

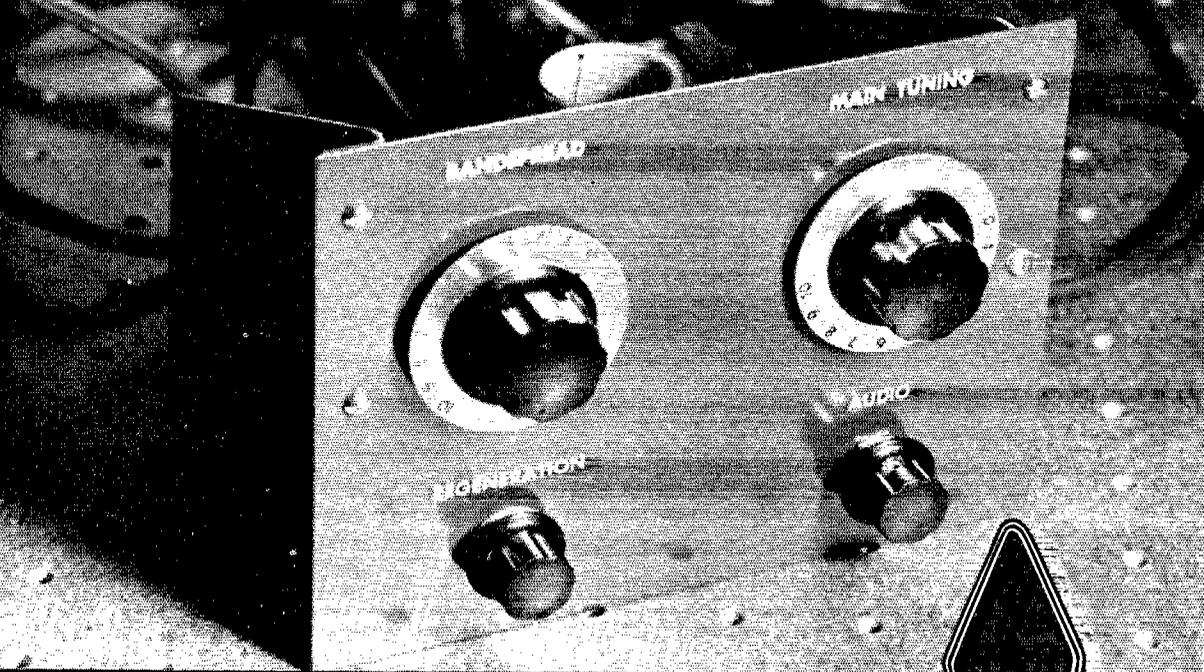
June 1968

75 Cents

# QST

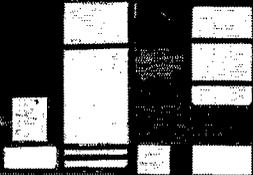
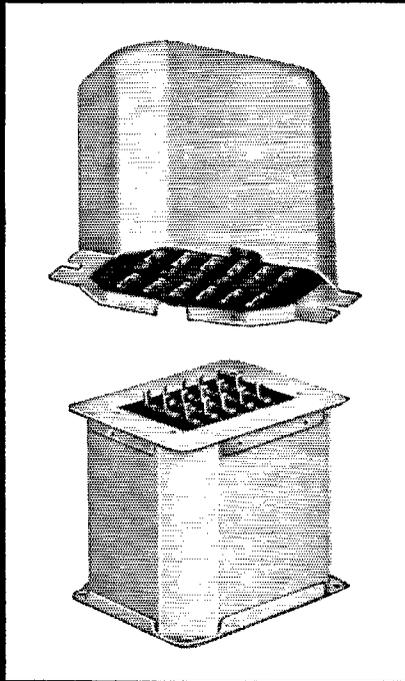
devoted entirely to

# amateur radio





# "S" SERIES



# 10 reasons to buy Hallicrafters' new SR-400 Cyclone

| FEATURE                                | Hallicrafters SR-400          | Collins* KWM-2                | Drake* TR-4                   |
|----------------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Power Input                            | SSB=400 watts<br>CW=360 watts | SSB=175 watts<br>CW=160 watts | SSB=300 watts<br>CW=260 watts |
| Accessory "dual receive" VFO available | Yes                           | No                            | No                            |
| Noise Blanker                          | Yes                           | \$135.00<br>Accessory         | No                            |
| Receiver Incremental Tuning            | Yes                           | No                            | No                            |
| Built-in notch Filter                  | Yes                           | No                            | No                            |
| Sharp CW Filter                        | Yes<br>200 cycles             | No                            | No                            |
| Sensitivity                            | .3 uv for<br>10 db S/N        | .5 uv for<br>10 db S/N        | .5 uv for<br>10 db S/N        |
| 1 kHz dial readout                     | Yes                           | Yes                           | No                            |
| Carrier Suppression                    | 60 db                         | 50 db                         | 50 db                         |
| Unit Price                             | \$799.95                      | \$1,150.00                    | \$599.95                      |

\*Data from published specifications.

## Now: can you think of one reason why you shouldn't?

Superb sensitivity, 400 watts RF, 200 cycle CW selectivity, receiver incremental tuning, 1 kHz readout, amplified automatic level control, exclusive notch filter! There's even the HA-20 dual receive VFO for sensational, award winning DX operation. No matter what specifications or features you choose as a standard of comparison, the exciting new SR-400 fixed/mobile transceiver is unsurpassed. Unsurpassed feature for feature. Unsurpassed for rugged dependable performance in all environments. Unsurpassed in value and versatility. Prove it to yourself. Write for complete specifications in a four page brochure. See your Hallicrafters' distributor today.



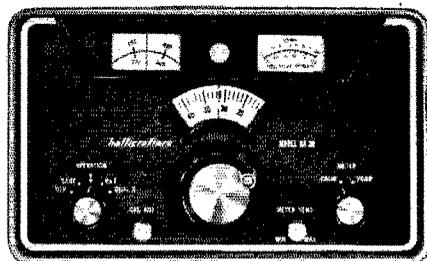
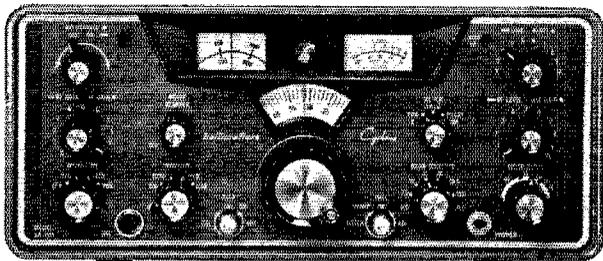
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600 Hicks Road  
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SR-400 Cyclone Transceiver

See your distributor for special offer on HA-20 VFO

HA-20 VFO



Export: International Dept. Canada: Gould Sales Co.



# SUITCASE SYSTEM

Slide a PM-2 Power Supply on the back of your KWM-2 and put them into a CC-2 Carrying Case. Slip the 30L-1 Linear Amplifier into another CC-2 and you're DXpedited. Plug in the antenna, microphone, and three patch cords and

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**OUR COVER**

Integrated circuits and FETs go together in a compact assembly to provide this 1-30 Mc. beginner's battery-operated receiver. See page 11 for the complete story.

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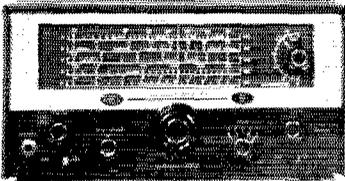
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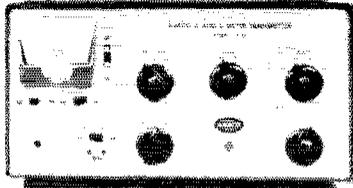
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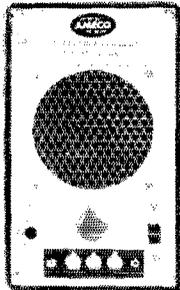
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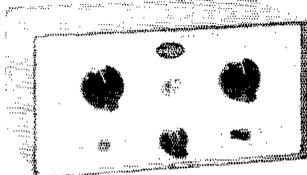
MODEL OM



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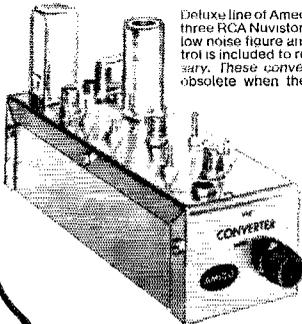
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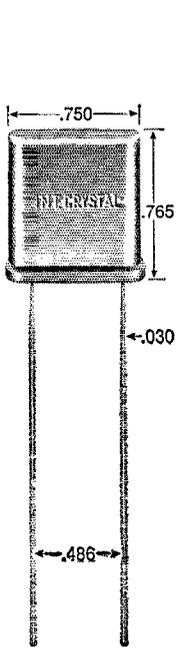
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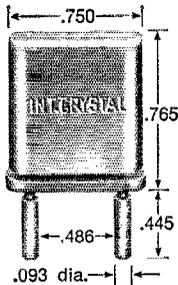
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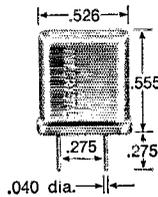
### HOLDER TYPES



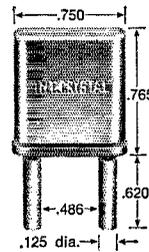
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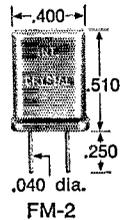
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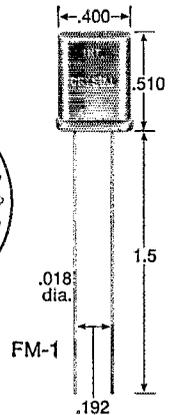
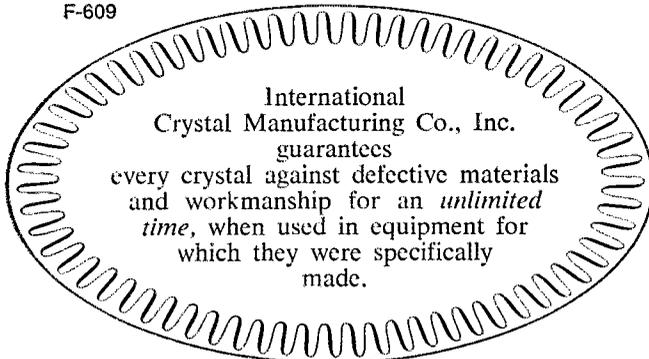
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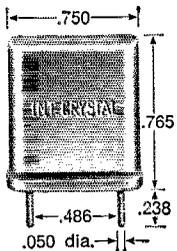
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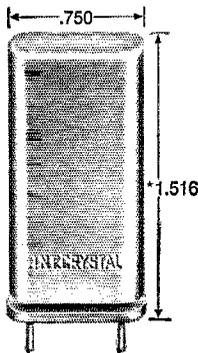
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F-605



F-13

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

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

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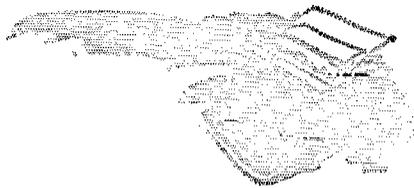
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# "It Seems to Us..."



*Fifth of a Series:*

## THE APPLIANCE OPERATOR

Amateur radio has its terms of derision and disfavor . . . and the phrase "appliance operator" has come to be one of them.

The trouble with this phrase is that it has more than one meaning. In the broadest sense, it is descriptive of any amateur who uses commercial gear in contrast to home-brew equipment. In that sense it applies to just about all of us. For many reasons it has become either impractical or undesirable as far as most hams are concerned to construct at least major pieces of equipment. For some the advanced technology of single sideband is beyond our practical capabilities. For others economics which dictate a low resale value for home-brew gear is an important factor. And for still others it is simply a lack of time or inclination.

Whatever the reason, the fact is that in this sense, the vast majority of us are indeed "appliance operators." And there is certainly nothing wrong with that.

On the other hand, many of us to whom amateur radio is an essential and who understand the need to protect its usefulness and hence its future, take a dim view of the occasional amateur whose sole interest and concern is with his own gratification, who wants only to "plug in and go on the air," who could not care less about radio theory and practical operating principles, or what goes on behind the dials and panels of his equipment. The trouble with this kind of individual — concerned only with his own personal pleasure — is that he contributes nothing to an activity which has a proud tradition of useful service on many levels. This has not only been a prime justification for the allocation of our frequencies, but a strong bond among amateurs everywhere. And so the ham who neither understands nor shares this feeling is referred to as an "appliance operator."

Actually, we suspect that no ham really wants to be in this category. We all want to feel the things we enjoy have more purpose than just our own pleasure. This is especially true in amateur radio where there are so many opportunities to be a part of useful and important activities which only enhance the pleasure of being a ham.

Part of the answer, we are sure, is for those of us who are members of local radio clubs and of the League to make more of an effort to extend a welcoming hand to new amateurs and other hams in our communities who have not really had the opportunity to learn what our fraternity means and is.

And perhaps each of us could constructively examine our own status. Do we reasonably measure up to the standards — in regulations or self-imposed — of operating and technical ability as well as courtesy? Does our presence add to the stature of amateur radio, or are we interested only in our own personal gratification?

Is ham radio better off because of our being a part of it?

**QST**

The ARRL Board of Directors met in Hartford on May 3-4, 1968, preceded by two days of informal sessions, and inspections of the Hq. plant and W1AW. Particular attention was devoted to general public relations matters and promotion of more interest in amateur radio. The Board authorized production of a half-hour color motion picture for showing at civic clubs, in schools, on television broadcast stations, etc. Studies were ordered of an additional League publication aimed at early teen-agers, and of methods of simplifying procedures for Novice and other mail examinations. Additionally, FCC will be asked to permit former Novices, current Technicians, and current Novices with a one-year license, to apply for an additional Novice license having a term of two years.

FCC will also be asked again to defer the effective date of incentive-licensing changes in the 6-meter band.

The Planning Committee's proposal for a structure of Advisory Committees, composed of selected League members expert in various fields, was enthusiastically adopted, and a committee of three directors requested to work out detailed rules of operation and procedure within 90 days. Two such committees -- one on V.H.F. Repeaters and a second on Contests -- were granted initial approval for an experimental period of 18 months.

Studies by various committees were ordered on the subjects of affiliation of nets in the same manner as clubs; the over-all field organization; band occupancy and usage throughout the amateur spectrum; restriction of contest activities to sub-bands; reduction of r.f. interference to hi-fi and other devices through improved manufacturing processes; a League publication on f.m.; and the use of League Hq. facilities in the event of war. After exploration of propriety under post office rules, the General Manager is to report in detail on the feasibility of an outgoing ARRL QSL bureau.

Roemer O. Best, W5QKF, and P. Lanier Anderson, Jr., W4MWH, were newly elected as vice presidents, while President Denniston, First v.p. Groves, Honorary v.p. Handy, Secretary Huntoon and Treasurer Houghton were re-elected for two-year terms. Directors Compton, Eaton and Smith were re-elected to the Executive Committee, and Director Harry J. Dannels, W2TUK, was newly elected to that Committee.

A five-band DXCC award was instituted, and DXCCers with 300 country credit may now submit cards for endorsement in increments of 5 (rather than 10) on their present DXCC certificate.

The program of assistance to amateur groups in other countries will be expanded, with emphasis on a club-to-club liaison for mutual exchange of information and knowledge.

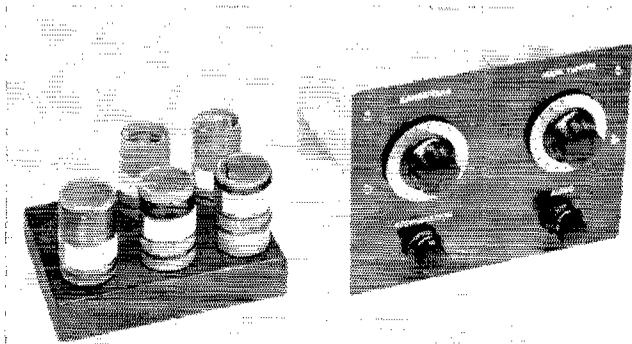
The Board expressed its sincere thanks to many individuals and groups -- FCC, DOT, vice directors and other elected and appointed League officials, the Intruder Watch, etc.

Minutes of the meeting will appear in the July issue of QST.

# The "GCR-2" Receiver

1.8 Through 30 Mc. With Two Hunks of Silicon

Beginner's solid-state receiver. The plug-in coils are at the left, plugged into a wooden base which serves as a coil rack. The battery pack is external.



BY DOUG DEMAW,\* WICER

It's handy to assign a simple name to a piece of equipment. In this instance "GCR-2" means that we have a general-coverage two-stage receiver. Practically, it is true that we have a receiver which uses only two stages, but actually we have more than two stages because the integrated circuit (IC) contains several transistors on its silicon chip.<sup>1</sup> For our purpose, however, let's regard the IC as a single unit that serves as an electronic building block. The other stage is the detector, a junction field-effect transistor which detects the incoming r.f. signal and converts it to audio-frequency energy so that it can be amplified by the IC, AR<sub>1</sub>, Fig. 1.

Mechanical simplicity is keynoted here by the exclusion of band switches and vernier dial-drive mechanisms, although the latter would provide smoother tuning for both the bandspread and main-tuning controls. Also, a vernier dial would

\* Assistant Technical Editor, *QST*.

<sup>1</sup> RCA Linear Integrated Circuit Fundamentals, Tech. Series IC-40. (Radio Corp. of America, Harrison, New Jersey)

*This article has a two-fold purpose: to offer the beginner a simple good-working circuit for his first receiver, and to help acquaint the tube-oriented experimenter with some basic semiconductor techniques. This battery-operated two-stage regenerative receiver uses a minimum number of parts and refinements, thus keeping cost and circuit complexity at a minimum. The detector is a junction FET and the audio channel uses an integrated circuit to drive headphones or a speaker.*

provide the operator with a logging scale, making it easier to keep a record of the dial settings required for tuning specific portions of the various bands.

Though not a "super-duper signal scooper" in the true sense, the GCR-2 will do a creditable job of receiving a.m., c.w., and s.s.b. signals in the 1.7- to 30-Mc. range. Coil data for the standard broadcast band has been included for those who wish to extend the tuning range of the receiver. This type of unit is not recommended as an integral part of a ham station, but it could be used effectively for short-haul portable or emergency work if the need arose. It lacks the refinements that most operators desire, but should serve nicely as a "first" receiver for the beginner.

### Some Circuit Highlights

Referring to Fig. 1,  $Q_1$  is used in a tickler-coil type regenerative-detector circuit. In this instance, the FET is used like a triode vacuum tube, the base element being like a grid, the drain acting as the plate, and the source serving like a cathode.  $C_1$  is used to vary the antenna coupling and is set for the best sensitivity possible while still enabling  $Q_1$  to oscillate freely (if too much coupling is used, the detector will not go into regeneration).  $C_2$  is used for fine tuning (bandspread) and  $C_3$  serves as a coarse-tuning control.

$L_2$ , the tickler coil, provides feedback between the drain and gate elements of  $Q_1$  so that the detector can be made to regenerate (oscillate) when  $R_1$  is set to increase the operating voltage on  $Q_1$ . If too few turns are used on  $L_2$ , if the spacing between  $L_1$  and  $L_2$  is too great, or if the polarity relationship between  $L_1$  and  $L_2$  is wrong, the detector will not oscillate. Make sure that the coils are wound exactly as shown in Fig. 1.

Audio from the detector stage is taken from the drain circuit of  $Q_1$  and routed through  $RFC_1$

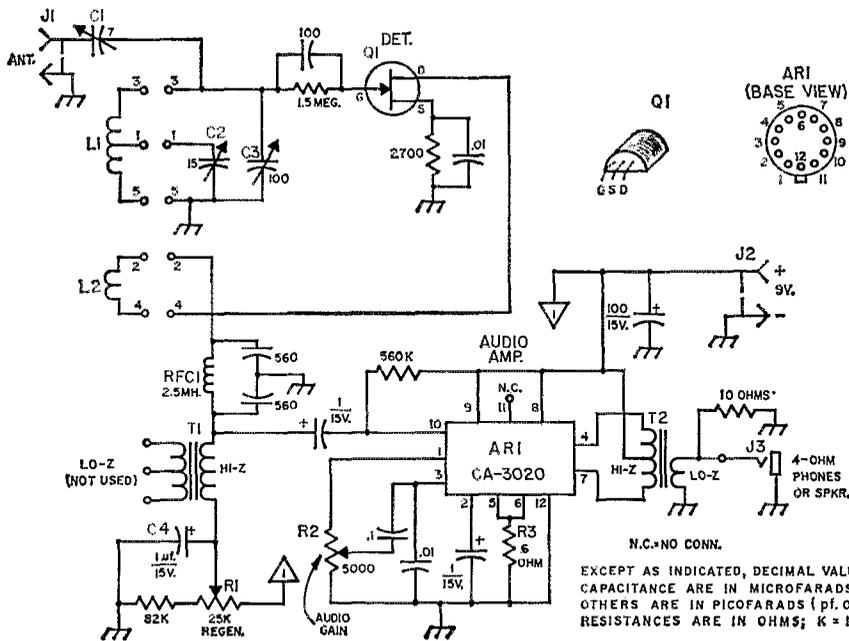


Fig. 1—Schematic of the GCR-2. Tapped-coil arrangement shown for  $L_1$  is used on the 40-, 20-, and 10/15-meter coils. Pin 1 connects directly to pin 3 of the coil form (inside the coil form by means of a jumper wire) for broadcast-band, 160- and 80-meter operation. There is no coil tap on these three bands. Fixed capacitors are disk ceramic. Polarized capacitors are electrolytic and are in  $\mu\text{f}$ . Fixed resistors are  $\frac{1}{2}$ -watt carbon.

AR1—RCA CA-3020 integrated circuit.

C1—1.5 to 7-pf. trimmer (Centralab 822-EZ used here. Elmenco 400 suitable and less costly, or make a "gimmick" capacitor by twisting two 1-inch lengths of insulated hookup wire together. Number of twists will determine degree of coupling).

C2—15-pf. miniature variable (Millen 20015).

C3—100-pf. miniature variable (Millen 20100).

J1, J2—Phono jack.

J3—Two-conductor phone jack (Switchcraft type 11 suitable).

$L_1, L_2$ —See Table I.

Q1—Motorola MPF-105 FET (MPF-102 or MPF-106 also suitable).

R1—25,000-ohm linear-taper carbon control.

R2—5000-ohm audio-taper carbon control.

R3—See text.

RFC1—2.5-mh. choke (Millen 34300-2500 or equivalent).

T1—Any small transistor driver transformer with one winding of 10,000-ohms or greater. (low-impedance winding not used) Argonne AR-153 or similar.

T2—Output transformer, primary 125 ohms c.f. to 4-ohm secondary (Argonne AR-174 or equal).

Knobs—Small knobs are Millen 10016. Large knobs with dial plates are Millen 10005-C.

to AR1, the IC audio amplifier. RFC1 and its associated 560-pf. capacitors filter out any r.f. energy that may be present in the audio lead, thus preventing r.f. from reaching AR1 and impairing its performance. The primary of T1 is used as an audio choke, for coupling the a.f. signal to the following stage. C4 is used to bypass the noise heard in the phones when R1 is adjusted—an annoying scratching sound which is audible when the regeneration control is advanced or retarded.

R2 functions as an audio gain control and is adjusted for the desired headphone or loud-speaker level. R3 is a bias resistor for AR1 and can be obtained by placing two 1.2-ohm  $\frac{1}{2}$ -watt resistors in parallel, or by winding approximately 6 feet of No. 30 enameled wire on a 1-megohm 1-watt resistor body—soldering the ends of the winding to the pigtails of the resistor—and using the wire's resistance for R3.

Transformer T2 matches the output impedance of AR1 (125 ohms collector-to-collector) to a 4-ohm load such as a pair of low-impedance hi-fi phones or a 3.2- or 4-ohm speaker. A 10-ohm resistor is connected across J3 to provide a constant load for AR1 should the operator forget to plug in the speaker or phones when the set is turned on. Such a condition could destroy AR1. Also, the resistor provides a mismatch safety factor when high-impedance phones are plugged directly into J3, should the operator choose to do so. Hi-Z phones will work, but the audio output will be somewhat less because of the mismatch which will result. If hi-Z phones are used, better results will be had if a replacement tube-type output transformer of (2500- or 5000-ohm primary impedance, 4-ohm secondary) is used between the phones and J3. The 4-ohm winding of the outboard transformer should plug into J3 if this method is used.

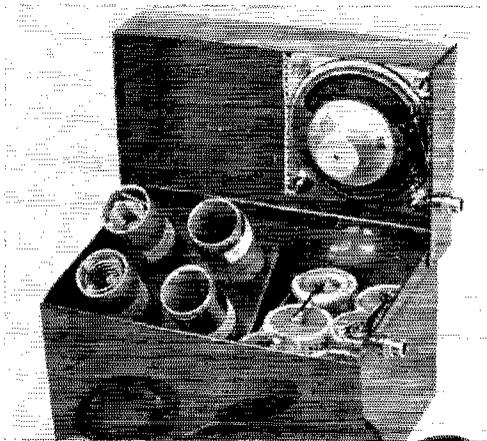
| Range<br>(Mc.) | $L_1$                                                                                                                                                                 | $L_2$                                                                                                                  | Tap                       |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------|
| 0.8-1.6        | 175 turns No. 36 enam. wire, close-wound.                                                                                                                             | 25 turns No. 36 enam. close-wound $\frac{1}{16}$ inch under $L_1$ .                                                    | None                      |
| 1.6-3.0        | 65 turns No. 30 enam. wire, close-wound.                                                                                                                              | 6 turns No. 30 enam. wire, close-wound $\frac{1}{16}$ inch under $L_1$ .                                               | None                      |
| 2.3-5.0        | 36 turns No. 30 enam. wire, close-wound.                                                                                                                              | 3.5 turns No. 30 enam. wire, close-wound $\frac{1}{4}$ inch under $L_1$ .                                              | None.                     |
| 4.5-9.5        | 18 turns No. 20 enam. wire, close-wound.                                                                                                                              | $2\frac{1}{4}$ turns No. 20 enam. wire, close-wound $\frac{1}{4}$ inch under $L_1$ .                                   | 9 turns                   |
| 8.0-19         | 18 turns No. 18 bare wire, $\frac{5}{8}$ inch dia. by 1 inch long. (18-turn length of B&W Miniductor 3007, Air Dux 516T, or Polycoils 1736. Install inside coil form. | $2\frac{1}{2}$ turns No. 20 enam. wire, close-wound on outside of form, $\frac{1}{8}$ inch under ground end of $L_1$ . | 9 turns                   |
| 16-30          | $8\frac{1}{2}$ turns No. 18 bare wire, $\frac{5}{8}$ -inch dia., 1 inch long. ( $8\frac{1}{2}$ turns of B&W 3006 Miniductor stock, Air Dux 508T, or Polycoils 1734.   | $2\frac{1}{2}$ turns No. 20 enam. wire, close-wound on outside of form, directly over ground end of $L_1$ .            | 4 turns above ground end. |

All coil forms are Millen 45005 units. Coils that do not have a tap on  $L_1$  should have a jumper wire connected between pins 1 and 3 inside the coil form. No other connection should go to pin 1 of such coils.

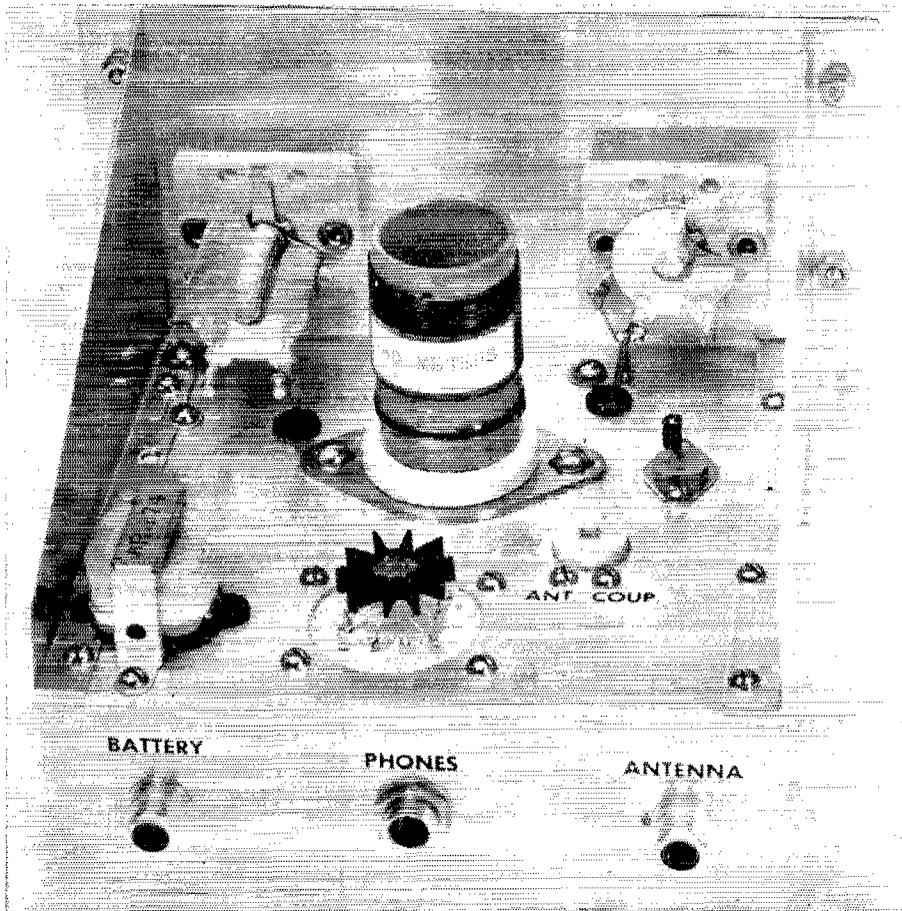
Six size-D flashlight cells, series connected, provide the 9 volts that operate the receiver. Smaller flashlight cells can be used, but will not last as long as the size-D pack. Under no circumstances should the builder use a small 9-volt transistor battery, as the receiver drain will deplete it in a very short time. The battery is plugged into  $J_2$  during operating periods. It should be unplugged when the receiver is not in use. *Make certain that the plus voltage connects to the center terminal of  $J_2$ .* The wrong battery polarity can immediately destroy  $Q_1$  and  $AR_1$ .

#### Construction Hints

To shave the cost of the receiver the chassis and panel were homemade. The entire assembly, including the side brackets, was cut from an aluminum cookie sheet purchased from a local discount store. Look for a sheet that has fairly thick aluminum stock; there are usually several grades available. The stock used here is approximately  $\frac{1}{32}$  inch thick. The cookie sheets should be available where cooking utensils are sold and cost approximately one dollar each. The chassis was formed in a bench vise and measures  $1\frac{1}{2} \times 4\frac{1}{2} \times 5$  inches. A Bud CB-1629 open-end chassis can be used as a substitute ( $1\frac{1}{2}$  by  $4\frac{1}{8}$  by  $5\frac{3}{4}$  inches) if the builder wishes. The panel is  $4\frac{1}{2}$  inches high and  $5\frac{3}{4}$  inches wide. If vernier dials are used with  $C_2$  and  $C_3$  a larger chassis and panel will be required, depending on the dimensions of the mechanisms used.



An accessory box for the GCR-2 is shown here. The case is a 60-cent 6 by 4 by  $4\frac{1}{2}$ -inch recipe-card box. The 6 size-D flashlight cells are wired in series and held in place by a home-made aluminum clamp. The clamp is bolted to the box at one point to keep the batteries in place. A piece of thick cardboard is glued to the bottom of the box, under the battery pack, to prevent the batteries from short circuiting to the case. A speaker (3-inch diameter 4-ohm type) mounted on the top cover is used for listening to strong signals when desired. The coil set slides into the box at an angle, permitting the lid to be closed. The patch cords for the 9-volt line and the speaker are carried in the box, under the coil set. A small transistor-radio type 8-ohm earphone is also carried in the box; it can be seen coiled up in front of the unit.



Top-chassis view of the receiver.  $Q_1$  is visible at the upper right, in front of the bandspread capacitor. The plug-in coil is at the center of the chassis, just to the left of  $Q_1$ .  $C_3$ , the main tuning capacitor, is at the left of the coil form. Output transformer  $T_2$  is at the lower left of the chassis.  $AR_1$  is just to the right of  $T_2$ , crowned by its radial-fin heat sink.  $J_1$ ,  $J_2$ , and  $J_3$  are on the rear lip of the chassis.  $C_1$  is visible in the right foreground, ahead of, but between, the plug-in coil and  $Q_1$ .

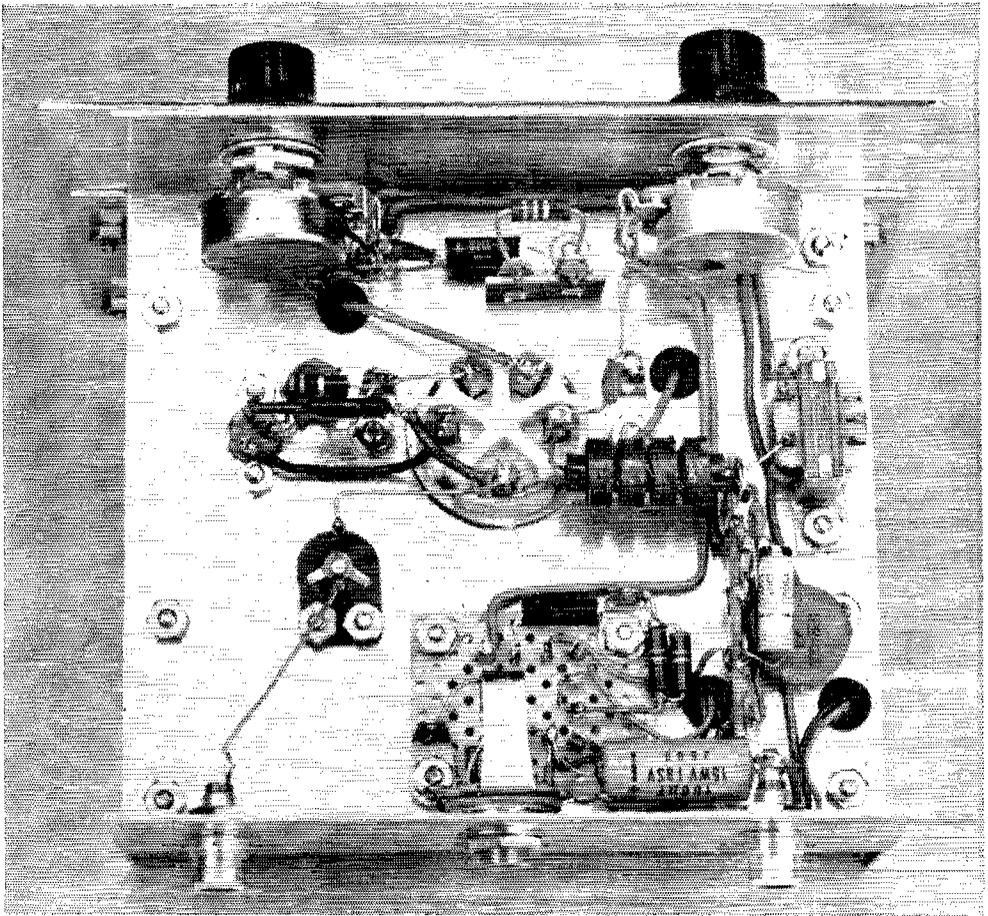
Side brackets were added after the receiver was built because of an annoying signal shift caused by mechanical instability when tuning the 20-, 15-, and 10-meter bands. The brackets make tuning much easier on the higher bands.

Low-cost sockets for 12-lead ICs are not yet available. For this reason  $AR_1$  was mounted on a home-made terminal block. The IC is secured to a  $1\frac{1}{4}$  by  $1\frac{1}{2}$ -inch piece of perforated board into which 12 push-in terminals have been placed. The leads from  $AR_1$  are soldered to the terminals on one side of the board and the circuit connections are made on the opposite side, under the chassis. The IC assembly is centered over a  $1\frac{1}{4}$ -inch diameter hole in the chassis. **Caution:** Use a heat sink each time a lead from  $AR_1$  is soldered to a push-in terminal, or when soldering to the opposite ends of the push-in terminals. Heat can damage the IC. By grasping the leads with long-nose pliers, between the body of the IC and the point to be soldered, the heat will be drawn safely away.

RCA recommends the use of a heat sink on the case of  $AR_1$  during operation at 9 volts. A Wakefield Engineering NF-205 heat sink is shown in the photo; it is available from most wholesale outlets for approximately 30 cents. Any small heat sink that will fit a TO-5 transistor case can be used, however.

The plug-in coils are wound on Millen 45005 forms,<sup>2</sup> which are  $1\frac{3}{8}$  inches high and have a diameter of 1 inch. The coils for the broadcast band and for 160-, 80-, and 40-meter reception are close-wound. The two high-band coils (8-30 Mc.) employ short lengths of air-wound (Mini-ductor) stock which are mounted inside the coil forms and cemented in place to assure good mechanical stability. Other brands of coil forms can be used. If they are slightly larger in diameter, use fewer turns of wire to compensate for the difference. If the forms have a smaller diameter,

<sup>2</sup> Millen components, including  $C_2$  and  $C_3$  of Fig. 1, are available factory-direct. Write to: James Millen Mfg. Co., Inc., 150 Exchange St., Malden, Mass.



Looking at the underside of the chassis,  $Q_1$ 's socket is at the left, in front of  $R_1$  and just to the left of the coil socket (Millen 33000 5-pin steatite).  $C_1$  is just below the socket for  $Q_1$  and connects to  $J_1$  on the rear lip of the chassis by means of a short length of bare wire.  $R_2$  is at the upper right, just ahead of  $T_1$  and  $RFC_1$ . The homemade mount for  $AR_1$  can be seen at the lower-center, directly under the phone jack,  $J_3$ .

a few more turns will be needed. The wire sizes given here are not vital to good performance. If wire of two or three gauge-sizes difference is handy, it can be used without a significant change in receiver performance. In other words, don't be afraid to "fudge" a little if need be. The main consideration is that the wire size be such as to permit all of the coil turns to be contained on the form.

The builder may wish to experiment with the spacing between  $L_1$  and  $L_2$ , or with the actual number of turns used for  $L_2$ , in the interests of smooth regeneration. The dimensions given provided smooth operating conditions in this model, but may not be optimum in other versions of the GCR-2 because of FET characteristics or differences in wiring and layout. A wise experimenter will be curious enough to investigate the effects of too much or too little feedback at  $Q_1$ , thus becoming more familiar with the operation of regenerative detectors. Remember, too, that it is not essential for the builder to follow the layout

to a fraction of an inch. The main consideration is that the r.f. leads be kept as short and direct as possible.

The completed coils can be coated with Q dope or Duco cement after they have been checked out in the receiver. This will tighten the windings and improve the overall stability of the receiver — important when tuning in weak c.w. or s.s.b. signals.

### *The GCR-2 in Action*

Initial checkout should start with a thorough visual inspection of the completed unit, following the schematic diagram and tracing each lead to make sure the circuit is correctly wired. The inspection should include a search for mechanical short circuits caused by solder blobs or component leads that touch one another or the chassis. If all seems as it should be, the receiver can be given an on-the-air test.

Connect an antenna — preferably a doublet

*(Continued on page 140)*

# An 80-Meter Inverted V for Field Day

BY FRANK GUE,\* VE3DPC, ex-VE6BH

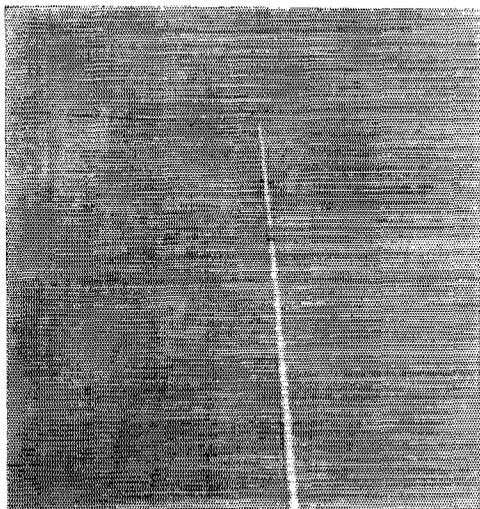
*It's that time of year again when portable operation is a delight. Here is a full-sized low-frequency antenna that you can put up in the field or at home without any help.*

A Field Day antenna for 80 meters should be light, portable, inexpensive, capable of easy erection without any special equipment, and it should not contain any fragile parts. Of course, the antenna must perform adequately.

The popular inverted V suggests itself as an answer to these requirements. It can be constructed so that it guys itself, minimizing the inevitable exasperating tangle of rope and wire, and it requires only one mast. Like all dipoles, the inverted V can be fed at the center with low-impedance line, and elements for several bands can be connected in parallel at the feed point of the antenna.

The inverted V shown in the photographs and sketches is simple, easily managed (20 minutes to erect, 10 minutes to dismantle), and costs

\*2252 Joyce Street, Burlington, Ontario, Canada.



Upper portion of the 80-meter inverted V as it appeared at the Field Day site.

under \$15 for all components. Not only is it a convenient antenna for portable operation, but it can serve as a fine permanent antenna for the home station as well. In fact, that's what has happened to the inverted V pictured; it's been in use in the back yard of VE3DPC ever since Field Day, 1967.

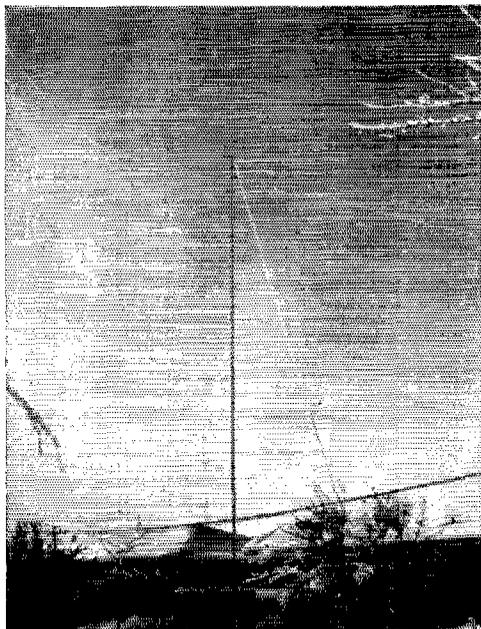
## Assembly

As shown in Fig. 1, the antenna support consists of three 10-foot sections of 1 $\frac{1}{4}$ -inch TV mast. One end of each of the two lower sections is swaged, permitting all three sections to be force-fitted together. Hooks of music wire were installed in the top section, so that the element wire and feed line could be easily coiled for storage.

The center insulator (Fig. 2) is made of maple; however, if this wood cannot be found, birch or fir can be used instead.

Fig. 2 shows how the center insulator was drilled and Fig. 3 shows how the feed line and antenna element were attached. Dimensions are obviously not critical, and the sketches are intended to show in a general way how the insulator was made, not to give precise detail. Just be careful where you drive the screws!

Softwood (pine) was picked for the end insulators (Fig. 4) because it is adequate for the application and easier to work with than maple. Fragile ceramics should not be used in place of the wood insulators.



The inverted V as it looked this past winter in the author's backyard.

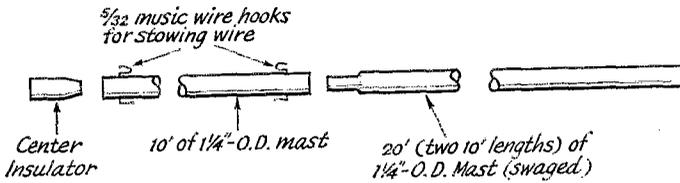


Fig. 1—The makings of the inverted-V center support.

