record. Total 22 pages heavy paper. $2.00. Kinetic Publications, Room 411, 261 Hamilton Ave., Palo Alto, California 94301.

R-4A w/9 crystals, $320; Collins ARC-2 2-9 MHz transceiver, $80; excellent quality shortwave receiver Hallicrafters ARR-7, 55-42 MHz., 6 position crystal filter, many other features, p/s, $80. Jerry Malone, WØMII/1, 27 Maple, Cambridge, Mass. 02139.

SWAN 350, 117-C power supply with speaker in cabinet, crystal calibrator, microphone, in exclnt condx, $350. Larry Leventhal, WB2DPG, 290 Ninth Ave., New York, N.Y. 10001.

MAINLINE TT/L-2 filters. J-J Electronics, Windham Road, Canterbury, Conn. 06331.

FOR Sale: HROI50T1 with speaker and coils covering 10,15, 20,40 75-80 meters and broadcast band. $175.00. WB2WFR, Mt. St. Alphonsus, Esopus, N.Y. 12429.

FOR Sale: Swan 250 transceiver, mint condition: $245.00. Five-element six-meter Cush Craft beam, $16.00. WA2VFQ, 54 East Williston Ave., East Williston, N.Y. 11596. Tel: (516)-746-3298.

MUST Sell: TA-33, Jr. beam like new, $35.00. Water's Compreamp, $15.00. Swan D.C. module for mobile, #117 power supply. Contact WB2HJW, P.O. Box 2, Garfield, N.J. 07026.

FOR Sale: HQ-110C, $110.00. Bill Geiger, Box 78, Lincoln, Va. 22078.

FOR Sale: HQ-110C receiver, $110.00; Eico 723 transmitter, $30.00; Elmac A-54H transmitter, 50W AM-CW-VFO, $20.00. DuPont oscilloscope, $15.00; various crystals and accessories. You ship. WA5MHR, 975 Lees Drive, Las Cruces, New Mexico 88001.

HT-44 with PS150-120 AC power, like-new condx, $220.00. Heath HP-23 AC power, $13, like-new. All units little used. WA2GWE, N. E. Woodward, Brook Farm Lane, RFD 1-309, Bedford, N.Y. 10506.

WANTED: 2 meter station, AM/SSB. Also 2 kilowatt linear or what have you. E. W. Antonson, 4206 Lombard St., Duluth, Minn. WAØQHC.

720 XMTR: $35.00; SX-111 rcvr, $135.00. Want VTVM, Heathkit SB accessories, HP-23 P S. Will trade. WN2GJT, 23 Birchwood Lane, Hillsdale, N.J. 07642. Tel: (201)-664-4135.

EXCITER C-E 100-V, receiver HRO-60 with product detector, coils A,B,C,D, AA and AC. Both are in excellent condx. Make an offer! Will deliver in the San Diego or Los Angeles areas. P. A. White, W5UIB/6, Box 341 Lemon Grove, Calif. 92045. Tel: 463-8290.

WANTED: Collins 2.1 kc mechanical filter for 75A-4. Write or call E. C. Schmults, 361 Old Roaring Brook Road, Mt. Kisco, N.Y. 10549. Tel: (914)-MO6-7378.

4CX1000A, new, still in sealed plastic. Sell or trade. Mike Pioso, exWH6CZZ/HS2M, 7505 Hopkins Ave., College Park, Maryland 20740.

SALE: Heath SB-300 recvr, in vy gud cond mechanically and electrically. Has SSB filter. $180. WA2SOZ, 1325 Pennington Rd. Teaneck, N.J. 07666.

SELL: Johnson Viking 500. Can be used as an SSB linear. 600 watts CW; 500 watts AM. Will sked on the air. $250.00 freight collect. W2PQG. Stan Sears, 188 Concord Drive, Paramus, N.J. 07652.

INTEGRATED Circuits: new medium power RTL IC's in epoxy TO-5 packages: 900 buffers, 914 gates, 60¢ each; 923 J-K flipflops, 90¢ each. Add 15¢ handling and postage. HAL, Box 365, Urbana, Illinois 61801.