Fig. 2—An X-ray view of the center insulator.

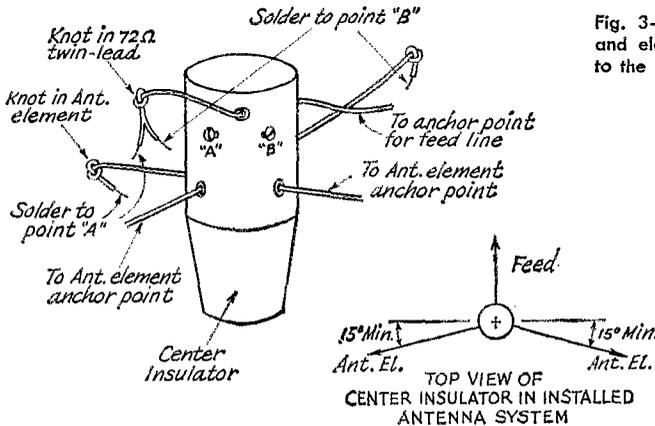
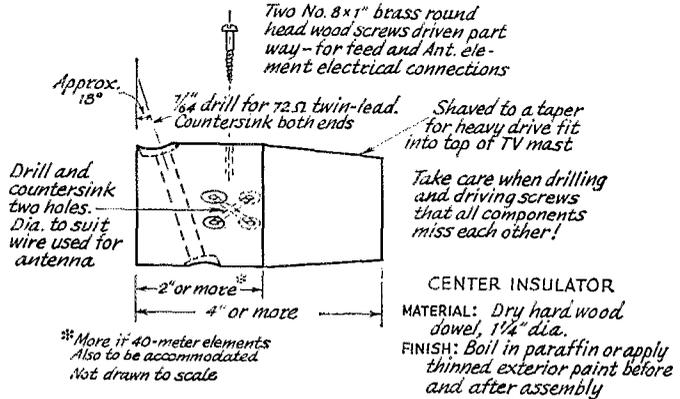


Fig. 3—Details of how the feed line and element wires should be attached to the center insulator, and a top view of the installed insulator.

Drill to suit Ant. wire and countersink both ends.

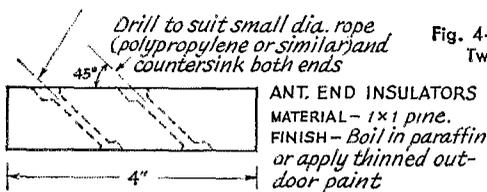


Fig. 4—A sketch of one of the wooden end insulators. Two insulators are required for each dipole used.



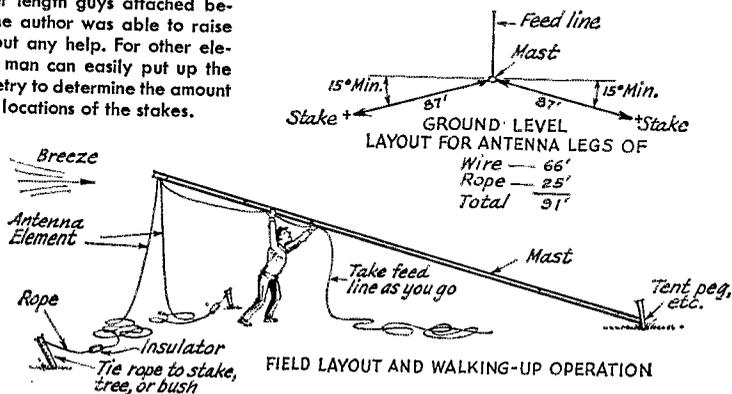
A sideview of one of the wooden end insulators.

The 80-meter element (Figs. 3 and 5) is made from small-gauge, Teflon-insulated, stranded Copperweld that was bought at a surplus outfit. This wire is worth looking for; it's tough, durable, light, and easy to handle. If operation on both 80 and 40 is desired, the builder can connect a 40-meter element to points A and B in Fig. 3.<sup>1</sup>

The feed line can be 50-ohm coax, 72-ohm coax or 72-ohm Twin-Lead. I chose the latter because it is low cost, lightweight, very flexible,

<sup>1</sup> Although dimensions for an 80-meter inverted V are given in Fig. 5, these aren't necessarily the optimum dimensions for every installation: there are too many variables involved. If the antenna is not to be used with a transmatch and open-wire line, it is best to experimentally determine the length of the inverted V. This can be done by starting with an overall length equal to about 525 divided by the frequency in megacycles. The ends of the inverted V should then be trimmed until the s.w.r. is minimum at the operating frequency. A simpler method is described in footnote 2.

Fig. 5—By using the dimensions and layout shown in the upper right corner of the sketch—so that ground stakes could be installed and proper length guys attached between them and the mast—the author was able to raise his 80-meter inverted V without any help. For other element lengths than shown, one man can easily put up the antenna by using simple geometry to determine the amount of rope required and the locations of the stakes.



easy to store, and because it lends itself to such outrageous techniques as being tied in knots; however, since most transmitters have coax output, either a balun or an antenna coupler must be used between the feed line and the transmitter to maintain balance.<sup>2</sup> If elements for more than one band are to be used, the antenna coupler is preferred because it will reject harmonics of the transmitting frequency that might fall in the range of one or more of the paralleled antennas.

### Raising and Lowering

Transporting the antenna to and from the Field Day site is easy. Tape the three mast sections together, wrap them with cloth to protect the car's finish, and tie the works between one of the door handles and the rear bumper. If the antenna extends past the back of the car, don't forget to tie a red flag on the end of the bundle to alert other drivers.

Upon arrival at the Field Day site, unpack the antenna and join the TV masts together. The three-section support is light enough to be "walked up" by one man, if the wind is under 10 miles per hour; however, prior to the antenna raising, you must put stakes into the ground, determine the exact length the guys will be when the antenna is in its operating position, and attach the guys to the stakes (Fig. 5).

If help is available, it won't be necessary to install stakes or measure guys prior to putting up the antenna. Have the helpers pay out each half of the antenna element and keep slack out of the wire as the mast goes up. Station the men about 45 degrees off the line of the mast as it lies on the ground, and then, once the mast is up, have the helpers walk around to the final positions shown in Fig. 5. The last few degrees of "walking up" is where your control is poorest.

(Continued on page 142)

<sup>2</sup> An easier arrangement, especially for multiband operation, can be achieved by using a transmatch and either 300-ohm Twin-Lead or 450-ohm Ladder-Line. Only one dipole—about 100 feet long (length not critical)—is all that is necessary to cover all the amateur bands between 3.5 and 30 Mc.

# An Automatic Band Scanner/Transmitter Monitor

*Putting the Inexpensive Oscilloscope to Work*

BY R. F. LATTER,\* W2YFM

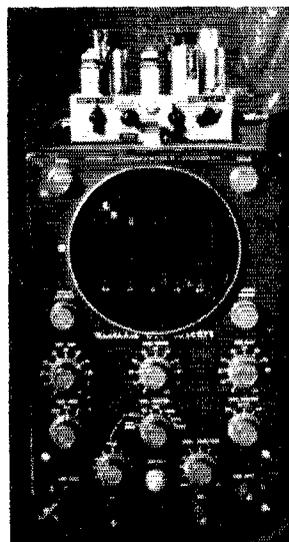
A DESIRE to use an existing oscilloscope to increase the effectiveness of the author's station, rather than to let the oscilloscope gather dust as a seldom used test instrument, resulted in the unit shown in the photographs. The gadget enables the oscilloscope to alternately display two patterns, one showing all signals 25 kc. above and below the frequency the receiver is tuned to and another showing the transmitter wave envelope. These alternate displays change automatically (following either VOX or manual control) as the station operation changes from receive to transmit. Each pattern is centered, and no manual adjustments are needed as the displays change. The unit has proved itself to be an extremely useful operating tool.

The band scanner/transmitter monitor is small, easily fits on top of the author's Heathkit OM-2 oscilloscope, and is complete with its own power supply. Inexpensive components are used, including a varactor diode as a reactance modulator. The necessary modifications to the oscilloscope are relatively simple and do not affect any of the oscilloscope's normal test functions. The use of an existing oscilloscope greatly simplifies the design of the band-scanner circuit, and at the same time it gives a larger display than is usually provided by commercial panoramic adapters, which are more expensive and only display received signals.

You can use the adapter with receiver intermediate frequencies from 450 to 1800 kc. by using the appropriate transformers and tuning capacitors for  $T_1C_1$ ,  $T_2C_2$  and  $T_3C_3$ , and with transmitter frequencies from 3.5 to 30 Mc. by using a band-switching wave-envelope display circuit that is built into the unit (see Fig. 1). Switchover from band scanner to transmitter monitor is accomplished by a small relay which is installed in the oscilloscope and connected in parallel with the coil of the station's antenna-changeover relay (see Figs. 2 and 5).

\* 179 Pittsford Way, New Providence, New Jersey 07974.

*Here's a clever device that should satisfy anyone looking for a gadget that will let him see the kind of signal he is putting out, as well as look at a good-sized chunk of the band his receiver is tuned to.*



The band scanner/transmitter monitor is small enough to be conveniently located on top of the scope. The scale on the face of the c.r.t. has been calibrated to indicate the number of kilocycles a signal is either above or below the center frequency the receiver is tuned to.

## Circuit Description

The band scanner (Fig. 1) is basically a four-tube superheterodyne receiver tuned to the intermediate frequency of the station receiver. Capacitive coupling is used between the unit and the receiver mixer (Fig. 4A) to provide the band scanner with the same signals as the station receiver. The output signal from the 6C4 infinite-impedance detector,  $V_4$ , is connected to the vertical input terminals of the oscilloscope (Fig. 5).

The frequency of the 6USA oscillator,  $V_{2B}$ , is determined in part by the varactor-diode reactance modulator connected across  $T_3$ . This modulator is driven by the same sawtooth wave that determines the horizontal position of the oscilloscope display tube. This arrangement causes each horizontal position of the electron beam on the c.r.t. to correspond to the particular frequency to which the four-tube superhet is tuned at that instant. If  $T_3$  is properly adjusted, a signal in the 50-kc. band centered around the frequency to which the station receiver is tuned will cause a vertical deflection of the electron

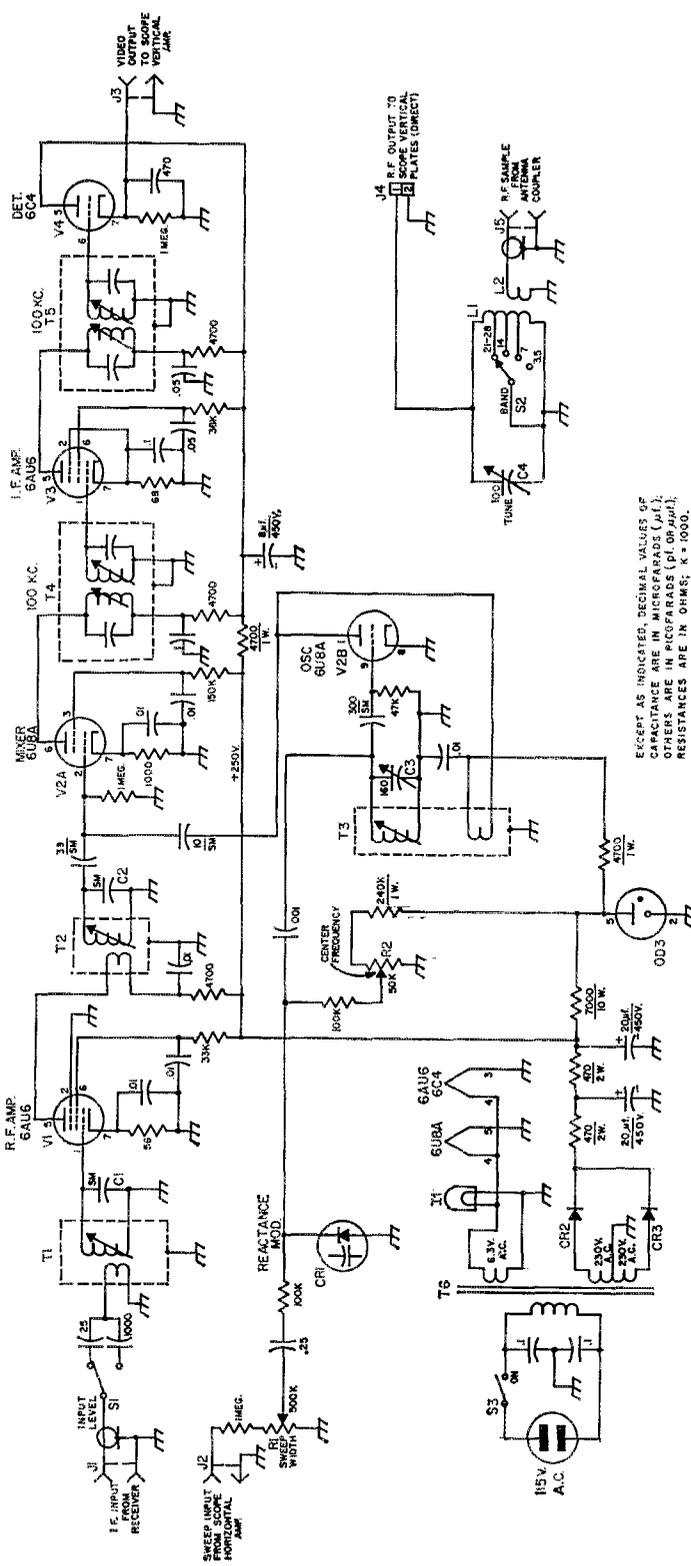


Fig. 1—Schematic diagram of the band scanner/transmitter monitor. Capacitors with polarity indicated are electrolytic, fixed capacitors are ceramic except those marked SM (silver mica). Unless otherwise specified, fixed resistors are 1/2-watt composition.

- C<sub>1</sub>, C<sub>2</sub>—Value dependent on receiver i.f. Use 560 pf. for a 455-kc. i.f. and 100 pf. for a 915-kc. i.f.
- C<sub>3</sub>—10-100-pf. mica padder (Miller 160-D).
- C<sub>4</sub>—100-pf. variable (Hammarlund HF-100 or equivalent).
- CR<sub>1</sub>—Voltage-variable capacitor (Motorola MV838).\*
- CR<sub>2</sub>, CR<sub>3</sub>—Silicon, 800 p.i.v., 750 ma.
- J<sub>1</sub>, J<sub>2</sub>—Coaxial chassis receptacle (SO-239).
- J<sub>3</sub>, J<sub>4</sub>—Phono jack.
- J<sub>5</sub>—Two-terminal connector (Cinch-Jones 2-140 or equivalent).
- L<sub>1</sub>—54 turns No. 24, 3/4-inch diam., 32 turns per inch, tapped at 4, 9 and 25 turns from J<sub>1</sub> end (B&W 3012 or equivalent).
- L<sub>2</sub>—2 turns insulated hookup wire over ground end of L<sub>1</sub>.
- R<sub>1</sub>—500,000-ohm linear-taper control with switch.
- R<sub>2</sub>—50,000-ohm linear-taper control.
- S<sub>1</sub>—S.p.s.t. slide switch.
- S<sub>2</sub>—Phenolic rotary, 1 section, 1 pole, 5 positions, 4 positions used (Centralab PA-1003 or equivalent).
- S<sub>3</sub>—S.p.s.t. switch (part of R<sub>1</sub> assembly).
- T<sub>1</sub>—BC band antenna coil (Miller A-320-A).\*
- T<sub>2</sub>—BC band r.f. coil (Miller A-320-RF).\*
- T<sub>3</sub>—Osc. coil, type dependent on receiver i.f. Use Miller X-320-C for a 455-kc. i.f. and Miller A-320-C for intermediate frequencies from 800 kc. to 1800 kc.\*
- T<sub>4</sub>, T<sub>5</sub>—100-kc. i.f. transformer (Miller 1709 or 1710).\*
- T<sub>6</sub>—Power transformer, 460 volts c.t. at 50 ma., 6.3 volts at 2.5 amperes (Stancor PC-8418).

\* Available from Federated Purchaser Inc., Route 22, Springfield, N. J.

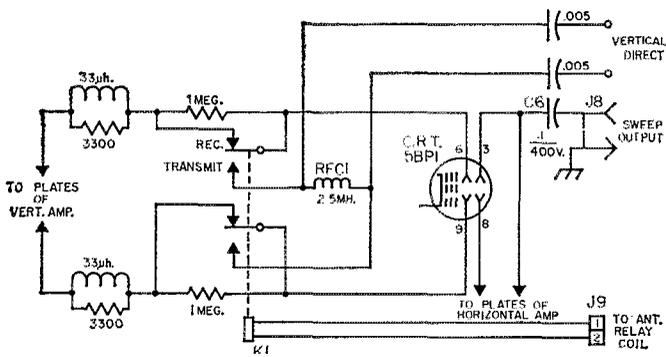


Fig. 2—Circuit showing modifications to the Heathkit OM-2 oscilloscope. The VERTICAL DIRECT slide switch (not shown) on the back of the scope has been replaced by  $K_1$ , and the parts with component designators added. Capacitance values are in microfarads ( $\mu\text{f}$ ); resistances are in ohms. Resistors are  $\frac{1}{2}$ -watt composition.

$C_6$ —0.1- $\mu\text{f}$ . 400-volt paper.

$J_8$ —Phono jack.

$J_9$ —Two-contact female socket (Cinch-Jones S-302-AB).

$K_1$ —D.p.d.t., 115-volt a.c. (Potter & Brumfield KT11A).

$RFC_1$ —2.5 mh.

beam in proportion to the signal's strength. This vertical deflection or pip will occur at a horizontal position corresponding to the difference in frequency between the signal and the frequency — which is always indicated in the center of the c.r.t. screen — that the station receiver is tuned to.

Of particular interest in this circuit is the reactance modulator, which employs a Motorola MV838 varactor diode,  $CR_1$ . This diode costs less than a vacuum tube, yet it permits a reasonably linear sweep over a much wider frequency range than a 6AK5 reactance modulator used in a previous model of the band scanner.  $CR_1$  is a relatively high- $Q$  back-biased silicon diode whose capacitance is a function of the voltage applied.<sup>1</sup> The simple associated circuit applies an appropriate d.c. bias, which determines the average capacitance of the diode, via the center frequency control,  $R_2$ , and a superimposed sawtooth wave of the proper amplitude via the sweep width control,  $R_{1,2}$ .

An 0D3 voltage regulator is used to stabilize the voltage applied to the oscillator and the varactor-diode reactance modulator.

### Parts Layout and Construction

The unit is built on a  $7 \times 7 \times 2$ -inch aluminum chassis, and the parts layout is illustrated in Fig. 3.  $C_4$  and  $S_2$  are mounted on a vertical plate placed underneath the chassis near the back of the unit. Extension shafts are used so that the BAND and TUNE controls are accessible from the front. Care should be taken in the placement of parts to permit short, direct leads. The cathode (white band) of the MV838 is connected to the junction of two 100,000-ohm isolating resistors and a 0.001- $\mu\text{f}$ . blocking capacitor.

### Oscilloscope Modifications

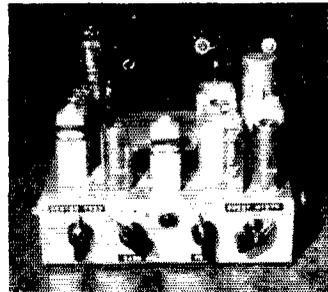
Modifications to the Heathkit OM-2 oscilloscope are detailed in Fig. 2.<sup>3</sup> These consist of the replacement of an existing slide switch on the rear of the scope chassis with a small d.p.d.t. relay,  $K_1$ , and the installation of appropriate

<sup>1</sup> Motorola Semiconductor Data Book, 2nd Edition, pp. 12-21, 16-99.

<sup>2</sup> Brady, "Select Varactors for Voltage Tuning," Electronic Design 12, p. 72, June 7, 1967.

<sup>3</sup> Many other types of oscilloscopes can be similarly modified.

connectors,  $J_8$  and  $J_9$ , a 2.5-mh. r.f. choke,  $RFC_1$ , and a 0.1- $\mu\text{f}$ . capacitor,  $C_6$ . Plenty of room is available for these additional components. Relay  $K_1$  is connected in parallel with the 110-volt winding of the station's antenna-



The automatic band scanner/transmitter monitor is built on a  $7 \times 7 \times 2$ -inch aluminum chassis. In conjunction with an inexpensive oscilloscope, it will alternately provide panoramic reception for your receiver and wave-envelope display for your transmitter.

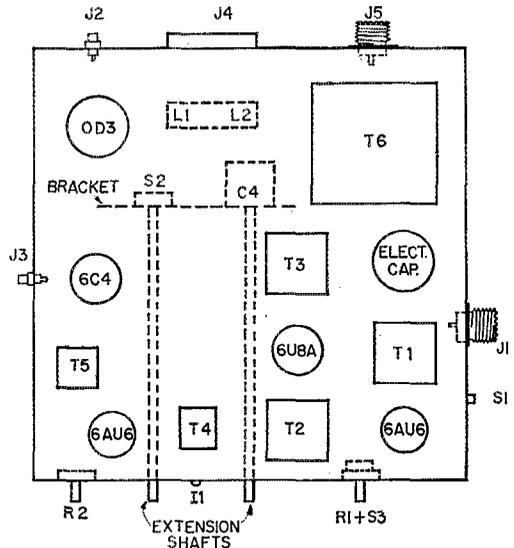


Fig. 3—Top view of the chassis showing where the major components are mounted. Dotted lines indicate parts that are located on the underside of the chassis.

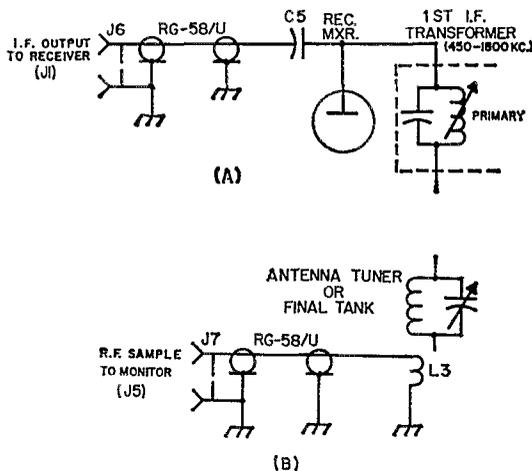


Fig. 4—Modifications to the receiver (A) and antenna tuner or transmitter (B).

C<sub>5</sub>—5-pf. disc ceramic.

J<sub>1</sub>, J<sub>7</sub>—Coaxial chassis receptacle (SO-239).

L<sub>3</sub>—Single turn of insulated hookup wire, 3-inch diameter, near cold end of coil. See text.

changeover relay. When this relay is activated, the transmitter wave-form display on the oscilloscope tube face is centered through *RFC*<sub>1</sub>, and at the same time, input signals from the scope vertical amplifier are blocked from the vertical plates by two 1-megohm resistors. The first feature is desirable since the optimum beam position for the band scanner display is below center. During reception, the display can be positioned by using the normal oscilloscope centering controls. Besides the scope modifications, the receiver and antenna tuner changes shown in Fig. 4 should be made as indicated.

### Adjustment

Using a continuous coverage receiver, adjust the oscillator, *V*<sub>2B</sub>, to the receiver intermediate frequency plus 100 kc. Next, with an r.f. signal generator, align the band scanner portion of the circuit (with no connection to *J*<sub>2</sub>) in the same manner you would adjust any other superhet receiver. Connect all cords per Fig. 5 and starting with all controls at midscale and the scope sweep at about 30 cycles, feed an unmodulated signal from the signal generator into the receiver. After the controls and signal levels have been adjusted so that a horizontally centered pip of reasonable amplitude appears, realign the i.f. transformers for the narrowest pip possible.

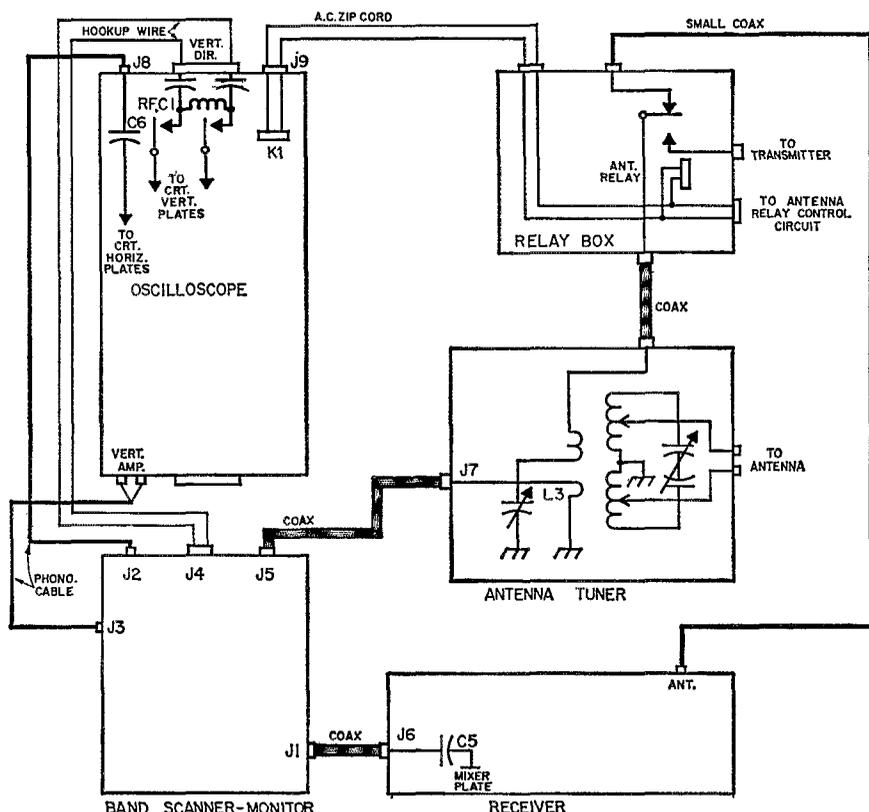


Fig. 5—Diagram showing how the band scanner/monitor is integrated with several other pieces of equipment in a ham station. In setups where an antenna tuner is not used, L<sub>3</sub> should be coupled to the output coil in the transmitter.

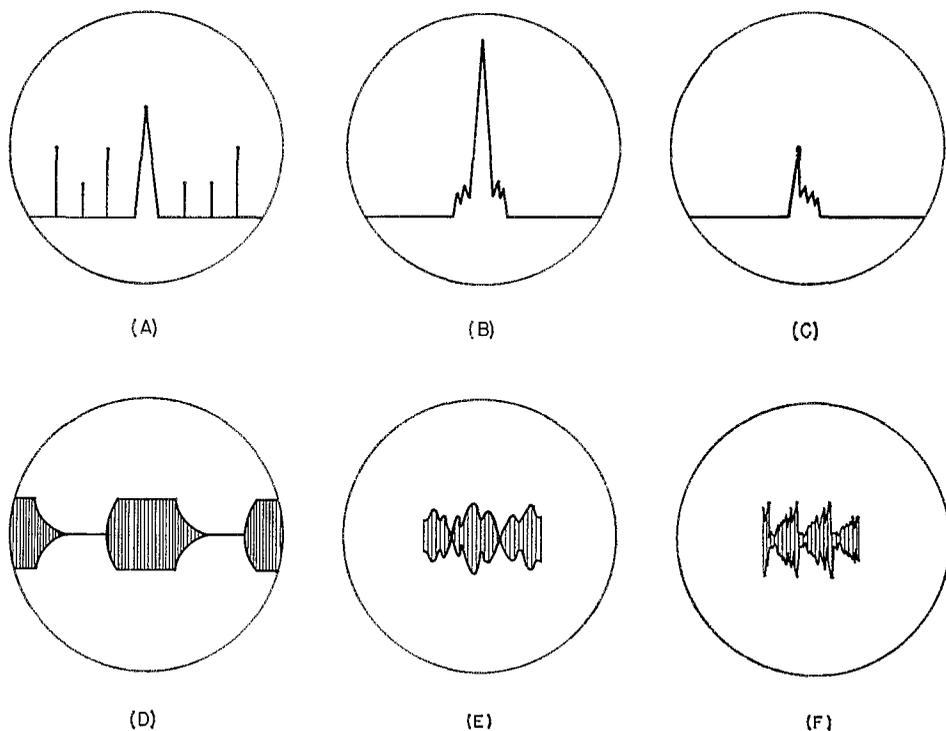


Fig. 6—Some typical band-scanner displays (A, B and C) and some typical transmitter-monitor waveforms (D, E and F). A—Constant carrier with some noise pulses on either side. B—Double-sideband a.m. C—S.s.b., suppressed carrier. D—C.w. wave envelope. E—A.m. wave envelope. F—S.s.b. wave envelope.

Don't forget to touch up the alignment of the first i.f. transformer's primary (Fig. 4A) in the station receiver.

Next, with the SWEEP WIDTH control,  $R_1$ , set for about a 50-kc. scan, note the amplitude of the pip as it moves across the screen while the receiver tuning is varied. Stagger tune  $T_1$  and  $T_2$  to compensate for the attenuation characteristics of the station-receiver's r.f. stages. Throughout this process be sure that the unit is not overloaded;  $S_1$  permits it to handle a wide range of input signals. Final adjustment of the band scanner controls, including sweep width, is largely a matter of personal preference and the characteristics of the station receiver. Synchronization of the horizontal sweep rate to 60 cycles is recommended. The grid on the face of the c.r.t. can be calibrated in kilocycles as illustrated in one of the photographs.

The adjustment of the waveform-monitor circuit is straightforward. With  $L_1C_4$  tuned to the transmitter frequency, adjust the coupling between the loop,  $L_3$ , (Fig. 4) and the antenna tuner or transmitter final coil until the desired display amplitude is obtained. Very loose coupling will usually suffice.

#### Operation

The unit shown in the photographs has been in operation at W2YFM for several months with

a BC-348-Q receiver which has an i.f. of 915 kc. A version that will accommodate receivers with a 455-kc. i.f. has been built by WB2WGM, and he uses this model with a Collins 75S-1 receiver. Both of us are convinced that the visual displays produced do indeed add another "dimension" which contributes greatly to effective station operation. The selectivity of the unit is such that the pips produced usually run about 3 kc. in width at the base line, permitting the observation of a great deal of detail, yet causing imperceptible baseline "tilt"<sup>4</sup> in a.c.-coupled scopes at ordinary sweep-width settings. If you build one, be prepared to answer numerous questions about signal characteristics and where to move to find a clear channel. Fig. 6 illustrates some of these characteristics that can be observed. The display always attracts a great deal of attention from visitors.

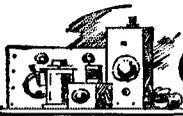
The author wishes to acknowledge the ideas borrowed from previous articles on panoramic reception,<sup>5,6,7</sup> and the encouragement received from local amateurs to write this article. QST

<sup>4</sup> By "tilt" the author is referring to the shifting base line that occurs if there is a change in the average amplitude of signals in the 50-kc. passband being observed.

<sup>5</sup> Priebe, "Build Your Own Panoramic Adapter," *QST*, September, 1954.

<sup>6</sup> Hutton, "The Pan Scope," *CQ*, February, 1960.

<sup>7</sup> Ehrlich, "The Lazy Man's Panoramic Adapter," *QST*, November, 1954.



## A JFET QRP Rig For 40 Meters

BY KEN M. DOOLITTLE,\* W2SMR

**E**VER been rockbound on 40 meters with less than 1-watt input? It's a real challenge for the QRP buff. Armed with ambition, doubt and \$4.64, I decided to accept the challenge. The result is the little 700-milliwatt QRP transmitter shown in the photograph.

Fig. 1 is a schematic of the circuit. Inexpensive JFETs are used in a simple push-pull crystal oscillator. A pair of 9-volt transistor batteries connected in series serves as the power supply.<sup>1</sup>

### Construction

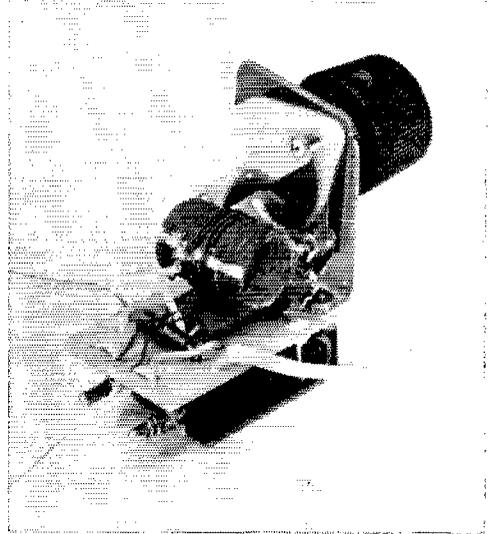
Construction is simple and straight forward, and the transmitter is compact enough to be mounted on the base of the transmitting key. However, as long as short leads are used, there is no reason to exactly follow the layout shown.

The transmitter chassis was made from a 1 X 1½-inch circuit board, and the front panel from a 1¼-inch high by 1-inch wide aluminum bracket having a ¼-inch lip. For mounting the tuning capacitor, a ⅜-inch hole was drilled in the front piece, and for attaching the panel to the base, two holes were drilled in the ¼-inch lip. The circuit board used for the base is the surplus type available from most supply houses for 25 cents or less. It was prepared by holding the soldered side of the board on an electric sander until the foil was removed. This caused the components on the other side to fall off easily, leaving a nice clean board. I used some of the existing holes and drilled others with a ⅛-inch drill.

As purchased, the tuning capacitor listed in Fig. 1 has a total capacitance of 365 pf., which is excessive for the rig's requirements; however, the variable can easily be made usable by removing eight plates. First take off the two screws on the rear strap of the capacitor. Then hold the

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<sup>1</sup> The drain on the battery can be reduced considerably at only a slight loss (2 db.) in transmitter output by reversing the polarity of the battery. A transmitter similar to W2SMR's was constructed in the ARRL laboratory. With the battery connected as in Fig. 1, the rig had an output of about 130 mw. for an input of 840 mw. — an efficiency of 15 percent; however, with the battery reversed, the rig had an output of about 85 mw. for an input of 180 mw. — an efficiency of 47 percent. Where battery life is important, the latter arrangement is worth considering.



A close-up of the FET transmitter. From left to right across the top of the circuit board, but only partially visible in this view, are the 1600-ohm resistor, two r.f. chokes and two FETs. The crystal is the only component underneath the board. The wires leaving at the left go to the battery, those at the bottom go to the antenna tuner, and those at the right go to the key.

front of the shaft with a pair of pliers and remove the large nut on the other end with another pair. Once the small nut on the stator has been taken off, carefully remove four stator plates, four rotor plates, and the associated insulators and washers. Using all the parts except the plates and insulators removed, reassemble the capacitor. Take care that the stator plates do not swing sideways and touch the rotor plates.

Begin construction of the coil by covering 2 inches of a ½-inch diameter wood dowel with wax paper. Drive a common pin through the paper into the dowel, and secure one end of the coil by winding the wire once around the pin. Then loosely wind 18 turns around the dowel and make a small twist for the center tap. Wind 18 more turns of wire and secure the end of the coil

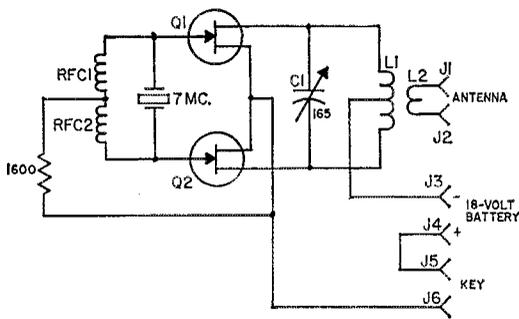


Fig. 1—Circuit diagram of the 7-Mc. transmitter. Capacitance is in pf.; resistance is in ohms; resistor is 1/2-watt composition.

BT1—Two 9-volt batteries in series (Eveready 216 for portable or intermittent use; Burgess M6 for home operation).

C1—165-pf. miniature variable (modified Radio Shack 272-1431 365-pf. unit; see text).

J1-J6, inc.—Alligator clip.

L1—36 turns No. 26 insulated wire, tapped at center, 1/2-inch diameter, close wound.

L2—4 turns No. 26 insulated wire over center of L1.

Q1, Q2—MPF106 JFET (Motorola).

RFC1, RFC2—250  $\mu$ h. to 2.5 mh. (see text).

with a common pin as mentioned above. Next make at least four horizontal strips of epoxy on the outside of the coil. Place a dab of epoxy on each end of the coil where the leads come off and another dab at the base of the center tap. After allowing the cement to cure, carefully slide the coil from the dowel. Finish the coil by completely covering its inside with epoxy.

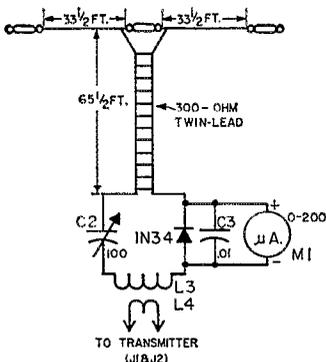
Although 250- $\mu$ h. r.f. chokes were used in the rig, if you have the space, any chokes in the 250- $\mu$ h. to 2.5-mh. range can be used and should work just as well.

The crystal is mounted directly under the circuit board. Connections to the crystal were made by winding a common pin around each prong of the crystal and soldering the head of each common pin to a short length of hookup wire. Common pins were also used to secure the body of the crystal holder to the board; two tiny holes were drilled in the board, common pins were inserted and glued in position with epoxy, and the pins were bent so that they would hold the crystal in place by spring tension. Of course if space is available, there is no reason why a crystal socket cannot be used.

For the antenna, battery and key connections, small alligator clips are used. They are inexpensive and can be removed quickly and easily.

### Tune-up

To be successful with flea power, you need a matched antenna system. As shown in Fig. 2, I use a home-built antenna tuner, 65 1/2 feet of



300-ohm Twin-Lead, and a 67-foot dipole. The microammeter and 1N34 diode permit the system to be easily adjusted. It is only necessary to tune C1 in the transmitter and C2 in the tuner for a maximum reading. If you have a v.o.m. in the shack, you can use it in place of the microammeter. Alternatively, tune-up can be accomplished with a field-strength meter. Once you have power going into the antenna, listen to the note on your receiver and adjust C1 for best keying and C2 for maximum antenna power. The rig keys well if an active crystal is used.

### Higher Power Operation

By adding another 6 volts it is possible to squeeze one-watt input into this little transmitter. Since the transistors heat up quickly under this condition, it is much better to play it safe and stick to 700 milliwatts. If the rig is run at the 1-watt level, be careful not to hold the key down for any extended period. With a 9-volt supply it is possible to run the rig at 225 milliwatts, and several contacts have been made at this power level.

The transmitter has not been tried on other bands, but I suspect it should work fine with proper crystals and coils.

### Results

The QRP disease is a difficult thing to explain. I must say, however, that after thirty years of ham radio, this little transmitter has caused me to spend a lot more time on the air than usual and has renewed my interest in the hobby. I have had many fine QSOs with the gadget, including contacts in New York, Pennsylvania, West Virginia, Indiana and Georgia.

Why not try this little QRP rig? It can be a source of much fun and amazement. QST

Fig. 2—Suggested antenna system for use with the QRP rig. The feed line should be an even multiple of a quarter wavelength for use with the series-tuned coupler shown. C2—100-pf. variable.

C3—0.01-pf. disk ceramic.

L3—20 turns No. 14 insulated wire, 3-inch diameter, close wound.

L4—4 turns No. 14 insulated wire over center of L3.

M1—0-200 microammeter, or v.o.m. with similar range.

# Relative Merit of Toroidal And Conventional R.F. Inductors

BY NORMAN B. WATSON,\* W6DL

*This paper summarizes the information available in published research papers on toroid coils with ferrite cores. The references listed are the only significant ones that TRW librarians were able to uncover. The author also contacted manufacturers of cores that are available to amateurs, and in a subsequent communication to us wrote, "Surprisingly, the manufacturers of toroidal cores whom I contacted have no data available on power losses in their cores at the r.f. power levels of interest for amateur transmitters." If more recent work has been done in the collection of core-loss data above milliwatt r.f. power levels, it seems not to have been published.*

**A**t the present time amateur interest in the use of toroidal coils as resonating inductors in radio-frequency amplifiers seems to be renewed, if one is to judge by the number of articles regarding use of toroids for this purpose appearing lately in amateur radio magazines.

Toroidal coils are by no means new — witness the references listed at the end of this article. In fact, their use dates back to the mid-1920's or earlier. In Reference (1) Mr. Butterworth covers the properties of toroids quite extensively and sets forth engineering data covering optimum design vs. coil merit; i.e.,  $Q$ , copper losses, and so on. Reference (2) also covers toroidal coil design. Reference (3), in addition to being an excellent overall electronic design handbook, compiles design data for all types of r.f. coils. The use of powdered-iron cores dates back to 1909.

One is intrigued by the thought that toroids, like single sideband which originated in 1915, may have been relegated to relative obscurity as regards their use in amateur equipment for many years and are now being regarded as a "new" development in electronics in some circles. Summarizing data in References (1), (2), and (3) regarding application of form-wound toroids vs. conventional coils at radio frequencies reveals the following facts:

## *Air or Form-Wound Coils*

- 1) The conventional air or form-wound inductor has a considerably higher  $Q$  (figure of merit) than an air-wound toroidal coil of the same physical size.
- 2) The toroidal coil has little external magnetic field and may be placed close to other parts with little effect upon its inductance. The conventional coil if placed at least one coil radius away

from chassis or shield will be relatively unaffected by eddy current losses in the shield. This means that its efficiency will be lowered very little by proximity of the shield.

- 3) An air-wound or typically well-designed form-wound coil enclosed in a copper or aluminum shield will be equal to or higher in  $Q$  than an air-wound toroid of the same physical size as the shield. The shielded coil has an advantage over the toroid in that it has no external electrostatic field. The external electromagnetic fields of the two coils will be equivalent — about 1/30 the value of an unshielded coil.

- 4) When either the coreless toroid or conventional coil is used as the resonating inductance in radio-frequency applications of high flux density, such as in a transmitter, the  $Q$  of the coil under r.f. load is relatively unchanged from the  $Q$  measured at the low flux densities of commercial  $Q$  test equipment. The  $Q$  will drop under load only because of increase in wire resistance due to heating. Wire heating in the coil is easily controlled by the size of wire used.

- 5) Toroids wound on forms of round cross section exhibit a higher  $Q$  than those wound on square or rectangular-cross-section forms. The  $Q$  of the toroid is increased by the use of square wire or wire which is flat on one side with the flat side placed next to the coil form.

## *Useful R.F. Power Range of Ferrite-Cored Coils*

Considerable research has been applied, particularly in the last ten years, toward improvement of iron cores and extending their usefulness upward in frequency while maintaining acceptable internal losses. The majority of applications of ferrite cores today are at frequencies below 5 MHz. in filters, test equipment, computers, and radio and TV receiver applications where the intensity of the radio-frequency field applied

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to the core is low. This does not mean that many small ( $\frac{1}{2}$  watt) cores are not in use at frequencies above 5 MHz. Reference (4) quotes  $Q$ 's measured on a commercial  $Q$  meter of up to  $Q = 500$  at 5 MHz., dropping to a value of  $Q = 1$  at 400 MHz. for a very low r.f. flux density test of a core sample of cobalt-nickel-zinc ferrite. However, problems arise in achieving stable permeability of the core with temperature change in high frequency ferrites, and losses increase with frequency.