RME-6900 receiver for sale. In mint condx: $240.00 or your best offer. Will ship. All letters answered. WN6WHA, 2266 Albury Avenue, Long Beach, Calif. 90815.

HEATHKIT Marauder, Mohawk combo, complete, operating station: $250.00. Al Shapiro, Nassau St., Islip Terrace, N.Y. 11752.

SELL: Hallicrafters HT-44, SX-117, a.c. pwr. supply, Heath Ham-Scan. Will sell separately or as a unit for $450. Also Heath SB-110A w/pwr supp. $250; TX-1 Apache, $50; Ameco TX-62 w/VFO, Johnson 6N2 xmtr, Nuvistor conv. 50, 144 & 432 MHz, Hy-Gain beams, 3-el. 20M, 6 el. 6M and 8 el. 2M. Offers wanted. R. Petrushun, WA2IRN, 138 Coe Ave., Hillside, N.J. 07205. Tel. (201)-452-4708.

WANTED: Early wireless receivers and transmitters prior to 1926 for private collection. Jack Swanson, W5PM, RFD #1, Box 399, Covington, Louisiana 70433.

2NB Blanker for sale: $12.00. Howard Ball, WB2PUI, 2700 Grand Concourse, Bronx, N.Y. 10458.

MOTOROLA VHF-FM Communications gear wanted. Send price and description. John Gardenour, Ave. A. Melbourne Beach, Fla. 32951.

HW-32 Heath realigned. HP-13. Both $110.00. Hustler antenna, $10.00. WA5ERC/Ø. Box 29. Columbia, Missouri 65201.

COLLINS 75A4 receiver, like new condx manual, 0.5-3.1 filters, speaker, $350.00. Tom Jones, 14 Gragmere Rd., Suffern, N.Y., 10901. Tel: (914)-357-4406.

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NCX-5, Mark II, NCXA AC supply, with XCU 27 calibrator. Like new condx. $400 firm. K4CRX. Lloyd Matthews, 1154 Ridgetop Drive, Chattanooga, Tenn. 37421. Tel: 892-0919.

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SB-500 (for HW-100), $190; HW-18-3 (three heterodyne xtals) $80; SB-310 (plus SBA-301-2; SBA-310-2; SBA-310-3), $295.00. Built by Heath engineer. J. Taschetta, RR 1, Box 11, Bridgman, Michigan 49106. Tel: (616)-465-1508.

COLLINS 75A3, $175; Hunter 2000C, $350; Heath SB-100, $295; Drake R4A, $285; T4X, $295; 1A, $125; Lafayette HA-350, $75; National NC-81X, $45.00. Dr. Tom Nash, W5NWA, 1100 Canterbury, Dallas, Texas 75208.

FOR Sale: my spare Collins 75A4 receiver. Late serial number, vernier dial, 3.1 kc. filter; c.w. crystal filter optional, little used. With matching Collins speaker and book, $350.00. Gene Hubbell, W7DI, 6633 E. Palo Verde Lane, Scottsdale, Ariz. 85251.

CLEANING House: Drake 2A receiver w/calibrator, $150.00; Johnson Ranger I, w/PTT, $75.00; B&W 51SB sideband adaptor, $70; commercial 2M converter, 14 MHz outp., $15.00; Paco S-50 5" oscilloscope, $30; Dumont 274-A 5" oscilloscope, $30; BC-603 receiver, $15.00. SASE for list of goodies. Want 5-band transceiver. Robert Seydler, 7826 Belbay, Houston, Texas 77033.

HEATH SB-300 receiver, with SSB, AM, and CW filters, $215; SB-400 transmitter, full crystal pack, $215.00; each carefully checked, aligned and in excellent condition. W. C. Hall, 1400 Owens Rd., S.E., Washington, D.C. 20021.