As stated previously, the  $Q$  of an air-wound coil is essentially unchanged when operated at high r.f. flux density. This is not true of ferrite cores. In experiments with selected high-quality ferrites covered in Reference (5), a specially designed and built high-r.f.-power  $Q$  meter was used to measure the core losses and  $Q$  of toroids with varying values of r.f. flux density. It was found that the  $Q$  dropped sharply and losses climbed rapidly above a flux density of about 8 gauss (8 lines per square centimeter cross section of the core). The watts loss (per cubic centimeter of core material) increased directly as the square of r.f. flux density at low values of r.f. field strength. At the point where the  $Q$  of the inductor started to drop the losses increased rapidly.

Flux density of a ferrite-cored coil for a 1-kw. tank circuit at 10 MHz. was calculated by the author. Using typical plate voltages for this power and using the largest core found readily available to amateurs (5 square centimeters cross section) the flux density was calculated to be 325 gauss. This is somewhat higher than the 8 gauss flux density at which  $Q$  was found to drop in Reference (5). Under an r.f. load of 325 gauss the loss in the 5-square-centimeter core, which has a permeability of 40, is estimated roughly to be 230 watts per cubic centimeter per second at 10 MHz. Extrapolation of data in Reference (6) yields a somewhat higher loss figure. If one uses an 8-gauss flux density in design of a one kilowatt r.f. tank inductance for use at 10 MHz. the toroidal core required has a cross-sectional diameter of three inches.

Distortion in ferrite cores is also a consideration in their use. The air-wound or conventional coil wound on a good insulator has negligible distortion for communications purposes. The ferrite core exhibits varying distortion properties dependent upon the manufacturing process used in core construction, but in general a current waveform distortion occurs which decreases with increasing frequency.

In summary of the performance data for ferrite toroids reviewed by the writer it appears that where miniaturization or minimum size is a requirement in equipment the ferrite core is useful provided that the radio frequency power being handled is very nominal, as related to frequency of operation, and distortion encountered can be neglected.

I have been researching various circuit element performance parameters related to r.f. amplifier design lately as part of a linear amplifier design project. On the basis of calculations made and data sifted, air-wound coils have been selected for a one-kilowatt p.e.p. amplifier. Tapped-coil band switching will be used for the low-powered cathode drive inductance, and plug-in coils will be used in the plate tank circuit. I can visualize readers recoiling in horror at the idea of anyone designing a new amplifier and using plug-in coils! However, the fact remains that this old coil design is still unsurpassed in terms of efficiency (shades of the 1920's!).

QST

#### References:

- <sup>1</sup> S. Butterworth, "The High-Frequency Resistance of Toroidal Coils," *Exp. Wireless and Wireless Eng.*, Vol. 6, p. 13, January 1929.
- <sup>2</sup> G. Reber, "Optimum Design of Toroidal Inductances," *Proc. I.R.E.*, Vol. 23, p. 1056, September 1935.
- <sup>3</sup> F. Terman, *Radio Engineers Handbook*, 1943 (McGraw-Hill Book Co., Inc.).
- <sup>4</sup> G. Palmer, "High Ferrites for Frequencies From 2 to 200 MHz.," *Proceedings 1959 Electronic Components Conference*, Philadelphia.
- <sup>5</sup> Remis, Bady, Sands, "Planar Ferrites for Permeability Tuning in the Very High Frequency Region," *Proceedings 1966 Electronics Components Conference*, Washington, D. C.
- <sup>6</sup> *Advances in Electronic and Electron Physics*, Edited by L. Marton, National Bureau of Standards, Washington, D. C., 1954.

## Strays

### HEADQUARTERS VISITS

The League Headquarters building is open to visitors Monday through Friday, 8:30 to 4:00, on a "drop-in" basis, and at other times by appointment. The headquarters is on Main Street (Conn. Route 176 and 176-A) about a mile north of the center of town, and about 3 miles west of Conn. 15-U. S. 5, the Wilbur Cross Highway. (For W1AW visiting hours, see the schedule on page 98).

Philadelphia Fire Commissioner James J. McCarey sends holiday greeting radiograms to city firemen serving in the Armed Forces, via ham radio and MARS. Left to right are M3MYS, E. Pa. PAM; Commissioner McCarey; K3WAJ; Mr. and Mrs. John Christmas whose son, John Christmas Jr. is a city fireman serving in Korea.



# • *Beginner and Novice*

## How To Do A Good Soldering Job

### *Some Tips On an Important Subject*

BY LEWIS G. MCCOY,\* WHICP

*One of the first things a newcomer must learn is how to solder. Here is some information that will get you on the right track to end up with a "professional" soldering job.*

It is probably possible that you can put a station together without having to solder any connections — but quite unlikely. Whether you build your own gear or put together kits, your ability in doing a good soldering job will make the difference between success and failure.

#### *Tools For The Job*

There are certain tools, in addition to the soldering iron, that are necessary for a good soldering job. Soldering irons will be discussed a little later; first, let's see what other tools are needed.

The No. 1 tool required in a ham shack is a pair of wire cutters. There is one type, shown in an accompanying photograph, that will serve the dual purpose of wire cutting and insulation stripping. The tool shown has notched cutting edges, and the notch can be adjusted so that it will cut through the insulation but not the wire, making the removal of the insulation a simple matter.

Another important tool for any wiring job is a pair of long-nose pliers. It is often difficult to feed wires through terminal strips with your fingers and long-nose pliers makes the job easy.

A handy tool for soldering jobs is a "soldering aid." This tool has a two-tined fork at one end and a probe at the other. The probe end is useful for pushing wires into hard-to-reach spots, removing bits of wire and solder and many other applications. The forked end can be used for making bends in wires where they come through a terminal. Even more important, the forked end is handiest when it comes to "unsoldering" a connection. This last statement may sound a little strange to the reader of an article on soldering. However, take our word for it, you'll make plenty of mistakes in soldering connections, and the forked end of the tool is excellent for loosening soldered leads. The connection is heated up and the forked end of the tool is slipped over the end of the wire to be loosened and the connection can be quickly opened.

\* Novice Editor

One more tool that is required is a pocketknife. The knife is used to scrape insulation from wires or to clean the ends of a wire to be soldered. We've seen beginners trying to solder enameled ends of wire without first removing the enamel. One very important rule in soldering is that any wire or terminal must be clean if you want a good soldered connection. Insulation or dirt on connections make a poor joint.

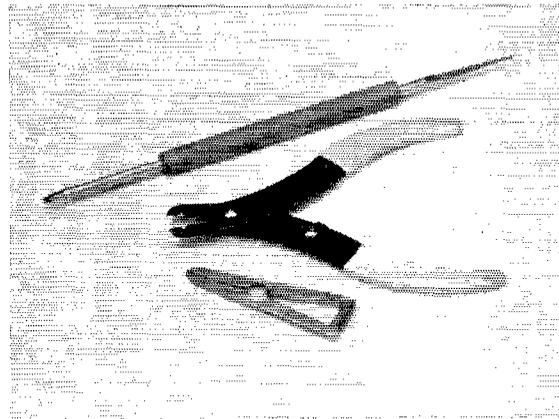
#### *The Solder*

If you go to a radio or hardware store you'll find two kinds of solder on sale, rosin-core and acid-core. *Don't* buy acid-core solder. Acid-core solder is used in plumbing work and never should be used in doing radio work. The acid-core solder makes a connection that will corrode after a short period. Use only rosin-core solder.

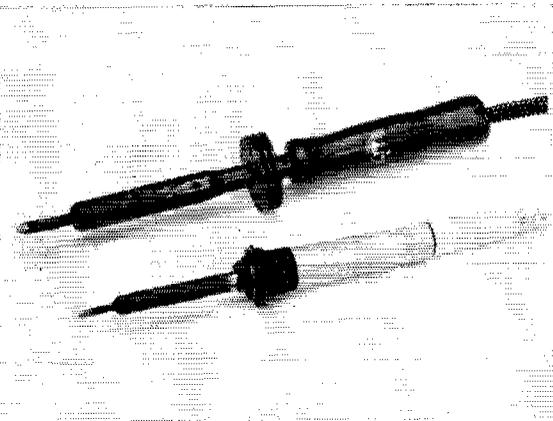
For general soldering work, a 60/40 rosin-core solder is recommended. The 60/40 indicates 60 percent tin and 40 percent lead. The rosin acts as a flux in that it aids the soldering by cleaning the surfaces to be soldered and keeping them clean until the solder flows over and into the surfaces.

#### *Which Soldering Iron?*

If you pick up a radio parts distributor's catalog you'll find a very wide selection of solder-



These are some of the soldering tools described in the text. At the top is a soldering aid. In the center is a pair of wire cutters and trimmers. The unit at the bottom is a commercially made heat sink, available from any radio or TV parts distributor.



The larger iron is needed for tube-type construction while the smaller pencil type is suited for printed circuit work and in wiring transistors.

ing irons available. The two common types used by hams are either soldering guns or the "constant-heat" type iron. A soldering gun must be turned on each time you solder a connection while the constant-heat type iron is plugged in and remains hot, ready for instant use. Whether you choose a gun or the constant-heat type depends on the amount of soldering you plan to do. For occasional soldering jobs a gun is very handy. However, if you do a considerable amount of soldering the constant-heat iron is preferred.

For many years a single type of soldering iron would do most of the jobs in building radio gear. However, with the advent of printed circuit work the requirements have changed. These days the typical experimenter needs two kinds of irons, one for the "light" touch needed in wiring circuit boards and transistors, and a heavier unit for the bigger jobs.

For circuit-board work the pencil-type iron shown in the accompanying photograph is the most popular. This type usually comes in the 40-watt range and is supplied with a couple of different tips. The two types of tips used with the pencil iron are the pointed and blade tips. The blade width is usually  $\frac{1}{8}$  inch.

For heavier work, an 80- to 100-watt iron is required. The tip on such an iron is usually pointed with a  $\frac{3}{8}$ -inch diameter.

### Soldering

Before getting into the actual techniques of soldering, let's say something about the care of your iron. For the tip of the iron to conduct heat from the iron to the work, it is necessary for the tip to have a thin coating of solder — not dirty or oxidized solder, but a bright, shiny surface. A new iron should be heated and then "tinned". The tinning process consists of flowing some solder and flux on the hot tip (which must be bright or the solder won't adhere) and then wiping the tip clean with a rag. This will give the tip a bright appearance. Whenever you solder,

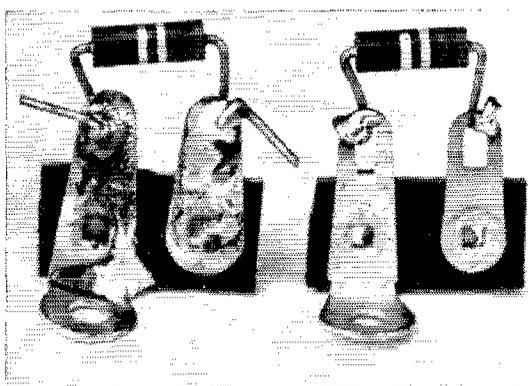
any excess solder should be wiped off the tip of the iron. If the tip gets scaly or pitted it should be filed clean to remove the scale and then re-tinned. It is very important to keep the tip of the iron clean; otherwise it is practically impossible to get a good soldering job.

Whenever you complete a soldering session, wipe the tip clean with a rag or some steel wool while the iron is still hot. This will help keep the tip clean and in usable condition.

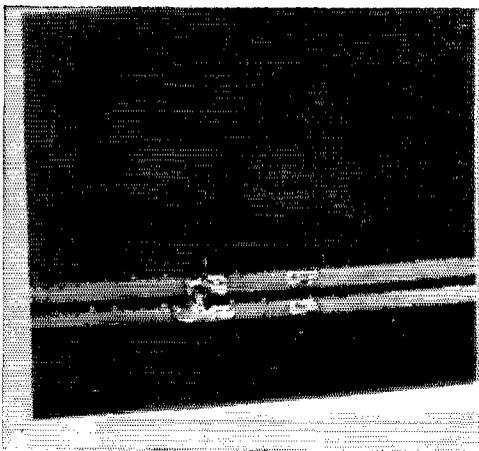
The process of soldering is quite simple. The tip of the iron is applied to the connection and the connection allowed to heat up to the point where the solder flows around the connection. Where many amateurs make a mistake is by applying solder to the iron and not the connection. It is very important that the leads to be soldered must reach a temperature that melts the solder. Otherwise, you end up with a connection that is known as a "cold" solder joint. A cold solder connection looks like a soldered connection but actually is a poor connection and can cause an intermittent-operation problem in the equipment. The newly-soldered connection should have a bright silvery appearance. If the terminal looks dull, it could be that the work didn't reach the proper soldering temperature.

How much solder should be applied to a connection? The answer to this is simply enough solder to make the connection. Beginners are inclined to use big gobs of solder on connections and this is unnecessary. Not only is it unnecessary but if too much solder is used there is always the danger of one connection shorting to another. This is particularly true when wiring printed circuits. It is very easy to use too much solder on a printed board, causing a short between two or more portions of the circuit.

Of course, as mentioned earlier, it is important that the work must be clean in order to get a good solder connection. Terminals and tinned leads need not be cleaned but dull or oxidized copper and brass leads should be cleaned and shiny before soldering.



This illustrates the right and wrong way to solder. The resistor leads on the unit at the left should be trimmed off and too much solder is used to make the connection. The correct installation is shown at the right.



The printed circuit shows a common mistake in soldering. The connection at the left has entirely too much solder, causing a short across two parts of the circuit. Always use just enough solder to make a connection.

At one time, it was considered a "must" in soldering that leads to be soldered were first wrapped around a terminal in order to provide mechanical strength to the connection. This always made for a messy situation when such a connection had to be unsoldered. And — keep one thing in mind — you are bound to make mistakes in wiring circuits, everybody does. In amateur work, it isn't necessary in most cases to wrap a connection. Merely feed the wire or lead through the terminal, make a 90-degree bend in the end of the lead to hold it in the terminal, and then solder. If you have to take the connection apart it will be a much simpler

job than if the lead was wrapped around the terminal.

### Use A Heat Sink

In soldering small components, such as diodes, transistors, capacitors and resistors, if too much heat from the iron reaches the body of the component its value may change, or the component may even be ruined. It can be very exasperating to do a nice wiring job and then not have the unit work simply because a component has changed value or been ruined. The simplest way to prevent this from happening is to use a heat sink. A heat sink is merely a piece of metal — long-nose pliers or a wire clip that is used to conduct the iron heat *away* from the body of the component. The heat sink shown in the accompanying photograph is a commercial unit that is available from any radio parts dealer. This unit has spring-loaded jaws so that the heat sink can be clipped to the lead being soldered, freeing the hands for other work.

The heat sink is applied to the lead between the body of the unit and the point being soldered. This will prevent the iron heat from reaching the component and ruining it.

### In Summary

Follow the steps outlined below and you should wind up with a good soldering job.

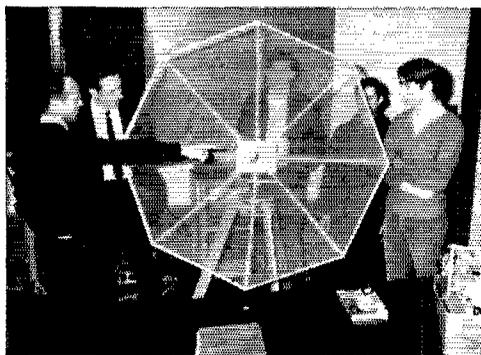
- 1) Always use rosin-core solder, never acid-core.
- 2) Keep the tip of the iron clean and tinned.
- 3) Any leads or terminals should be clean.
- 4) Apply the solder to the work, not the iron.
- 5) Never use more solder than necessary.
- 6) Always use a heat-sink on small components.

**QST**

## Strays



The Vermilion County ARA is doing its part to promote interest in amateur radio among youngsters. They've helped to form an Explorer Post to involve boys 14-18 years of age in various aspects of electronics. Shown at a code practice session are (from left) K9CDD, K9JLP, Mike Aderson, and Douglas Ries.



Student members of the Talcott Mountain U.h.f. Society (see QST for June 1967, p. 56) get an introduction to 2300 MHz, techniques by studying a pulse transmitter and parabola built by WA1IAO. From left are WA1IAO, K1TZD, WN1IQJ, WA1ISE and WA1GIS.

# Some Observations With V.h.f. Yagis

## *Practical Pointers on the Design, Construction and Evaluation of Antennas for 50 Mc. and Higher*

BY EDWARD P. TILTON,\* WIHQ

WE'VE been building and writing about v.h.f. parasitic arrays for many years. Reliable information in this field has not been easy to come by, since such antennas all but defy precise analysis, even for the mathematically inclined. Most of what we know today is the result of time-consuming effort by scores of back-yard experimenters, some of it dating back more than 30 years.

In recent times we've confirmed some earlier results that were obtained with less effective instruments and methods than are available today, but we've also turned up vagaries in some long-accepted practices.<sup>1</sup> We'll not bore the reader here with much repetition, but footnoted reports of this series may be of interest as background for this discussion, if you've not already gone over them. Many hours have been spent in the past year or so, adding to this store of practical information about v.h.f. antennas, particularly as to the effects of wood and metal booms. In the process, we've learned a little more about the lengths of elements in parasitic arrays generally.

### **About Booms**

In an array for 14 Mc., the boom diameter is no more than about 0.8 percent of the element length, so builders of h.f. beams need not worry about the detuning effects of all-metal construction. But at 432 Mc. even the smallest practical metal boom is likely to "short out" some 5 percent of an element — and right at the high-current portion, at the center. That we have been able to ignore this factor in building v.h.f. beams all these years pretty well bears out our contention that element lengths in v.h.f. Yagis are not nearly so critical as we once believed. There has to be some difference in optimum element length, depending on whether the element is mounted in a metal or insulating boom — but how much?

In working out details of the now-popular 11-element Yagi for 432 Mc.,<sup>2</sup> we first used a wood boom. When optimum element lengths and spacings were obtained, we duplicated the array with a boom of  $\frac{3}{4}$ -inch aluminum tubing. No observable difference could be found in forward gain at 432 Mc., but when the array was swept from 427 to 436 Mc. the center frequency of the metal-boom version was found to be about one megacycle higher than that of the wood-boom job.

\* V.h.f. Editor, *QST*.

<sup>1</sup> "V.h.f. Antenna Facts and Fallacies," January, February and March, 1964, *QST*.

<sup>2</sup> "Yagi Arrays for 432 Mc.," April, 1966, *QST*, p. 19.

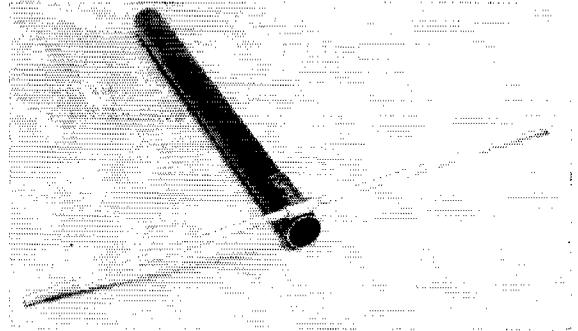


Fig. 1—Model showing a mounting method for elements in an array for 220 Mc. or higher frequencies. Riveting is done with the "Pop Rivetool," now generally available in hardware stores. A drop of epoxy cement on the element before assembly will keep the mounting tight indefinitely.

The resonant frequency of a single element can be checked readily with a dip meter, and the difference for various types of booms found in a few minutes. If this is done in any confined space, or close to ground, the resonant frequency will be different from that in free space, but the comparisons for various booms will be valid. If you are looking for true element length information, make the check out of doors, and at least one wavelength away from ground and other sources of reflections. Couple the dip-meter coil to the center of the element, as loosely as possible. This work is usually easier at 144 Mc. than on 220 or 420 Mc., as most dip meters work poorly above about 150 Mc. Information obtained at 144 can be scaled to 220 or 432, but scaling tends to become inaccurate above about a 3-to-1 change in frequency.

Incidentally, a neat all-metal array for 432 Mc. can be made by the use of the "Pop Rivetool," now available in most hardware stores. An example of this technique, Fig. 1, was first suggested to the writer by WIQVF, who made this model. We built a riveted version of the 11-element 432-Mc. Yagi. Somewhat to our surprise, it worked more like the antenna in which the elements were run through a metal boom than like a similar one made on 1-by-1 wood. There appears to be a sort of "proximity effect" with all-metal construction, but as already pointed out it is of little practical importance.

### **Element Lengths**

Since the first words ever published about parasitic arrays, we've been warned that they are, by nature, highly frequency-conscious. This

may be true in the h.f. range, where element diameter is a very small percentage of a wavelength, and feed impedances tend to go very low in close-spaced arrays. But at v.h.f. and u.h.f. we feel that this point has been overworked. There are many ways to get optimum results, or very near optimum, with v.h.f. Yagis and our considerable experience indicates that worries about variations of one percent or so in element lengths are all but unfounded.

To be sure, even small changes in element lengths do affect the feed impedance of the system, and a properly-tuned parasitic array may show a perfect match only over a very small frequency range. Thus, if a fixed method of matching is employed, the frequency spread over which the s.w.r. remains under 2:1 (usually given as the maximum acceptable) may be quite small. With a long Yagi peaked in the first megacycle of the 2-meter band, it probably will not be more than about 144 to 145 Mc. But if the matching method is adjustable, smaller Yagis may be useful over a considerably wider range.<sup>3</sup>

At 432 Mc., where elements tend to be larger diameter in terms of wavelength, the spread in megacycles may be more than three times as great. We've heard of experimenters filing the element ends to adjust 432-Mc. Yagis — and this may be preferable to other cutting methods which give less precise lengths — but  $\frac{1}{8}$ th inch is less than one percent of a 432-Mc. element length, and one percent is just not all that important! This is especially true if the matching system is readjusted to optimum whenever element lengths are changed. You can change all the elements in a 432-Mc. Yagi by  $\frac{1}{8}$ th inch, and if you rematch the system you'll hardly be able to tell any difference in performance, except by checking over a wide range of frequencies.

The main consideration in regard to the lengths of parasitic elements is that the reflector be on the long side of resonance and the directors on the short side. The closer the element spacing, the nearer to the resonant lengths the parasitic elements must be, for maximum gain. It is important to note that performance falls off slowly as the directors are made shorter and the reflector longer than those lengths which give the absolute optimum gain. Conventional Yagis for 144 Mc. and higher bands can thus be "broad-banded" sufficiently for most amateur needs with almost no sacrifice in gain. If the matching system is adjustable, the frequency coverage of any Yagi system can be extended considerably. This makes the universal stub, used in many of our v.h.f. arrays of recent years, a very desirable feature.<sup>4</sup>

The usefulness of a Yagi tends to fall off more rapidly on the high side of resonance than on the low. If you want a 50-Mc. beam to work well from 50 to 50.7 Mc., for example, adjust it at about 50.4 Mc. or higher. If you want good

results at the low end of the 2-meter band, and acceptable performance in the more heavily-occupied region just above 145, it's a good idea to match at 145, or thereabouts. What really makes a Yagi quit on you is the property the directors have of eventually becoming reflectors, when the frequency is pushed too high. Until this happens, readjusting the matching will make most Yagis work over a wider frequency range than you would expect, from some propaganda you've heard on this score.

### How About Driven Elements?

The tendency has been to ignore the driven element's contribution to the performance of v.h.f. Yagis. We see split dipoles, folded dipoles, triple dipoles, T-matches, Gamma matches, and so on ad infinitum. Lengths are often fudged to make the system match, as will be seen from a perusal of the lengths given in many different designs. Generally it is best to use a resonant driven element, and then adjust other aspects of the system to achieve a match. But how long should a driven element be for, say, 145 Mc.?

More-or-less standard procedure has been to start with the time-honored figure of

$$L \text{ (inches)} = \frac{5540}{\text{Freq. (Mc.)}}, \text{ or about } 38\frac{1}{4} \text{ inches}$$

for a 145-Mc. element. But if you make the dip check carefully on a 2-meter element of average diameter, you'll find that this is quite a bit too short. It works acceptably with commonly-used element diameters because we arbitrarily make the directors about 5 percent shorter, and the reflector about 5 percent longer, but why not make it the *right* length? Just out of curiosity, the writer decided to track down that 5540 number, and found that it dates back to the late 1920s. It was used first, not for a Yagi driven element at all, but for a dipole length that would take into account the end effect of a wire supported on insulators!

The lengths arrived at in this way worked well with folded dipoles<sup>5</sup> and some other commonly-used v.h.f. matching systems, but when we began to check the true performance of driven elements we found that most of them were on the short side of optimum length. Something like 5600 looks like a more realistic figure. This is particularly true of unbroken driven elements with delta matching. Poor old delta — for years we'd been giving it low marks, but when we finally got it long enough to be resonant at the desired operating frequency, and the delta adjusted to optimum dimensions,<sup>6</sup> it turned out to be a pretty good system.

### Checking Up On Results

A wonderful time to put up a new v.h.f. array is in the pleasant weather of spring or fall. One advantage of this is that the first use of the an-

<sup>3</sup> "Building Your Own Arrays for 50 and 144 Mc.," October, 1966, *QST*, p. 33.

<sup>4</sup> *Radio Amateur's V.h.f. Manual*, Edition 1, Fig. 8-18D.

<sup>5</sup> "Technical Topics," — "Some Observations with V.h.f. Folded Dipoles," April, 1965, *QST*.

<sup>6</sup> "More Ideas for 50-Mc. Portable Arrays," October, 1967, *QST*, p. 15.

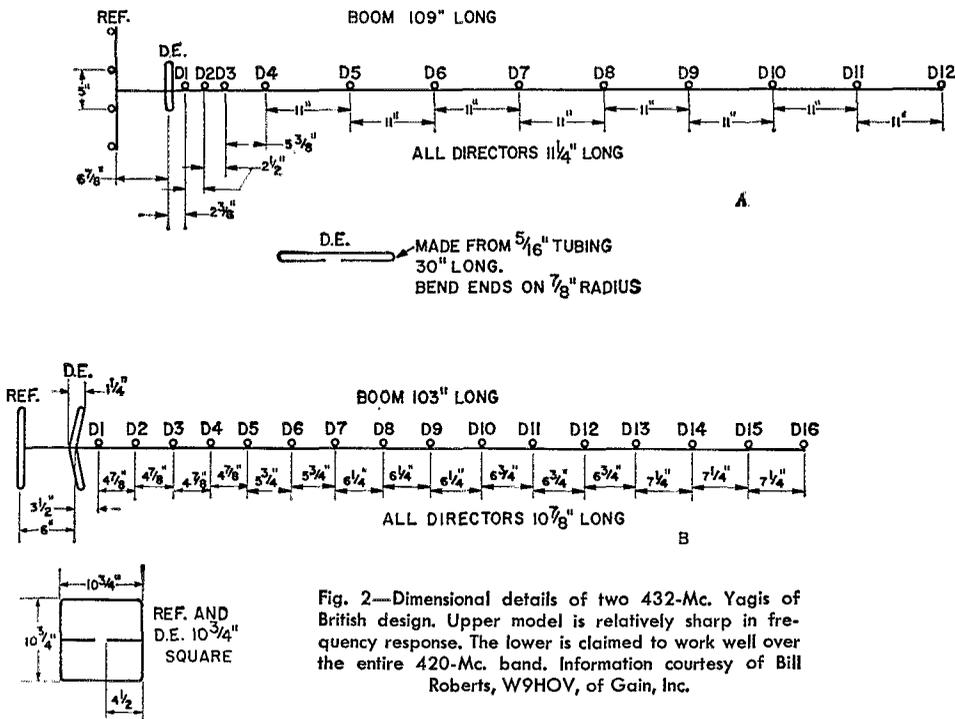


Fig. 2—Dimensional details of two 432-Mc. Yagis of British design. Upper model is relatively sharp in frequency response. The lower is claimed to work well over the entire 420-Mc. band. Information courtesy of Bill Roberts, W9HOV, of Gain, Inc.

tenna stands a good chance of being made when there is a fine tropospheric inversion. Signals will come rolling in from far beyond the usual working limits, and your confidence in the new beam will be firmly established. Just *thinking* that it works better can help mightily to make the proud owner feel that the heavy labor has been worth it. Many a highly touted new beam has no firmer claim to fame than this!

But if you've done a lot of antenna work in your time you know that true evaluation of an antenna's worth is more involved than this. You probably have had the disquieting experience of checking a new array against an old, smaller or perhaps lower one, and finding that the big high job shows little, if any, improvement. One reason for disparities in observations is reflections. It is quite possible for variables to add up impressively on one antenna, and cancel out on another, especially in tests with local stations. Comparisons made with stations farther out are more likely to show meaningful results. But many tests must be made, on many paths, in many directions, and under various propagation conditions, before any real evaluation of a new array can be obtained.

Backyard tests with field-strength indicators are often misleading. Reflections are a constant threat to the accuracy of such measurements, and there are other factors. Knowing exactly how much power is going into the array is of paramount importance, and this makes careful adjustment of matching for zero reflected power a must on every check. If you have a perfect match, you can measure at least the *relative* power being used, and this is a big help.

Say you have a field-strength reading of 100 microamps with 10 watts going into your beam. If adjustments make this same reading possible with 5 watts, you have a pretty good indication of having made a 3-db. improvement in the antenna. But unless the system is rematched after every adjustment, those forward-power readings are not sufficiently accurate for comparative purposes. Being in the dark about the true power level being used has been at the bottom of much misleading information published about antennas, especially v.h.f. Yagis.

### Some Novel Ideas

One of the great joys of antenna work on the higher bands is that there are so many ways that antennas can be built. No one design "has everything," and there are many possible approaches that we have used little, if at all, in the home construction of our v.h.f. arrays. Some European designs offer examples. Two 432-Mc. Yagis described herewith, by courtesy of Bill Roberts, W9HOV, of Gain, Inc. are particularly interesting.

These two Yagis, whose principal dimensions are given in Fig. 2, have some design features in common. Both are of exceptionally solid construction; practically indestructible. Both have 1 1/4-inch diameter booms, larger than usual in 432-Mc. antennas. Elements are 5/16-inch diameter, mounted in two-piece cast-aluminum saddles that bolt to the boom.

The driven elements are unlike anything used in this country, and so are the reflectors. The one shown in Fig. 2A is primarily intended for

(Continued on page 136)

# Interference and the V.H.F.

## Mountain-Topper

### How To Get Along with "Big Brother"

BY J. G. "BUNKY" BOTTS,\* K4EJQ

**D**URING the early '30s a new term was added to the amateur's vocabulary: "mountain-topping." In those days avid 5-meter operators would head for the hills at every opportunity, with self-excited oscillators and rush-box receivers. The v.h.f. amateur of today still enjoys this activity, perhaps even more than ever. A major difference is the complex nature of the gear in use today, and its vastly greater efficiency. We also face a problem unknown to early 5-meter men: interference to and from other services that have also gone in for mountain-topping.

Today it is almost impossible to find a desirable mountain location that doesn't sport some type of commercial and/or governmental radio, television, radar or microwave facility. In ever-increasing numbers, these services are locating in high spots for the same reason that you went there: to extend their coverage. Secondly, many of the higher-powered stations are on remote mountain sites to prevent interference to other services, and vice-versa. The question of who interferes with whom is pretty much a one-way affair; an amateur must not interfere with

these services, but if his expedition is wiped out by interference, "that's tough!" We operate nearby at our own risk. There are many commercial and government facilities; we will discuss only those most likely to be encountered.

#### Federal Aviation Administration

There are four basic FAA facilities normally located at high elevations:

V.h.f. omnirange (VOR) 108 to 118 MHz.

Remote control, air-to-ground communications systems (RCAG).

Radar microwave links (RML).

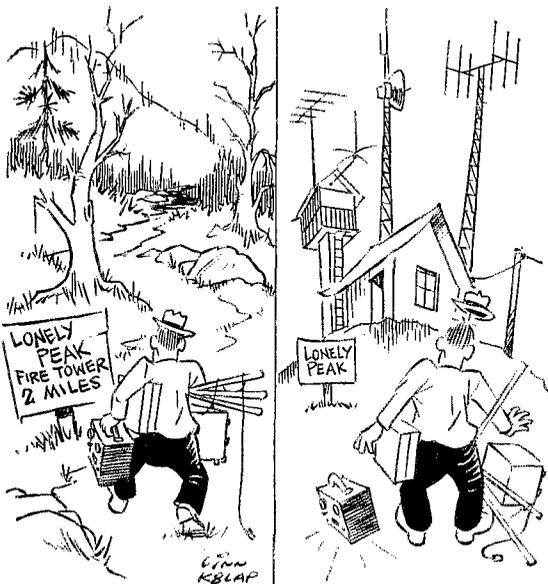
Surveillance Radar.

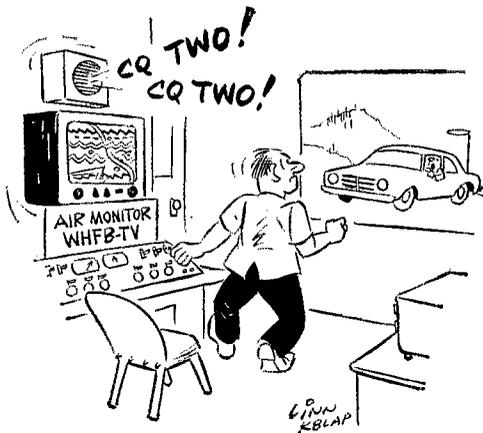
With the exception of most radar installations, these facilities are not manned except during maintenance periods. The VOR station is easily identified by its tepee-type building on a levelled mound of earth, or domed building with a circular ground system supported above actual earth ground. An amateur operating near one of these must conform to antenna-height restrictions. This is to prevent possible distortion of the radiated pattern and consequent erroneous information to airborne navigational equipment found on all commercial and military aircraft, and most private planes. Power lines entering or nearby these installations are buried, for the same reason. Warning signs advise visitors to keep away, and in particular not to drive vehicles near the facilities.

Should your mountain top QTH be near an RCAG installation, it would be advantageous to contact your local FAA maintenance center, usually located at a nearby airport. Find out which frequencies are in use. The problem here is to keep your equipment from radiating harmonics, parasites or other spurious signals, as many of these facilities operate on frequencies not far from our v.h.f. bands.

A coaxial or strip-line filter<sup>1</sup> may aid materially in the reduction of interference to other services, and to your own operations as well. Use of radiating receivers near this kind of facility is asking for trouble, as they can easily cause interference to sensitive receiving equipment used there. Imagine the average 5-meter rig of the 1930s near one of these stations!

<sup>1</sup> Filton, "Coaxial-Tank V.H.F. Filters," October, 1964, *QST*. Other filters in *The Radio Amateur's V.H.F. Manual*, Chapter 12.





There is little chance of an amateur on 6 or 2 causing interference to a radar installation, as most of these are on frequencies much above these bands. And, since in most instances high transmitter power is involved, extensive provisions have been made to protect receiving gear from stray r.f. pickup. On the other hand, you had better come prepared to cope with severe pulse-type interference in your receivers. An effective noise limiter capable of clipping these pulses is mandatory, and a properly-adjusted noise blanker may be helpful. Keep in mind that i.f. noise blankers are quite susceptible to overload from strong signals, so make provision for removing the blanker from the receiving circuit.

#### TV and F.M. Transmitter Sites

Should the mountain you aim to operate from dominate the terrain near any large city, you can expect to find one or more TV or f.m. transmitters located there. The majority of these are manned 18 hours a day or more, so it is advisable to notify the technicians at any where you plan to operate in the immediate vicinity. Conducting on-the-air checks with station personnel is recommended. Often these fellows will turn out to be hams, and friendly to courteous visitors.

The equipment most susceptible to amateur interference is the microwave (STL) receivers. As in the microwave equipment of the FAA RML facilities, the problem arises from the use of high-gain wideband i.f. amplifiers in the microwave receivers. It is not unusual for the i.f. passband to include all or part of an amateur v.h.f. band. In such cases, a strong signal from a nearby amateur station can cause considerable interference. At my mountain QTH, a TV transmitter site, I have to limit my 2-meter power output to 100 watts or so. When I increased power output to around 700 watts, approximately 8 db., interference became very severe. Perhaps if the 2-meter antenna was farther away from the microwave receivers and their antennas we could run the higher power safely, but desirable space is often at a premium on mountain tops.

Being near these high-powered transmitters creates many receiving problems, in the form of spurious responses and overloading of the receiver front end. A poorly-designed converter or receiver, with inadequate image rejection or selectivity, and a low threshold for overloading, can be rendered useless. Most popular transceivers fall short in this department. A coaxial or strip-line filter may help, but it is no cure-all. It's good practice to shield interconnecting cables, and keep them to the minimum required length. Use shielded transmission lines for all antennas. A good earth ground is especially important, not only for reduction of interference caused by induced r.f. currents, but for lightning protection. Believe me, a mountain-top thunderstorm is as dangerous as it is spectacular. Do not attempt to operate when there is a storm nearby. Disconnect antennas from equipment, and ground them. It doesn't take a direct hit to put you or your equipment out of business.

Then, after all you can do to prevent interference to your amateur work, be prepared to "operate around" possible birdies in the receiving gear. It is almost impossible to set up near to high-powered v.h.f. stations of various kinds without encountering some extraneous signals.

#### Cable TV Installations

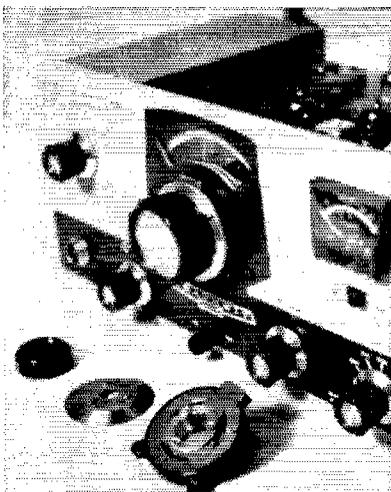
There is just one good word of advice about trying to operate near a community antenna television system (CATV) — *don't!* These cable systems have pickup stations on hills or mountains near the communities they serve. The TV signals are picked up by high-gain antennas, then amplified many times and fed through coaxial cable and more distribution amplifiers, into the homes of the community. Such facilities are not manned, except for brief maintenance periods. The problem here is not one of interference to your equipment, but to theirs. If you've ever had TVI caused by overloading of a neighbor's antenna-mounted booster, you have some idea of what it's like if your signal gets into a CATV system — except that now you're getting into every TV set in the community. No amount of care in the design and filtering of your transmitter will prevent this sort of thing. The only safe procedure is to avoid CATV installations entirely.

#### Other Possibilities

There are many other radio facilities such as public utility, commercial two-way, governmental, and so on, not discussed here. Rest assured that, since they have gone to the trouble and expense of locating their equipment in remote high locations, they are using some mode of v.h.f. communications, and they do not expect to be interfered with. If you plan to operate near such a facility it is advisable to contact the technician in charge beforehand, and get all pertinent details concerning the installation.

(Continued on page 144)

# Dial Modification for Heath Monoband Transceivers



New dial mechanism installed on an HW-32A. Only the vernier mechanism is used, after removing the knob and calibration scale as shown in the foreground.

## *Easier Tuning in Mobile Operation*

BY STANLEY P. SEARS,\* W2PQG

THE Heath monoband transceivers HW-12A, HW-22A and HW-32A are in worldwide use, and have been affectionately termed the "Hot Water" series. These units are well designed and perform equally well in a fixed station or a mobile installation.

Early this past summer the writer installed an HW-32A as a mobile rig. With the exception of ignition noise (reference October, 1967 *QST*, page 46), the transceiver performed exceptionally well. When in motion, however, it was found to be very difficult to tune in stations because of the effect that the movement of the car had on the stability of my hand on the tuning knob. As designed, there is a single friction washer on the capacitor shaft. This serves adequately for fixed-station applications, but the amount of friction is insufficient for mobile use. Discussions with other mobile users of the HW-series monobands have revealed this to be a common problem.

Several methods of introducing additional friction were tried, such as using a heavier spring washer, and placing a felt washer under the knob. Although there was some improvement, these measures were not adequate. The modification described in this article finally corrected the problem, and in response to requests for details from other operators, the following description of the alteration is provided.

The shaft of the v.f.o. tuning capacitor in these transceivers has a built-in vernier which provides a ratio of about 4:1. The modification

doubles this ratio to 8:1 and at the same time adds the required friction. The combination of an 8:1 tuning ratio and increased friction completely eliminates the original problem, and actually makes tuning easier because of the ratio change.

The photographs show that a vernier tuning mechanism has been added behind the original tuning knob (a second vernier dial is shown in the picture to illustrate the disassembly described later in the procedure). This mechanism is connected through a flexible coupling to the shaft of the v.f.o. tuning capacitor. The tuning capacitor has been moved back over the printed circuit (p.c.) board to allow room for the coupling. This coupling was selected for its flexibility primarily to provide *mechanical* isolation between the new dial mechanism mounted on the front panel and the v.f.o. tuning capacitor. This modification was initially made without the flexible coupling, and it was found that vibration of the front panel carried back to the tuning capacitor, causing frequency modulation. The flexible coupling isolates the capacitor from these vibration effects. (In the original arrangement the tuning knob is isolated from the panel.)

Only three principal parts are required for the alteration:

A) A 2-inch vernier dial, 8:1 ratio (Lafayette Radio P/N 99H6030 or Argonne AR-405, price \$0.99).

B) A flexible shaft coupling selected for mechanical isolation. This cannot be a rigid coupling, but must be extremely flexible to

\*188 Concord Drive, Paramus, New Jersey 07652.

absorb any fore and-aft-panel motion. The writer employed a coupling removed from an old SCR-522. The holes had to be bushed to  $\frac{1}{4}$ -inch shaft size. The common bakelite-wafer type of flexible coupling should be usable, provided that it can be easily compressed by pinching.

C) One piece of  $\frac{1}{4}$ -inch shaft, approximately  $\frac{5}{8}$  inch long.

For those desiring to perform this modification, the following sequential procedure is suggested:

1) Remove the original Heath tuning knob.

2) Locate capacitor  $C_{138}$  (0.02- $\mu$ f. ceramic) directly behind the v.f.o. tuning capacitor. Remove this part, and resolder it to the same points on the under side of the printed circuit board. Solder directly to the foil and do not insert the leads through the original holes.

3) Unsolder connections, remove four mounting screws, and lift out the v.f.o. tuning capacitor. Loosen the setscrew and slip the plastic dial off the shaft.

4) Using a hacksaw, carefully cut the shaft of this capacitor, leaving only  $\frac{3}{16}$  inch of length. (Dress the cut end with a file to remove burrs, and to permit the inner shaft of the original reduction mechanism to turn freely.)

5) Drill two new holes in the chassis for re-mounting the v.f.o. capacitor  $\frac{3}{8}$  inch to the rear of the original front holes. Only two screws will be used to secure the capacitor in its new rearward location. (Do not drill any holes in the p.c. board, as the rear screws will not be used.)

6) Since the capacitor is to be placed on top of the p.c. board, two spacing washers are needed with the two mounting screws to keep the capacitor level. The washers should be the same thickness as the p.c. board.

7) Mount the v.f.o. capacitor in its new location, using two new screws  $\frac{1}{8}$  inch longer than the original ones. Insert the screws through the new holes with the spacing washers installed between the chassis and the capacitor frame.

8) Resolder the wiring to the v.f.o. capacitor as originally connected.

9) Install the flexible coupling on the v.f.o. capacitor shaft, and tighten the setscrews.