SELLING: Immaculate 75A4, late serial No., $425.00; Globe King 500C, C-2 20A, $90; Sixer, $35.00; 6 meter FM xmtr-Rcvr, $50; 3-element Fiberglass quad, $80.00 TH6DX $80; 35 ft. tower, AR-22 rotor, S-40A, Hallicrafters Panadaptor. SASE. W9TQA, 2521 Clara Ave., Fort Wayne, Indiana 46805.

MOSLEY Classic 33 beam, 100 ft. RG-8/U, mast, $100; Central 100V, $385.00; BC-455A, power supply, $18.00; 24-hour digital clock, $8.00; Dow-Key coax relay, $9; B&W coax switch, $8; 40 and 80 meter inverted Vs, tunable, Hy-Gain insulators, plastic end ropes, 120 ft. RG-8/U each, $15.00 each; home-brew code monitor, $15.00. WA9SJU, David Paskin, 1201 E. Fairview, South Bend, Ind. 46614.

SELLING Out: KWM-2 with speaker, extras and 516F2, $625.00, directional wattmeter, $50.00. Heathkit SB-200, $175.00; Monitor 'scope, $45.00; grid dip meter, $15.00; TA-33, $65.00; U. S. Fiberglass cubical quad, $50; Ham-M with 175 feet cable, $60.00; NC-155 with crystal calibrator, $85.00. Other antennas, microphones, surplus and parts at bargain prices. Also antique radio items, books and magazines. SASE for lists, info. W1FDL, RFD 1a, Gardiner, Maine 04345.

CRYSTALS: Amateur, MARS, commercial, marine, etc. Novice 40 or 80 meter bands type FT-243, $1.50 each; 3400 to 10,000 kcs. etch to frequency, 0.1%. Type FT-243, $1.90 each, 5 or more, $1.50 each. Add 50¢ for .005% accuracy. 2000 to 3399 kcs. .01%. $2.50 each. Add 50¢ for .005% accuracy. Add 50¢ each for metal type HC6U. State your frequency and type. Quantity prices on request. Postage prepaid. Quality crystals since 1929. Precision Piezo Service, 427 Mayflower St., Baton Rouge, La. 70802.

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WANTED: Gonset No. 3211 2-meter linear, VFO, Comm. III. J. Gysan, W1VYB, 53 Lothrop St., Beverly, Mass. 01915.

HEATH Complete station: HR-20, HX-20, HP-20, $175.00; Gonset 2-meter Communicator GS-105, $150.00. All with manuals. Shipping extra. Gilbert Voyles, W6TOD, 5103 Marshburn Avenue, Arcadia, Calif. 91006.

COMMUNICATOR IV, 6 meters with Communicator IV VFO, both for $185.00; two Waters coaxial filters, one 2 meters Model 373-22, $15.00, the second, 6 meters Model 373-6, $15.00. Moving! Must sell antenna system intact; includes Amphenol heavy-duty rotator and indicator, TA-33 Senior Mosley Tribander 380 ft. transmission lines (2 RG-8/U poly foam, 1 RG-8/U) and 100 ft. 11 conductor rotator-indicator connector cable, plug terminated. All for $95. Buyer to remove. Ed O'Brien, W2IW, 86-10 34 Ave., Jackson Heights, L.I., N.Y. 11372.

SELL! Swan 500C with matching AC power supply, $500, and NC300 receiver with xtal calibrator, $140, both in excellent condx. Also Dow-Key relay, $10.00; D-104 mike with PTT switch, $15.00; Midland SWR bridge-meter $10; Brown deluxe hand-key, $5; Vibroplex bug, $10; Hy-Gain 14AVQ antenna with 80 M coil, $25.00; Conar signal generator, $20.00; Knight KG600B tube-tester, $25.00; Knight KG640 meter, $20.00. $750 takes all! Stanley Bahl, WØLZP, 10214 Meadow Wood Drive, Overland, Missouri 63114. Tel: 426-7458.

FOR Sale: Swan 500, Swan AC and DC power supplies, 444 microphone, 14BTV antenna, xtras, in mint condition. Original owner, $595. WA6GGC, 29438 Stonecrest Rd., Palos Verdes Peninsula, Calif. 90274.