10) Slide the plastic dial on the new section of  $\frac{1}{4}$ -inch shaft, and insert the shaft into the forward end of the flexible coupling; lightly tighten the screws. (The length of this new piece of shaft will be around  $\frac{3}{4}$  to  $\frac{7}{8}$  inch, depending upon the size of the coupling selected.)

11) Slide the new vernier dial on the end of the  $\frac{1}{4}$ -inch shaft until it rests against the front panel. Center and level the dial, and then mark the two mounting-screw locations on the panel.

12) Two small sheet-metal screws will be used to secure the vernier dial to the panel. These screws must be carefully selected for length so that they do not extend through the panel and touch the plastic dial behind.

13) Carefully drill clearance holes for the two sheet-metal screws. (It would be well to remove the plastic dial during this operation to prevent damage by the drill.)

14) Mount the vernier dial to the front panel, using the two sheet-metal screws.

15) Fully close the v.f.o. capacitor, and turn the vernier dial to its counterclockwise stop.

16) Loosen the screws on the forward end of the flexible coupling, and push the  $\frac{1}{4}$ -inch shaft forward until it bottoms in the vernier dial. Tighten the setscrews on the dial and flexible coupling.

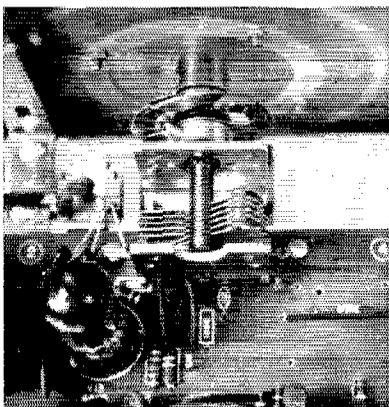
17) Relocate the plastic dial in its proper position in accordance with instructions in the Heath manual. Tighten the setscrew.

18) On the new vernier dial, remove the knob and the logging scale, as indicated in the picture. (These parts are not used.)

19) Install the original Heath knob on the shaft of the vernier dial. As shown in the photo, the Heath knob almost completely hides the new vernier mechanism behind it.

This completes the modification.

QST



The v.f.o. tuning capacitor is moved toward the rear of the transceiver to make room for the flexible coupling. The original 4:1 planetary vernier drive in the capacitor shaft is bypassed by coupling the dial shaft to the direct-drive part of the capacitor shaft.

## Strays

### Service And Conversion Information For GE Two-Way F.M. Radios

The General Electric Mobile Radio Business has published a two-volume service information set for mobile combinations and station combinations manufactured by GE from 1949 to 1955. Prepared especially for radio amateurs who have converted the GE radios for amateur use, Volume I — LBI-3883 — is for low band (25-50 MHz.) and mid band (72-76 MHz.) radios and Volume II — LBI-3884 — is for high band (150-174 MHz.) and u.h.f. (405-475 MHz.) radios. Each volume contains approximately 100 pages of schematic, outline and interconnection diagrams and is available for \$4.50. Available from General Electric Mobile Radio Business, P.O. Box 4197, Lynchburg, Va. 24502.



# Hints and Kinks

For the Experimenter

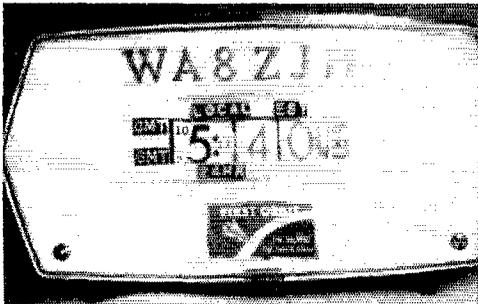


Fig. 1—By modifying a 12-hour digital clock as described in the text and shown above, you can read 24-hour GMT and 24-hour local time without any calculating.

## GMT FOR THE 12-HOUR DIGITAL CLOCK

FOR years I have had a 12-hour digital clock in my station. I've always liked the clock because I've found that it is easier to read local time on it than on my wristwatch; however, it has been a nuisance to convert the indicated figures on either timepiece to GMT. Then the other day I received a sample card of self-sticking numerals meant to be used by electricians and technicians to identify wires and instruments. Suddenly I thought of a way these markers could be used to solve my GMT conversion problems.

By sticking the numerals, 00 to 24, at appropriate locations on the hour wheel as shown in Fig. 1, I had a clock that not only indicated 24-hour GMT, but 24-hour local time as well. The particular markers that I used are about  $\frac{1}{8}$  inch square, which is just about the right size to conveniently fit near the original numbers on the clock.

Three markers were affixed near each original hour figure on the hour wheel. Twenty-four hour local time was provided by sticking the numeral 13 to the right of hour 1, 14 to the right of hour 2, and so forth. The GMT markers corresponding to the original hour figures were affixed to the wheel so that the markers would be visible in the upper left corner of the hour window, and the GMT markers corresponding to the added local hour figures were affixed to the wheel so that the markers would be visible in the lower left corner of the hour window. Labels were attached to the clock to indicate the meaning of the figures.

To prevent "day" errors, I used a felt marker pen to paint the 00 to 05 GMT hours red. The colored markers serve as a warning that the day at Greenwich has moved to "tomorrow" while the day at my location has not changed.—*Floyd Fellows, WA8ZJH*

## IAMBIMATIC KEYING FOR THE "MICRO-TO KEYS"

AFTER completing the "Micro-TO Keyer" described by K3CUW in *QST* for August, 1967, I decided that I would like to add the Iambimatic keying feature.<sup>1</sup> I accomplished this by adding a J-K flip-flop as shown in Fig. 2. The additional circuitry was mounted on a  $2\frac{3}{4} \times \frac{3}{4}$ -inch circuit board inside a  $3 \times 4 \times 5$ -inch utility cabinet. The resulting Iambimatic keyer performs very well, and I can certainly recommend the two-paddle keying technique to anyone interested in better keying with less effort.

—*C. W. Anderson, VE4WA*

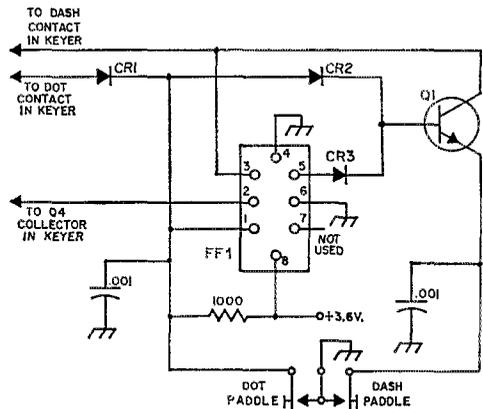


Fig. 2—Iambimatic adapter for "Micro-TO Keyer." Resistance is in ohms; resistor is  $\frac{1}{2}$  watt. Capacitors are ceramic; capacitances are in microfarads ( $\mu\text{f}$ .)

CR<sub>1</sub>, CR<sub>2</sub>, CR<sub>3</sub>—Germanium diodes (1N64 suitable).

FF<sub>1</sub>—J-K flip-flop (Fairchild  $\mu\text{L}923$ ).

Q<sub>1</sub>—N-p-n silicon, small-signal audio type (2N5127 used).

## LOWERING THE PITCH OF THE C.W. MONITOR IN THE SB-101

THE c.w. monitor (Fig. 3) in the Heath SB-101 operates at 1000 cycles, a higher frequency than many operators are accustomed to copy. The tone is generated by a conventional phase-shift oscillator,  $V_{15A}$ , which has its feedback components, except  $R_{325}$ , a 470,000-ohm resistor at the grid of the tube, enclosed in a printed electronic circuit (P.E.C.) Increasing the value of  $R_{325}$  lowers the monitor frequency. For example, with  $R_{325}$  at 1 megohm, the monitor out-

<sup>1</sup> Gensler, "The 'Iambimatic' Concept," *QST*, Jan., 1967.

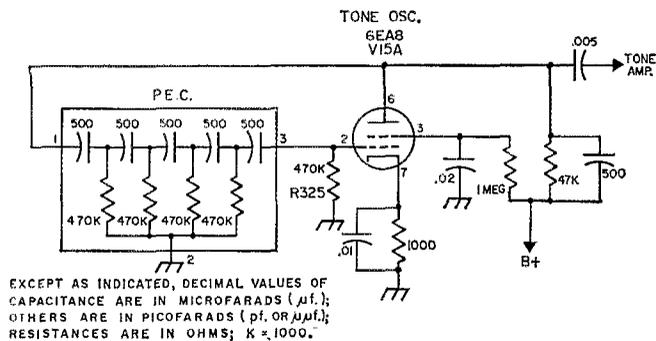


Fig. 3—Schematic diagram of the c.w. monitor in the Heath SB-101. By increasing the value of  $R_{325}$ , the user can lower the pitch of the oscillator. The P.E.C. is discussed in the text. Resistors are  $\frac{1}{2}$  watt.

put is about 850 cycles, and with the resistor at 1.5 megohms, the frequency is approximately 760 cycles. A convenient way to adjust the oscillator is to lift one end of  $R_{325}$  and place a 2-megohm potentiometer in series with the resistor. Vary the control until the desired tone is obtained and then replace the two series resistances with a fixed resistor equal to their combined resistance.

Perhaps with a suitable bracket, the control could be permanently installed so that different tones would be available. However, I didn't elect to drill the additional mounting holes.

Along with the lower tone, the modified monitor seems to key better—a little harder. Although not verified, the modification is probably applicable to other transmitters and transceivers that use a similar monitor oscillator. — *Stewart D. Lyon, W6CUX*

## ON SWAN 350 MODIFICATION

**I**N response to a question from a Swan 350 owner concerning the Hint & Kink on page 42 of January 1968 *QST*, W6QKI, general manager of Swan Electronics, had a number of comments which we reproduce below:

"The problem of short tube life with 6HF5s has affected only a relatively small percentage of Swan owners, and the main reason for running full power during tuning is because there is no better way to adjust the final for proper loading. As soon as you reduce power, whether by reducing drive, or screen and plate voltage, you can no longer find the correct setting for the P.A. LOAD controls. When loading adjustment is not properly set you lose efficiency, resulting in less output. Also, the final will 'flat-top' sooner, and distortion products are much greater. This is why we have been reluctant to provide for reduced-power tuning, and instead encourage the operator to become accustomed to rapid tuning procedures. Many owners tell us they have run their original tubes for as long as two to three years of regular operating without replacement. Their secret is mainly that they don't tune up often, and when they do it is done quickly.

"One of the problems we find is that some operators will dip the plate tuning and adjust the plate loading rather slowly, trying to tune

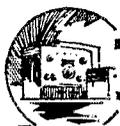
to exactly a certain number of milliamperes. They find 30 seconds rather short, and the tubes find it rather long. The best way for tuning up is to use a field-strength meter or bridge, and simply adjust P.A. TUNE and P.A. LOAD for maximum output, disregarding the p.a. cathode current. Tuning up with a plate or cathode current meter is mostly a carryover from the days when it was the only tuning indicator in the transmitter, and r.f. ammeters came rather high. But with so many s.w.r. bridges or field-strength meters around today, tuning for maximum output is simple, fast, and by far the better way.

"Referring to Step (3) of the Swan 350 modification article in January *QST*, we had actually removed this wire in later 350s and in all of the 500s manufactured through December of '67. This requires then that you have to insert carrier with the CAR. BAL. control every time you tune up, and then rebalance the carrier to operate. This is not nearly as convenient, and our reason for doing it was not to control power during tune-up, but to reduce a possible spurious problem when operating 15-meter c.w. Steps (4) and (5) in the article really don't do anything, because once you have done Step (3) you can control the power level during tune-up with the CAR. BAL. control, if this is the way you wish to tune up. However, as stated before, we don't recommend tuning up at reduced power. Incidentally, by doing Step (5) you no longer have offset transmit frequency when operating c.w. This won't bother the phone man, but will make a c.w. man unhappy.

"One other note regarding p.a. tube life: the tubes must be fairly well matched for idling current. We supply them in matched pairs on request. Usually a replacement pair picked from a dealer's shelf will not be matched very closely, and when idling current is set for 50 ma., one tube is drawing most of this. Tube life will then be quite limited. If the original tubes fail, and this can sometimes happen through no fault of the owner, they should be replaced by a matched set from the dealer, or from the factory." — *Herbert G. Johnson, W6QKI*

## CLEANING HINT

**F**OR the hard-to-clean spots in your rig or bug, try a moistened Q-Tip. — *W1VG*

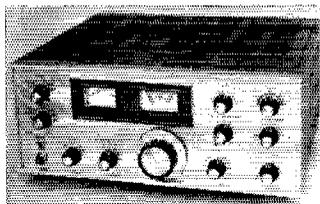


# Recent Equipment



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

## The Yaesu FT-DX-400 Transceiver



THE FT-DX-400 transceiver is a Japanese import with maximum power-input ratings of 500 watts p.e.p. on s.s.b., 400 watts on c.w., and 125 watts p.e.p. on a.m. (carrier and one sideband). Normal tuning ranges are 3500-4000 kc., 7000-7500 kc., 14,000-14,500 kc., 21,000-21,500 kc., 28,000-28,500 kc., 28,500-29,000 kc., 29,000-29,500 kc., and 29,500 kc.-30,000 kc.

### Transmitting Channel

Referring to the block diagram of Fig. 1, the microphone signal is amplified in two stages (12AX7), and then combined in a 7360 balanced modulator with the 3.18-Mc. signal from one of two crystal-controlled carrier oscillators (12AU7), the selection (by the mode switch) depending on whether upper or lower sideband output is

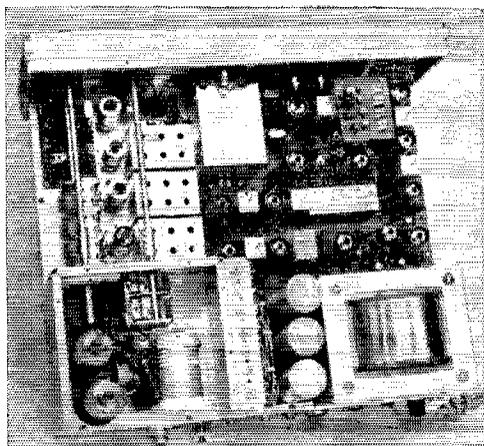
desired. The carrier is balanced out in the modulator, and the resulting 3.18-Mc. d.s.b. suppressed-carrier signal from the modulator is fed through a crystal filter to strip off the undesired sideband. After amplification in one stage (6BA6), the 3.18-Mc. s.s.b. signal is fed to the first transmitting mixer (6CB6), where it is combined with a signal from a v.f.o. covering the range of 8.9 to 8.4 Mc. to produce a signal in the range of 5.72 to 5.22 Mc. in the output of the mixer.

The v.f.o. is comprised of three stages — transistor oscillator, transistor buffer, and a 6BA6 buffer/amplifier. Provision is also made for substituting an internal transistor crystal oscillator, or an external v.f.o. (not furnished) for the internal v.f.o., the selection being made by a panel switch. The same switch selects one of four crystal frequencies (crystals not furnished) when the crystal oscillator is in use. The crystal oscillator is applied to both transmitting and receiving channels for spot-frequency work, but the external v.f.o. is applied to the transmitting channel only for independent control of transmit and receive channels.

There is also provision for offset tuning (clarifier). This is effected by a varactor diode in the v.f.o. circuit. A control on this circuit permits shifting either the receiving channel alone, or both receiving and transmitting channels simultaneously, from 0 to 5 kc. either side of the frequency indicated by the tuning dial. There is no provision for applying offset tuning to the transmitting channel only. The effect can be accomplished in a roundabout way by tuning the transceiver the desired amount away from the listening frequency, then switching in the offset tuning for receive only, and bringing the receiving channel back to the listening frequency.

The output circuit of the first mixer is tuned, and the tuning is ganged with that of the v.f.o., both circuits being controlled by the main tuning dial.

A signal in the 5.72-5.22-Mc. range is fed from the first transmitting mixer to a second transmitting mixer (6AH6) where it is combined with the signal from a crystal-controlled heterodyning oscillator (6BA6) whose frequency determines the operating band. Crystals for all amateur



Top view of the FT-DX-400. At the left-hand end of the chassis are the crystal-calibrator components, the variable capacitor operated by the preselector control, and the associated tubes and coils (in separate shielded boxes), and the shielded compartment (cover removed) housing the final amplifier. The bracket attached to the latter contains most of the internal controls. The box at top center is the top v.f.o. shield. The elevated circuit board at top right contains crystal sockets for crystal-controlled operation. The power transformer and some of the filter capacitors occupy the lower right-hand corner. The circuit change-over relay (plug-in type) is the light rectangular object above the upper left-hand corner of the power transformer.

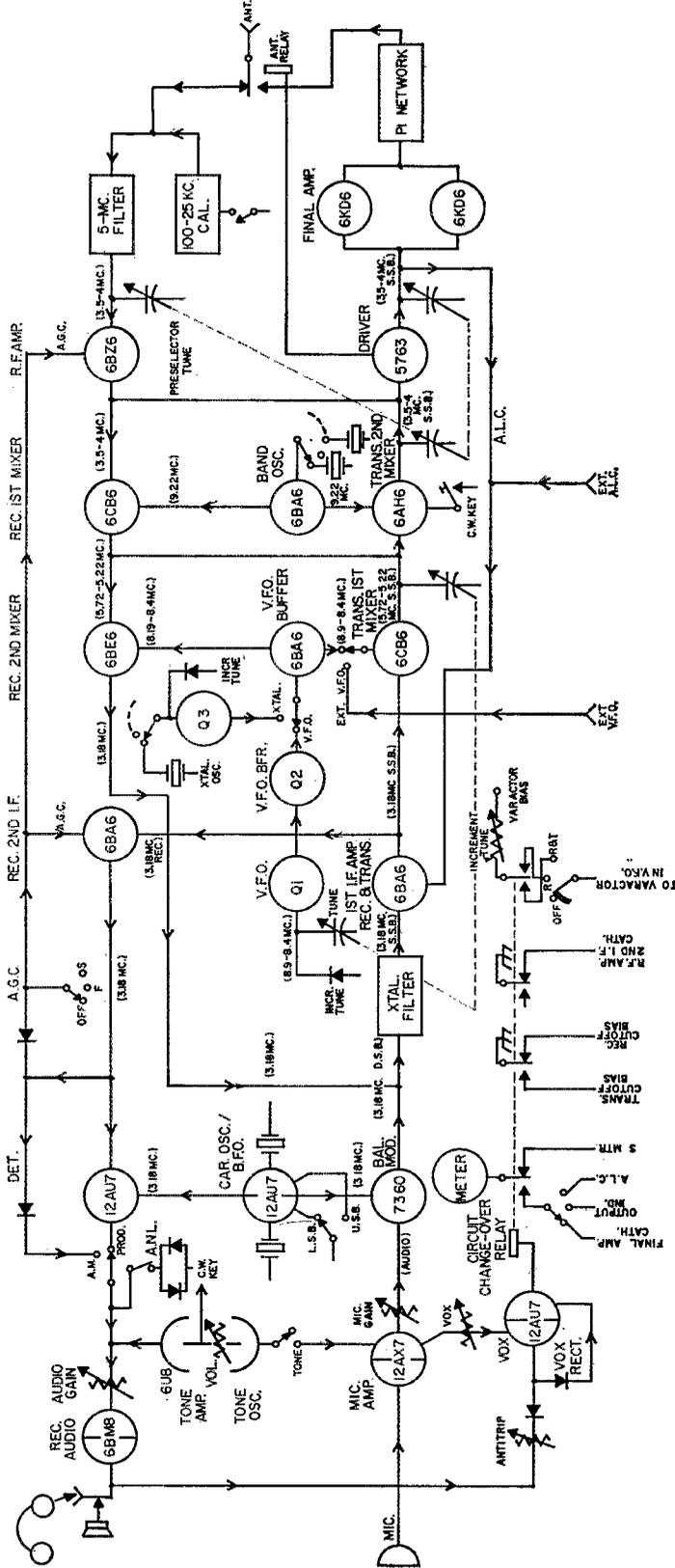


Fig. 1.—Block diagram of the FT-DX-400.

bands, 80 to 10 meters inclusive, are furnished. The 10-meter band is divided into four 500-kc. segments. Trimmers across the crystals are provided for adjusting the frequencies to dial calibration. (Three extra crystal positions are available for working outside of the normal ranges.)

Using the 80-meter band as an example, a 9.22-Mc. signal from the band oscillator combines with a signal in the 5.72-5.22-Mc. range to produce a signal in the 3.5-4-Mc. range in the output of the second mixer. This signal is then amplified in a 5763 driver and fed to the final amplifier (parallel 6DK6s with pi-network output for a 50- to 120-ohm load). The output circuit of the driver is tuned. (The tuning system of this stage will be explained presently.)

The driver and final are neutralized, the band switch connecting in an appropriate neutralizing capacitance for each band. Final-amplifier bias is adjustable by an internal control.

The a.l.c. system is more or less of the usual form. The a.l.c. signal, generated when the final amplifier is overdriven, is coupled out from the grid circuit, rectified, and fed back as additional bias to the grid of the first i.f. amplifier to reduce its gain. A jack is provided for feeding in the a.l.c. signal from a following linear amplifier.

### **C. W. Operation**

For c.w. operation, the mode switch actuates a diode switch which removes a loading capacitor shunting one of the carrier-oscillator crystals to move the carrier into the passband of the crystal filter. (This also lowers the beat note for better c.w. reception.) Another section of the mode switch unbalances the modulator to allow the carrier to ride through.

Still another section of the mode switch turns on an 800-cycle tone oscillator/amplifier (6U8) which feeds a side-tone signal to the receiver audio system for monitoring. A separate control (internal) permits the tone signal to be set to the desired level in respect to the audio level set by the receiving audio gain control. (With the tone control set, the tone level rides up and down with adjustment of the audio gain control.)

The transmitting channel is keyed in the second-mixer and final-amplifier stages by the blocked-grid method. The tone amplifier is keyed simultaneously in the same manner.

### **A. M. Operation**

On a.m., the carrier frequency is shifted, and the modulator unbalanced, as for c.w. operation. An internal control is provided for adjusting the carrier level. The filter band width is not sufficient to accommodate both sidebands, and the lower sideband is largely attenuated, resulting in essentially s.s.b. with carrier.

### **Receiving Channel**

A trap at the input of the receiving channel suppresses direct feedthrough of signals in the 5.72-5.22-Mc. range. The input and output circuits of the r.f. amplifier (6BZ6) are tuned. The r.f.-amplifier *input* tuning control is ganged

with those of the transmitting second-mixer output circuit and the driver output circuit. These circuits are tuned simultaneously by the panel preselector control. The *output* circuit of the 6BZ6 is the same tuned circuit used in the output of the transmitting second mixer, one tube or the other being cut off by the change-over relay. Thus, on receive, the preselector control tunes both input and output circuits of the 6BZ6; on transmit, this control tunes the output circuits of the transmitter second mixer and the driver. Setting for maximum drive to the final amplifier automatically tunes the receiver r.f. stage. Or, the process may be reversed.

Still using the 80-meter band as an example, a signal in the 3.5-4-Mc. range is fed from the r.f. amplifier to a first receiving mixer (6CB6), where it is combined with the 9.22-Mc. signal from the band oscillator to produce a signal in the range of 5.72 to 5.22 Mc. in the output of the mixer. A common output circuit is used for the first receiving mixer and the first transmitting mixer, again one tube or the other being cut off by the change-over relay. Thus, on receive, the main dial tunes both the v.f.o., and the output of the first receiving mixer; on transmit, it controls the v.f.o. and the output circuit of the first transmitting mixer.

The signal in the 5.72-5.22-Mc. range is then fed to a second receiver mixer (6BE6). Here it is combined with a signal from the v.f.o. (8.9-8.4 Mc.) to produce a signal at 3.18 Mc. in the output of the mixer. The 3.18-Mc. signal is fed through the crystal filter and first i.f. amplifier (which are common to both receiving and transmitting channels) to the second receiving i.f. amplifier (another 6BA6). The signal is then fed to a product detector (12AU7), a diode detector, and an a.g.c. rectifier. A switch at the input to the two-stage receiving audio amplifier (6BMS) selects either the product detector for s.s.b. or c.w. reception, or the diode detector for a.m. A shunt diode noise limiter can be switched across the input to the audio amplifier.

A.g.c. is applied to the grids of the r.f. amplifier, and the second i.f. amplifier. The a.g.c. switch has positions for off, and fast or slow release. The manual r.f. gain control, applied to the same stages, is in the common cathode circuit.

### **Crystal Calibrator**

The crystal calibrator is rather elaborate. It has four transistors which comprise a 100-kc. oscillator, amplifier, and a 25-kc. multivibrator that may be switched in to give additional markers at 25-kc. intervals.

### **Change-Over System**

Separate relays are used for switching the antenna and switching circuitry. The circuit relay opens the cathode circuits of the receiving r.f. and second i.f. amplifiers on transmit; shifts cutoff bias from the driver and both transmitting mixers on receive, to the two receiving mixers on transmit; shifts the meter from the S-meter circuit on receive (the S meter is backward-

reading), to read final-amplifier cathode current, monitor a.l.c., or indicate relative r.f. output on transmit, depending on how the meter switch is set. This relay also applies cutoff bias to the carrier oscillator on receive when using a.m., and switches the incremental tuning when this feature is in use.

The coil of the circuit relay is in the plate circuit of the VOX relay tube, and may be energized by a voice signal from the VOX amplifier/rectifier, by the mode switch in the MOX position, or by a p.t.t. switch at the microphone for voice operation. On c.w., this relay can be actuated by an external foot switch (not provided) connected to the three-circuit plug at the key jack for c.w. operation. For break-in operation, the foot switch may be replaced by the back contact of a keying relay, or of a relay in a "Tattoo" system. Regardless of the system selected, a standard two-circuit key plug cannot be used. The plug must be of the three-circuit type (plug furnished).

In the VOX system, an audio signal from the output of the microphone amplifier is rectified and fed as positive bias to the grid of a VOX amplifier/relay driver (12AU7). The VOX level is adjustable by an internal control. Signals from the receiving audio system are prevented from tripping the VOX relay by rectifying the output signal from this source and applying it as back bias to the VOX rectifier. The threshold level is adjustable by an interior control.

The antenna relay is actuated indirectly by the circuit relay. The former is in the plate-supply circuit of the driver stage, which is biased off on receive, as mentioned earlier. When the circuit relay removes the cutoff bias, the antenna relay is actuated by driver plate current. The

### Yaesu FT-DX-400 Transceiver

Height: 6¼ inches.

Width: 15¾ inches.

Depth: 13¾ inches.

Weight: Approx. 50 lbs.

Input: 117 or 220 volts, 50/60 cycles a.c.

Price Class: \$600.

Manufacturer: Yaesu Munsen Co. Ltd.,  
Tokyo, Japan.

U.S. Distributor: Spectronics, Box 356,  
Los Alamitos, Calif. 90720.

antenna relay is also actuated by the function switch in the calibrate position to disconnect the antenna and remove outside signals while using the crystal calibrator.

### Power Supply

A single power supply furnishes all operating voltages. The dual primaries may be connected in parallel for 115-volt operation, or in series for 230-volt input. Taps are provided for line-voltage adjustment. Aside from the heater windings (two), there are three secondaries. One provides 800 volts for the final amplifier. Another provides 300 volts and 150 volts for the other tube stages, while a third winding provides biasing voltages. Silicon rectifiers are used throughout. A 105-volt tap, regulated by a OC3A supplies the balanced modulator, band oscillator, tone oscillator and carrier oscillators. The transistor stages are supplied by 9 volts from a two-transistor voltage regulator operating from the 105-volt tap.

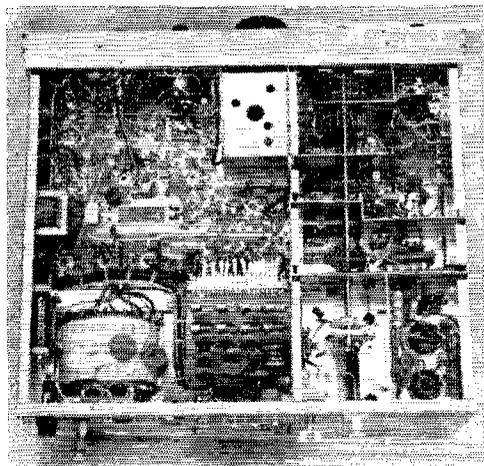
### Mechanical

The chassis is of heavy steel. The aluminum panel is approximately 3/32 inch thick and is set in a heavy die-cast aluminum frame.

The panel is further strengthened by a heavy cast bezel for the meter and dial windows. The cabinet is of heavy slotted steel, with a chassis opening at the rear. The lid (also slotted) is removable by releasing two clasps along the front edge. The cabinet is finished in crystalline slate grey. The panel is in natural aluminum. The controls are black with chrome inserts.

The tuning knob drives the tuning capacitor through a gear train. The dial, on the tuning-capacitor shaft, is calibrated from 0 to 500 in black, and from 500 to 1000 in red. The red scale is used for the 3500-4000 range and for the 28,500-29,000, and 29,500-30,000-ke. segments of the 10-meter band. The dial has calibration marks every 10 kc. The tuning knob is calibrated from 0 to 50 in black, and 50 to 100 in red, with a mark every kilocycle. It takes two revolutions of the knob to cover 100 kc., the black numbers applying to the first revolution, while the red numbers apply to the second revolution. Some operators may find this a bit confusing, since it is necessary to watch both the dial and the knob skirt at the same time to keep track of whether you should be reading black or red. The friction

(Continued on page 128)



Bottom view of the FT-DX-400. The aluminum box at top center is the bottom v.f.o. shield. Immediately to the right is a row of trimmers for the band-oscillator crystals to permit accurate alignment against the calibrator. The band switch is right of center with the antenna relay below. The sockets of the final-amplifier tubes may be seen in the lower right-hand corner. The power supply occupies the lower left-hand corner.

# Technical Correspondence

## MATCHING THE BIG BOTTLES IN THE FINAL

Technical Editor, *QST*:

Probably every amateur has seen amplifiers with two big tubes with one showing more color in the plate than the other, an indication of imbalance. This can be due to tubes that are not perfectly matched or to some circuit strays that cause imbalance. Usually the tube showing more color in its plate is the one that is taking more of the load, if both show color. This, of course, is not a healthy condition for long life of the overworked tube. What to do about it?

If there is enough space in the amplifier to accommodate another filament transformer and a large potentiometer, the solution is simple. See Fig. 1. If the tubes are not too different in their emission and other characteristics, a balance can be effected by balancing the plate heating, so that the plate dissipations will be equal. The potentiometer must be so arranged that it can be adjusted with a knob while watching the plates from all angles, performing the adjustment in a darkened room with perfect safety to the operator. More often than not this is not a large order.

This balancing adds some cathode bias to the amplifier, but it will hardly ever be necessary to reduce the grid bias in compensation. We did not find it necessary in two linear amplifiers using 4-400As in parallel.

Adjustment is simple. Connect the amplifier to a dummy load—preferably resistive, because a bright lamp load may obscure the color in the plates. Start with the potentiometer in mid position. If one of the plates is showing a little color while the other tube shows none, slowly turn the potentiometer with the purpose of taking the color from the plate. If the color gets more noticeable instead, the potentiometer is being turned in the wrong direction; therefore, turn it the other way until the color goes out. As the loading of the amplifier is increased to where both plates show color, as with tantalum plates, the colors may not be equal. The idea is to get them equal with the aid of the potentiometer adjustment. Then we can assume the tubes are dissipating about the same amount of heat. Balancing the cathode currents in the tubes by meter was

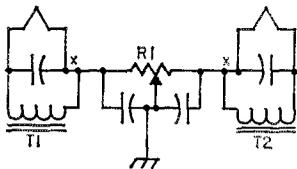


Fig. 1—Arrangement for balancing plate dissipation in two tube amplifiers having tubes which operate with visible color in the plates.  $T_1$  and  $T_2$  are separate filament transformers having ratings appropriate for the tubes used. Capacitors can be 0.005- or 0.01- $\mu$ . disk ceramic. See text for discussion of  $R_1$ .

tried, but we think the color plan is more accurate in determining just how much heat each plate dissipates. When both tubes are closely balanced as to dissipation, keep your eyes on the plates (with the room darkened), and pull the "big switch," cutting off plate and filament voltages simultaneously, to see if the colors in the two tubes disappear at the same time. If they do, the tubes should be dissipating equally. If the tubes cannot be balanced with the potentiometer, and if there are no serious component differences to upset the balance, the tubes are probably so dissimilar they should not be paired. (If the amplifier power supply uses m.v. rectifiers, be sure to turn off the plate-supply switch before turning on the main switch again.)

As can be seen from the diagram, the balancing system requires separate filament windings for the two tubes. The potentiometer can be 50 ohms, 50 watts, for 5-volt tubes; 80 ohms, 50 watts, for 6.3-volt tubes; or 100 ohms, 50 watts, for 10-volt tubes.

It is worth the price and trouble since big bottles are not cheap. An amplifier with two tubes is not working efficiently if an imbalance exists in the plate dissipation. It is a rarity to see two tubes in parallel or push-pull pulling the load equally without first bringing a balance into the operation.—*Joseph A. Terstegge, W9LQE, R. 2, Lookoutte, Indiana 47553.*

## SEMI-AUTOMATIC KEY ADJUSTMENT

Technical Editor, *QST*:

After reading over VE2AQQ's fine article on semi-automatic key adjustment in February 1968 *QST*, I'd like to add something. There is a vast difference between the action of dot hairsprings in semi-autos appearing after WWII and the much older models. It appears that the later springs are somewhat less flexible and dampen the dot action. Many users have tried filing off a bit of the spring at the bend in an effort to improve action at slower speeds, with moderate success.

I've seen as many as four and five weights on the arm in an effort to slow the dot speed down. The result is not as effective as it might be, and although the dot speed is reduced the damping action still persists.

By concentrating the weight mass, it is possible to improve the pendulum action of the arm on dots tremendously. In the past I've made up quite a few single weights for others which consist simply of a piece of 1-inch round stock—either brass or steel— $\frac{1}{8}$  inch thick are drilled for a slip fit on the arm.

By using a short piece of spring and a set screw, it is possible to make a firm sliding fit so that the weight can be moved in and out along the arm to vary dot speed quickly. With the weight all the way toward the pivot, nominal speed will be in the order of 30 to 35 w.p.m. With the weight well out on the arm, you can slow down to a crawl of 8 to 10 w.p.m. The best part is that all the dots are clean and uniform even unto the tenth or fifteenth dot.—*William H. Fishback, W1IKU, Old Comers Road, Chatham, Mass. 02635.*

## CODE REPRODUCER

Technical Editor, *QST*:

With incentive licensing in full swing, and with code being one of the major roadblocks, it occurs to me that the code-contest amplifier built by the writer for the Louisville Kenvention C.W. Contest would be useful to many clubs and individuals alike. The advantage of such a unit is that output

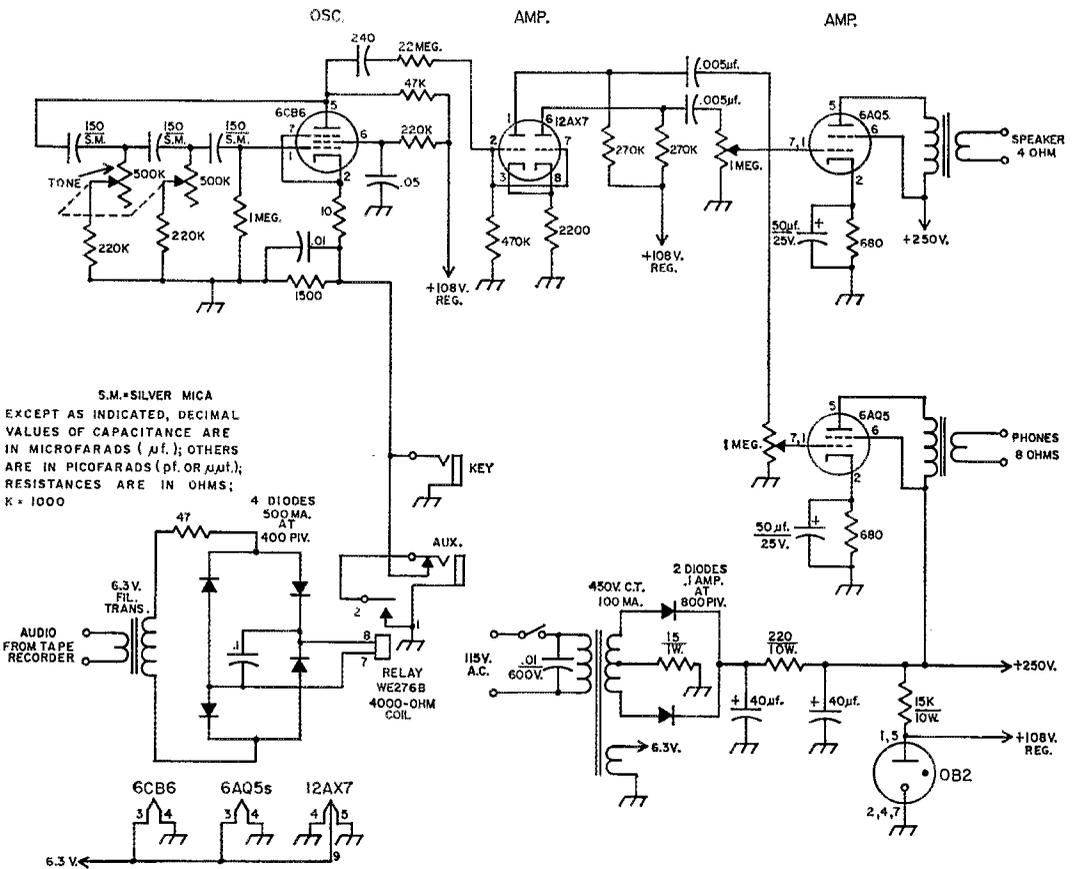


Fig. 2—Circuit for constant-tone reproduction of code from tape recordings run at various speeds. Except as indicated, resistors are  $\frac{1}{2}$  watt. Electrolytic capacitors have polarity indicated; other fixed capacitors may be any available type except those marked "SM" (silver mica).

tone does not change with tape speed, and any "wow," chirp or QRM on the tape is eliminated.

A tape recorder is used to key a relay which in turn keys an audio oscillator that is very loosely coupled to the amplifying stages, Fig. 2. One output stage can handle a dozen or more headphones of various impedances, each headphone having its own volume control consisting of a 500-to-1000-ohm pot. A separate amplifier tube is used for speaker output. The AUX jack was installed to facilitate using the tape recorder to key a transmitter or other out-board equipment. The key jack permits keying the unit independently of the tape recorder.

Building an audio oscillator that is chirp free and will key well at speeds exceeding 50 w.p.m. took a bit of experimenting with values, and those shown should not be deviated from. However, physical arrangement is relatively unimportant. The entire unit was built on a  $5 \times 9\frac{1}{2} \times 3$ -inch aluminum chassis. All jacks were mounted on the rear of the chassis, phono jacks being used for speaker and headphone outputs and tape-recorder input. Two volume controls and the off/on switch are on the front panel. The two 500K pots are of the screw-driver-adjustment type and mounted on the top side of the chassis near the front panel. — George Neidhardt, W4LW (ex-W4MPV), 4212 Silver Creek Road, Valley Station, Ky. 40272.

## SUN NOISE

Technical Editor, *QST*:

Some questions have arisen over the definitions used in the article on sun noise (April 1968 *QST*, page 42), and perhaps a note clarifying these is in order. To conform to common usage, as stated in the *IEEE Standards*, the relation between noise figure and noise factor should be:

Noise Figure =  $10 \log$  (Noise Factor).

Thus, "... add 1 ..." is incorrect, and a noise figure of 6 db. corresponds to a noise factor of 4. Also, as used in the equations,  $A$  is the fractional transmission of the feed line, rather than its fractional loss. Fractional transmission equals one minus fractional loss, resulting in  $A$  being correctly given in the example. However, the redefinition of  $N$ , as above, changes the results of the example so that the sun noise, taking one linearly-polarized component, should be 4.8 db. above the receiver noise, for the other constants assumed in the example.

One last word of caution: the whole presentation was based on the ratio signal/noise rather than signal + noise/noise. For systems where the sun is only slightly above the noise, reduction to signal/noise ratio, as described in January 1968 *QST*, page 34, may be required. — Don Lund, WA0IQN, P.O. Box 1664, Boulder, Colorado 80301.

**QST**

# Snowmobile

## Mobile



VE3ETO and VE3BSB (with mike in hand) operating snowmobile

### WINTER MOBILE OPERATION

--VE3 STYLE

BY READ C. EASTON \* W5PSY/VE3

**O**VER the years, mobile operation has been attempted from some rather bizarre conveyances—bicycles, tricycles, mules, trains—and probably pogo sticks. Recently, a motley crew was assembled in the wilds of the Ontario bush country for an attempt at a relatively new kind of mobile operation—snowmobile. This form of the mobile mania has an actual practical value, as was proven by the experiment conducted by the aforementioned crew. The task force consisted of Barrie Crampton, VE3BSB, Dr. Tom Maxwell, VE3ETO, Ray James, VE3CUA and Lt. Col. Read Easton, W5PSY/VE3. The first two members of this aggregation are born and bred Canadians, inured to the vicissitudes of outdoor winter activities in Canada. The third member is an expatriated G, while the refugee from Texas is at the mercy of USAF in his choice of domicile.

All share a common bond of activity on the Ottawa area 2-meter f.m. repeater, VE2CRA.

In the evening ragchews on the repeater, one of the crowd casually mentioned that possibly the sport of snowmobiling could be combined with ham radio to make winter searches for lost persons more efficient. Since VE3BSB is the proud possessor of a lakeside cottage nearly 70 miles from the bright lights of Ottawa, the gang decided that here was the perfect base camp for a weekend test operation. Several Ski-dos were rounded up—including one ultra modern electric start job, suitably equipped with battery

and generator for use as the snowmobile mobile test bed. VE3ETO supplied the 4-watt Pye Ranger f.m. unit crystallized for the repeater output frequency (146.940 Mc.) on both transmit and receive. VE3BSB volunteered the use of his 25-watt base station at the cottage for the control station operation.

After suitable planning—including food, 807's, 304TL's, fishing gear and W5PSY's 30-06 rifle (for protection against itinerant wolves)—the required goodies were packed in cars and the intrepid party sallied forth. The caravan made it to within a mile of base camp, with trail being broken by W5PSY's Jeep wagon. At this point, supplies were transferred to the snowmobiles for the last leg of the journey. Communications were maintained with ease between the mobile rigs in the cars and the snowmobile during the supply shuttling operation.

When all was in place at base camp, a good hot stew was washed down the assembled throats with several draughts of "buttermilk"—a local euphemism for the contents of 807's and 304TL's. The weary crew then staggered for the sleeping bags. The next morning bright and early the crew straggled out into a cabin temperature of —5 degrees, only after the Southern member had taken pity on his thin-skinned Northern brethren by lighting the fire. After breakfast, Canadian style (2 pounds of bacon, 2 dozen eggs and a gallon of coffee for six people) all turned out to raise VE3BSB's beam to a suitable elevation (see photo). The beam had

\*9 Roche Place, Ottawa 14, Ontario, Canada.

been used last summer in attempts to work the Ottawa repeater, but a ridge several hundred feet higher than the cottage had interfered. A pair of the more daring types of the party of six (including two s.w.l. types) swarmed up a handy small pine tree and firmly implanted the beam about 60-feet up. By the way, it *still* won't work Ottawa!

For the next two days, numerous forays were made with the snowmobiles through all kinds of terrain including open lake (well frozen), dense woods and frozen swamp at ranges of up to ten miles from base camp. Because of the rugged landscape, very little of the activity could be called line-of-sight, yet not once did the communications link fail. When the "search" party was off the side of the beam at 6 miles or so, the signal from the mobile unit was occasionally noisy, but solid copy. In all other areas, fully quiet f.m. reception was the norm. No equipment failures occurred although snowmobiling is closely akin to being towed on a large flat board by a team of runaway horses over a boulder strewn field.

In a serious vein, the spur-of-the-moment concoction of the small f.m. rig and the snowmobile is a very practical device for conducting searches with reliable communications over desolate, rugged terrain under heavy snow conditions. The crystal-controlled gear eliminated any problem of having to tune around hunting a net control station and thus is well adapted to the rugged conditions encountered. In an actual emergency situation, a 30-watt f.m. mobile unit parked at the end of a navigable road could be the link between a search party and a police car, for example. For those people in the Northern U. S. and Canada who have hiked lonely miles on snowshoes in search of lost hunters, etc., the snowmobile mobile offers much in speed, reliability and talkability.



Installing the 2-meter beam at the base camp. VE3ETO (lower) and Sandy, an s.w.l. (higher).

Incidentally, no wolves—itinerant or resident—were sighted, no fish caught, a goodly amount of "buttermilk" was expended in raising the internal humidity and warding off the cold. A good time was had by all in another pioneering effort in the field of mobile radio communications.

QST



In the Ontario bush country. (l. to r.) W5PSY/VE3, VE3CUA, VE3ETO, and VE3BSB.

## Strays

Interested in space projects? A new NASA publication entitled "Constructing Inexpensive Automatic Picture-Transmission Ground Stations" is available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151. The price is 50 cents. The publication describes how to procure or build the antenna, f.m. receiver and other components for an Automatic Picture Transmission (APT) ground station. Detailed drawings and parts lists are included, and installation, alignment and operation of the APT station is described.

### Feedback

In the April writeup of the November 1967 SS, the phone score of W2EWO, which appeared in the S.N.J. listing, should have been shown under W.N.Y. Sri!

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

*"Fascinating,*

*Frustrating,*

*Exciting,*

*Exhausting,*

*Irritating,*

*Challenging,*

*Absorbing,*

*and in a word,*

**Great."**

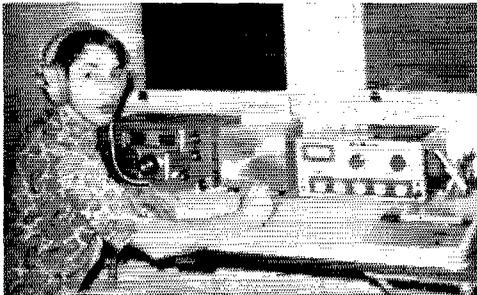
—WN6YMW

## Results, 1968 Novice Roundup

**F**OR sheer enthusiasm and excitement, it's hard to top the annual Novice Roundup (held this year February 3-19). Some 309 eager tyros (down a bit from last year's 320) and 139 helpful veterans submitted their logs, eloquent testimony to their keen enjoyment of this unique contest. Big score or small, everybody reported a good time!

Wisconsin's WN9UOP piled up the highest score, a healthy 39,262 points; Arizona rivals WN7ISP and WN7IE ran second and third. We were especially pleased to receive logs from Novices in Hawaii, Puerto Rico and the Canal Zone. (Where were you WL7s?)

Many entrants commented that the NR ought to be shortened to ten days or so; others felt that the RST ought to be included in the contest exchange. How about letting us know how *you* feel about making such changes. And CU next February! —W7ARR



Licensed only a few days before the contest started **WN1JAD** made a FB showing to place third in Connecticut. "Rad the Jad" is the only Novice member of Murphy's Marauders and says he's eager to get that General ticket so he can start racking up points for the club!

### Soapbox

"Contest was very exciting and active; really enjoyed working the Generals at high speeds." —WN3HOM. "My only regret is that there aren't more such contests! Keep up the good work." —WN3IRF. "Great fun and enjoyed every minute; hope to do it again next Roundup." —WN3JAF. "Even though Murphy struck, I managed to battle my way through the QRM for six new states." —WN3HEU. "Thanks for real FB contest; can't wait till SS." —WN3IMG. "Final blew at 6:10 p.m. on Saturday, Feb. 3." —WN3HXG. "One beef: the Novices who pound out CQ NR a dozen times and don't listen for calls in between." —WN2GXL. "Eighteen new states." —WN2DBB. "Lost a good deal of time trying to convince Generals that I was a Novice at a club station — and the two-letter call didn't help matters at all!" —WN5ROC, opr. at W2PU. "Met a great bunch of guys and the contest really helped my WAS total. Only complaint is that there should be as many Novices as there are Generals in the Roundup." —WN2AWX. "My last QSO as a Novice was my first QSO as a General: WN2DHS." —WA2CAL. "First DX — Canal Zone." —WN3JEM. "Great contest. A bit exhausting, though, and many seemed to have given up near the end." —WN9UZH. "Already waiting for the next one." —WN9USL. "My suggestion is to shorten the Roundup; it got quite monotonous after the first week." —WN9USR. "Fifteen new states." —WN9VVU. "Began to prepare for the NR about three weeks before it began. Set minimum limits of how many contacts I was to get a day. (25 on week-days and 125 on weekends.) This calculation was based on results of the 1967 NR. Together with getting caught up on sleep in school and neglecting schoolwork, my studies dropped almost a full grade in each subject — have not had time to go on the air since NR for trying to bring up my grades again." —WN9UOP. "Never had so much fun in my whole life!" —WN8SQD. "Lots of fun on all bands." —WN8TCN. "The Novice Roundup was a blast. I would like to congratulate anyone who worked the contest for any length of time, because I know their ears hurt just as much as mine, or more." —WN5SEG. "Worked Hawaii for WAS." —WN4GSS. "The NR allowed me to complete my WAS in only eight weeks. Worked K1TCI in New Hampshire, my 50th state, a few hours before the end." —WN4IIF. "Good opportunity to learn contest procedures." —WN4HUS. "Finished putting up my antenna 5 minutes before the NR! It was good for 46 states." —WN8YQO. "Didn't do too bad, considering my 8-to-1 s.w.r." —WN8YFH. "As an

Next time you feel like complaining that homework, sports and dates cut down on your operating time—well, this picture of **WN5TTH** speaks for itself. Mary, whose **OM K5AGI** is well known in contest and DX circles, will probably BCNU in next year's Roundup too.



older beginner (I'm a science teacher), I can now appreciate how much talent some of these youngsters have." — **WN2DTN**. "I puttered along at this whenever I had a few minutes or an hour or two, and probably this score sheet shows more weird on-and-off times than any other. At times I thought I was going great, then I started getting into QSOs with hams who answered my CQ NR and didn't know about the contest and just wanted to chat." — **WN2CDE**. "I was thrilled at working **W1AW** for my first time." — **WN2CRW**. "The Generals were great, with so many offering QSOs." — **WN2DRJ**. "Very exciting and challenging!" — **WN2BPZ**. "I think the Novice Roundup is one of the more fun things in amateur activities." — **WN0RGR**. "The most fun event I have witnessed so far in my hobby, especially with two other hams within two blocks of my station." — **WN0SBP**. "Really enjoyed it and look forward to helping the new crop next year when I get my General. Do you know that for a while after the contest I called CQ NR a couple of times? Hi." — **WN0SQG**. "Really enjoyed the contest, especially the first night when there were so many guys on es it was real great. The biggest accomplishment I gained was 20 new states and a new country (KZ5)." — **WN1JAD**. "Great contest, worked 10 new states." — **WN1IWD**. "Tnx fer vy FB onTEST!" — **WN1XJ**. "Best contest of the year." — **WN1HOL**. "Well, here are the gruesome statistics: I caused 155 operators to put **WN1ISH** in their logs, and spread this madness throughout 42 sections, this insane act taking 25 hours to perform. Had no trouble with Murphy, except once when my transmitter wouldn't fire up and I wasted 15 minutes only to find the line cord unplugged." — **WN1ISH**. "Thanks for a groovy contest. How ironic that the Novices were using bugs and the Generals were using hand-keys, hi." — **WN1IHH**. "It was a very enjoyable contest until a 40-m.p.h. wind visited the second Friday and made repairs impossible until Sunday. Antenna problems come in the large economy size here in **W1-land**." — **WN6WKN/1**. "Best 2 weeks of my Novice career." — **WN6WFN**. "Never had so much fun. What happened to everyone the last week?" — **WN6YCA**. "The dupes were haunting me." — **WN4IMW**. "It was a blast." — **WN4GGA**. "QRM was pathetic." — **WN4GRN**. "Grrrrrrreat contest!" — **WN4HRA**. "Worked three JAs

during the contest." — **WN5TOP**. "All in all, the NR sounded like a success. Either I wasn't getting out, or the QRM was so bad up there that I wasn't heard." — **KZ5THN**. "Eighteen new states." — **WN4FQK**. "Enjoyed contest very much. Had my ticket only 4 months. Contacted 26 new states, which makes me 39 states." — **WN4HZS**. "Surely the highlight of my Novice career." — **WN4HO1/4**. "Very enjoyable contest. Worked only 15 meters because of bad QRN and QRM on 40 and 80 from here. Sure would like to try *not* being DX for a while, though. QSLs will be quickly answered via **KP4AXM**." — **WN9VPX/KP4**. "Thanks for the great contest. What happened to Vermont and New Hampshire? I worked all sections except them! My last NR QSO also completed my WAS! Some way to end the contest. Wish more stations would try to avoid duplicate QSOs. I received many contest tips from my OM, **W7IMA**." — **WN7ISP**. "Worked ten new states and **W1AW**!" — **WN6WGO**. "It was great fun and it was a thrill to work **W1AW**." — **WA6VUS**. "FB contest. I believe my participation significantly improved my operating ability. The Generals who took part were a great help — they accounted for half my contacts. However, 40 hours is a bit too long for a married man who must keep peace with the family. Also, participation does drop off after the first week. How about a 20-hour one-week contest?" — **WN6WNO**. "Operated as L.A. for section and found out in middle of contest that I was in Orange! Lots of fun anyway." — **WN6ZEC**. "All I heard for two weeks was CQ NR, so I figured I may as well join them." — **WN6VIE**. "Enjoyed it immensely and worked 17 new states." — **WN5TJU**. "How can I express my deep gratitude for a contest like this one? Thanks! I do have some

#### THE TOP TEN

| Call   | Section | Score  | Bands Used | Transmitter                          | Receiver            | Antenna(s)                          |
|--------|---------|--------|------------|--------------------------------------|---------------------|-------------------------------------|
| WN9UOP | Wis.    | 39,262 | 80, 40, 15 | Heath DX-40                          | Drake R-4           | Dipole (80), trap vertical (40, 15) |
| WN7ISP | Ariz.   | 36,500 | 80, 40, 15 | Globe Scout (80), 6GK6-6DQ5 (40, 15) | Collins 75A-1       | Vertical (80, 40), 2-el beam (15)   |
| WN7IIE | Ariz.   | 33,345 | 40, 15     | Adventurer                           | Hallcrafters        | Vertical                            |
| WN8YOQ | Mich.   | 30,114 | 40, 15     | Knight T-60                          | Heath SB-301        | Inverted V                          |
| WN9UZH | Ill.    | 28,644 | 40, 15     | T-60                                 | NC-155              | Dipoles                             |
| WN5RWU | Okla.   | 27,202 | 40, 15     | Drake 2NT                            | R-4A                | Dipole (40), 4-el beam (15)         |
| WN8YME | W. Va.  | 23,760 | 80, 40, 15 | Johnson Viking Challenger            | Halli. S-85         | Dipole cut for 40                   |
| WN0RPI | Minn.   | 22,196 | 40, 15     | Globe Chief                          | Halli. SX-111       | Dipole cut for 40                   |
| WN2CPQ | W.N.Y.  | 21,835 | 80, 40, 15 | 6CL6-807                             | Hammarlund HQ-170AC | Dipoles (80, 40), W2AU quad (15)    |
| WN5TAF | Ark.    | 21,535 | 80, 40, 15 | DX-60                                | Drake 2C            | Longwire                            |

comments about band conditions, though: 15 — great; 40 — got their QSTs late; 80 — what contest?????” — **WN5TSM**. “Thoroughly enjoyed the NR even though I may run out of QSL cards confirming R.I.” — **K1QFD**. “Enjoyed a somewhat rarer status up here in N.H., as my home is in Mass.” — **WA1CRT**, opr. at **W1ET**. “Magnitude of QSO number received was inversely proportional to the length of the station’s CQ. One chap had sent CQ 22 times before I quit waiting and moved on through the band.” — **K2EIU/5**. “Really like this super-relaxed contest. Where else could you have a two-hour contest exchange? (Is this the record, anyone?)” — **WA2ZEW/1**. “Some of these Novices are real sharp c.w. ops. Hope they stay c.w. fans; we need them.” — **WB2VAZ**. “You could just tell the excitement these Novices felt, and this feeling for the contest was transmitted along with their QSOs.” — **WA3AYW**. “Would have been on more but my brother is a Novice and he had the rig most of the time, hi.” — **WN3HQK**. “Just about everyone I talked to said I was their first Delaware; nice being in a rare state! Glad to help out the Novices, for this is their contest. By the way, don’t give too much recognition to anyone but the Novices. This is their contest, let them have the limelight!” — **WA3HD**. “My first NR since 1953. Lots more activity now. XYL is **WN4IIF**.” — **W4YOK**. “Continually amazes me how rapidly these youngsters learn the code and operating skills.” — **WA4PAE**. “Never loses any of its excitement.” — **WB4EKL**. “Good Roundup — these Novices are much sharper than in my Novice days in ‘55.” — **W5JFB**. “Noticed that almost all Novices called very long CQs while I sat and chewed my nails, hi. By the time they finished they had everybody and his brother calling them.” — **WA5QPA**. “As usual, participation was good and I worked all sections except Alaska, Canal Zone, and Idaho. Was hoping to get all states for a Novice WAS, since I’ve just moved to Texas from N.J.” — **WA5TOS**. “Just got on to give a few Novices Wyoming in the contest. Most of them got very excited when I sent WYO; about half requested QSLs right then.” — **WA7EWC**. “It’s a pity

### DIVISION LEADERS

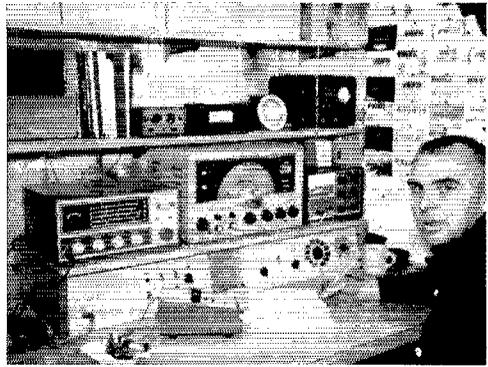
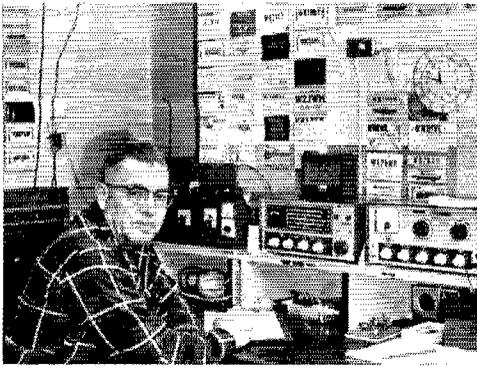
|               |        |                |        |
|---------------|--------|----------------|--------|
| Atlantic..... | WN2CPQ | New England..  | WN1HVL |
| Central.....  | WN9UOP | Northwestern.. | WN7LYZ |
| Dakota.....   | WN6RPI | Pacific.....   | WN6YBX |
| Delta.....    | WN5TAF | Roanoke.....   | WN8YMF |
| Great Lakes.. | WN8YOQ | Rocky Mt....   | WN5TQP |
| Hudson.....   | WN2DRJ | Southeastern.. | WN4FQK |
| Midwest.....  | WN9RMA | Southwestern.. | WN7ISP |
|               |        | West Gulf...   | WN5RWU |

that so many of the Novices here in the Northwest don't know about the NR.” — **WA7EYN**. “My time on the air was very limited, as my brother **WN7ISP** went out to win for the Southwestern Division.” — **WA7HRE**. “Great contest again this year, but again not much activity after the first few days.” — **WA7ITZ**. “Those Novices in the 11-15-year-old class could run circles around the majority of the fellas holding General-Class licenses. Will send information re special Illinois Sesquicentennial award to any Novices desiring same.” — **W9GXR/9**. “After all the high-pressure DX contests and QSO parties, this is one contest that I find is completely refreshing and enjoyable.” — **WA9MMT**. “Lots of good operators on, but too many still insist on repeating exchange data 5 and 6 times.” — **WA9WXL**. “I could just feel the excitement on the other end when they received the North Dakota section. One of the comments was ‘What do I owe you for North Dakota?’ hi.” — **WA9PPK**. “Missed the NR when I was a Novice and guess I never got over it, hi. Wonder how many of the boys worked the DX, particularly the VK and F3 on the low end of 15?” — **WA8OPD**. “Still remember this contest in my Novice year as my best fun in amateur radio, and I’m sure many hams feel the same way. The Novices I worked showed an amazing proficiency for the short time they had been on the air. They will certainly be a credit to the fraternity when they get their higher-class licenses.” — **WA9NMA**. “The Novice band was so cluttered up with General or more proficient classes blasting their CQ NR that I found it most unpleasant to even attempt to put my 60 watts on the air. It would have behooved these fellows to patiently wait for the *Novice* to call CQ NR before transmitting.” — **W9ZZU**. “Tks for the FB contest that helped with my WAS, checked out my rig, and gave me hours of enjoyment.” — **WA9VPP**.



Future Sweepstakes champs in action! Pictured below is **WN9UOP**, who used a dipole on 80 and a trap vertical on 40 and 15 to amass the highest score in the Roundup. Got those marks back up yet, Dave? Arizona’s **WN7ISP** (bottom left) turned in the next largest tally; Bob somehow managed to knock off 73 out of 75 possible multipliers! And **WN5RWU** (top left) led all entrants in the West Gulf Division. Craig’s 4-element 15-meter beam undoubtedly had something to do with those eye-popping QSLs on the wall. Nice going, guys!





Just to show that not all Novices are teenagers, we offer you **WN2CDE** (left) and **WN6YCA** (right). Besides knowing how to operate (Mal was third in ENY, Chuck second in EBay), these fellows also can put together some attractive operating positions!

## 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:* **WN3LXJ** 1890-70-27-7 or total score 1890, different stations worked 70, sections worked 27, total operating time 7 hours.

### ATLANTIC DIVISION

|                             |                  |
|-----------------------------|------------------|
| <i>Delaware</i>             |                  |
| <b>WN3HXJ</b>               | 1890-70-27-7     |
| <i>Eastern Pennsylvania</i> |                  |
| <b>WN3INW</b>               | 15,875-270-55-39 |
| <b>WN3HOM</b>               | 12,094-228-53-34 |
| <b>WN3LXR</b>               | 10,285-172-55-40 |
| <b>WN3HMK</b>               | 9000-200-45-22   |
| <b>WN3JCJ</b>               | 7840-225-32-34   |
| <b>WN3IIA</b>               | 7693-157-49-30   |
| <b>WN3HFG</b>               | 6390-142-45-35   |
| <b>WN3IRP</b>               | 4725-169-27-40   |
| <b>WN3JAF</b>               | 4070-110-37-35   |
| <b>WN3ILL</b>               | 3450-100-30-34   |
| <b>WN3JAE</b>               | 2924-86-34-18    |
| <b>WN3HEU</b>               | 1798-58-31-17    |
| <b>WN3IMG</b>               | 1326-51-26-7     |
| <b>WN3JEL</b>               | 1206-54-24-23    |
| <b>WN3HOM/3</b>             | 1204-43-29-6     |
| <b>WN3IOA</b>               | 564-32-12-9      |

### Maryland-D.C.

|               |                  |
|---------------|------------------|
| <b>WN3JAB</b> | 12,348-181-63-38 |
| <b>WN3IYS</b> | 5610-150-34-37   |
| <b>WN3IIA</b> | 4250-125-34-25   |
| <b>WN3JCH</b> | 3848-104-37-18   |
| <b>WN3HXG</b> | 3224-109-26-15   |
| <b>WN3IUY</b> | 12-4-3-9         |

### Southern New Jersey

|                            |                  |
|----------------------------|------------------|
| <b>WN2BVW</b>              | 19,557-369-53-24 |
| <b>WN2CXL</b>              | 13,462-244-53-37 |
| <b>WN2DBB</b>              | 6764-168-38-27   |
| <b>WN2BZB</b>              | 4928-112-44-14   |
| <b>W2IU (WN5ROC, opr.)</b> | 1188-41-27-20    |

### Western New York

|               |                  |
|---------------|------------------|
| <b>WN2CPO</b> | 21,835-377-55-40 |
| <b>WN2VQG</b> | 9360-180-52-19   |
| <b>WN2AWX</b> | 5016-104-44-12   |
| <b>WN2CAL</b> | 1950-60-26-8     |
| <b>WN2BSG</b> | 1204-43-29-6     |
| <b>WN2BRI</b> | 176-16-11-6      |

### Western Pennsylvania

|               |                  |
|---------------|------------------|
| <b>WN3HUN</b> | 18,924-317-57-29 |
| <b>WN3HQL</b> | 14,396-244-59-31 |
| <b>WN3JEM</b> | 13,724-277-47-33 |
| <b>WN3JBN</b> | 1200-50-24-12    |
| <b>WN3IHZ</b> | 192-14-8-6       |
| <b>WN3JGO</b> | 184-13-8-12      |

### CENTRAL DIVISION

#### Illinois

|               |                  |
|---------------|------------------|
| <b>WN9UZH</b> | 28,644-434-66-38 |
| <b>WN9WAI</b> | 21,266-343-62-29 |
| <b>WN9UXR</b> | 20,790-310-63-38 |
| <b>WN9UQS</b> | 19,328-282-64-37 |
| <b>WN9WEC</b> | 17,342-279-58-40 |
| <b>WN9UST</b> | 13,737-241-57-32 |
| <b>WN9USE</b> | 10,089-177-57-8  |
| <b>WN9WAS</b> | 6406-137-45-34   |
| <b>WN9VOX</b> | 5460-120-42-22   |

|               |                |
|---------------|----------------|
| <b>WN9VVV</b> | 5110-146-35- - |
| <b>WN9UYV</b> | 3560-89-40-16  |
| <b>WN9UOT</b> | 3192-84-38- -  |
| <b>WN9VFO</b> | 2886-74-39-9   |
| <b>WN9UIG</b> | 1800-60-30-9   |
| <b>WN9VGX</b> | 154-14-11-4    |
| <b>WN9WTD</b> | 130-13-10-5    |

### DAKOTA DIVISION

#### Minnesota

|               |                  |
|---------------|------------------|
| <b>WN0RPI</b> | 22,106-358-62-35 |
| <b>WN0TAE</b> | 14,280-223-60-25 |
| <b>WN0SEN</b> | 4620-100-42-14   |
| <b>WN0SCH</b> | 2240-80-28-11    |
| <b>WN0THC</b> | 2205-63-35-19    |
| <b>WN0RXC</b> | 384-24-16-12     |

#### North Dakota

|               |                |
|---------------|----------------|
| <b>WN0SQD</b> | 6350-127-50-34 |
|---------------|----------------|

#### South Dakota

|               |                |
|---------------|----------------|
| <b>WN0THG</b> | 6072-123-44-38 |
| <b>WN0TCN</b> | 6030-119-45-17 |
| <b>WN0SJK</b> | 1920-64-30-17  |



### Tennessee

|               |                  |
|---------------|------------------|
| <b>WN4HOK</b> | 16,320-257-60-24 |
| <b>WN4GNR</b> | 11,792-248-44-28 |
| <b>WN4PZP</b> | 10,120-169-55-22 |
| <b>WN4HNB</b> | 8800-178-50-33   |
| <b>WN4HLL</b> | 7350-137-50-38   |
| <b>WN4CTI</b> | 6300-136-42-28   |
| <b>WN4HPY</b> | 5421-139-39-30   |
| <b>WN4GSS</b> | 4620-105-44-15   |
| <b>WN4HMA</b> | 1595-55-29-11    |
| <b>WN4HLH</b> | 731-43-17-12     |
| <b>WN4RSS</b> | 306-18-17-3      |

### GREAT LAKES DIVISION

#### Kentucky

|               |                  |
|---------------|------------------|
| <b>WN4ILF</b> | 17,568-273-61-40 |
| <b>WN4HUS</b> | 7344-144-61-39   |
| <b>WN4ILP</b> | 3672-102-36-39   |

#### Michigan

|                              |                  |
|------------------------------|------------------|
| <b>WN8YQQ</b>                | 30,114-458-63-37 |
| <b>WN8YYV</b>                | 8850-162-50-26   |
| <b>WN8WLK</b>                | 6118-161-38-35   |
| <b>WN8YTR</b>                | 6028-117-44-20   |
| <b>WN8YRF</b>                | 5735-140-37- -   |
| <b>WN8YHP</b>                | 2100-106-21- -   |
| <b>WN8ZJM</b>                | 1020-51-20-13    |
| <b>WN8ZIS</b>                | 54-9-6-2         |
| <b>WN8YHO (WN8s WCZ YHO)</b> | 4563-117-39-15   |

#### Ohio

|               |                  |
|---------------|------------------|
| <b>WN8WGX</b> | 19,965-343-55-36 |
| <b>WN8ZNG</b> | 16,302-286-57-35 |
| <b>WN8YKE</b> | 15,444-282-52-36 |
| <b>WN8YOW</b> | 13,833-261-53-40 |
| <b>WN8ZBA</b> | 11,592-207-56-25 |
| <b>WN8YFH</b> | 11,220-200-51-25 |
| <b>WN8YWL</b> | 11,205-234-45-23 |
| <b>WN8YTN</b> | 10,175-185-55-35 |
| <b>WN8ZBJ</b> | 9880-180-52- -   |
| <b>WN8WYO</b> | 8418-183-46-26   |
| <b>WN8WGN</b> | 8400-153-50-24   |
| <b>WN8ZNO</b> | 6847-167-41-30   |
| <b>WN8YXH</b> | 6068-164-37-40   |
| <b>WN8YXE</b> | 1914-126-39-26   |
| <b>WN8YXI</b> | 1890-63-30-10    |
| <b>WN8WHR</b> | 1587-60-23-28    |
| <b>WN8YTH</b> | 648-26-18- -     |
| <b>WN8WBV</b> | 490-34-10-5      |
| <b>WN8WCR</b> | 99-18-13-13      |

### HUDSON DIVISION

#### Eastern New York

|               |                  |
|---------------|------------------|
| <b>WN2DYN</b> | 13,080-218-60-40 |
| <b>WN2BND</b> | 10,710-223-45- - |
| <b>WN2CDE</b> | 5754-122-42-30   |
| <b>WN2ASW</b> | 4420-120-34-16   |
| <b>WN2LYL</b> | 2842-76-37-14    |
| <b>WN2CRW</b> | 1560-63-20-7     |
| <b>WN2BQE</b> | 522-29-18-9      |
| <b>WN2DUS</b> | 45-5-3-1         |
| <b>WN2BQF</b> | 42-7-6-4         |

#### N. Y. C.-L. I.

|               |                  |
|---------------|------------------|
| <b>WN2COL</b> | 12,238-191-58-31 |
| <b>WN2CBM</b> | 7334-183-38-40   |
| <b>WN2DFD</b> | 4633-115-21- -   |
| <b>WN2AYF</b> | 3235-75-31-10    |
| <b>WN2BSQ</b> | 1404-44-26-13    |
| <b>WN2DSF</b> | 1400-70-20-12    |
| <b>WN2BSP</b> | 1150-40-23-14    |
| <b>WN2AVX</b> | 56-8-7-1         |

### DELTA DIVISION

#### Arkansas

|               |                  |
|---------------|------------------|
| <b>WN5TAF</b> | 21,535-365-59-25 |
| <b>WN5TCL</b> | 16,302-286-57-36 |
| <b>WN5SGW</b> | 11,440-205-52-22 |

#### Louisiana

|               |                |
|---------------|----------------|
| <b>WN5SBJ</b> | 6600-150-44- - |
| <b>WN5TTH</b> | 2233-77-29-11  |

#### Mississippi

|                 |                |
|-----------------|----------------|
| <b>WN5SEG</b>   | 8428-172-49-31 |
| <b>WN5TKL</b>   | 4800-120-40-23 |
| <b>WN5SLC/5</b> | 320-20-16-11   |

#### Indiana

|               |                |
|---------------|----------------|
| <b>WN9VJB</b> | 8208-142-54-37 |
| <b>WN9VYJ</b> | 4860-135-36-22 |
| <b>WN9VDP</b> | 4600-100-40-17 |
| <b>WN9UEO</b> | 4200-80-42-40  |
| <b>WN9WIK</b> | 3168-132-24-12 |
| <b>WN9VZD</b> | 2816-83-32-20  |
| <b>WN9VHA</b> | 2408-71-28-13  |
| <b>WN9WDB</b> | 2310-77-30-11  |
| <b>WN9UIR</b> | 440-22-20-16   |

#### Wisconsin

|               |                  |
|---------------|------------------|
| <b>WN9UOP</b> | 39,262-576-67-39 |
| <b>WN9VHV</b> | 8194-64-31-15    |
| <b>WN9WDP</b> | 1909-83-23-17    |
| <b>WN9UWS</b> | 1534-59-26-10    |
| <b>WN9WBQ</b> | 507-39-13- -     |

Northern New Jersey

|         |                  |
|---------|------------------|
| WN2DRJ  | 17,360-300-56-38 |
| WN2DNY  | 13,144-248-53-40 |
| WN2DVN  | 11,475-225-51-24 |
| WN2CWY  | 10,971-207-53-25 |
| WN2BPZ  | 10,290-190-49-34 |
| WN2APG  | 5474-141-34-9    |
| WN2DZU  | 5328-148-36-36   |
| WN2CCKU | 5240-121-40-24   |
| WN2CJT  | 2835-105-27-13   |
| WN2CUB  | 1829-59-31-12    |
| WN2CUN  | 1368-72-18-7     |
| WN2DXV  | 1180-49-20-28    |
| WN2CZF  | 1040-40-26-11    |
| WN2C'EW | 646-34-19-14     |
| WN2BUP  | 456-28-12-10     |
| WN2C'WV | 440-22-20-5      |

MIDWEST DIVISION

Iowa

|        |               |
|--------|---------------|
| WN0RXQ | 3240-81-40-34 |
| WN0RGR | 1098-74-27-19 |
| WN0RJZ | 1512-56-27-17 |
| WN0RXR | 1215-45-27-19 |

Kansas

|        |                |
|--------|----------------|
| WN0SKR | 6842-142-41-27 |
| WN0THQ | 5412-123-44-27 |

Missouri

|        |                  |
|--------|------------------|
| WN0RAL | 10,324-178-58-31 |
| WN0SBP | 8313-153-51-31   |
| WN0RTO | 7056-147-48-30   |
| WN0RKP | 4322-104-38-12   |
| WN0TPT | 3705-95-39-38    |
| WN0SQG | 3008-94-32-21    |
| WN0RMB | 2464-78-28-19    |
| WN0SYI | 583-53-11-4      |
| WN0TAY | 9-3-3-3          |

Nebraska

|        |              |
|--------|--------------|
| WN0SHO | 2100-70-30-5 |
|--------|--------------|

NEW ENGLAND DIVISION

Connecticut

|        |                  |
|--------|------------------|
| WN1HYL | 20,496-321-61-38 |
| WN1IQJ | 16,856-286-56-40 |
| WN1JAD | 14,734-268-53-35 |
| WN1HUN | 12,180-200-58-23 |
| WN1WD  | 4440-111-40-11   |
| WN1HUE | 4288-134-32-12   |
| WN1IBD | 4170-124-30-36   |
| WN1IXJ | 2320-80-29-25    |
| WN1IBT | 902-31-22-9      |
| WN1HOL | 720-25-16-6      |
| WN1IZN | 315-15-9-15      |
| WN1IVE | 144-16-9-10      |

Eastern Massachusetts

|                      |                  |
|----------------------|------------------|
| WN1HRT               | 20,480-305-64-30 |
| WN1JDW               | 18,000-300-63-36 |
| WN1IDP               | 9888-206-48-24   |
| WN1ISH               | 6930-155-42-25   |
| WN1IYA               | 3420-85-36-23    |
| WIKBN (WN1ION, opr.) | 3078-81-38-14    |
| WN1HQV               | 2596-118-22-21   |



**WH6GLB** thrilled a lot of WNs in the process of logging 200 exchanges and 12,000 points—a sterling performance when you realize that 15 is virtually the only band useful from Hawaii in such a contest. Without that TA-33 beam, Gary probably would have had aloha score.

|          |               |
|----------|---------------|
| WN1HTC   | 2324-83-28-21 |
| WN1IDO   | 1134-54-21-10 |
| WN1IRV   | 1020-68-15-15 |
| WN3ITR/1 | 208-26-8-21   |

Maine

|          |                |
|----------|----------------|
| WN1IOG   | 3030-101-30-26 |
| WN1IUT   | 1456-56-26-7   |
| WN1IGG/1 | 368-23-16-5    |

New Hampshire

|        |               |
|--------|---------------|
| WN1IHH | 2958-87-29-20 |
|--------|---------------|

Rhode Island

|        |                  |
|--------|------------------|
| WN1IJB | 15,576-264-59-40 |
| WN1IJC | 14,952-267-56-39 |

Vermont

|        |               |
|--------|---------------|
| WN1HUQ | 5220-106-45-7 |
| WN1HRM | 697-41-17-6   |

Western Massachusetts

|          |                  |
|----------|------------------|
| WN1HYI   | 13,974-274-51-25 |
| WN1IPZ 1 | 13,530-236-55-37 |
| WN1IJS   | 7350-140-49-18   |
| WN1JCT   | 5371-131-41-17   |
| WN1IJI   | 3937-127-31-27   |
| WN6WKN/1 | 2016-69-24-8     |

NORTHWESTERN DIVISION

Oregon

|        |             |
|--------|-------------|
| WN7IOK | 301-38-8-33 |
|--------|-------------|

PACIFIC DIVISION

Washington

|        |             |
|--------|-------------|
| WN7IYZ | 592-37-16-6 |
|--------|-------------|

East Bay

|        |                  |
|--------|------------------|
| WN6WFN | 14,514-246-59-39 |
| WN6YCA | 13,167-216-57-40 |
| WN6YMB | 532-38-14-8      |
| WN6YJK | 126-11-6-3       |
| WN6AZJ | 20-5-4-1         |

Hawaii

|        |                  |
|--------|------------------|
| WH6GLB | 12,098-201-56-37 |
| WH6GLP | 150-15-10-6      |
| WH6GKC | 44-11-4-12       |

Nevada

|        |                |
|--------|----------------|
| WN7DUG | 9646-182-53-40 |
| WN7LJP | 280-28-10-11   |

San Francisco

|          |                  |
|----------|------------------|
| WN6YMW   | 15,022-244-58-40 |
| WN6ZHD   | 12,980-256-55-40 |
| WN6ZFA   | 4004-91-41-16    |
| WN6YAY   | 592-37-16-10     |
| WN6YAY.6 | 36-6-6-2         |

San Joaquin Valley

|        |                  |
|--------|------------------|
| WN6YBX | 18,698-321-58-34 |
| WN6ZP  | 10,070-175-53-40 |
| WN6YMK | 8427-149-54-15   |
| WN6YXB | 3136-112-28-19   |
| WN6WGR | 2409-58-33-15    |
| WN6ZBX | 1748-76-23-21    |

Santa Clara Valley

|        |                  |
|--------|------------------|
| WN6YQY | 16,695-265-63-19 |
| WN6YTY | 3432-78-39-19    |

ROANOKE DIVISION

North Carolina

|        |                |
|--------|----------------|
| WN4GXW | 5704-124-16-37 |
| WN4IAW | 2902-72-26-35  |
| WN4FGC | 1701-66-21-14  |
| WN4HKO | 374-22-17-21   |

South Carolina

|          |                  |
|----------|------------------|
| WN4GGA   | 12,667-219-53-32 |
| WN4FUV   | 3684-126-40-25   |
| WN8ZGN/4 | 4158-99-42-27    |

Virginia

|        |                  |
|--------|------------------|
| WN4GRN | 29,150-305-62-39 |
| WN4FQR | 17,643-315-56-34 |
| WN4HRA | 8120-217-35-26   |
| WN4FSV | 2320-80-29-9     |
| WN4HYO | 9-3-3-3          |

West Virginia

|        |                  |
|--------|------------------|
| WN8YAF | 23,760-432-55-40 |
| WN8YWK | 15,336-284-51-39 |

ROCKY MOUNTAIN DIVISION

Colorado

|         |                |
|---------|----------------|
| WN0RMJ  | 8052-168-44-38 |
| WN0BSUD | 3255-85-31-18  |
| WN0RYS  | 1269-47-27-20  |
| WN0RJB  | 500-15-12-7    |
| WN0BSQA | 32-8-4-8       |

New Mexico

|        |                  |
|--------|------------------|
| WN5TQP | 17,324-274-61-16 |
| WN5TVO | 2268-81-28-2-    |

SOUTHEASTERN DIVISION

Alabama

|        |               |
|--------|---------------|
| WN4HVD | 1080-45-24-1- |
|--------|---------------|

Canal Zone

|        |          |
|--------|----------|
| KZ5THN | 30-6-5-3 |
|--------|----------|

Eastern Florida

|          |                  |
|----------|------------------|
| WN4FOK   | 12,265-213-55-24 |
| WN4GQZ   | 9024-192-47-39   |
| WN4FSG   | 7050-141-50-30   |
| WN4HQX   | 2970-99-33-15    |
| WN4RSP   | 2139-49-31-8     |
| WN4HFS   | 1410-47-30-8     |
| WN4PQK.4 | 480-22-15-4      |

Georgia

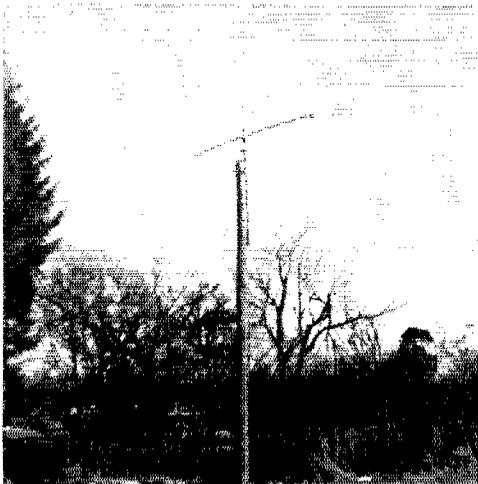
|          |                |
|----------|----------------|
| WN4HOI.4 | 6272-118-40-20 |
| WN4HVO   | 5969-127-47-12 |
| WN4HLC   | 3564-99-36-1-  |
| WN4HIEJ  | 836-38-22-11   |

West Indis

|            |                |
|------------|----------------|
| WN9VPX.KP4 | 4400-110-40-25 |
|------------|----------------|

(Continued on page 154)

A close section race adds plenty of excitement to the NR. In Rhode Island, **WN1IJB** edged neighbor **WN1IJC** by a scant 600 points and made the 5th-highest score in New England. Besides the Cushcraft 15-meter beam, Mark used a vertical mounted atop the house.



# Results, 21st ARRL V.H.F. Sweepstakes

REPORTED BY BOB HILL,\* WIARR



Two very active multioperator stations were NLI's **K2VMR** and Colorado's **WAØPHZ/Ø**. The VMR gang, which ran up 26 kilopoints, consisted of (seated L to R) WA2CSM, WB2EIR, WA2QYO, K2SSQ, (standing L to R) WA2s CPX PZI and HVK, plus K2VMR himself. WAØPHZ/Ø Hamsters (L to R) WAØs RFA LUM RED and SLM braved Rocky Mountain cold to tally 141 QSOs on 6, 2, and 432 Mc.

**T**HERE is a little-known corollary to Murphy's famous law, and it states that *even though* "if anything can go wrong, it will." V.h.f. Sweepstakes enthusiasts are still going to enjoy themselves in spite of all obstacles — they just refuse to quit! And so it was that some 964 hardy entrants (compared to last year's 1123) defied gosh-awful snowfalls, howling winds, sub-zero temperatures, punk band conditions and relatively low activity — all for the pleasure of participating in our annual V.h.f. SS the weekend of January 6-7.

It is certainly true that conditions on six meters weren't very good, all right, but on the other hand you have to admit that conditions on two were downright awful. Whereas 50 Mc. had at least a few fair sporadic-E openings to excite the gang, 144 Mc. had about as much DX as you could fit on the head of a pin! V.h.f. Editor WIHDQ sums it up concisely and precisely: "Interesting though difficult contest. Minor openings on 50 Mc. made top-quality stations pay off. This was definitely not a contest in which marginal stations could score well. Heard many stations and several sections I was not able to work, even with a kw. on s.s.b. and c.w."

Apparently someone forgot to tell **W3MPY** about the crummy condx, however, so Pres merely set a new all-time QSO scoring and record for a V.h.f. SS: 715 contacts and 52,910 points! *Sic transit* the old marks of 666 contacts (held by **W3KKN**) and 47,804 points (set last year by **W3MPY** himself). Just to keep things in the Funk family, son Dave, **WA3CAG**, turned in the affair's second-high score of 38,480 — yet he and his OM, living a mile apart, forgot to work each other during the contest! Other 20K-plus totals were fashioned by **K3IPM/3** (34,304), **W2EIF** (25,926), **W2REB** (24,696), **W3LHF**

(24,246), **W3KWH** (23,445), **WB2MTU** (22,572), **WA2PBN** (21,200), and **W3CL** (20,800). Multioperator highs came from **W2JKI** (35,150), **K8MMM** (26,696), **K2VMR** (26,588), and **W2PAU** (20,462).

Seven Novices, taking advantage of their last SS opportunity to use A3 on 144 Mc., earned section awards: **WN1HHN**, **WN1HUE**, **WN2BFH**, **WN2CEW**, **WN2DBA**, **WN8YV**, and **WN9UHB**.

## Clubs

This contest always stirs up plenty of group activity — better than 60% of all entrants were striving on behalf of an ARRL-affiliated club. The **Mt. Airy V.h.f. Radio Club** is tops again, as they have been every year since 1961. The **Rochester V.h.f. Group**, in response to the enthusiastic prodding of SS Chairman **K2YCO**, chipped in with a whopping 122 entries and second spot in the club tabulations. Not far behind was the **South Jersey Radio Association**, the only other club to total six figures. All together, the 33 clubs ran up 1,838,364 points!

## Soapbox

"Conditions very good on 6 and terrible on 2. Just about every type of propagation present on 6 except *F2*, which came a week before. Six-meter activity in Quebec is picking up by leaps and bounds. I will be on 2 and 432 s.s.b. for the June contest, and please tell the stations in the States to turn their beams up north!" — **VE2DFO**. "First V.h.f. SS that I've been in. It was a real blast and there was actually local QRM. Sure wish I had c.w." — **VE2BGJ**. "Had hoped to have a kw operating for this one; hope it's ready for June." — **VE3DSQ**. "Contest very interesting — at least on six, with what appeared to be backscatter allowing some of the scarcer sections to be worked." — **VE3CUA**. "Thanks to all the U.S. stations for heading their beams toward Ontario and making the contest enjoyable for us here in the frozen North." — **VE3EZC**. "Since the advent of a w.b.f.m. repeater system in our area, contest activity has fallen off considerably. A ground-plane or a vertical whip isn't much good when you can't use the repeater." — **VE3ASO**. "First contacts on 6 outside Newfoundland. Believe am

\* Assistant Communications Manager, ARRL.