NEW Galaxy GT-550, SC-550, AC400, demonstrator, one hour use. Warranty cards, $450.00; 32S3, AC supply, $490. Telrex 20M 546 beam, like new condx, complete, factory crates, $374. KWM-2, PM-2, mint, $735.00. Sell or trade for linear or sideband gear. Don Payne, K4ID, Box 525, Springfield, Tenn. 37172.

DON And Bob new gear specials. Galaxy R-530, $625.00; Hammarlund HQ-215, $475.00; Hammarlund HQ-180A clock, $445.50; Tri-Ex W-67 freestanding crank-up, prepaid freight (reg. $851.50) $725.00; TH6DXX Hy-Gain $138.00. Write for quote. Used Collins KWS-1, 75A-4 with cables, relay $1000 Cash. 75A-4, $375.00; KWM-1 with NB, AC supply, $350.00; 32S-3, $595.00. New, guaranteed items, Motorola HEP-170 epoxy diode 2.5A, 1000V, 39¢; TopHat 600V, 1A 25¢; Telex HMY-2000 stethescope headset, $3.95; 1000KHz HC6/U crystal, $3.95; 28V 8A. transformer $6.95; 6V 12A $3.95; 12V.6A $3.95; complete export facilities. GECC Finance, Bankamericard, prices for Houston. Madison Electronics, 1508 McKinney, Houston, Texas 77002. Tel: (713)-CA4-2668.

SELL: Heath HW-100, HP-23A AC supply; perfect condx, $285.00. WA9AUU, J. Cain, 2415 West Main, Richmond, Indiana 47374.

SALE: Apache transmitter and SB-10 SSB Adaptor; HQ-170AC receiver. In fine condition. You make offer. WA3BBB, 1522 Longshore Avenue, Philadelphia, Penna. 19149.

JOB Wanted: summer. Beginning graduate student holds B.A. in sociology. Advanced class ham ticket. NYC preferred. Howard Ball, WB2PUL, 2700 Grand Concourse, Bronx, N.Y. 10458. Tel: LU-4-0316.

FOR Sale: KW using two 813s with power supply, $110.00. Handbook keyer using two 12AU7s, $10.00. Both are in xclnt condx. WA2YYJ, Larry, 700 West 178th St., New York, N.Y. 10023. Tel: WA8-9067.

SELL: HT-32, vy gud condx: $225.00. WA2BYB, Eric M. Crawley, 8 Fulton Ave., West Long Branch, N.J. 07764.

FOR Sale: HT-37 xmttr, $200; HQ-1704 receiver, $200. In excint condx. Toni Adler, WB2QSK, (Tel: 914-723-3041) 2 Garden Rd., Scarsdale, N.Y. 10583.

SELL:Heath Pawnee, 2-meter transmitter/receiver with beam antenna and instruction book. Excellent condition. Lesklnen, 33-45 172 St., Flushing, N.Y. 11358.

NEW 6 meter KW linear, $95; 75A4 w/$175 Collins noise-blanker, only updated authorized mods, $395; new Hy-Gain $90 calibrated stainless tape antenna, $45.00; few premium VHF; UHF converters, list, stamp. W4API, Box 4095, Arlington, Va. 22204.

SELL Or trade. Heathkit depth-sounder Model MI-11A. Waters Clipreamp Model 372, Gonset Monitone oscillator-Monitor Model 3302, Metrodynamics Compreamp model CPH, P&H audio compressor model AFC-2, all have instructions. K7AGJ, 1523 "C" St. SW, Ephrata, Wash. 98823.

E-Z Way Tower, in excellent condition. Separate crank-up and over. Special ground post. No guys required. Galvanized. 41 foot t tower. Up to 46 fee with 2-inch mast. Designed for Ham-M rotor. Will fit others. Cost $320.00 Any reasonable offer takes it. K7DVT, P.O. Box 15606, South Salt Lake, Utah 84115. Tel: (801)-486-2073.

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SB-301 receiver, perfect, factory-tuned and aligned, with SSB and AM filters, $250.00. P. Margulies, K2GYY, 25 Fern Way, Berkeley Heights, New Jersey 07036.

SWAN 350, 117 a.c. P/s, Knight MK, Drake TV1000, SWR bridge, all in gud condx, $380. Lloyd Wilkins, 212 Dorado Ridgecrest, Calif. 93555. Tel: 375-4972.

MUST Sell: Complete station, Drake 2-C receiver with 2 CQ and calibrator, $165.00; Galaxy III, $145.00. Gonset GSB-201 linear, $140.00; Heath HW-12A, $65.00; Swan Mark II linear, $250. Steven Sever, 3102-48th, Lubbock, Texas 79413.

SELLING Complete Station! Hallicrafters SX-115 (mint), $199.00; Hallicrafters HT-33A linear, $150.00; Collins 75A-4, $275.00, and Drake TR-3, $290.00. New and still in the box: National NCL-2000 linear. Complete with all cables and warranty cards. $450.00. Martin Mitchell, 2128-70, Lubbock, Texas 79413.

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SELLING Complete station, Hammarlund HQ-180 with speaker, $165.00; Viking Valiant, $50.00; TH-4 beam, $40.00; AX 52 tower, $25.00. D-104 mike, $15.00. Other accessories or your best offer for all. Verne Cox, 5711 MacArthur Blvd., New Orleans, La. 70114.

HW-32A in excellent condition, $89.00 with homebrew, rugged power supply, $99.00. WA1IRU, Art Karis, 14 Caldwell St., Fitchburg, Mass. 01420. Tel: a.c. (617)-392-3469.

SELL: National NC-270 rcvr. 80 thru 6, $75.00. Heath HX-20 SSB rig, 80 thru 10. HB power supply, $100. Clean, no scratches. D. Klinger, 801 S. 60th St., Harrisburg, Penna. 17111.

FOR Sale: Heath SB-300 receiver, clean, $195.00; HRO-5 receiver all coils, 50 kc to 30 meg. Ham-band coils band-spread, power pk and n/s. Instruction book. $135.00. W2AOM, 67 Juniper St., Dumont, N.J. 07628. Tel: (a.c. 201)-384-1264 evenings.

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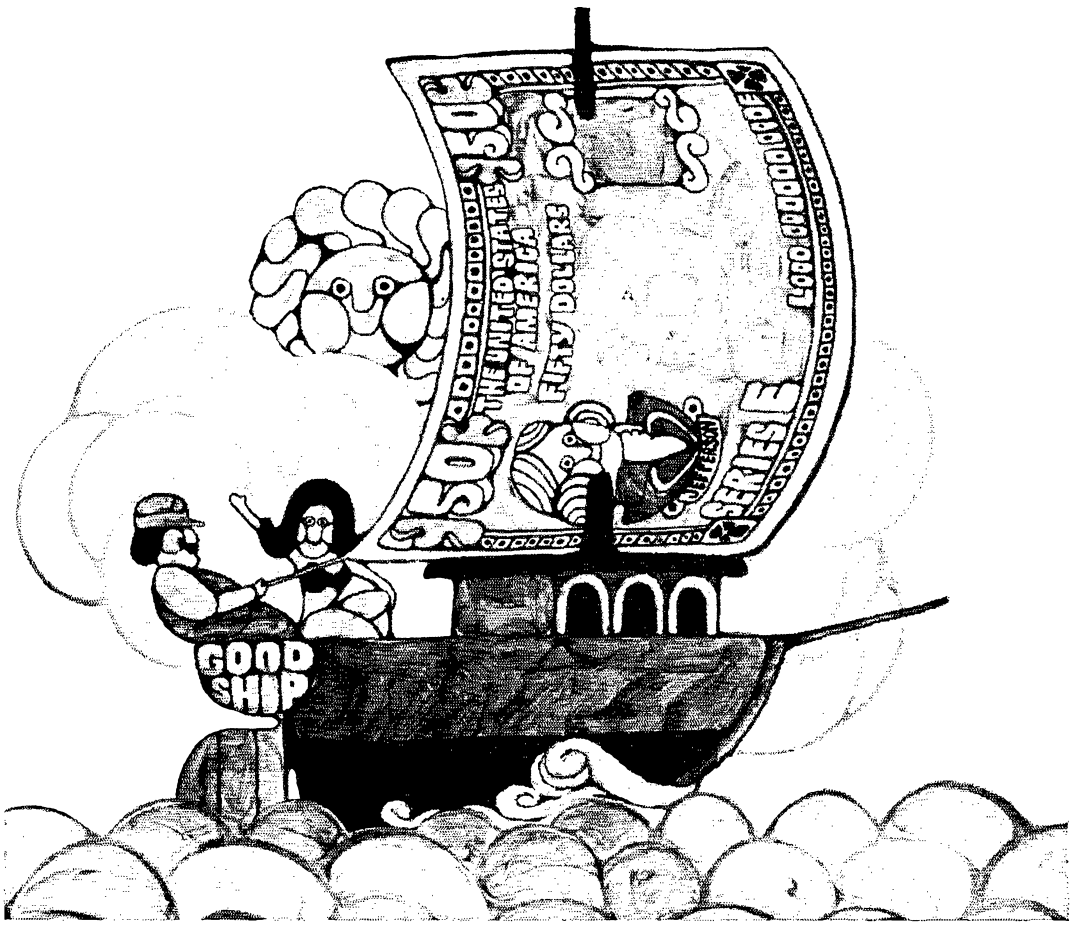