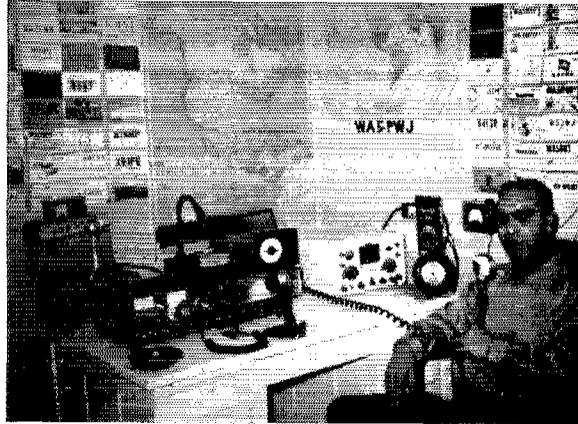
first station to work out on 6, and am looking for stations on 2. Only two of us on 2 meters at this time." — **VOIDZ**. "My first v.h.f. contest. With a Two'er and a beam there's not much you can do in the St. John area." — **VELAKA**. "It never ceases to amaze me that so many don't know what section they're in, let alone the fact that there's a contest going on." — **WB6TFC**. "Activity was rather sparse and local band conditions were only fair at best. One nice *Es* opening was had, of about two hours' duration, first to the East, then winding up as usual to the Pacific Northwest with a very nice QSO with W6PUZ/7, who is our nightly scatter contact." — **WB6NMT**. "I have been on 6 meters since 1957 and that's the first Six (WB6NMT) I've ever heard. I just wish there would be activity like that on the band all the time." — **K4IGR**. "Supply of 807s was adequate and some were even brought back for future contests, in spite of the fact that one of the projects of the expedition was to construct an 80-meter vertical from the empties." — **WB4FMJ/4**. "Pretty quiet down this way; quite a difference from when I lived in 8-land (Ohio), when a couple hundred contacts didn't even put you in the running for a booby prize." — **WB4EHR**. "High-y QSOs during the 4-hour band opening did a lot for my score. Glad to give a Wyoming contact to so many happy fellows." — **K6OPH/7**. "Would like no limit set on operating time — that is, a possible 35-hour period." — **W5IXR**. "For a little while, six meters sounded like 20 meters on Sunday." — **WA9PHZ/8**. "My first contest as a single operator and found it a nice experience. The six-meter band was open, which allowed many section contacts." — **W0INK**. "Cond'x very poor. Freezing temp, rain/snow all weekend." — **K4QIF**. "One never knows how many 'bugs are in the wood' until the Sweepstakes seems to bring them out of hibernation. The band openings were not too outstanding — just enough to spur continued listening." — **W4TBO**. "We started out on 6 and 2 but our six-meter gear gave out on us. Two was practically nil, as we had a slight mountain range between us and the main action of the SOV. About 9:00 p.m. PST we were attacked by a bunch of burglars who had been using the cabin for their own use. We finally beat them off after they had practically dismantled our generator. About 3 a.m. a lantern exploded and we had to shut down. At noon on the 7th, we found that our 2-meter antenna had been shorted out (we did pretty good for not having had any antenna and only 10 watts!). Herein we derived our name, 'The Willow Glen Hard-Luck Ham and Burglar-Chasing Society.'" — **WB6WLE/6**. "Two meters was worse than ever; I think the repeaters have ruined it in California. All in all, though, much fun was had and we'll be on for the next one." — **W6YEP/6**. "Unfortunately that the contest did not start a few hours sooner, seeing that KH6NS was being worked in Calif. about 1925Z. The *Es* we had made up for it. I heard every con-

tinental U.S. call-area except W1." — **WB6UYG**. "Lots of fun, but a scarcity of home-designed and home-built gear. Sorry to say I think the appliance operators have entered the v.h.f. field too." — **W6MIW**. "Appalled by the lack of activity in this area. So far as I could tell, I was the only active contester on 50 Mc. Ran into one station who refused to exchange information because he was anti-ARRL and wouldn't support its contests! It takes all kinds. Am presently awaiting assignment of a W7 call; will be active here from now on." — **W6PUZ/7**. "We'll try again next year in a better location." — **K7UYX**. "My first contest and it was really fun." — **WA7FNZ**. "It was even hard at times to hold a frequency on 2. The band was really jumping, and there were even a couple of Washington stations." — **WA7ECY**. "Worked more people on six during the contest than I did all last summer." — **K7ZFG**. "We heard many 8s and 9s on 6-meter backscatter and aurora but didn't work any because of the lack of s.s.b. Looks like it's time to get a 6-meter s.s.b. rig." — **W1YK**. "Found out I would be in 3W8-land after May 1 for a year. No. 2 meters over there! Will be back in 5-land after May '69 all set to give Oklahoma contacts on 2 and possibly 220 and 432." — **W5NWG/1**. "My only complaint was that 99.9% of the operation was below 50.7 Mc. and most of the stations did not tune sufficiently to hear me. All in all, it was a lot of fun — but please tell everyone to 'remember the second Megahertz' on 6 meters!" — **WA1EHO**. "In these days of incentive licensing I expected more c.w. in the contest." — **W1EXZ**. "What! Maine section not needed? Very few stations beaming northeast!" — **K1EPO**. "My beam was frozen in the north. Bad snowstorm and too many outside activities." — **W1JSM**. "The final blw (no spare), rotator froze, and after these were corrected, poor band condx. Old Man Murphy rang in the New Year!" — **W1DZA**. "Thank goodness for K2HLL!" — **WNIQJ**. "It was a real pleasure to work WA4LTS and W8PT/4 in S.C. on 50-Mc. iono scatter." — **W1HDQ**. "We enjoyed the sporadic-E — please include more in the next contest." — **WA6JYK**. "TVI cut down on operating time but did work the *Es* opening." — **WA6OVM**. "Try explaining to teachers why you're so tired Monday." — **WB2UAQ/2**. "Our newly-formed Interstate V.h.f. Society will operate all ARRL-sponsored v.h.f. contests." — **WB2WIK**. "Conditions were way off, as shown by only 10 sections worked (17 in September contest)." — **W2AQT**. "W1-land (Vt., N.H., Me.) seemed to be at an all-time contest low. About 70% of all contacts were on s.s.b. — glad to see the increase." — **WA2PBN**. "Like every V.h.f. Sweepstakes, it was most interesting and a lot of fun. There were a few openings to the west and south, but they were very short." — **WA2PNF**. "One of the most enjoyable experiences in my so-far-short amateur career." — **WA2BCY**, opr. at **WA2CVS**. "Lack of activity below 145 Mc. is appalling." —

## CLUB SCORES

| Club                                        | Score   | Entries | Certificate Winner | Club                                          | Score  | Entries | Certificate Winner |
|---------------------------------------------|---------|---------|--------------------|-----------------------------------------------|--------|---------|--------------------|
| Mt. Airy V.H.F. Radio Club (Pa.)            | 742,811 | 95      | W3MFY              | Villanova University Amateur Radio Club (Pa.) | 12,836 | 3       | WA3HGX/3           |
| Rochester V.H.F. Group (N.Y.)               | 253,185 | 122     | W2UTH              | Hartford County Amateur Radio Assn. (Conn.)   | 12,537 | 9       | W1HDQ              |
| South Jersey Radio Association              | 233,631 | 45      | W2REB              | Springfield Amateur Radio Club (Ohio)         | 11,814 | 9       | K8DEO              |
| Albany Amateur Radio Association (N. Y.)    | 96,162  | 56      | K2CBA              | Dutchess County V.H.F. Society (N. Y.)        | 11,760 | 3       | .....              |
| Mobile Sixers Radio Club (Pa.)              | 82,299  | 27      | W3IZU              | East Coast V.H.F. Society (N. J.)             | 11,240 | 5       | K2OJD              |
| Hampden County Radio Assn. (Mass.)          | 42,796  | 30      | K1ANF              | Six Meter Club of Dallas                      | 10,376 | 5       | WA5PWJ             |
| Dayton Amateur Radio Assn. (Ohio)           | 35,848  | 20      | W8KKF              | Central Michigan Amateur Radio Club           | 9310   | 5       | K8WEX              |
| Talcott Mountain U.H.F. Society (Conn.)     | 35,759  | 14      | K1HTV              | Greater Pittsburgh V.H.F. Society             | 8260   | 8       | WA3ISY             |
| Six Meter Club of Chicago                   | 34,029  | 16      | K9ENZ              | Mid-Hudson V.H.F. Society (N. Y.)             | 6888   | 3       | K2BCU              |
| Rock Creek Amateur Radio Assn. (Md.)        | 30,980  | 24      | W3HB               | Skokie Six Meter Indians (Ill.)               | 6371   | 8       | WA9FIY             |
| Germantown Radio Club (Pa.)                 | 30,104  | 8       | WA3HGW             | Lake Success Radio Club (N. Y.)               | 5708   | 4       | W2TUK              |
| 1200 Radio Club (Mass.)                     | 21,793  | 13      | K1CHY              | Argonne Amateur Radio Club (Ill.)             | 5149   | 9       | K9HPW              |
| Alexandria Radio Club (Va.)                 | 20,196  | 9       | K4SUM              | York Radio Club (Ill.)                        | 4976   | 3       | WA9NRI             |
| Southern California V.H.F. Radio Club       | 19,729  | 8       | WA6WKF             | Fulton Amateur Radio Club (N. Y.)             | 4258   | 9       | WA2S00             |
| Ranconas Valley Amateur Radio Assn. (N. J.) | 15,934  | 5       | WB2LZW             | Mid-Island Radio Club (N. Y.)                 | 3340   | 3       | W2SEU              |
| Vienna Wireless Society (Va.)               | 13,458  | 11      | K4YCH              | Scarborough Amateur Radio Club                | 3184   | 6       | VE3ERQ             |
|                                             |         |         |                    | Sacramento Amateur Radio Club                 | 1652   | 3       | W6MIW              |

Five entrants from the Six-Meter Club of Dallas were paced by contest chairman **WA5PWJ**, whose 3104 points was good for third-high for the West Gulf Division.



**W2KXG**. "Conditions on band were worst in a long time. W1s and W4s were quite weak except for a few times when S9 sigs were heard. Also found that the stations in W.Va. don't know that Texas can copy code, because I heard beautiful sigs. Stations in EPa led the pack, with K31PM and WA3CAG having S9 sigs the whole contest." — **WB2DIN**. "Anyone who didn't use c.w. sure missed a lot of sections." — **K2HLA**. "Had much fun, as usual, but it seemed that bands (144 and 220 Mc.) were quite closed. 220 just had a plain lack of activity. Two meters was — well, DX signals were way down from normal; very slow QSB noted during c.w. operation. Many c.w. contacts were made with a kw on 2." — **K2DNR**. "All the equipment here is 10 years old or more and still going strong, but for the first time in a contest I used c.w. to grab a couple more sections. Next time I may try working c.w. only, to see what the little 25-wattter will do." — **W2IP**. "Heard the s.s.b. stations working stuff like crazy, but could not hear any of it on the old a.m. rig." — **WA8RCN**. "In spite of lousy wx, activity was low — everyone skiing?" — **WASTYF**. "Had to work both days. (I mean like on my job, hi.) Wasn't able to use v.f.o. due to having no room on operating table for it. Trying to break other stations with only two xtals is not easy." — **WASEOW**. "Where was everybody?" — **WASUDE**. "Was a shame for a good aurora to occur less than 24 hours before the contest began — sure needed one with the lousy tropo on two during the contest. Lots of fun anyway." — **WASROJ**. "I transmitted 35 contacts on s.s.b. and 5 on a.m. I received 5 on a.m., 1 on c.w., 34 on s.s.b. Looks like s.s.b. has taken over for good." — **WB4ASA**. "Heard stations from California to New York. Most must have been looking in other direction, as it was difficult to work them." — **WASSER**. "After having quite a serious go-around with the flu bug, which

ended up in my throat, I started off in the contest feeling and quite unmistakably sounding like the rest would at finish time." — **K9LSB**. "Disappointed with the lack of c.w. activity. Several times I tried scaring up c.w. activity at the low end of 2 but no one was around." — **K9AWV**. "Local turnout poor, skip conditions unstable, only s.s.b. men were heard QSOing out-of-state skip: where was the a.m. group?" — **WA9FIY**. "Worked all call-areas on 50 MHz but missed usually reliable sections N.C. and Tenn. Was surprised to work W. Fla. section on iono-scatter — WFla usually completely absent here." — **W3KWH**. "For a contest weekend, this was the deadeast we ever saw." — **WB2VPY**. "The excitement in this my first v.h.f. contest was too much for me, and my doctor advises me to stack a couple of 2-meter beams for additional transmit power as a prescription to create a tranquilizing effect on my nervous system for the next Test." — **WB2RXS**. "Really enjoyed this contest. A 10-15-20-meter quad does great on 6!" — **WA3GBD**. "Almost fell off my chair when a Nebraska station answered my CQ SS." — **WA3ELA**. "Why can't six meters always be this active?" — **WA3HGX/3**.

**QST**

### 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. The highest-scoring Novice also receives a certificate in each section where at least three such licensees submitted valid contest logs. In sections with fewer than 3 Novice entries, a certificate will be awarded to the highest scoring Novice displaying exceptional effort; asterisks denote WJ winners. A double asterisk denotes a headquarters staff member, ineligible for an award. Columns indicate final score, number of contacts, number of different sections worked, and the bands used. A represents 50 Mc., B 144 Mc., C 220 Mc., D 420 Mc. Multioperator stations are shown at the end of each section tabulation.

#### ATLANTIC DIVISION

*Delaware*  
**W3CQV** 9296-166-18-ABCD  
**K3OBP** 1856-58-6-A  
**K3URF** 1800-50-8-B  
**K3FFD** 364-13-4-A

*Eastern Pennsylvania*  
**W3MFY** 52,910-715-27-ABCD  
**WA3CAG** 38,439-520-27-ABC  
**K3IPM/3** 54,304-536-22-ABCD  
**W3LHF** 24,246-449-17-ABC  
**W3CL** 20,800-416-15-ABC  
**W3KKN** 19,338-440-12-ABC  
**W3HFF** 18,496-272-24-ABCD  
**K3IUU** 16,016-364-12-ABCD  
**WA3CQG** 15,180-345-12-ABC  
**K3JIZ** 14,076-391-8-ABCD  
**K3UJD** 13,904-316-12-ABCD  
**W3IZU** 13,314-317-11-ABC  
**K3BPP** 12,782-291-12-ABCD

**WA3BIV** 12,204-339-8-ABC  
**K3GAS** 11,932-314-9-ABCD  
**K3DUC** 11,894-313-9-AB  
**W5NFV/3** 11,077-293-9-AB  
**K3GGJ** 11,020-290-9-ABC  
**W3SAO** 10,812-318-7-ABC  
**W3CXC** 10,744-316-7-ABC  
**W3CJT** 10,744-316-7-ABCD  
**W3MVF** 10,374-273-9-ABC  
**K3ZRN** 10,225-205-15-A  
**K3ACR** 9,042-206-12-A  
**K3HSS** 8,976-281-6-ABC  
**K3KPY** 8,896-278-6-AB  
**K3FOD** 8,240-258-6-AB  
**K3KVS** 8,194-241-7-ABC  
**WA3HIT** 7,700-275-4-AB  
**K3IGX/3** 7,581-200-9-A  
**K3AQH** 7,560-210-8-AB  
**K3BOY** 7,500-250-5-AB  
**K3NMN** 7,480-220-7-AB  
**WA3HGX/3** 7,232-226-6-A  
**WA3AXV** 7,140-210-7-ABD  
**W3ETB** 6,984-194-8-A  
**W3CXU** 6,840-171-10-AB

**WA3IMT** 6,810-227-5-AB  
**W3FGQ** 6,750-225-5-AB  
**K3QMK** 6,307-186-7-AB  
**W3BBC** 6,290-185-7-AB  
**WA3IVY** 6,290-185-7-AB  
**WA3ADN** 6,132-219-4-AB  
**WA3EHD** 5,850-195-5-A  
**W3AJF** 5,820-194-5-ABD  
**K3ZPQ** 5,792-181-6-AB  
**K3DEF** 5,740-205-4-AB  
**W3HKZ** 5,328-148-8-ABCD  
**K3LNV** 5,312-166-6-A  
**K3MXM** 5,200-200-3-AB  
**WA3OND** 5,096-182-4-A  
**W3QXV** 5,085-170-5-A  
**K3WEU** 5,070-169-5-A  
**K3YPL** 5,070-169-5-A  
**WA3EGW** 4,860-162-5-AB  
**WA3FAA** 4,844-173-4-AB  
**WA3BTE** 4,760-140-7-AB  
**WA3ERQ** 4,758-183-3-AB  
**K3ATL** 4,640-119-10-A  
**K3GQJ** 4,500-150-5-A  
**K3EPB** 4,452-159-4-AB  
**K3OBY** 4,290-165-3-ABC  
**W3ELI** 4,290-165-3-AB  
**WA3EMQ** 4,280-142-5-AB

**WA3HET** 4,020-134-5-A  
**K3KUB** 3,825-128-5-AB  
**WA3GNL** 3,796-146-3-A  
**K3TPM** 3,648-114-6-B  
**W3KXH** 3,456-144-2-A  
**K3AFT** 3,416-123-4-A  
**K3VEQ** 3,354-129-3-ABC  
**K3HNP** 3,328-104-6-A  
**K3UZQ** 3,320-115-1-AB  
**W3ZRR** 3,180-132-2-AB  
**WA3BRV** 3,068-118-3-AB  
**K3CIV** 3,024-126-2-AB  
**W3IXL** 3,024-126-2-AB  
**K3FYX** 2,865-96-5-AB  
**K3WJL** 2,600-100-3-A  
**W3GSS** 2,240-80-4-A  
**K3GEG** 2,232-93-2-A  
**WA3BYJ** 2,112-88-2-B  
**K3AA** 1,960-70-4-A  
**W3HYO** 1,960-70-4-B  
**K3IYA** 1,876-67-4-A  
**K3HWZ** 1,872-78-2-A  
**K3ZLL** 1,608-67-2-A  
**W3HAB/3** 1,558-41-9-AB  
**W3PST/3** 1,482-57-3-AB  
**K3EHQ** 1,428-51-4-AB  
**K3IKO** 1,404-54-3-AB  
**K3ZMS** 1,400-50-4-  
**WA3BGM** 1,344-48-4-A  
**WA3EIO** 1,344-48-4-A  
**K3IFE** 1,320-55-2-A  
**K3ALK** 1,272-53-2-A

**K3DLS** 1,272-53-2-ABC  
**WA3GNV** 1,248-52-2-B  
**W3HKZ/3** 1,170-45-3-A  
**K3DAQ** 1,032-44-2-A  
**K3GAY** 1,022-37-4-AB  
**WA3EKM** 884-34-3-A  
**WA3IOK** (WA3EKM, opr.) 854-33-3-A  
**WA2AMB/3** 720-30-2-A  
**W3GXB** 676-24-2-G  
**K3GFG/3** 480-20-2-A  
**K3GZT** 442-17-3-A  
**K3YDZ** 432-18-2-A  
**WA3BKP** 420-15-4-A  
**WA3FOP** 360-15-2-AB  
**W3IHT** 330-15-1-B  
**K3ESL** 264-11-2-A  
**W3HAB** 240-10-2-B  
**K3QMK/3** 198-9-1-A  
**W3BBC/3** 176-8-1-A  
**WA3IVY/3** 176-8-1-A  
**W3IA** 120-5-2-B  
**K3GQJ/3** 88-4-1-A  
**K3YFD** (6 ops) 10,438-307-7-AB  
**W3GVE** (K3NDA, W3GVE)  
**W3GVE** 10,064-296-7-AB  
**W3CLQ** (K3DLS, W3CLQ) 6,657-202-9-AB  
**K3WGC** (K3S, W3GJ) 6,732-187-8-ABC

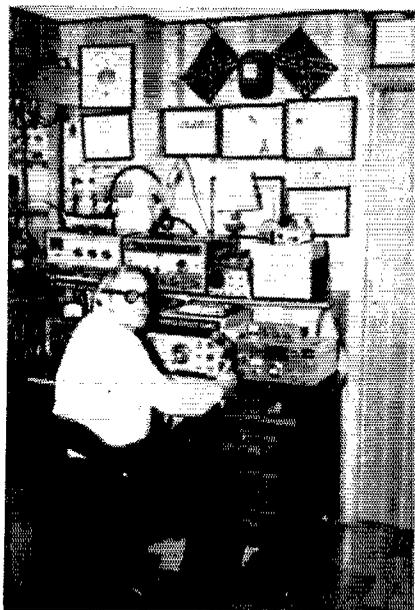
K3WGJ (K3s WJG) 6324-186-7-ABC  
 K3WEB/3 (8 oprs.) 3120-78-10-AB  
 W3NSI (W3s NSI QAS) 3104-97-6-ABC  
 W3QAS (W3s NSI QAS) 2720-85-6-ABC  
 WA3GFZ (K3WJF, WA3GFZ) 2424-101-2-A  
 WA3HVE (WA3s ADK FWLHVR) 3400-100-2-A  
 W3DYL (W3DYL, WA3EUV) 2100-75-4-AB  
 Maryland — D. C.  
 WA3ELA 3914-103-9-AB  
 WA3ELO 3712-116-6-AB  
 W3HB 3572-94-9-AB  
 WA3HEN 3270-109-5-AB  
 W3OTC 2992-94-6-AB  
 W3LUL 2720-80-7-B  
 WA3GBX 3628-76-8-B  
 K3PPE 3520-90-4-AB  
 WA3ILO 2002-77-3-AB  
 W3MNE 1980-55-8-B  
 W3CPM 1612-62-3-R  
 W3PTH 1586-61-3-B  
 WA3EOQ/3 1586-61-3-B  
 W3MHB 1534-59-3-R  
 W3PZK 1392-58-2-AB  
 K3LFN 1200-50-2-AB  
 W3MSR 1176-42-4-R  
 W3YAG 1128-47-2-B  
 WA3BNM 1104-46-2-AB  
 W3KUH 1066-41-3-B  
 W3BNL 858-33-3-B  
 W3CGR 790-33-2-B  
 W3ATR 748-22-7-BD  
 K3RWY 720-30-2-AB  
 W3KMY 720-30-2-B  
 K3BEG 648-27-2-B  
 K3LZX 600-25-2-A  
 K3UMB 576-24-2-AB  
 W3FNU 528-22-2-B  
 W3AX 480-20-2-B  
 WN3JAS 456-19-2-B  
 K3MUP 360-15-2-AB  
 W3AEA 336-14-2-B  
 WA3IKV 66-3-1-B  
 WA3AKZ (WA3s AKZ HBZ) 10,856-236-13-AB

W3PGA (6 oprs.) 6510-155-11-ABD  
 K3ERM/3 (K3s ARN OPB UH) 4074-97-11-ABD  
 WA3GDB (WA3s GDB GLP) 2835-95-5-AB  
 Southern New Jersey  
 W2HIF 25,926-448-19-ABCD  
 W2REB 24,606-344-26-AB  
 WB2MT 22,572-513-12-AB  
 WA2EMB 18,225-339-17-ABD  
 W2AXU 16,128-224-26-AC  
 W2EV 11,250-225-15-AB  
 K2BPK 10,440-261-10-AB  
 W2QON 8908-262-7-AB  
 WB2IOE 8840-260-7-ABD  
 WB2UVB 7786-229-7-AB  
 WB2NOK 7740-258-5-ABC  
 W2ZUL 7456-233-6-AB  
 W2EWN 7310-215-7-AB  
 WA2OAA 7208-212-7-AB  
 W2JAV 7200-200-8-ABC  
 WB2SMJ 6672-209-6-AB  
 WB2YEL 6570-219-5-AB  
 WB2OAD 5550-111-15-A  
 WB2LWZ 5440-170-6-A  
 WB2LV 5150-103-15-B  
 W2BSZK 5018-193-3-ABC  
 W2VX 4760-140-7-AB  
 WB2YXP 4480-160-4-AB  
 K2QPN 4370-115-9-A  
 WA2MGV 4192-131-6-AB  
 WB2WRP 4160-130-6-B  
 WA2QZG 4020-132-5-A  
 WB2CEJ 3480-87-10-A  
 WB2PZF 3302-127-3-A  
 WA2AOC 3198-123-3-AB  
 K2QLJ 3120-120-3-AB  
 WA2EIV 2898-69-11-A

**DIVISION LEADERS**

| Single Operator |              | Multioperator |
|-----------------|--------------|---------------|
| W3MIFY          | Atlantic     | W2PAU         |
| K9QKB           | Central      | K9DZK         |
| K9DFTA          | Dakota       | .....         |
| WA5NOB          | Delta        | .....         |
| K8DOC           | Great Lakes  | K8MMM         |
| WA2PBN          | Hudson       | W2JKI         |
| W9ECV/θ         | Midwest      | WA0JYK        |
| K1MRI           | New England  | WA1IOX        |
| W6PUI/7         | Northwestern | K7UYX         |
| WB6UYG          | Pacific      | W6YEP/6       |
| K4SUM           | Roanoke      | WA4LTS        |
| K7UFQ           | Rocky Mt.    | WA6PHZ/θ      |
| K4HWV           | Southeastern | WB4FMJ/4      |
| WA6WKF          | Southwestern | .....         |
| K5IPV           | West Gulf    | .....         |
| VE3ASO          | Canadian     | VE2DFO        |

WA2HVD 2828-101-4-AB  
 WB2UEY 2160-90-2-AB  
 W2ORA 2028-78-3-AB  
 W2PU (WB2CHO, opr.) 1920-60-6-  
 WB2EEH 1920-60-6-AB  
 WB2LXA 1898-73-3-A  
 WB2ICB 1728-72-2-A  
 K2SQM 1540-55-4-A  
 WB2SPJ 1536-64-2-A  
 WB2EFL 1530-51-5-A  
 K2DFE 1500-50-5-AB  
 WB2MNM 1368-57-2-A  
 WB2ZMY 1274-49-3-B  
 WB2VMD 1272-53-2-A  
 WB2ZJR 1118-43-3-B  
 K2MKD 1040-40-3-B  
 K2LEO 1008-42-2-B  
 K2BG 984-41-2-B  
 W2LZA 962-37-3-BC  
 W2ADLN 924-33-4-A  
 WN2BXJ/2 864-36-2-B  
 WB2FOC 840-35-2-B  
 WN2DBB/2 816-34-2-B  
 K2OHM 624-26-2-A  
 W2SDB 384-16-2-B  
 WB2GPH 384-16-2-B  
 WB2MNF 336-14-2-B  
 W2BQ 240-10-2-A  
 W2HBE 88-8-1-R  
 K2QLJ/2 48-2-2-A  
 WA2MGV/2 44-2-1-A  
 WB2UVB/2 44-2-1-A  
 WB2KYO/2 22-1-1-A  
 W2PAU (W2s ESX PAU, WA2HSP) 20,462-395-16-AB  
 WB2MOQ/2 (WB2s MOQ ZGR) 7424-232-6-AB  
 WB2YCYZ (WA2WTC, WB2s JEP YCZ) 7072-221-6-AB  
 K2MIO (K2s MIO RRC) 6464-202-6-AB  
 W2BAY (W2s BAY FYS) 6450-215-5-ABC  
 WN2BVV (4 oprs.) 5814-172-7-R  
 WA2KWS (WA2s KWS OAA) 4288-134-6-AB  
 Western New York  
 W2UTH 1920-80-2-AB  
 W2A2JWS 1914-87-1-A  
 K2IMZ 1892-86-1-AB  
 K2YMM 1848-77-2-AB  
 WA2GIA 1830-61-5-A  
 WA2CJL 1800-75-2-A  
 W2MPM 4830-161-5-AR  
 W2ALL 4755-159-5-AB  
 WA2TEY 4140-138-5-AB  
 W2VVG 3978-153-3-AB  
 W2QY 3960-165-2-AB  
 W2ALN 3892-147-3-AB  
 W2ROC 3640-91-10-A  
 WA2KND 3432-143-2-ABD  
 K2BBJ 3380-130-3-AB  
 W2CNSJ/2 336-139-2-ABD  
 WA2YPT 3264-136-2-AB  
 WA2ZNC 3264-136-2-AB  
 K2JA 3192-134-2-AB  
 K2WV 3072-128-2-AB  
 WA2KVN 3072-128-2-AB  
 WB2YHD 3072-128-2-AB  
 WB2JFL 3048-127-2-AB  
 K2YRZ/2 3002-79-9-B  
 WA2GCF 2992-136-1-AB  
 WA2YTK 2970-135-1-AB  
 K2RZI 2882-131-1-AB  
 WB2MAC 2882-131-1-AB  
 WB2MAB 2856-102-4-A  
 WB2NFFY 2756-106-3-A  
 W2YBK 2750-125-1-AB  
 K2RHS 2664-111-2-A  
 WA2LHM 2574-117-1-AB  
 WB2HZM 2530-115-1-AB  
 WA2FVG 2486-113-1-AB  
 WA2HWC 2464-112-1-AB  
 WB2HLI 2442-111-1-AB  
 W2RHS 2424-101-2-AB  
 K2CEH 2340-65-8-BD  
 WB2LZM 2332-106-1-AB  
 WB2ZFS 2244-102-1-AB  
 WB2QXB 2136-89-2-A  
 K2JJT 2136-88-2-A  
 W2MDC 2134-97-1-AB  
 WB2FDZ 2064-86-2-A  
 K2LZF 2040-85-2-A  
 WA2KMI 2016-84-2-A  
 WA2IVZ 2002-91-1-A  
 WB2MCP 2002-91-1-AB  
 WA2ALW 1920-80-2-AB  
 WA2TJS 1914-87-1-A  
 K2IMZ 1892-86-1-AB  
 K2YMM 1848-77-2-AB  
 WA2GIA 1830-61-5-A  
 WA2CJL 1800-75-2-A  
 W2AZUFV 1760-80-1-AB  
 W2BPE 1742-67-3-B  
 WB2INN 1738-79-1-AB  
 WB2SNA 1738-79-1-A  
 WB2KQW 1716-78-1-AB  
 K2JL 1606-73-1-A  
 WB2YJH 1562-71-1-A  
 WB2DKA 1474-67-1-A  
 WB2UDV 1474-67-1-A  
 WA2YRH 1452-66-1-ABD  
 WB2DWP 1430-65-1-A  
 WA2AQV 1386-63-1-A  
 K2UOA 1364-62-1-A  
 WB2DCC 1342-61-1-A  
 K2SQJ 1320-60-1-A  
 WB2KUY 1320-55-2-B  
 WB2FAN 1298-59-1-A  
 WB2NXL 1298-59-1-A  
 WB2HJN 1270-58-1-A  
 W2SFA 1254-57-1-B  
 WA2SOO 1200-50-2-AB  
 WB2RVV 1188-54-1-A  
 WB2WBZ 1188-54-1-B  
 W2ECM 1144-52-1-AB  
 W2WGL 1140-30-9-B  
 K2TFO 1122-51-1-A  
 WA2YFM 1122-51-1-A  
 WB2ZJY 1122-51-1-A  
 W2UAD 1104-46-2-B  
 WB2JGV 1104-46-1-AB  
 K2QWC 1100-50-1-A  
 W2RUJ 1078-49-1-B  
 WA2POG 1067-50-1-A  
 WB2SMID 1056-48-1-B  
 WA2UGF 1034-47-1-A  
 K2DHA 990-45-1-B  
 WA2JMR 968-44-1-A  
 WB2ZEA/2 968-44-1-B  
 WB2LXS 960-32-5-B  
 WA2YSG 946-43-1-AB  
 WB2ZYT 924-42-1-B  
 K2MAJ 902-41-1-A  
 K2YQT 880-40-1-A  
 WA2UTM 880-40-1-A  
 WB2WZG 880-40-1-B  
 WB2IUM 858-39-1-A  
 WA2AI 876-38-1-B  
 K2UCI 748-34-1-A  
 WB2MBP 748-34-1-AB  
 WA2ZYH 726-33-1-AB  
 K2DUR 704-32-1-AB  
 K2VYH 704-32-1-A



**W4TBQ** utilized this neat setup, plus 4 elements at 60' on six and 7 elements at 35' on two, to take third spot in Virginia.



It isn't easy from Oregon, either! **WA7FNZ** stuck to 50 Mc. in this his first contest—Joe had a ball with his Elmac AF68A and 6-element beam turned by rope.

**WB2KYQ** 690-23-5-B  
**WAZYEK** 682-31-1-A  
**KZZNC** 660-30-1-A  
**W2WUW** 616-28-1-B  
**WA9LQJ/2** 594-27-1-B  
**WB2FPT** 594-27-1-B  
**WB2QGL** 572-26-1-A  
**WB2GJB** 561-26-1-A  
**K2UBA** 550-25-1-A  
**WA2GVH** 528-24-1-AB  
**WB2LJG** 506-23-1-A  
**K2KWK** 442-21-1-A  
**K2OPC** 462-21-1-A  
**WA2ZXU** 440-20-1-AB  
**WB2LWN** 440-20-1-AB  
**WB2YWI** 440-20-1-AB  
**K2ZVY** 396-18-1-AB  
**WA2GRT** 396-18-1-AB  
**WB2ZDF** 360-15-2-A  
**WN2BFF** 352-16-1-B  
**K2HDY** 330-15-1-A  
**W2ICE** 308-14-1-AB  
**WA2BXT** 286-13-1-A  
**K2YRU** 242-11-1-A  
**WN2AWX** 240-10-2-B  
**WN2CJO** 220-10-1-B  
**K2ACQ** 182-7-3-D  
**WB2QPT** 176-8-1-A  
**WB2SRH** 132-6-1-A  
**WN2BSC** 110-5-1-B  
**W2OW** (15 oprs.) 6250-125-15-AB  
**K2ERJ** (12 oprs.) 4000-100-10-AB  
**W2TRS/2** (W2TRS, W2ZYGD) 2908-92-2-AB  
**WB2VPY** (13 oprs.) 1736-62-4-A

**WA9ENM** 3960-110-8-AB  
**WA9NVE** 3696-132-4-AB  
**K9ZVU** 3562-137-3-ABC  
**WA9HIR** 3510-117-5-B  
**W9JGV** 3424-107-6-B  
**K9ZVV** 3380-130-3-ABC  
**WA9SHV** 3380-130-3-AB  
**K9FHP/9** 3008-94-6-A  
**K9ZVV** 2996-107-4-B  
**W9YYF** 2924-86-7-B  
**K9ECZ/9** 2912-104-4-B  
**K9ONA** (WA9IRZ, WA9NRI) 2912-112-3-AB  
**WA9NRI** 2912-112-3-B  
**WA9FIH** 2860-110-3-AB  
**W9NWHJ** 2808-117-2-B  
**W9GFF** 2616-109-2-B  
**WA9SEQ** 2576-92-4-A  
**WA9NRB** 2520-84-5-B  
**WA9SPA** 2366-91-3-B  
**WA9IRZ** 2314-89-3-AB  
**K9JWA** 2256-94-2-B  
**W9DUJ** 2240-80-4-A  
**WA9RSH** 2208-92-2-B  
**K9HPW** 2160-90-2-B  
**WN9TZI** 2136-89-2-B  
**K9SGE** 1952-61-6-A  
**K9YJG** 1620-80-2-AB  
**W9EHU** 1920-80-2-B  
**WA9GUK** 1904-68-4-A  
**WN9TZH** 1872-78-2-B  
**WA9QPM** 1800-75-2-B  
**W9GMK** 1632-68-2-AB  
**WA9OBQ** 1608-67-2-B  
**WA9SVD** 1568-57-4-A  
**WA9FIY** 1560-65-2-A  
**K9VUI** 1428-51-4-B  
**W9ETK** 1428-51-4-AB  
**WA9MSZ** 1428-51-4-B  
**K9BDJ** 1394-41-7-AB  
**WA9VXQ** 1378-53-3-B  
**W9RPH** 1352-52-2-AB  
**K9VTUN** 1326-51-3-B  
**WA9VKN** 1326-51-3-B  
**WA9EEC** 1320-55-2-AB  
**WA9QOI** 1272-53-2-AB  
**K9SYA** 1248-52-2-A  
**K9VFK** 1248-52-2-B  
**WA9NFP** 1248-52-2-AB  
**W9CVX** 1200-50-2-AB  
**K9DKI** 1128-47-2-A  
**WA9IWU** 1100-50-1-AB  
**K9OOG** 960-40-2-B  
**W9QVE** 946-43-1-B  
**W9ZSS** 946-43-1-A  
**WA9KQD** 912-38-2-AB  
**K9FBL** 902-41-1-AB

**K9YHB** (WA9EJD, opr.) 902-41-1-A  
**K9AVU** 896-32-4-B  
**WA9SDT** 864-36-2-AB  
**W9TGY** 846-35-2-B  
**WA9QHI** 748-34-1-AB  
**W9YOW** 660-30-1-A  
**WA9BMC** 660-30-1-A  
**WA9SVF/9** 650-25-3-B  
**WA9KTO** 649-30-1-AB  
**WA9RIF** 638-29-1-B  
**W9CEJ** 624-26-2-B  
**WA9KJX** 600-25-2-B  
**W9BOD** 480-20-2-A  
**W9VWT** 456-19-2-B  
**WA9BBZ** 456-19-2-B  
**WA9VWJ** 352-16-1-A  
**W9AVE/9** 330-15-1-B  
**W9ZYL** 264-12-1-B  
**WA9TWA** 198-9-1-B  
**K9FHM** 176-8-1-AB  
**W9ZVE** 176-8-1-AB  
**WA9SKJ** 88-4-1-A  
**WA9GVP** 66-3-1-AB  
**WA9FTH/9** 44-2-1-A  
**K9MFE** (4 oprs.) 6800-200-7-AB  
**WA9JYR** (G3PAC, W8PFO) 6244-223-4-AB  
**W9MCG** (W9S MCG RVG) 5408-169-6-ABC  
**WA9QZE** (WA9S QZE TCW) 2756-108-3-B  
**WA9QJD** (WA9S QAD UJQ) 2328-97-2-B  
**Indiana**  
**W9HTF** 3204-118-4-B  
**WA9ONY** 2034-58-8-AB  
**WA9NLA** 1568-56-4-B  
**K9EFX** 1056-45-2-B  
**WA9UUE** 990-34-5-A  
**WA9CFK** 792-33-2-B  
**WA9FAQ** 756-32-2-B  
**K9LSJ** 450-16-5-A  
**K9QCB** 448-16-4-ABCD  
**WN9UNK** 336-14-2-B  
**K9JTZ** 312-12-3-A  
**K9DZK** (K9DZK, WA9FAE) 26,520-342-29-AB  
**W9BZN/9** (9 oprs.) 2478-59-11-AB  
**Wisconsin**  
**W9IYQ** 3984-83-14-AB  
**WA9HJN** 3654-63-19-A  
**W9YIT** (K9OXY, opr.) 2375-48-15-A  
**WA9RTH** 2054-79-3-AB  
**WA9PO** 484-22-1-AB  
**WA9ULK** 374-17-1-A  
**WA9MCC** 242-11-1-B  
**WA9EZX** 55-5-1-A  
**K9IFF** (6 oprs.) 11,492-169-24-AB

**GREAT LAKES DIVISION**  
*Michigan*  
**WABAT** 3100-78-20-AB  
**WASRQJ** 2610-73-8-B  
**WASVHG** 2460-82-5-B  
**K8LZF** 1976-52-9-B  
**W8CVG** 1680-70-2-AB  
**WASHAA** 1540-55-4-AB  
**WASTSY** 1472-46-6-A  
**WASPST** 1368-57-2-AB  
**WASUDE** 1014-39-3-AB  
**K8WEX** 960-40-2-AB  
**K8MVA** 952-34-4-AB  
**WASQBG** 864-36-2-A  
**WASWSV** 864-36-2-A  
**WASBOW** 702-27-4-A  
**W8CKK** 672-28-2-AB  
**K8SBN/8** 624-25-3-A  
**K8UDJ** 480-20-2-A  
**W8WVU** 264-12-1-B  
**K8AJC** 198-9-1-A  
**WASRSU** 82-1-1-B  
**W8BQD** (4 oprs.) 7000-140-15-AB  
**Ohio**  
**K8DOC** 9972-139-26-A  
**W8KJF** 7296-192-9-AB  
**W8MOW** 6048-168-8-AB  
**WASHPY** 4023-76-17-A  
**W8NEE** 3780-105-8-AB  
**WASREM** 3458-91-9-AB  
**K8OWB** 3276-126-3-AB  
**W8JRN** 3248-102-6-AB  
**K8DEO** 3060-85-8-ABD  
**W8STTX** 3030-101-5-A  
**K8TVT** 2940-105-4-B  
**W8TYF** 2755-73-9-AB  
**K8MHJ** 2128-76-4-AB  
**K8EHR** 2112-66-6-AB  
**WASAUO** 3100-70-5-A  
**WASBOB** 2080-80-3-AB  
**K8GDV** 1778-64-4-AB  
**WASHVX** 1632-68-2-B  
**W8SYYV\*** 1200-50-2-B  
**W8WAT** 1196-46-3-B  
**WASIKN** 1152-48-2-AB  
**K8VAK** 1058-18-1-AB  
**W8DPW** 1056-44-2-AB  
**WASLYM** 988-37-2-B  
**WASCFZ** 984-41-2-AB  
**WASRUO** 936-36-3-B  
**WASRWJW** 884-34-3-A  
**K8IIS** 864-36-2-B  
**K8ADI** 868-33-3-AB  
**W8RLY** 792-33-2-B  
**W8MCM** 682-31-1-B  
**WASUYM** 616-28-1-B  
**WASFZS** 552-23-2-B

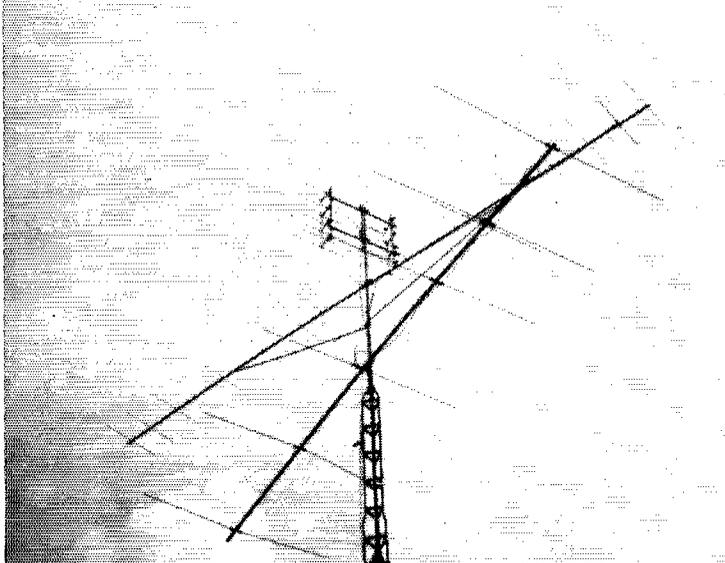
**WASIHG** 528-24-1-A  
**W8NIG** 520-20-3-A  
**W8BK** 494-19-3-A  
**W8ZEM** 468-18-3-AB  
**WASMTS** 396-18-1-A  
**K8QCA** 390-15-3-B  
**WASRCN** 320-16-1-A  
**W8TDY** 308-14-1-  
**W8HQX** 242-11-1-B  
**W8ZEM** 198-18-3-AB  
**WASVYJ** 165-8-1-A  
**WASWKQ** 110-5-1-A  
**W8SQM** 44-2-1-AB  
**K8MMM** (6 oprs.) 26,606-284-37-A  
**W8CCI** (9 oprs.) 19,902-321-21-AB  
**WASPLZ** 19,114-253-28-AB  
**W8ZOF** (W8ZOF, WASHUB) 4978-131-9-AB  
**WASBWN** (W8GVQ, W8BWN) 1794-69-3-AB  
**WASHNY** (4 oprs.) 1740-58-5

**HUDSON DIVISION**  
*Eastern New York*  
**K2CBA** 6372-118-17-ABCD  
**K2BGU** 5616-117-14-AB  
**WB2VQU** 5559-164-7-B  
**WB2OIM** 4646-101-13-A  
**WB2RBG** 4080-128-6-AB  
**WB2VLL** 3700-90-5-AB  
**WA2JWO** 2492-89-4-AB  
**WA2DTE** 2490-83-5-AB  
**WA2WSY** 2464-88-4-AB  
**WB2MHH** 2408-86-4-AB  
**WA1FGF/2** 1860-62-5-AB  
**W2DSK** 1794-69-3-AB  
**K2UAR/2** 1680-61-4-AB  
**W2CTH** 1596-57-4-AB  
**WAZMCP** 1456-52-4-AB  
**WA2GUT** 1404-54-3-AB  
**WA2GGD** 1378-53-3-AB  
**WB2BPS** 1372-49-4-AB  
**WB2PZL** 1260-45-4-AB  
**WB2EUV** 1232-44-4-AB  
**WA2KUL** 1152-36-6-B  
**WB2OGN** 1080-45-2-A  
**WB2WVZ** 1036-37-4-AB  
**WB2ICI** 1014-39-3-AB  
**K2ARO** 986-29-7-B  
**W2CDQ** 936-36-3-AB  
**W2LJ** 884-26-7-B  
**K2ACB** 858-33-3-AB  
**K2AXX** 840-30-4-AB  
**K2KTJ** 840-35-2-AB  
**WA2GXM** 836-38-1-AB

**DAKOTA DIVISION**  
*Minnesota*  
**K8DTA** 4100-82-15-AB  
**KH6FKB/8** 351-14-3-A  
**WA9CJU** (6 oprs.) 1929-84-21-AB  
*South Dakota*  
**K8GJX** 150-5-5-A  
**DELTA DIVISION**  
*Arkansas*  
**WA5NOB** 4216-6-24-A  
*Louisiana*  
**WA5SER** 180-6-5-A  
*Mississippi*  
**K5TYF** (W8QNR, opr.) 1173-27-13-A  
*Tennessee*  
**W4WQZ** 2162-47-13-AB  
**WB4ASA** 1760-40-12-A  
**WB4EXI** 264-11-2-A



WMass Novice **WN1HHN** adding another one to the log. Wait was one of seven WNs to bag a Section Award sheepskin.