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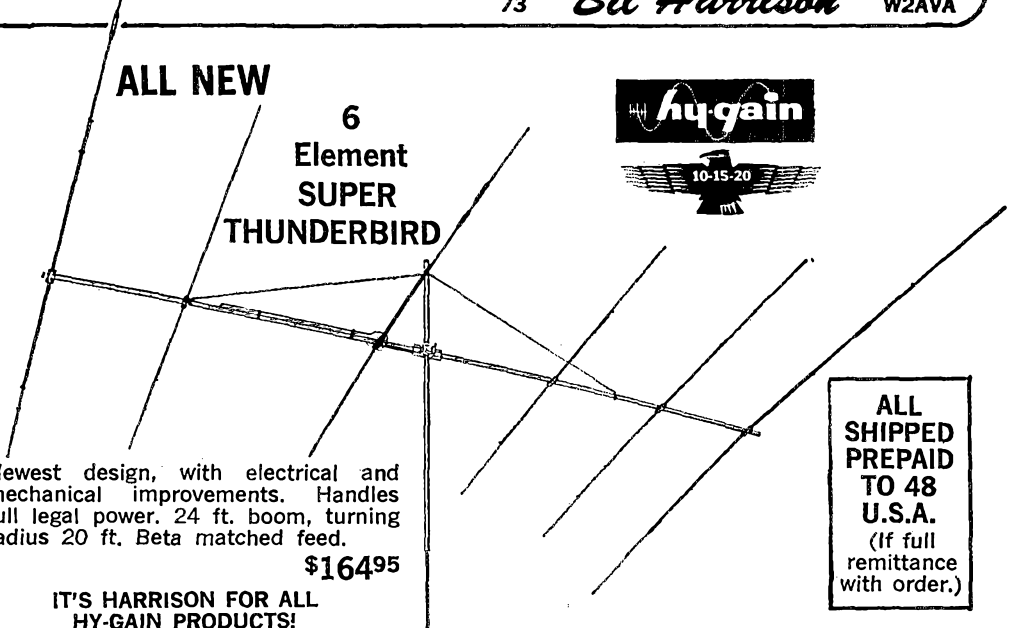

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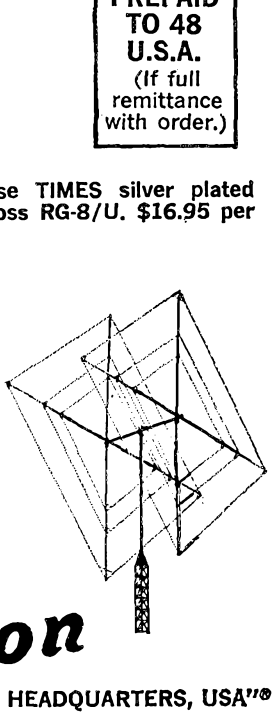

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NEW Heathkit® SB-500 2-Meter Transverter

Put Your Heathkit® SB-Series Rig On "2" For Only $179.95*

• Provides complete 2-meter capability for SB-101, SB-110A, HW-100 and the SB-301/401 combination • USB, LSB & CW operation • 144 to 148 MHz coverage • 130 watts PEP input ... 50 watts PEP output • Highly sensitive receiver • Fast, easy tuning • No cable switching • Handsome SB-Series styling

Now, in answer to many requests, Heath has a fast, low cost way to put you on two meters . . . without having to buy a whole new rig. If you own an SB-101, SB-110A, HW-100 or the SB-301/401 combo, you're almost there. Here are the details on how to get on "2" — the SB-500 way.

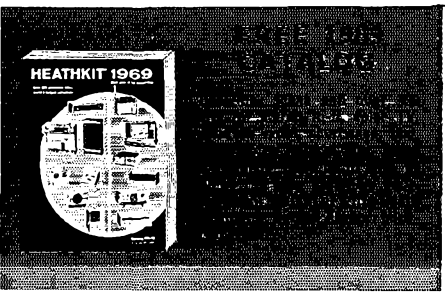
Here's How It Works. In the receive mode, the SB-500 takes an incoming 2-meter signal and heterodynes it to either 6 or 10 meters, where the low band gear handles it in the usual way. On transmit, a 28 or 50 MHz driver output is heterodyned to 2-meters, amplified and coupled to the output.

Here's What It Delivers. When used with any of the gear above, the SB-500 2-Meter Transverter gives you complete 2-meter SSB or CW transceive operation from 144 to 148 MHz. A pair of inexpensive 6146's in a push-pull AB1 circuit deliver a husky 50 watts output into a 50 ohm nonreactive load. Final plate voltages are derived from the driving unit, but all other operating voltages come from a built-in power supply — no extra supply to buy. Receiver sensitivity is 0.2 uV for a 10 dB S+N/N ratio... that means solid copy QSO's. A front panel on-off switch places the SB-500 into operation or allows the low band gear to operate straight through to an antenna or drive a linear . . . a combination of complete rear apron jacks and internal relay switching eliminates troublesome cable changing. Reliable relay-controlled T/R switching too. Tuning is fast and easy, and a built-in meter monitors either final plate current or relative power. ALC voltage is supplied to the driver to aid in preventing over-driving and distorted signals. A built-in 1 MHz crystal calibrator is also included.

Solid, Stable Construction. The sensitive receiver and oscillator go together on well planned circuit boards. To insure stability and make adjustment more exact, the transmitter and power supply components are ruggedly chassis mounted. The SB-500 comes complete with all interconnecting cables too. Start enjoying the QRM-free world of 2-meters today ... with the new Heathkit SB-500 ... another hot one from the hams at Heath.