Some of the hardware used on 50, 144 and 432Mc. by **WA5KPU** to roll up the top score in Southern Texas. Dick, ex-K1GGY, threatens to return to Mass. if he doesn't get some local competition pretty soon!

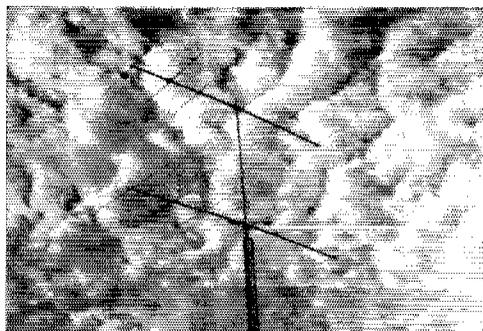
WB2PUH 819-32-3-AB  
 W2AWF 784-28-4-B  
 K2ZUK 782-23-7-B  
 WA2BAH 728-28-3-AB  
 WA2KCB/2 704-32-1-AB  
 WA2RWR 696-29-2-A  
 K2BUF 650-25-3-B  
 W2FKE 650-25-3-B  
 W2HCS (K2ACB, opr.) 624-24-3-AB  
 W2YPN/2 576-24-2-AB  
 WB2QVX 572-26-1-AB  
 WAIGDA/2 528-24-1-AB  
 WA2JK/2 528-24-1-AB  
 WB2BDG/2 528-24-1-AB  
 W2CJS 484-22-1-AB  
 K7TAZ/2 (K2UAR, opr.) 462-21-1-AB  
 WAIFPS/2 352-16-1-AB  
 W2HVM 338-13-3-B  
 WA2OYV 330-15-1-AB  
 WB2BZE 330-15-1-AB  
 WB2JRS 286-12-3-B  
 WA2BRA/2 230-10-1-AB  
 WB2YEM/2 144-6-2-AB  
 WA2YRF 132-6-1-B  
 W2PNI 120-5-2-AB  
 WA2JIK 88-4-1-A  
 K2CLU 44-2-1-B  
 WA2KCB 33-2-1-A  
 WA2PZB 22-1-1-A  
 W2JKI (4 oprs.) 35,150-475-27-ABCD  
 WB2VUK/2 (6 oprs.) 7680-243-6-AB  
 K2DNR (8 oprs.) 6000-120-15-BC  
 WB2YQU (4 oprs.) 4978-131-9-AB  
 W2SZ (6 oprs.) 3026-89-7-AB  
 WB2FXB (W2UFT, WB2FXB) 2204-58-9-B  
 WB2ABJ/2 (4 oprs.) 1950-65-5-AB  
 WB2MOX/2 (K1NKR, WB2MOX) 88-4-1-B  
 N. Y. C.-L. I.  
 K2HLA 11,542-199-19-B  
 W3ANW/2 10,266-177-19-AB  
 WA2EE (WB6NIK, opr.) 7904-250-6-AB  
 WB2MZE 6516-181-8-AB  
 WB2DIN 5334-127-11- -

W2TUK 3816-106-8-AB  
 WB2UZU 3492-87-8-AB  
 K2RLW 3136-99-6-B  
 WN2DBA\* 3008-94-6-B  
 W2KXG 2160-72-5-B  
 W2BEU 1824-57-6-ABCD  
 WA2OVG 1800-60-5-A  
 WB2YV 1176-42-4-B  
 WB2TJE 1024-32-6-B  
 W2QAN 930-31-5-B  
 WA2EXP 900-30-5-B  
 W2TNI 676-26-3-B  
 WB2DDL 616-22-4-  
 W2ML 236-13-1-B  
 W2GFF 252-9-4-B  
 WB2PGR 22-1-1-B  
 K2VMR (8 oprs.) 26,588-391-24-AB  
 WA2CVS (WA2BCY, WB2WOD) 7412-218-7-AB  
 WA2PNF (WA28 KIK PNF) 3206-103-6-AB  
 Northern New Jersey  
 WA2PBN 21,200-265-30-A  
 K2OJD 7920-165-14-AB  
 W2AQZ 4840-121-10-  
 WA2BLB 4032-126-6-B  
 K3AFW/2 3488-109-6-B  
 W2CVW 2295-76-5-AB  
 K2KJI 1710-45-9-B  
 WN2CEW\* 1144-44-3-B  
 WA2VOZ 1072-34-6-A  
 WB2VFX 1020-34-5-B  
 W2DLT 840-28-5-B  
 WA2CMG 800-25-6-AB  
 WN2AQK 741-29-3-B  
 WA2DRX 598-23-3-B  
 K2MHP 510-17-5-B  
 K2VNW 260-10-3-A  
 WB2WIK/2 (5 oprs.) 19,282-312-21-AB  
 W2BSC (8 oprs.) 12,230-309-10-AB  
 WB2TGT (4 oprs.) 10,836-258-11-AB  
 WB2KCO/2 (11 oprs.) 10,428-237-12-AB  
 K2DEL (4 oprs.) 8670-255-7-AB  
 WB2UAQ 3104-97-6-B  
 WN2AFI (WN28 AFI BJW) 2490-83-5-B

KITZD 240-10-2-B  
 WIDZA 168-7-2-  
 K1OXU 144-6-2-A  
 WA1EP 44-2-1-A  
 WA1OX (KITZD) 6279-137-13-AB  
 WALS CYP IOX)  
 W1AW (W1ARR, WA1FVJ)\*\* 2390-85-4-AB  
 WN1IZR (WN18 ISD IZR) 1846-71-3-B  
 Eastern Massachusetts  
 WALACD 7332-141-16-A  
 WIHMM/1 4160-130-6-A  
 K1CHY 3690-123-5-ABC  
 WAIGGB 3520-110-6-AB  
 W1EJ 3434-101-7-AB  
 W1QIB 3060-90-7-AB  
 K1KNI 2720-80-7-A  
 W1RSR 2592-81-6-AB  
 WA1FCD 2298-72-6-AB  
 WA1GVH 1984-62-6-A  
 W1AGN 1920-60-6-A  
 WA1EH/1 1376-43-6-A  
 WA1DYU 1260-42-5-AB  
 WA1HON 1110-37-5-AB  
 K1QYY 898-32-4-A  
 K1CQX 780-26-5-A  
 WA1GNP 598-23-3-A  
 W1JSM 504-18-4-B  
 WA1BL8 476-17-4-A  
 W1CTR 442-17-3-B  
 K1DUI 405-14-5-A  
 WA1AWJ/1 264-12-2-  
 VE2DBK/W1 198-9-1-A  
 WA1HHK 198-9-1-B  
 W1CHF 192-8-2-AB  
 W1MX (4 oprs.) 480-150-6-AB  
 W1KN 4048-127-6-A  
 W1IPJ (W18 BXI CHF) 278-67-7-AB  
 WA1DGH (K1PAM, WA1DGH) 1248-39-6-A  
 Maine  
 WA1HWC 1424-49-6-AB  
 K1EPO 468-19-3-AB  
 W1ZGZ/1 22-1-1-A  
 MIDWEST DIVISION  
 Iowa  
 W6PFF 3944-58-24-A  
 WA9OVM 1740-30-19-A  
 Kansas  
 W9ECV/0 12,890-138-37-A

W0IPB/0 1900-50-9-AB  
 W0SPF 336-18-1-AB  
 WA9JYK (7 oprs.) 9520-136-25-AB  
 Missouri  
 K0TLM 3822-74-16-A  
 W0DSW 1728-72-2-AB  
 Nebraska  
 WA0MRH 7067-96-27-A  
 K2PCG/0 2688-42-22-A  
 W0UJK 646-17-9-A  
 NEW ENGLAND DIVISION  
 Connecticut  
 K1MRI 15,370-265-19-A  
 W1HDQ\*\* 9099-170-17-AB  
 K1HTV 6534-121-17-B  
 WA1GYL 3000-125-10-AB  
 WA1GIS 4046-119-7-ABD  
 WA1CWW 3808-112-7-ABE  
 K1YON 3610-95-9-ABCDE  
 W1MEH 3300-75-12-AB  
 KITZD/1 3200-80-10-AB  
 W1VTU 2550-51-15-B  
 WN1HUE\*\* 2496-78-6-B  
 WA1HUO 2128-56-9-AB  
 WA1GTP 1760-55-6-AB  
 WN1IQJ 1261-49-3-B  
 K1AOY 1118-43-3-B  
 W1QVF/1 1066-41-3-A  
 WN1HSV 980-35-4-B  
 WA1IYJ 912-38-2-A  
 W1RNT 598-23-3-ABD  
 K1KKK 552-23-2-B  
 K1PCC 544-16-7-B  
 K1FNF/1 528-22-2-A  
 K1XSF 480-20-2-AB  
 WA1EHK 468-18-3-AB  
 W1VLK 456-19-2-A  
 W1YCP 480-20-2-AB  
 WA1GNQ 432-18-2-A  
 W1IMV/1 420-15-4-A  
 W1QVF 264-11-2-ABD  
 W1LVQ\*\* 260-10-3-A  
 New Hampshire  
 W1IJO 4692-138-7-ABC  
 W1ALE 720-24-5-ABC

Rhode Island  
 W1EYH (K1LPL, opr.) 11,160-180-21-A  
 W1POP 1242-102-11-AB  
 Vermont  
 K1GYT 3834-71-17-AB  
 W1EZX 120-5-2-AB  
 Western Massachusetts  
 K1ANF 7358-141-16-AB  
 WA1ECR 3978-117-7-AB  
 W1STR 3800-100-9-AB  
 K1ULZ 2784-87-6-AB  
 K1PYX 3728-82-12-A  
 W1PHF 2632-91-4-AB  
 K1DQG 2548-91-4-AB  
 WN1EHN\* 2460-82-5-B  
 K1NJC 1800-60-5-AB  
 W1ALL 1768-68-3-AB  
 W1NY 1566-61-3-AB  
 W1QWJ 1540-55-4-BD  
 WN1IEK 1456-56-3-B  
 W1IC 1196-46-3-AB  
 K1DYL 1178-42-4-AB  
 K1PMK 1066-41-3-B  
 K1LTD 1056-44-3-B  
 W1UCB 1056-44-2-AB  
 W1VNH 1020-34-5-B  
 K1RPB 952-28-7-AB  
 W1JW 816-34-2-B  
 WA1DNB 792-33-2-B  
 K1LJH (K1KQS, opr.) 780-26-5-A  
 K1BNS 768-32-2-A  
 WA1BTU/1 (W1UPH, opr.) 768-32-2-AB  
 WA1FKE 748-34-1-A  
 K1LKY 650-50-3-AB  
 K1YXX 648-27-2-B  
 W1UWF 624-26-2-AB  
 WA1EHO 572-22-3-A  
 W1MNG 552-23-2-AB  
 W1KUL 528-22-2-B  
 W1TKR 504-21-2-B  
 W1UPF 480-20-2-AB  
 W1NDM 392-14-4-AB  
 W6NWG/1 384-16-2-B  
 WA1UI 144-6-2-B  
 K1FUA 88-4-1-B  
 W1YK (K1FJM, WA2VFN) 3400-100-7-AB  
 WA1FJW (WA18 FJW HX) 1800-45-10-A  
 WB2MOQ/1 (K1NKR, WB2MOX) 22-1-1-B  
 NORTHWESTERN DIVISION  
 Oregon  
 K7ZFG 1248-52-3-AB  
 WA7EY 950-40-2-AB  
 W7TYR 624-26-2-AB  
 WA7ENZ 576-24-2-A  
 WA7EGD 242-11-2-AB  
 WA7GFP 187-9-1-A



Working the V.h.f. SS from the San Joaquin Valley takes patience, determination, and a good rig! **WB6UYG** racked up the highest single-operator score in the Pacific Division with two stacked 6-element beams at 75' for 50 Mc. and 20 elements cross-polarized for 144. The six-meter array is shown on the right.

WN7IWU 110- 5- 1-B  
 K7UYX (4 optrs.)  
 319- 15- 1-AB  
*Washington*  
 WBPUZ/7  
 1520- 41- 9-A

**PACIFIC DIVISION**  
*Sacramento Valley*

WB6NTL 1938- 51- 9-A  
 W6TPE 1188- 50- 2-AB  
 WB6UEO/6 (WB6UVH,  
 optr.) 1050- 35- 5-AB  
 W6MHW 840- 30- 4-B  
 WA6CXB 572- 22- 3-B  
 K6IKV 240- 10- 2-B

*San Joaquin Valley*  
 WB6UYG 3480- 60-19-AB  
 K6ITJG 504- 14- 8-A  
 W6YFP/6 (K6GSS,  
 W6YEP, WB6MIL)  
 3990- 95-11-AB

*Santa Clara Valley*  
 WB6WLE/6 (WB6s  
 RGR WLE)  
 264- 11- 2-AB

**ROANOKE DIVISION**  
*North Carolina*

K4HKG 3120- 60-16-A  
*South Carolina*  
 WA4LTS (5 optrs.)  
 12,792-164-29-ABD  
*Virginia*  
 K48UM 9240-154-20-ABD  
 K4YCH 5508-102-17-A

W4TBQ 3026- 89- 7-AB  
 WB4HAJ 2184- 84- 3-A  
 WB4EIV 2132- 82- 3-AB  
 WB4FQR 2100- 75- 4-A  
 W4KYI 1780- 55- 6-B  
 W4YKH 1584- 65- 2-B  
 K4QIF 1134- 27-11-B  
 K4AJE 1014- 39- 3-AB  
 WB4GKR 1008- 42- 2-A

WA4UAU 960- 40- 2-A  
 WA4HIM 936- 39- 2-A  
 WA4VWX 840- 39- 2-B  
 WA4MHB 792- 33- 2-AB  
 WA4BTS 744- 31- 2-A  
 K4GPE 528- 22- 2-B  
 K4YCG 480- 20- 3-A  
 WB4BSR 480- 20- 2-AB  
 WA4OUW 336- 14- 2-A

K4OKM 288- 12- 2-A  
 WA4YKF 216- 9- 2-B

*West Virginia*  
 W8AEC 3360- 70-14-B

**ROCKY MOUNTAIN DIVISION**  
*Colorado*

W0INK 1932- 42-13-AB  
 W40MJR 512- 19- 6-AB  
 W0WYX 96- 4- 2-B  
 WA8PHZ/6 (7 optrs.)  
 8062-141-19-ABD  
*New Mexico*  
 W5IKR 828- 23- 8-AB  
 K5EFP 352- 16- 1-B

*Wyoming*  
 K7UFQ (K6QPH, opr.)  
 5320- 95-18-AB

**SOUTHEASTERN DIVISION**  
*Alabama*

K4WHW 1734- 51- 7-A  
*Eastern Florida*  
 K4YSN 1056- 48- 1-AB  
 W4GDS 900- 30- 5-A  
 WB4HR 456- 19- 2-A

*Georgia*  
 WB4FMJ/4 (7 optrs.)  
 3082- 67-13-AB  
 K4ICR (K4ICR,  
 WA5RBI)  
 779- 23- 7-A

**SOUTHWESTERN DIVISION**  
*Arizona*

WA7CJO 2356- 38-21-A  
 W7EPB 1150- 50-13-A  
*Los Angeles*

WA6WKF 5780-170- 7-A  
 WB6IMV 3690-123- 5-AB  
 (WB6NE, opr.)  
 2688- 96- 4-AB  
 WA6ARC 2080- 80- 3-AB  
 WA6KIK 1846- 71- 3-A  
 WB6TSM 1500- 50- 5-A  
 WB6YVP/6 1235- 48- 3-B

WA6ZNP 910- 35- 3-A  
 WB6SXS 336- 14- 2-B  
*Orange*

K6IBY 2160- 54-10-ABCD  
*San Diego*  
 WA6ZQU 4140- 90-13-  
 WB6NMT 3444- 84-11-AB  
 WB6TFC 2016- 73- 4-B

**WEST GULF DIVISION**  
*Northern Texas*

K5IPV 5564-107-16-A  
 WA5PWJ 3104- 97- 6-A  
 WA5RPJ 3040- 76-10-A  
 K5IVB 2240- 56-10-A  
 K5CMC 1680- 60- 4-A  
 W5JWJ 312- 13- 2-A

*Oklahoma*  
 W5WAX 2755- 47-19-A  
 WA5LXT 72- 3- 2-A

*Southern Texas*  
 WA5KPT 3990- 68-20-  
 K5BDQ 504- 21- 2-B  
 WA5RNL 264- 11- 2-B

**CANADIAN DIVISION**  
*Maritime*

VE1PI, 640- 20- 6-AB  
 VE1AKA 220- 10- 1-B  
 VO1DZ 112- 4- 4-AB

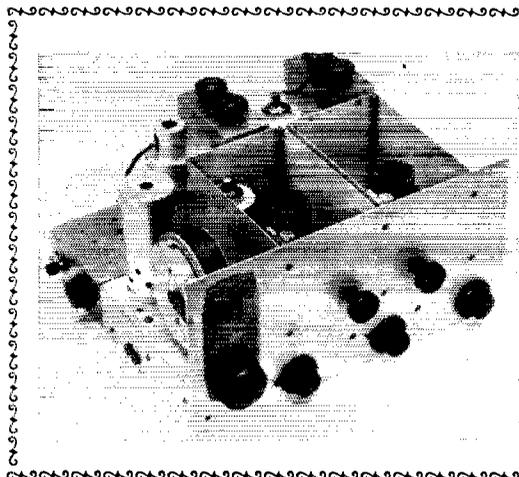
*Ontario*  
 VE3ASO 6072-132-13-B  
 VE3E2C 6050-121-15-BD

VE3CUA 2875- 63-13-AB  
 VE3ER 1608- 67- 2-B  
 VE3DNR 1512- 63- 2-B  
 VE3DSQ 1456- 52- 4-B  
 VE3AIB 1248- 52- 2-BD  
 VE3GAF 1062- 30- 8-AB  
 VE3OJ 728- 28- 3-AB  
 VE3CIT 650- 50- 3-ABD

VE3BBC 576- 24- 2-B  
 VE3DWF 432- 18- 2-  
 VE3FOE 408- 17- 2-  
 VE3CUL 264- 12- 1-B  
 VE3HR 210- 12- 1-B  
 VE3DAY 88- 4- 1-B

*Quebec*  
 VE2SH 5244-114-13-ABD  
 VE2BU 1708- 61- 4-  
 VE2HW 1316- 47- 4-ABDE  
 VE2BMQ 980- 32- 5-ABD  
 VE2BMH 576- 24- 2-AB  
 VE2BCJ 532- 19- 4-  
 VE2ALE 408- 17- 2-B  
 VE2DFO (VE2s BGY  
 DFO DGB)  
 3168- 66-14-AB

*Check logs:* W1HAX,  
 K2FRP, W2HF,  
 WA2DNJ, WB2YUK,  
 WA5SS, W5LHD,  
 WA7DSS, W8YHX,  
 WA8ALO, WA8UV,  
 WA8WCF, WN8ZBU,  
 WA9CXQ, VE3BDX.



## From the Museum of Amateur Radio

In January, 1933, George Grammer, W1DF, described his "rationalized" Autodyne receiver, which gained immense popularity and was just the thing to build. It had an r.f. stage, ganged with the detector tuning condenser. A little later, James Lamb, W1AL, converted this rig to a single-signal superhet, the necessary additional gear being fastened on the rear. The photo shows the composite outfit.



# AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,\* WINJM

## Recognition

THERE are 589 "net names" in the 1967 year-end net directory, of which 199 are identified as being part of the National Traffic System. Since only public-service-type nets are eligible for registration, and since only 200 (actually, we think this is quite a few) are a part of NTS, where do the rest of these nets fit into the public service picture, and what is the League doing in the way of affording them recognition?

These questions are being asked as we prepare this month's column, and there is a possibility that they will have been answered by action by the time you read this. Presumably, close to 400 public service nets are outside the League's sphere of action and receive no League recognition. If this be true, something ought to be done about it.

But how true is it, actually? What is the difference between recognition and sponsorship, and where is the fine line of distinction? We can point out, to begin with, that these 400-odd nets *are* registered; isn't this recognition? They are also mentioned from time to time in the AREC-RACES "Diary," further along in this column. Their activities are briefly summarized each month, if they submit data. Occasionally, a feature article about one or another of them appears "up front" in *QST*. They are eligible for and welcome to receive all kinds of materials and supplies which the League makes available to all nets for this purpose — operating aids, booklets, manuals, forms. Isn't this recognition?

Sure it is, but the need seems to be present for something a little more official than this. Back in the early 60's, when ARPSC was first organized and an article on the subject appeared in *QST*,<sup>1</sup> the diagram illustrating the AREC-NTS combination showed an embryonic "third division" of ARPSC labeled "Other Amateur Facilities." This arrow was intended to recognize the quite-large contingent of pro-ARRL organizers who have nevertheless proceeded to organize on an independent basis. Most of the participants in these nets are ARRL members, so their organizations are not just *pro-ARRL*, in a manner of speaking they *are* ARRL. Yet, they do not follow the lines of organization sponsored by the League. How to include them?

There have been many ideas submitted, but the one that seems to recur most frequently is to have ARRL "affiliated" nets, somewhat on the same order as affiliated clubs. Leave us approach this cautiously, there are pot holes along

the road, a whole new set of principles to observe, a whole new set of rules and procedures to consider and adopt.

Another possibility is making some sort of certificate available to be issued to any independent net that wants to be recognized as a part of ARPSC. This would make everybody happy except the NTS and AREC nets which became a part of ARPSC by following the comparatively strict requirements set down in the Public Service Manual. It would be, in effect, lowering standards in order to be popular — a procedure not calculated to improve anything except an image. Images are ethereal, illusive, yes even deceiving.

But still, there is obviously a need of some kind to be fulfilled here. Ideas develop slowly. They start out with something that ought to be done, without any idea how to do it. Then as the desirability becomes stronger and the pressure starts to develop, some doodling is called for, to figure out ways and means by which the objective can be accomplished. After that, one of two things happens: either the doodling becomes energetic and enthusiastic as a feasible plan takes shape, or the inherent difficulties loom so insurmountably that the whole thing is set aside for further consideration at a later date. So far, this latter is what has been happening.

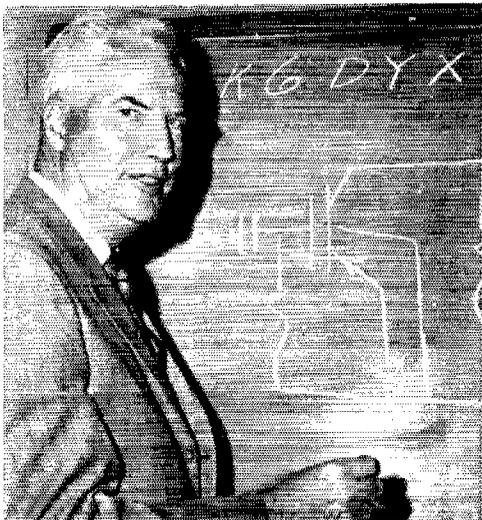
This isn't the same thing as giving up. If a thing is desirable enough and beneficial enough, there has to be a way to do it. The thing to do is keep on worrying the problem until some kind of a solution presents itself.

There are several imponderables connected with including the so-called independent organizations in ARPSC, or otherwise recognizing them officially. First is the terminology; the designation "independent" implies separation from an established organization. Probably it would be more accurate to call them non-AREC or non-NTS, as the case may be. Secondly, what sort of changes would be required in their own organization to make them eligible for whatever we set up — if any? Thirdly, do enough of them *want* to be included to make the whole venture worth while? Fourthly, *how* to bring them into the ARRL sphere, whether as part of ARPSC or something separate (competing?) or something completely different in concept? And fifthly, if this means more work for the headquarters administratively, what do we drop to make it possible?

These are the questions which must be answered before we can proceed with impunity. — WINJM.

\* Communications Manager

<sup>1</sup> April 1964 *QST*, p. 49.



At the Pacific Division Director's meeting, held in Oakland early in April, Assistant Director K6DYX signs in and draws a transistor doodle on the blackboard. Photo by W7PBV.

### Diary of the AREC and RACES

At 1715 MST, Mar. 3, an appeal for mobile units and operators was made by W0QFC, RO for Adama County, Colo., on 147.3 kc. to assist in the search for a missing child. At 1730 MST, WA0BDF/mobile left for Thornton and joined WA0PNF and W0GIL in the search. The child was found at 1825 MST. Several mobiles from Denver were also on the way to assist. — W0LRN.

On Mar. 17 VE5DP/mobile acted as base station in a search for a missing 5-year-old boy in Regina, Sask., and area, but without success. On Mar. 17 a further unsuccessful search was made in the park area adjacent to the boy's home, and again the amateurs provided communications with search groups and Emergency Measures Organization headquarters. Thirteen amateurs took part. — VE5DO, EC.

On March 20 at 2200 GMT VE2BSQ/mobile on the Trans-Canada Highways ran into some foul driving weather. He called on VE2RM and VE2XO to relay to the newsroom of a local radio station the fact that there were numerous accidents on both east and west bound lanes of the highway. This activity was on 2 meters. — VE2ALE, SEC Quebec.

On Mar. 21, K30LG was listening on 20 meters and came across a SOS call from a Greek ship off the coast of Baja California, Mexico. Not sure he heard right, he called W3YI and asked the operator there to check. Upon confirmation that there was indeed an SOS call in the amateur bands, K30LG called the Coast Guard, who took the matter from there. Apparently fire aboard the vessel had made necessary the abandonment of the radio shack, making use of the ham equipment necessary. — W3YI.

On Mar. 24 at 0245 PST, WB6ZOG heard WA6YAY/MM calling CQ on 7255 kc., with a note of urgency in his voice. Because of heavy

QRM, contact could not be established and W4IKB was asked to help. Meanwhile, W0VPG heard the call and established contact. It seemed that WA6YAY was aboard the *Finley* and they had steering problems, wanted Coast Guard headings on 2182 kc. WB6ZOG called the Western Air Rescue and Recovery Center which called the Coast Guard which relayed the information.

But all was still not well. While the *Finley* could receive on 2182, they could not transmit on it, so for a time all communications from the *Finley* to the Coast Guard had to be relayed via W0VPG to W4IKB to WB6ZOG to the WARRC to CG. This little hookup was secured at 0330 PST. The West Coast Amateur Radio Service, which operates on 7255 kc. 24 hours a day, was standing by while all this was going on. — WB6ZOG.

On March 28, K2UBG was advised, in the Early Bird Transcon Net, that a 5-year-old girl in Pontiac, Mich., was in need of a certain type blood in great quantity for treatment of acute aplastic anemia. He relayed the request into the Mike Farad Emergency and Traffic Net the same day, and into other outlets as well. As a result, enough donors and pledges of blood have been received to continue the girl's treatment through July, all thanks to amateur radio. — K2UBG.

On April 3 and 4 Western Nebraska was hit by severe blizzards which began with rain, then turned to freezing rain, then snow blown by a driving wind and reducing visibility. K00AL, SEC and Acting SCM, was stranded on his way home from work at 1:00 A.M., but managed to hitch a ride home. Next morning Dawes County EC K00DF and SEC K00AL activated the AREC Net. Weather reports were received and disseminated to all interested parties, along with road reports. The tow truck dispatched to rescue K00AL's car became stuck within 400 feet of the marooned vehicle, and K0PTK went the rest of the distance on foot. En route, he noticed a number of other marooned vehicles which were still occupied. He put K00AL mobile into operation, contacted K00AL and advised him of the circumstances. Meanwhile, the tow truck had returned to town and advised K00AL they could not reach his car. K00AL then advised the Road Department of the additional stranded motorists, and a decision was made to attempt to plow to that point. K00AL then advised K00AL/mobile (K0PTK) who brought this good news to the other stranded motorists. After plowing, K0PTK got K00AL's car moving and drove into town, advising K00AL on the way that some of the other cars would need a tow truck. K00AL then phoned the tow service and a truck was dispatched. Had not K00AL been stranded on his way home, chances are all this communications service could not have been rendered.

The above is just one highlight during the blizzard. To list the part each amateur played would take more space than QST could possibly make available. Twenty amateurs took part. During this emergency all played an important part in providing the public with some means of information, critical to its particular needs. — K00AL, SEC, Nebraska.

The West Coast Amateur Radio Service (WB6IZF, publicity chairman) reports the following recent incidents of public service communication:

*Peb. 16*, direct relay communication between a tanker whose commercial frequency was being



Orange County AREC set up this v.h.f. link at Orange County (Calif.) Heart Fund Drive headquarters in March (see writeup). Shown with the Queen and Prince of Hearts are (l. to r.) SEC WA6ROF, Orange County EC WB6CQR, W6WRJ and WB6QAK.

jammed by an unidentified station, and its home office. W7ACF and WA6BBG were the principals.

*Mar. 6,* direct relay communications between OA4ZD and a doctor via W6USA, initiated at the request of WB6GYQ and assisted by W6BOL, WB6INQ and WB6HZZ.

*Mar. 8,* a family death message from a mother to her son in Hawaii, requested by WA6TYR and executed via KH6PQ, with WB6DBS assisting.

*Mar. 13,* communication on behalf of a father concerned about his hospitalized son in Ecuador. W6JNG called in the request and contact was made via HC2SF, with the assistance of the YL International SSB System, the International Missionary Radio Net and four other amateurs.

*Mar. 19,* medical information for an ill person in remote Arizona, requested by W7JTC, provided by WA6VOR with assistance from WB6INO, WB6YFT and WA7GLW/6.

*Mar. 23,* WA6YAY/MM on a yacht off Baja California needed Coast Guard contact for advice on repair of "frozen" steering apparatus. Communications were provided by W6JFM and WA7GLW.

*Mar. 24,* problem involving evacuation of missionaries from Laos, communications requested by WB6RPK, handled by WA6WHP, WA6YMG and W6MP.

In addition, communications regarding eight unreported highway accidents were handled on 7255 kc. between Mar. 6 and April 4. Several involved injuries requiring ambulances, long skip sometimes requiring distant relay stations. A total of 37 amateurs were involved.

On April 4, the Louisville (Ky.) Red Cross requested K4YZU to communicate between their Louisville station and a disaster team being dispatched to Russellville, isolated by flash floods. Through WA4AGH and the Kentucky Traffic Net, WA4RTI/mobile, accompanied by WA4SWV and WB4CFH, left for the scene at about 1745. Information on routing around flood waters was obtained from state police and relayed via KTN. At 1845, W4OYI/mobile accompanied by K4UDZ was dispatched, followed immediately by W4YOY/mobile, with W4MMY and WB4AOH bringing along additional gear and emergency antennas. However, on arrival WA4RTI was advised that telephone service

had been restored and the alert was cancelled. Nice try anyway, gang. — W4OYI, SEC Kentucky.

Nineteen Orange County, Calif., amateurs took part in communications connected with a Heart Fund Drive on Mar. 3. Four dispatching stations and eleven mobile units of the Orange Co. AREC took part, among them SCM W6DEY and SEC WA6ROF. The county was divided into 11 sectors, one mobile in each sector. A v.h.f. link was set up between Fund Drive Headquarters and EC WB6CQR, who then retransmitted to the mobiles on 2 or 80 meters. Said one of the drive officials: "It was the smoothest operation I have ever seen . . . they saved the Heart Association days of work by their outstanding organization and handling of the situation." — WB6CQR, EC Orange County, Calif.

Seventeen San Gabriel Valley (Calif.) AREC operators were used to provide communications for a parade in La Puente, March 16. There were 12 mobiles and a portable base station, all on 146.82 Mc. The AREC provided line-up information for the judges, aided in forming the parade and even helped locate some lost dignitaries. — WA6JXG, Acting EC, East San Gabriel Valley, Calif.

Forty-one SEC reports hit us for February activities, representing 15,377 AREC members, one less than a year ago (which was 8 fewer than Feb. 1966) and about 1800 fewer AREC members. Sections checking in: Alta., Ala., Ark., Me., Nebr., Nev., Utah, S. Tex., Conn., Mont., E. Fla., Mo., Ky., Que., W. Fla., Ill., N. C., S.N.J., Ind., N.H., Orange, Wash., Tenn., W. Va., San F., La., Okla., N.N.J., Va., Mich., S. Dak., Colo., SCV, Kans., Mar., NYC-LI, W. Pa., Del., Ohio, B.C., Ga.

### National Traffic System

While we sporadically toil away at getting the SET reports in order so that we can make some kind of an analysis and writeup of them, we ponder the future of this annual activity. At first SET was an AREC exercise set up mostly for the benefit of the Red Cross, and the ARC was so prominent in it that some called it the "Annual Red Cross Test." While Red Cross participation has remained a definite part of the SET and will undoubtedly continue to do so, during the early fifties civil defense participation increased manyfold. After the formation of ARPSC about five years ago, NTS was brought into the picture officially as the "long lines" division, and this part of the picture has received considerable attention ever since.

Traditionally, the SET has been held in October, usually the second weekend. Complaints that this conflicted with all kinds of other activities (football, baseball, Canadian Thanksgiving, contests, hurricane season, etc.) became so widespread that in 1967 we changed the date to the last weekend in January, 1968. Thus, the 1967 SET was held in 1968. The sorting and tabulation of returns is not yet at the stage which will permit comparisons with previous years, but if the complaints about October were valid, they should show a vast increase over the 1966 SET — that is, unless the October complaints are made insignificant by comparison with January complaints yet to be received.

Just as a wild guess, based on size of report piles, etc., we would say that the January SET will show an improvement (or anyway an increase) in NTS participation, but a decrease in AREC participation — because NTS participation is mainly on an indoor basis, while AREC participation can have a

pronounced outdoor flavor, and outdoors in some parts of the country in January can be pretty rugged.

Now along comes our Poll Survey with a definite indication that a "surprise" or unannounced SET is desired by a majority; quite a substantial majority, too. How do we implement this?

NTS area staffs and other NTS groups, in their get-togethers this summer, might well give some serious consideration to this matter, and let us have your ideas. According to the present procedures, any local SET exercise may be counted as the annual SET if it is held within a month either before or after the official date. But of course, with NTS it doesn't work out that way, because NTS is too closely-knit to be able to function if nets act unilaterally or independently. Is the answer, perhaps, regional NTS activation on different weekends? Emergencies are usually not more widespread than regional anyway.

Would it be complying with the "unannounced" aspect of the SET to let them be conducted at different times in different parts of the country? Perhaps it is wrong and unrealistic to try to set up a nationwide emergency activity. How about regional activities, both for AREC and NTS, that area nets and TCC can handle in stride?

Just some preliminary thinking on paper. We have a lot of work to do on SET preparation, best we spend at least a part of this summer thinking about it, so we can have something ready to go during the fall and winter. The 1968 SET is tentatively scheduled for Jan. 25-26, 1969, but this is just to reserve a spot on the activities calendar. — W1NJM.

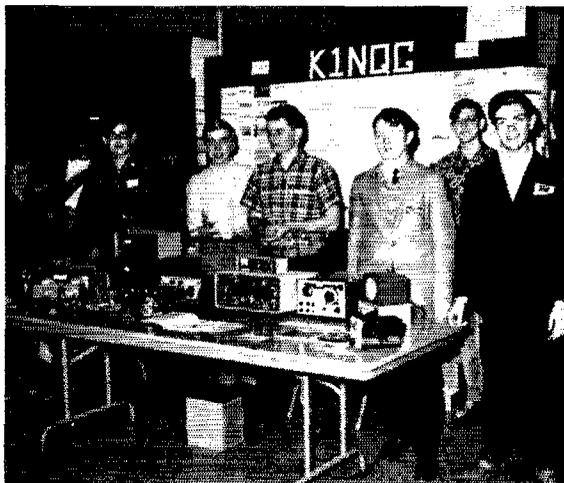
#### March reports:

| Net              | Sessions         | Traffic | Rate  | Average | Representation (%) |
|------------------|------------------|---------|-------|---------|--------------------|
| EAN.....         | 31               | 1808    | 1.271 | 58.3    | 37.8               |
| CAN.....         | 31               | 1152    | 1.055 | 37.1    | 100.0              |
| PAN.....         | 31               | 1311    | 1.008 | 42.3    | 100.0              |
| 1RN.....         | 62               | 431     | .323  | 7.0     | 92.9               |
| 2RN.....         | 62               | 708     | .669  | 11.4    | 96.8               |
| 3RN.....         | 62               | 687     | .503  | 11.1    | 98.4               |
| 4RN.....         | 57               | 505     | .402  | 8.9     | 86.0               |
| RN5.....         | 62               | 530     | .313  | 8.5     | 96.0               |
| RN6.....         | 62               | 1219    | .741  | 19.6    | 100.0              |
| RN7.....         | 58               | 446     | .334  | 7.7     | 47.8               |
| 8RN.....         | 62               | 526     | .353  | 8.5     | 99.5               |
| 9RN.....         | 62               | 525     | .460  | 8.5     | 95.2               |
| TEN.....         | 59               | 472     | .570  | 7.6     | 81.8               |
| ECN.....         | 62               | 160     | .251  | 2.6     | 74.7               |
| TWN.....         | 53               | 257     | .218  | 4.9     | 66.8               |
| Sec./Local.....  | 2083             | 11143   |       | 5.6     |                    |
| TCC Eastern..... | 124 <sup>2</sup> | 813     |       |         |                    |
| TCC Central..... | 93 <sup>2</sup>  | 644     |       |         |                    |
| TCC Pacific..... | 124 <sup>2</sup> | 902     |       |         |                    |
| Summary.....     | 2898             | 25039   | EAN   | 7.8     | —                  |
| Record.....      | 3031             | 33737   | 1.420 | 14.2    | —                  |

<sup>1</sup> Section and local nets reporting (66): QAIN (Mich); SWRN, BEN, WSN, WBSN (Wis.); MDDS (Md.-Del.-D.C.); RPQ (Que.); AEPN (Md.); TN, Tenn. SSB; Mo. Teen, ANN; NNTN (Tex.); KTN, KYN, Ky. Rebel, Falls City; EPA, PTTN, PPN, EPA EP&T, EPA VHF (Pa.); GN, W. Fla. Phone, Volusia Emerg., FMTN (Fla.); NJN, NJEPTN (N.J.); AENT, AENO, AENAI, AENH, AEND (Ala.); VTNHN (Vt.-N.H.); BSN (Ore.); Iowa 75; NYS (N.Y.); NCN, CNL, NCSSB, THEN (N.C.); Passaic Valley T & E (N.J.); GSN (Ga.); VN, VSN, VSB (Va.); LAN (La.); CPN (Conn.); OLZ, SSZ (Okla.); RISP (R.I.); PTN (Me.); MSN, MJN (Main.); WMPN, WMN (Mass.); OZK (Ark.); ILN (Ill.); QKS (Kans.); GBN (Ont.); E. Tenn. Phone; QIN (Ind.); Alberta PS; Ohio SSB; BUN (Utah); QFN (Fla.).

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

K2KIR feels slighted that we didn't mention his five consecutive years as Wed. night NCS on EAN, without a miss; so we're mentioning it. WA9RAK replaces K4BSS



These members of the Fidelity Amateur Radio Club of Cranston, R.I., set up this exhibit station at the Midland Mall Shopping Center, Warwick, R.I., during the Christmas season last year. Left to right behind the counter are WATHUM, WA1FGB, WA1BOP, WA1EEJ, WA1GND and WN1HTH.

as Sat. NCS on CAN. W7BQ and W7EM are new calls for K7JHA and W7LQE respectively. PAN certifies to W7AXT, WA7BDD and WA7BYP. Green Manager W2FR has a long list of projects to improve 2RN. K3MVO says 3RN just about held its own in March. W4SLJ issued 4RN certificates to K4KNP, K4YSN, WA4CFN and WA4ZLK. RN5 switched to 7095 kc. for its early session. RN6 certifies to K6KOL and WA6SCE. W6FCP is now W6SE. W6GYH can handle traffic for Mexico and "legal" Central and South American countries; route it via RN6. RN7 traffic down, continuing the downturn since December's probable all-time high. W9QLW, 9RN manager, asks "Does anybody know what time it is?" W0LGG reports three net reports missing, mostly because she's not on the net to receive them. ECN moved its early session to 7040 kc. and time to 23:45Z; late session will remain on 3540 kc. for the time being. K7NHL reports that TWN's second session is working well, but sections in the region find the hour too late for sessions after TWN.