Kit SB-500, 19 lbs.....**$179.95***

SB-500 SPECIFICATIONS — RECEIVER: Sensitivity: 0.2 microvolt for 10 dB signal-plus-noise to noise ratio for SSB operation. **Spurious Response:** All are below 0.1 microvolt equivalent signal input, except at 145.310 MHz (50 MHz IF only). **Antenna Input Impedance:** 50 ohm unbalanced. **TRANSMITTER: DC Power Input:** 130 watts PEP. **Power Output:** 50 watts (50% duty cycle). **Output Impedance:** 50 ohm with less than 2:1 SWR. **GENERAL: Frequency Range:** Any 2 MHz segment between 144 & 148 MHz into 50 MHz or 28 MHz tuned IF. **Mode of Operation:** SSB or CW only. **Power Requirements:** (1) 120/240 VAC, 50/60 Hz at 82 watts (internal). (2) 700 to 800 VDC at 200 mA (from driving unit). **Fuse:** ¾ ampere slow-blow for 120 VAC (formerly 3AG); ½ ampere slow-blow for 240 VAC. **Front Panel Controls:** Meter-calibrate switch, final tuning, off-on (function) switch, preselector, final loading, driver tuning. **Chassis Controls:** Relative power adjust & bias adjust. **Rear Apron Connectors:** RF output, ALC, linear relay, relay, drive, power plug, low f receiver, low f antenna, fuseholder. **Tube Complement:** 6CB6 transmitter mixer, 6CB6 crystal calibrator, 6DS4 receiver RF amplifier, 6DS4 receiver mixer, 12GN7 transmitter RF amplifier, (2) 6146 final amplifiers, (types 6146A or 6146B may be directly substituted), 7059 heterodyne oscillator-amplifier, 8156 RF driver, 0A2 voltage regulator. **Diode Complement:** 5 silicon diodes, 750 mA, 500 PIV; 3 in power supply, 2 in ALC. 1 Germanium diode, IN191: REL PWR. **Cabinet Dimensions:** 12¼" W x 6⅝" H x 13" D. **Overall Dimensions:** 12¼" W x 7-15/16" H x 14" D including knobs and feet. **Net Weight:** 14½ lbs.



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AM-215

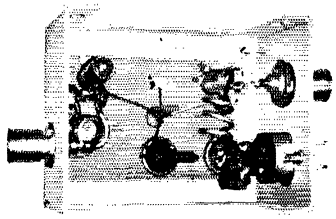
Here are two ideal VHF projects-pre-amps to "soup up" older receivers and help dig for the tough ones almost down to noise level. Both take advantage of the outstanding performance of RCA MOS/FET units—metal oxide semiconductor field effect transistors... high gain, low noise, improved sensitivity.

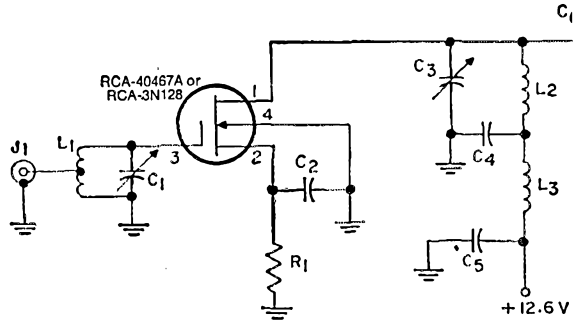
Full details are available in the November and December 1968 "Ham Tips". Write RCA Electronic Components, *Commercial Engineering* Sect. **F-37SD**, Harrison, N. J. 07029 for copies.

All RCA devices listed are available from your RCA Industrial Solid-State Distributor.

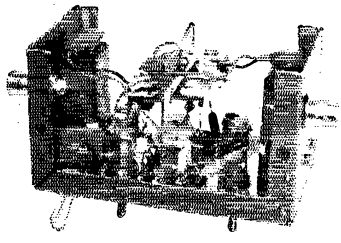
10 meter and 2 meter Pre-Amps

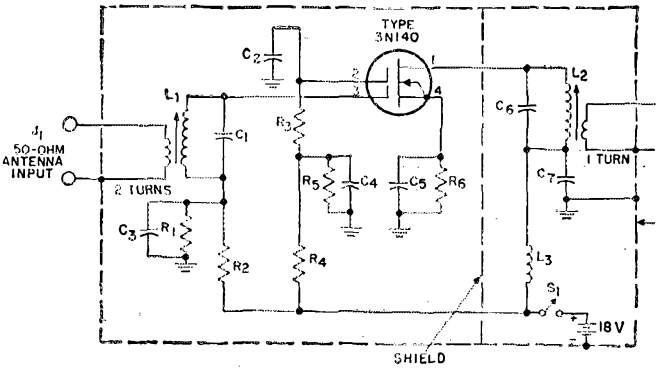
Single Gate MOS/FET 2M Pre-Amp





Dual-Gate MOS/FET 10M Pre-Amp





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