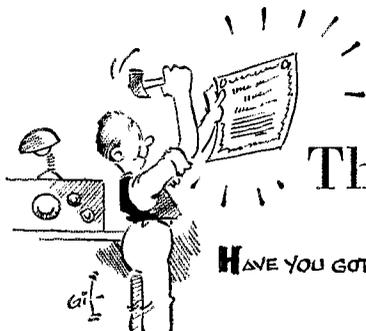
Two Area Staff meetings are scheduled to take place the last weekend in April, will be history by the time you read this. The PAS is meeting in Paramount, Calif., to resolve some Pacific Area internal difficulties, and EAS is holding a regular meeting in Syracuse, N. Y., to discuss all kinds of Eastern Area problems. Results, if any of note, later.

Transcontinental Corps. W3EML notes the following who have received TCC-Eastern certificates six years simultaneously since he has been director: W1NJM, WA2BLV, K3MVO, W8CHT; five years in a row for W4DVT (now W4UQ). Other TCC certificates to W1s BJG, FFW, EDB, W2s FR, GKZ, K2RYH, WA2UWA, W2s DYE, RKK, W3s EML, NEM, W4s NLC, ZM, W8UM/WB2FIT, W8UM/K8QKY, K8KMQ, WA8s OCG, ZBC. Central Area TCC functioning well under its new manager, W0LCX, who reports W0JUK and K4BSS will be absent for a while; TCC-C certificates were issued to WB4AIN, W9DND, W0INH and WA0DOJ. TCC-P reports nine missed functions in March, mostly through no fault of the PAN functionaries.

#### March reports:

| Area    | Functions | % Successful | Traffic | Out-of-Net Traffic |
|---------|-----------|--------------|---------|--------------------|
| Eastern | 121       | 95.1         | 2199    | 813                |
| Central | 93        | 95.6         | 1304    | 644                |
| Pacific | 121       | 92.7         | 1809    | 902                |
| Summary | 341       | 94.4         | 5312    | 2359               |

(Continued on page 142)



# Those Higher-Class License Examinations

HAVE YOU GOT YOURS?

In Six Parts — Part IV

## Radiotelephony

**T**HE various methods of transmitting radiotelephone signals constitute the subject of this section of our higher-class license examination series. The FCC sample questions for the Advanced and Extra Class licenses cover all three of the basic systems used by amateurs — amplitude modulation, frequency modulation, and single sideband. The sample questions show that the actual examinations are aimed at bringing out the applicant's knowledge of both principles and practice — how the several modulating schemes work, how to adjust them for optimum performance, and how to check the operation to be sure that it does meet modern standards.

The study material for this part of the series is to be found in *The Radio Amateur's Handbook*, and supplementary information can be obtained from a few other League publications. The specific references are:

A.m. phone principles and adjustment: *Handbook*, pages 237-248 in the 1968 edition, pages 259-270 in the 1967 edition; *Understanding Amateur Radio*, pages 80-90.

A.m. phone checking and monitoring: *Handbook* pages 294-298 (1968) or 311-318 (1967); *U.A.R.*, pages 251-255.

Frequency and phase modulation, principles and methods: *Handbook* pages 248-252 (1968) or 270-274 (1967); *U.A.R.* pages 92-94.

F.m. and p.m. checking: *Handbook* pages 298-300 (1968) or 319-320 (1967).

Single-sideband principles and methods: *Handbook* pages 253-260 (1968) or 275-282 (1967); *U.A.R.* pages 89-92.

S.s.b. testing and adjustment: *Handbook* pages 262-266 and 300-303 (1968) or 320-325 (1967); *Single Sideband for the Radio Amateur* pages 191-224.

The FCC sample questions which follow have been arranged according to content. The questions come from both the Advanced and Extra Class study guides, identified respectively by (A) or (E) preceding the question.

Continuing the practice in the earlier sections of this series, there is a group of multiple-choice questions of our own at the end of this installment.

### FCC Sample Questions

**(A) How is the power output of a 100%-modulated a.m. signal related to the carrier power?**

The output is higher than the carrier output alone when the signal is amplitude-modulated, because of the additional power in the sidebands. With single-tone 100% modulation the power output increases 50%. With voice modulation the rise in power is smaller because voice waveforms contain less average power than a sinusoidal tone having the same peak amplitude. Depending on the modulation waveform, the increase in power output may be of the order of 10% to 25%, with voice modulation.

**(E) What are sideband frequencies? During 100% sinusoidal amplitude modulation, what percentage of the average power is in the sidebands? How is sideband power related to percentage of modulation?**

Sideband frequencies are the sum and difference products of the modulation frequencies and the carrier frequency. That is, they are equal to the

carrier frequency plus the modulation frequencies, and to the carrier frequency minus the modulation frequencies. Thus sideband frequencies are equally spaced above and below the carrier frequency. The intelligence in a modulated signal is conveyed by the sidebands, not the carrier.

During 100% sinusoidal modulation one-third of the average power is in the sidebands. Sideband power is proportional to the square of the modulation percentage. Mathematically,

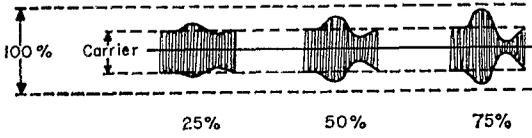
$$P_s = \frac{P_c}{2} \times m^2$$

where  $P_s$  is the sideband power,  $P_c$  is the carrier power, and  $m$  is the modulation percentage expressed as a decimal. This equation assumes linear modulation, which in turn means that  $m$  cannot exceed 1 in conventional amplitude modulation, and also assumes that the modulation is sinusoidal. For other waveforms such as voice, the average sideband power also varies as the square of the modulation percentage, for a given

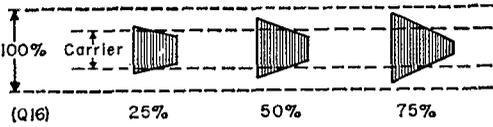
waveform, but is not equal to  $P_c/2$  at 100% modulation.

(A) What do oscilloscope patterns showing 25%, 50% and 75% modulated signals without distortion look like?

Patterns for sinusoidal modulation are shown below. For other waveforms the modulation peaks would reach the same heights as the sinusoidal peaks shown, at the same modulation percentage.



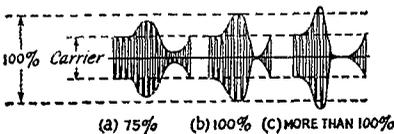
SINUSOIDAL MODULATION ENVELOPE



TRAPEZOIDAL PATTERNS

(E) What do the modulation envelopes of amplitude modulated waves with 75%, 100%, and greater than 100% modulation look like?

The patterns for sinusoidal single-tone modulation are shown below. For other waveforms, the modulation peaks will have the same heights at 75% and 100% modulation as the sinusoidal peaks shown. Overmodulation with any type of waveform is accompanied by the complete absence of output during part of the modulation cycle as shown by the right hand (over 100%) pattern. This gap indicates severe distortion and "splatter" (sidebands appearing outside the normal communication channel).



(a) 75% (b) 100% (c) MORE THAN 100%

(E) What is a grid-bias modulated amplifier? Should the source of fixed bias have a high or low internal resistance? Explain.

In grid-bias modulation, the modulating signal is superimposed on the d.c. grid bias of a Class C amplifier, thereby changing the instantaneous bias at the modulation-frequency rate and causing corresponding variations in the r.f. output voltage. The Class C amplifier's rectified grid current flows through the internal resistance of the bias supply, causing a voltage drop which adds to the operating grid bias. Since the grid current varies nonlinearly over the modulation cycle, this varying voltage drop causes distortion. To minimize it, the bias supply must have low internal resistance.

(E) What radiotelephone transmitter operating deficiencies may be indicated by a decreasing antenna r.f. current during modulation of the final r.f. amplifier?

With plate modulation, downward deflection of the antenna r.f. ammeter might indicate insufficient r.f. excitation or improper grid-bias voltage in the modulated r.f. stage, inadequate cathode emission in the tubes of the modulated r.f. amplifier, poor voltage regulation of a power supply common to both modulator and r.f. amplifier, insufficient modulator power, or a poor match between the modulator plates and the modulating impedance of the r.f. amplifier.

With grid-bias modulation downward modulation can be caused by adjusting the r.f. amplifier's output circuit for too high a value of plate efficiency, or the grid bias may be insufficient for the amplitude of the r.f. excitation voltage applied to the tube. With screen modulation, it can be caused by setting the d.c. screen voltage too high, insufficient r.f. drive and grid bias, improper plate loading, or inadequate modulator power.

(E) What may be the cause of a decrease in antenna current during modulation of a Class B r.f. amplifier?

The Class B amplifier should be used only as a linear amplifier and should not be modulated directly. If modulated directly, the relationship between r.f. output voltage and modulating voltage will not be very linear, and downward modulation is likely. A Class C stage should be used.

In linear amplification of an amplitude-modulated signal the r.f. output with no modulation represents carrier power alone. Assuming that the amplifier is properly biased (i.e., not biased beyond cutoff), a decrease in antenna current with modulation indicates that the plate loading is too light and the plate efficiency at the carrier level is too high.

A Class B stage amplifying a suppressed-carrier s.s.b. signal has no output until modulation takes place. The antenna current cannot decrease with modulation in such case.

(A) Define frequency deviation in f.m. transmissions.

In f.m. transmission, frequency deviation is the change in the carrier frequency with modulation. In rating an f.m. transmitter, the "frequency deviation" is understood to mean the maximum frequency shift that occurs under full modulation.

The instantaneous frequency deviation — i.e., the change of carrier frequency at some instant in the modulation-frequency cycle — is proportional to the amplitude of the modulating signal at that instant. The actual value of frequency shift for a given modulating amplitude is a matter of choice in transmitter design.

(E) Define the deviation ratio in a frequency modulated signal.

The deviation ratio in f.m. transmission is the ratio of the change in carrier frequency (deviation), with modulation, to the frequency of the modulating signal which caused the deviation. In equation form,

$$\text{Deviation ratio} = \frac{\Delta f}{f_m}$$

where  $\Delta f$  is the carrier-frequency deviation and  $f_m$  is the modulating frequency.

For a given value of deviation,  $\Delta f$ , the deviation ratio varies inversely with the modulating frequency, as shown by the above equation. In f.m. transmitters the term "deviation ratio" is understood to mean the *maximum* frequency deviation (determined by the transmitter design) that can be obtained without distortion, divided by the *highest* modulating frequency. In frequency modulation the maximum deviation is the same for all modulating frequencies.

**(E) What type of signal will be produced when the output of a reactance modulator is coupled to a Hartley oscillator and multiplied in frequency?**

The signal will be frequency-modulated. If the frequency deviation caused by the reactance tube is small compared with the unmodulated oscillator frequency (i.e., of the order of 1 per cent or less) the relationship between oscillator frequency and amplitude of the audio signal impressed on the modulator tube's grid will be substantially linear, a requirement for satisfactory modulation. Larger deviations can be secured by subsequent frequency multiplication which increases the frequency deviation in direct proportion to the order of multiplication; e.g., if the frequency is multiplied by 8, the frequency deviation also will be multiplied by 8.

**(E) How are reactance tubes used?**

Reactance tube modulators are used to vary the frequency of an oscillator circuit at a voice-frequency rate and thus produce a frequency-modulated signal.

The tube is connected in shunt with the oscillator tank circuit. Depending on the type of modulator circuit, the tube simulates either inductance or capacitance, the instantaneous value of which varies with the varying amplitude of the voice signal. The circuit does this by using a sample of the r.f. tank voltage to generate an amplified voltage shifted in phase by 90 degrees.

A reactance tube also can be used to produce phase modulation of the carrier. For this purpose it may be applied either to an oscillator or an amplifier, and the reactance variations are used to change the phase of the carrier rather than the frequency directly. The difference between phase and frequency modulation is that in phase modulation the deviation ratio is constant for all modulating frequencies, while in frequency modulation it varies inversely with the modulating frequency.

**(E) How may a limiter be employed in an f.m. receiver?**

A limiter is used to eliminate any amplitude variations in the r.f. (or i.f.) signal before it reaches the f.m. detector.

It also maintains a constant signal level at the input to the detector (except for very weak signals which cannot be amplified up to the limiting level) and thus provides automatic gain control action.

Since amplitude variations are not used in f.m. reception, none of the various r.f. and i.f. stages preceding the detector need operate linearly with respect to amplitude. Thus limiting can be allowed to occur in any amplifier stage (e.g., by overdriving) before detection.

**(A) What methods are most commonly used to generate single sideband signals? Draw a block diagram of the filter method showing all essential stages. How can a low frequency s.s.b. signal be converted to the desired transmitting frequency?**

The two most common methods are known as the "filter" method and the "phasing" method.

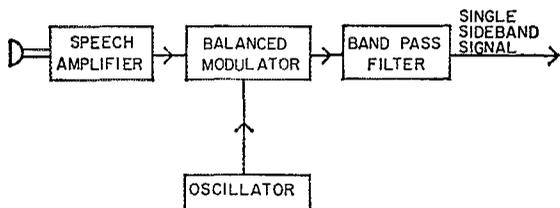
The essential stages for generating a single-sideband signal by the filter method are shown in the accompanying block diagram. The oscillator supplies a "carrier" frequency to the balanced modulator, where the audio and r.f. signals are combined to produce an amplitude-modulated signal. Because of the balancing arrangement used in the modulator the carrier frequency is eliminated in its output, leaving only the two sidebands. These are then applied to a band-pass filter which is sufficiently selective to pass one sideband while suppressing (or greatly attenuating) the other sideband.

In transmitters using the filter method the s.s.b. signal is generated at a fixed frequency since it would be impracticable to supply individual sideband filters for all useful output frequencies. The fixed s.s.b. frequency is converted, by conventional mixing circuits, to the desired final output frequency and then further amplified by linear amplifiers.

The phasing system is based on the phase relationships between the carrier and sidebands. The audio signal is split into two components, identical except for a phase difference of 90 degrees. The r.f. oscillator energy is likewise split into two separate components having a 90-degree phase difference. One r.f. and one audio component are combined in a balanced modulator which suppresses the r.f. carrier and produces a double-sideband output. Similarly, the remaining r.f. and audio components are combined in a second balanced modulator. The relative r.f. phases of the two double-sideband suppressed-carrier signals so produced are such that when the outputs of the two modulators are combined one pair of sidebands is cancelled out and the other two add together. For example, the two lower sidebands may cancel and the resultant output will then be the sum of the two upper sidebands. The cancellation and addition may be reversed by reversing the phase of either the r.f. or audio signal applied to one balanced modulator.

With the phasing system the s.s.b. signal can be generated directly on any desired frequency,

and frequency conversion following the s.s.b.-generating circuits is not required.



**(E) What useful functions does a balanced modulator perform in a radio transmitter?**

A balanced modulator is used to perform simultaneously the functions of modulation and carrier suppression or reduction in radiotelephone transmitters. By suitable adjustment, a high degree of carrier suppression can be obtained for suppressed-carrier s.s.b. and suppressed-carrier double-sideband transmission. In addition, provision can be made in the modulator circuit for adjustment to allow a desired amount of carrier to accompany the sidebands in the output of the modulator.

**(E) What effect will extending the low-frequency response to a signal have on the design of an s.s.b. transmitter?**

The low-frequency modulation in a single-sideband signal depends on the frequency relationship between the suppressed carrier and the sideband-filter passband. As sideband filters usually are steep-sided — that is, the attenuation increases rapidly beyond the edges of the passband — modulation frequencies lying between the suppressed-carrier frequency and the near edge of the filter passband are greatly attenuated. To increase low-frequency response it is necessary to move the suppressed-carrier frequency closer to the filter passband. This choice of frequency is a minor design matter, but if the suppressed-carrier frequency is so close to the filter passband that the attenuation is small, carrier suppression in the balanced modulator becomes more critical because little or no carrier-frequency attenuation is added by the filter.

**(A) The ratio of the peak envelope power to the average power in an s.s.b. signal is primarily dependent on what?**

The ratio of peak-envelope to average power in an s.s.b. signal is primarily dependent on the modulation waveform. With single-tone modulation, the peak-envelope and average power are the same. With a two-tone (sinusoidal tones) test signal, the peak-envelope power is 2 times the average power. In voice communication, the ratio is dependent on characteristics of the individual operator's voice; the ratio is generally at least 2 to 1, and may be considerably larger.

**(A) How can s.s.b. signals be amplified with little or no distortion?**

Single sideband signals can be amplified by the use of a properly-adjusted linear amplifier; that

is, an amplifier which will reproduce, without distortion, in its output circuit the modulation envelope of a modulated signal applied to its grid or input circuit.

Linear amplifiers may be operated Class A, AB, or B with minimal distortion if the operating conditions are properly chosen, but not Class C.

**(A) What happens to even-order products in r.f. linear amplifiers?**

Odd- and even-order products in the output of a linear amplifier occur because of mixing ("intermodulation") of r.f. harmonics in the plate current of the amplifier, when two or more radio frequencies are being amplified simultaneously. The mixing or intermodulation gives rise to sum and difference frequencies as in any modulation process. The difference between an odd harmonic of one such fundamental frequency and an even harmonic of the other can result in a beat frequency close to the fundamental frequencies and thus add a spurious component to the output of the amplifier. Combinations of such odd and even harmonics result in the "odd-order" products.

"Even-order" products are generated only by even-numbered harmonics, in which case the difference frequency is at least twice the fundamental. Even-order products are readily suppressed by the amplifier's tuned tank circuit and therefore do not appear in the output.

**(A) How does the peak-envelope power input of an amplifier used for c.w. compare to the p.e.p. of an s.s.b. amplifier when using the maximum legal d.c. power?**

In c.w. transmission the peak-envelope power input is the d.c. input to the final amplifier as read by the plate voltmeter and plate ammeter when the key is closed. It is therefore the same as the average key-down d.c. input. In s.s.b. transmission the peak-envelope input occurs only at the peak of the modulation waveform and cannot be measured by ordinary d.c. instruments, which read only average, not peak, voltage and current. The ratio of s.s.b. peak envelope power to average d.c. power during the modulation cycle that produced the peak depends on the voice waveform. As a rule of thumb, an average d.c. input of 1000 watts on s.s.b. is assumed to be producing a peak-envelope input of approximately 2000 watts, with linear amplifiers operating Class AB. On this assumption, the p.e.p. of an s.s.b. amplifier is twice the p.e.p. of the c.w. amplifier. This further assumes that the amplifier is capable of producing the peak-envelope output with good linearity. The actual ratio of p.e.p. to d.c. input depends on the operating conditions of the amplifier as well as the voice waveform, and can only be determined by measurement in each case.

**(A) How should a linear amplifier be adjusted for linear operation?**

One method uses an oscilloscope to display the modulated r.f. pattern. Since the worst non-linearity usually is at the peak of the modulation envelope, where overdriving is likely to occur, an indication of proper adjustment can be obtained by observing the modulation-envelope peaks with voice input. A 60-cycle or low-frequency linear horizontal sweep can be used for securing a useful pattern. The plate loading, grid bias, and r.f. driving voltage should be adjusted with a view to obtaining the largest r.f. output consistent with modulation-envelope peaks that do not appear flat-topped or that reach a definite limiting amplitude with increasing voice input. In general, the amplifier will be most linear with rather heavy plate loading and a value of negative grid bias that results in enough plate current to cause the "resting" (no-signal) plate dissipation to approach the rated plate dissipation of the tube or tubes used in the amplifier.

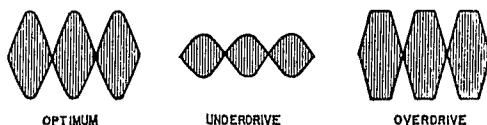
A second method, also using the oscilloscope for displaying the modulated r.f. signal, employs two sinusoidal tones of different frequencies that fall within the transmitter's passband. The "two-tone" modulation pattern has an envelope that resembles the output of a full-wave rectifier (a succession of half sine waves) but back-to-back vertically. The amplifier adjustment is made to preserve the half-sinusoidal appearance of the pattern to the fullest possible extent. The effect of amplifier grid bias is particularly visible in this pattern since it influences the shape of the envelope near the "crossover" point. Flattening of the envelope peaks is affected by plate loading, grid bias and drive voltage as in the case of voice input.

If an oscilloscope is not available a reasonable approximation of proper adjustment may be achieved by applying a single-tone signal (inserted carrier, for example) to the amplifier and adjusting the plate loading, grid bias, and drive signal level for maximum output, then reducing the drive gradually until the r.f. output just starts to drop off. The process usually must be repeated several times in order to reach the optimum condition; i.e., when the r.f. output is as high as possible (consistent with permissible plate input to the amplifier tube) at the point where the amplifier output decreases noticeably when the drive level is reduced slightly. In operation, the peak drive must not exceed the level at which this occurs.

**(E) How can the two-tone test output of a linear amplifier be used to tell if a transmitter is working properly? Show scope patterns for optimum, underdrive, and overdrive conditions.**

Best use of the two-tone test is made when the r.f. output is displayed on an oscilloscope. The modulation-envelope pattern can be used to determine the value of driving voltage (or audio input level) at which flattening of the peaks begins to occur. Some indication of linearity in other respects can be obtained by comparing the appearance of the pattern with a half cycle

of pure sine wave, but this requires judgment on the operator's part and is not wholly dependable since there may be some distortion in the audio system. Wave-envelope patterns for optimum, under- and overdrive are shown in the accompanying figure. In the optimum pattern it is assumed that a further increase in drive would cause the tips of the pattern to begin to flatten, as in the overdrive pattern (but less extreme flattening). Note that the envelope shape is the same (half sine waves) for both optimum and underdrive, except for amplitude.



If the "how-tie" or double-triangle pattern can be displayed (this usually can be done only with phasing-type transmitters) considerably better information can be secured from the two-tone test. Curvature of the sloping sides of the pattern indicates distortion. The transmitter should be adjusted for the straightest sides possible. Flattening on peaks is readily evident in bending of the triangle sides at the maximum amplitude parts of the pattern.

**(E) In what section of a properly operating s.s.b. transmitting system is distortion most likely to originate?**

In a properly operating s.s.b. transmitter, distortion is more likely to occur in the final amplifier than in earlier stages. Nonlinear distortion in the amplifier tube increases when the tube is operated at or near its maximum power capacity. The final amplifier stage is generally operated in such a way as to obtain as much power as possible, while earlier stages in the transmitter usually are operated at much less than maximum capability, hence cause relatively little distortion. Also, if the final amplifier is operating Class AB<sub>2</sub>, its grid circuit represents a widely-varying load resistance for the driver stage, and if the circuit is not adequately "swamped" so the load is essentially constant at all modulation levels the signal-voltage regulation will be poor, causing distortion. Swamping requires absorbing a large proportion (often 90% or more) of the driving power in a fixed load, external to the tube, having an r.f. resistance that is low compared to the lowest value of resistance represented by the tube's grid circuit during amplification of a modulated signal.

**(E) An oscilloscope is used to study the relationship between the input and output of an amplifier produced by a voice signal. How would the scope pattern display a linear relationship?**

The usual method of connecting the scope for checking an audio-frequency amplifier would be to connect the scope's vertical-amplifier input

terminals in parallel with the output terminals of the amplifier under test and to connect the horizontal-amplifier input terminals in parallel with the input terminals of the amplifier being tested. (The scope amplifiers can be interchanged, if necessary, in order to get sufficient gain for a pattern of reasonable size; the horizontal amplifier usually has less gain than the vertical amplifier. Interchanging the amplifiers will rotate the pattern 90 degrees, but the pattern gives the same information either way.) The gains of the vertical and horizontal scope amplifiers are then adjusted so that both signals give about the same deflection. If the amplifier under test is perfectly linear, the voice pattern will be a sloping straight line of varying length, provided the phase relationship between input and output is either 0 or 180 degrees. With intermediate phase relationships the pattern will be a series of concentric smooth ellipses, varying in size with voice amplitude, if there is no distortion. Nonlinearity will be indicated by a bend at some point in the line or irregularity in the ellipses. (Note: The oscilloscope amplifiers should be checked for linearity and phase shift before this test is made. The check may be done by connecting the input terminals in parallel and applying a single tone.)

A similar check may be made of a radio-frequency amplifier by sampling the input and output r.f. voltages at the grid and plate tank circuits, respectively, through links loosely coupled to the tanks. With most oscilloscopes available to amateurs the r.f. signals must be applied directly to the deflection plates, since the horizontal and vertical amplifiers will not function at radio frequencies. Alternatively, the two r.f. voltages may be rectified to produce audio signals which can be compared as described above.

#### Examination-Form Questions

**Q1. An f.m. transmitter has a maximum audio modulation frequency of 3500 c.p.s. and a deviation ratio of 2 to 1. What is the frequency deviation at full modulation when a modulating frequency of 2100 c.p.s. is used?**

- A — 7000 c.p.s.
- B — 14,000 c.p.s.
- C — 3500 c.p.s.
- D — 2100 c.p.s.
- E — 4200 c.p.s.

**Q2. A Class AB linear amplifier for s.s.b. is biased for a no-signal plate current of 75 ma. When the single-tone drive and loading are adjusted for maximum output, the plate current is 300 ma. and the transmitter's relative-output indicator reads 100. The single-tone signal displayed on an oscilloscope has a height of 1 inch. With voice modulation the peaks as shown by the oscilloscope just reach the same height, but the plate current during the peak is only**

**125 ma. and the relative-output reading is only 25. What is wrong?**

- A — The plate loading is too heavy.
- B — The plate loading is too light.
- C — The audio gain is insufficient.
- D — The amplifier grid bias is too great.
- E — The operation is normal.

**Q3. A plate modulator for a Class-C amplifier has a sine-wave output of 60 watts with acceptably-low distortion. If the d.c. input to the Class C stage is 180 watts, what is the maximum percentage of modulation that can be obtained without increased distortion?**

- A — 70.7%.
- B — 63.6%.
- C — 75.3%.
- D — 81.6%.
- E — 66.7%.

**Q4. A filter to be used in a single-sideband generator will pass all frequencies between 9000 kc. and 902.5 kc. with all frequencies outside these limits sharply attenuated. If the lower sideband is to be obtained from the generator and maximum demodulated audio frequency in the output is to be 3000 c.p.s., at what frequency should the carrier oscillator operate?**

- A — 9000 kc.
- B — 9003 kc.
- C — 9005.5 kc.
- D — 8997 kc.
- E — 8999.5 kc.

**Q5. A linear amplifier for s.s.b. is rated at a p.e.p. input of 200 watts, at which power level the plate current is 250 ma. The no-signal plate current, with the recommended grid bias, is 35 ma. If the amplifier is driven to the p.e.p. point, as shown by an oscilloscope, with voice modulation, about what current would you expect the plate meter to rise to on modulation peaks?**

- A — 200 ma.
- B — 250 ma.
- C — 50 ma.
- D — 100 ma.
- E — 175 ma.

**Q6. If an s.s.b. balanced modulator is not perfectly balanced, what is the usual result?**

- A — The signal becomes distorted.
- B — There is output in the unwanted sideband.
- C — The output contains a carrier-frequency component.
- D — The linear amplifier is overloaded.
- E — The signal cannot be demodulated satisfactorily at the receiver.

*(Answers on page 138)*

# Novice in Wonderland

or

## How the Dummy Got Its Tank Load

BY KEN POLLOCK,\* W6BRE

**T**RANSFORMER oil?" The forehead of my friendly neighborhood service station owner was creased in a deep frown as he responded to my question. After a few moments concentration, he said, "Nope, don't carry anything that even sounds like that. Why don't you try P. G. & E. (Pacific Gas & Electric)? They must have some dope on it."

This contact was one of a series of encounters caused by my (finally) reaching the step in the assembly manual of my first transmitter kit which read:

"The following equipment is necessary for alignment

- 1) A v.t.v.m. . . .
- 2) A 50 ohm non-reactive dummy load . . .
- 3) A receiver capable of receiving WWV . . ."

The v.t.v.m. and receiver were no problems, but a dummy load was not at hand. Keith Riley and the boys at the East Bay Radio Club assured me that no self-respecting amateur ever tuned up while on the air, and that a dummy antenna would serve me well long after the initial alignment of my rig, so I bought another kit. This one was easily assembled until reaching the step reading:

"Pour transformer oil into the container until it reaches about one inch from the top . . . do NOT use motor oil of any type due to its low vaporizing temperature. . . ."

The quest for transformer oil led me on a landline telephone DXpedition before it was over. P. G. & E. told me in friendly but certain terms that they marketed natural gas and unnatural electricity, not transformer oil, and referred me to an oil company with headquarters in San Francisco. I will call this firm Banded Oil Company. The scene now shifts to Banded Oil's corporate headquarters . . .

Friendly female voice answering phone: Banded Oil, good morning, may I help you, please?

*Me:* May I speak to someone in Marketing?

*FFV:* What about, sir?

*Me:* I want to find out how to get some transformer oil.

*FFV* (doubtfully): Transformer oil, sir?

*Me:* Please.

*FFV* (pause, then): I'll transfer you to our Product Information Division.

*Me:* Thanks a lot.



(Ringing sound. Then.)

Friendly male voice: Product Information Division, Dan Vitale here. Good morning, what may I do for you?

*Me:* I want to find out how to get some transformer oil.

*FMV:* Transformer oil?

*Me:* Please.

(Pause, then sound of pages being flipped in background. Muffled voice says "you ever hear of trans — aha!")

*FMV:* What you are looking for, sir, is our insulating oil. It has (reading) 'a high dielectric constant and excellent heat dissipating qualities.'

*Me:* Great, that's it. How do I get it?

*FMV:* Lemme see, here . . . guess I have to transfer you to our local refinery operation . . .

Miss De Sylva, will you have the call here transferred to the plant manager's office?

*Me:* Thanks a lot.

(Pause, sound of ringing, then a Strong Male Voice)

*SMV:* Logario here.

*Me:* Uh, Mister Logario, your Product Information Division referred me to you. I'm interested in transformer oil.

*SMV:* Fine, fine, you want the regular or the inhibited?

*Me:* Well, I'm not sure which . . . this is for a radio application.

*SMV:* Radio application, huh? I better give you to Bill Hyde, one of our petroleum applications engineers. He can give you the information you need. Hold on a minute while I get you transferred . . .

*Me:* Thanks a lot.

\* 833 Oxford, Berkeley, Cal. 94707.

(Continued on page 138)

# Happenings of the Month

## CANADIAN FEE QUADRUPLED

The Canadian Government on April 1 raised the amateur license fee from \$2.50 annually to a new rate of \$10; amendments are \$6.00 each (e.g., change of address). Needless to say, the immediate reaction of VE amateurs was one of outrage and dismay.

Early in April, high officials of the Department of Transport (DOT) met with officers of the League, the Radio Society of Ontario and Radio Amateur du Quebec, Incorporated, to discuss the issue. The amateurs were told that the change was necessary under Government policy; any reduction would require action by the Cabinet.

Accordingly, each of the three groups is filing a formal brief with the Minister of Transport; all clubs in Canada are urged to follow suit, with copy to the local Member of Parliament and to ARRL Canadian Director Noel B. Eaton, VE3CJ.

## "PINK TICKETS"

Amateur slang has caused some confusion among newer amateurs. FCC's Official Notice of Violation has been printed on white paper for years, but hams still refer to it as a "pink ticket." In any case, receipt of such a notice may be grounds for disqualification in ARRL contests. More important, the Official Notice of Violation requires an answer within ten days: failure to reply may result in revocation proceedings.

Minor technical problems spotted by FCC's monitoring stations may result in issuance of an Advisory Notice. No reply is needed, but of course the amateur should correct the discrepancy promptly.

## CLUB GEAR UNDER PRIVATE CALL

In reply to a question from a club officer, FCC says an individual may sign his own call from a club station with proper approval. The pertinent portion of the letter reads:

"An amateur club station may be operated as portable under the license and call sign of an individual provided the club station trustee, or members delegated by the trustee to act for him, authorize such use of the station equipment." — James B. Barr, Chief, Safety and Special Radio Services Bureau

Boy Scout Executive Samuel King, center, receives radio equipment from Francisco Corneiro, Attorney General of the U.S. Virgin Islands while Governor Ralph M. Paiewonsky and Government Secretary Cyril King (far right) looks on. The equipment will be used under the call KV4FL to train Scouts. (Photo by KV4EY)

## EXPANSION OF 160 METERS

The Federal Communications Commission, after extensive consultation with the Interdepartment Radio Advisory Committee (IRAC), the U. S. Coast Guard and ARRL, has revised amateur frequency assignments in the 1.8–2.0 Mc. band to accommodate an expansion of the Loran-A system of radionavigation.

Incredible as it may seem, the changes for the most part also constitute an expansion of amateur use of the band, too. For additional background on why this is possible, see "160 Meter Changes Imminent," page 85, May 1968 *QST*.

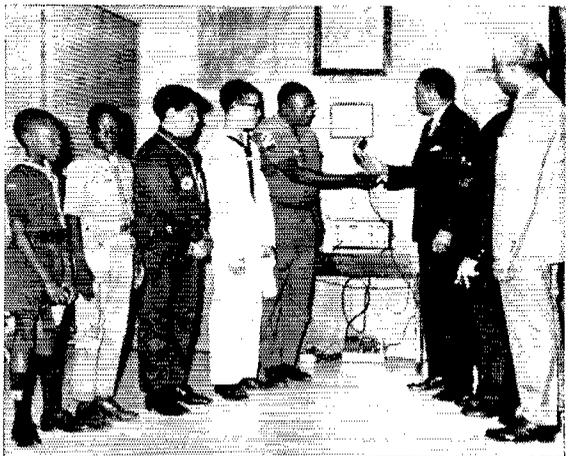
Effective July 1, therefore, Section 97.61 (b) is amended to read as follows:

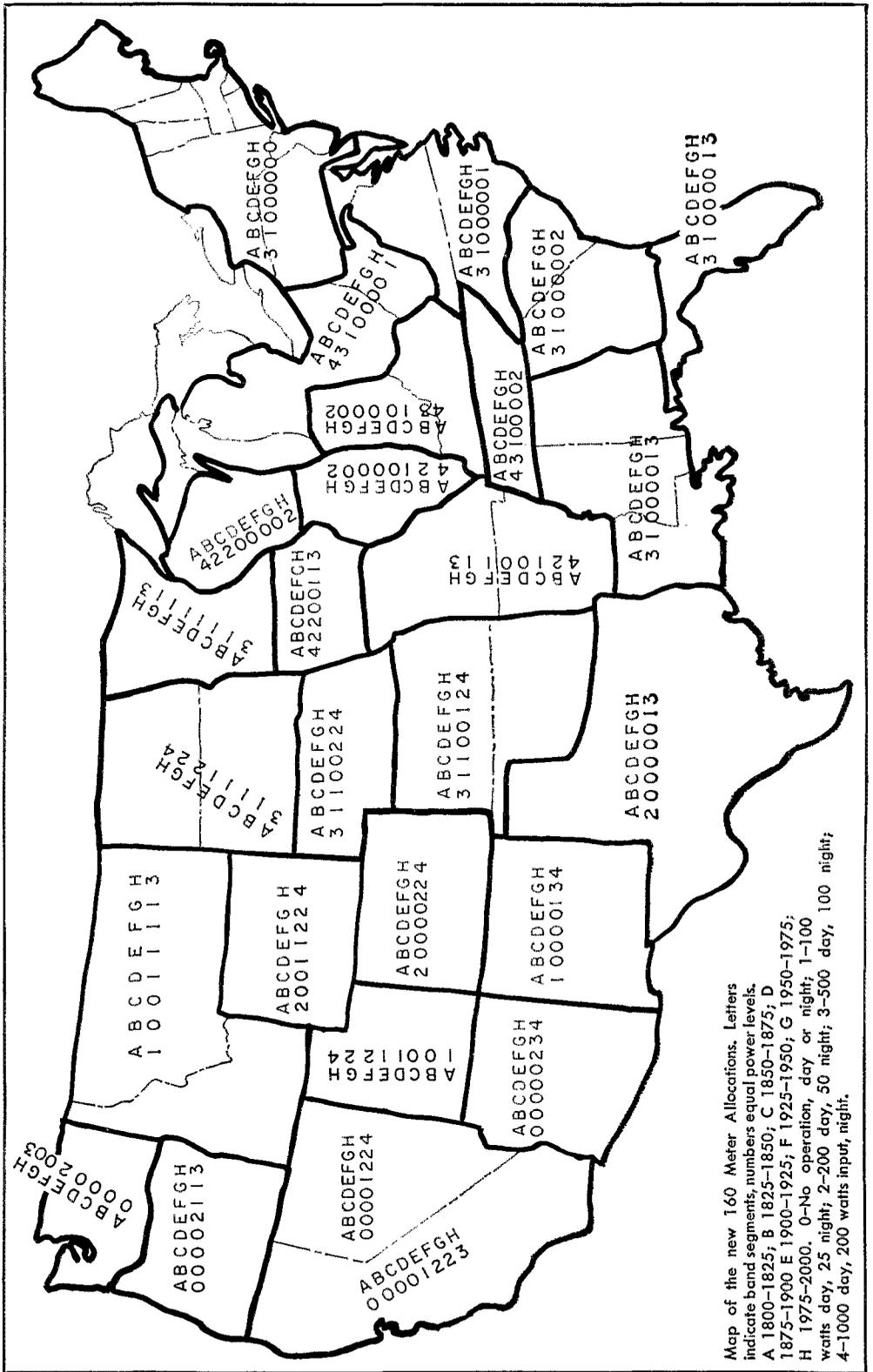
"(b) Explanation of the limitations appearing in the frequency tabulation of paragraph (a) of this section:

(1) Use of this band is on a shared basis with the Loran-A system of radionavigation. The Amateur Service may use the sections of the band 1800–2000 kc/s which are not required for Loran-A in accordance with subparagraph (3) of this paragraph. The use of these frequencies by the Amateur Service shall not be a bar to the expansion of the radionavigation (Loran-A) service;

(2) The use of these frequencies by stations in the Amateur Service shall not cause harmful interference to the Loran-A system of radionavigation. If an amateur station causes such interference, the station licensee shall, as directed by the Commission, immediately cease operation on the frequencies involved.

(3) Amateur operation shall be limited to [the frequencies shown in the chart on the following page]."

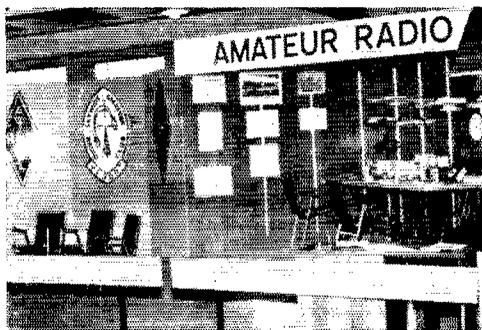




Map of the new 160 Meter Allocations. Letters indicate band segments, numbers equal power levels. A 1800-1825; B 1825-1850; C 1850-1875; D 1875-1900 E 1900-1925; F 1925-1950; G 1950-1975; H 1975-2000. 0-No operation, day or night; 1-100 watts day, 25 night; 2-200 day, 50 night; 3-500 day, 100 night; 4-1000 day, 200 watts input, night.

Maximum D.C. Plate Input Power in Watts

| Area                                    | 1800-<br>1825 kc. | 1825-<br>1850 kc. | 1850-<br>1875 kc. | 1875-<br>1900 kc. | 1900-<br>1925 kc. | 1925-<br>1950 kc. | 1950-<br>1975 kc. | 1975-<br>2000 kc. |
|-----------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                         | Day/Night         |
| Alabama                                 | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 100/25            | 500/100           |
| Alaska                                  | 200/50            | 0                 | 0                 | 200/50            | 0                 | 0                 | 0                 | 0                 |
| Arizona                                 | 0                 | 0                 | 0                 | 0                 | 0                 | 200/50            | 500/100           | 1000/200          |
| Arkansas                                | 1000/200          | 200/50            | 100/25            | 0                 | 0                 | 100/25            | 100/25            | 500/100           |
| California                              | 0                 | 0                 | 0                 | 0                 | 100/25            | 200/50            | 200/50            | 500/100           |
| Colorado                                | 200/50            | 0                 | 0                 | 0                 | 0                 | 200/50            | 200/50            | 1000/200          |
| Connecticut                             | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| Delaware                                | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 100/25            |
| District of<br>Columbia                 | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 100/25            |
| Florida                                 | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 100/25            | 500/100           |
| Georgia                                 | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 200/50            |
| Hawaii                                  | 0                 | 0                 | 0                 | 0                 | 200/50            | 100/25            | 100/25            | 500/100           |
| Idaho                                   | 100/25            | 0                 | 0                 | 100/25            | 100/25            | 100/25            | 100/25            | 500/100           |
| Illinois                                | 1000/200          | 200/50            | 100/25            | 0                 | 0                 | 0                 | 0                 | 200/50            |
| Indiana                                 | 1000/200          | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 200/50            |
| Iowa                                    | 1000/200          | 200/50            | 200/50            | 0                 | 0                 | 100/25            | 100/25            | 500/100           |
| Kansas                                  | 500/100           | 100/25            | 100/25            | 0                 | 0                 | 100/25            | 200/50            | 1000/200          |
| Kentucky                                | 1000/200          | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 200/50            |
| Louisiana                               | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 100/25            | 500/100           |
| Maine                                   | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| Maryland                                | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 100/25            |
| Massachusetts                           | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| Michigan                                | 1000/200          | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 100/25            |
| Minnesota                               | 500/100           | 100/25            | 100/25            | 100/25            | 100/25            | 100/25            | 100/25            | 500/100           |
| Mississippi                             | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 100/25            | 500/100           |
| Missouri                                | 1000/200          | 200/50            | 100/25            | 0                 | 0                 | 100/25            | 100/25            | 500/100           |
| Montana                                 | 100/25            | 0                 | 0                 | 100/25            | 100/25            | 100/25            | 100/25            | 500/100           |
| Nebraska                                | 500/100           | 100/25            | 100/25            | 0                 | 0                 | 200/50            | 200/50            | 1000/200          |
| Nevada                                  | 0                 | 0                 | 0                 | 0                 | 100/25            | 200/50            | 200/50            | 1000/200          |
| New Hampshire                           | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| New Jersey                              | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| New Mexico                              | 100/25            | 0                 | 0                 | 0                 | 0                 | 100/25            | 500/100           | 1000/200          |
| New York                                | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| North Carolina                          | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 100/25            |
| North Dakota                            | 500/100           | 100/25            | 100/25            | 100/25            | 100/25            | 200/50            | 200/50            | 1000/200          |
| Ohio                                    | 1000/200          | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 100/25            |
| Oklahoma                                | 500/100           | 100/25            | 100/25            | 0                 | 0                 | 100/25            | 200/50            | 1000/200          |
| Oregon                                  | 0                 | 0                 | 0                 | 0                 | 200/50            | 100/25            | 100/25            | 500/100           |
| Pennsylvania                            | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| Rhode Island                            | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| South Carolina                          | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 200/50            |
| South Dakota                            | 500/100           | 100/25            | 100/25            | 100/25            | 100/25            | 100/25            | 200/50            | 1000/200          |
| Tennessee                               | 1000/200          | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 200/50            |
| Texas                                   | 200/50            | 0                 | 0                 | 0                 | 0                 | 0                 | 100/25            | 500/100           |
| Utah                                    | 100/25            | 0                 | 0                 | 100/25            | 100/25            | 200/50            | 200/50            | 1000/200          |
| Vermont                                 | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| Virginia                                | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 100/25            |
| Washington                              | 0                 | 0                 | 0                 | 0                 | 200/50            | 0                 | 0                 | 500/100           |
| West Virginia                           | 1000/200          | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 100/25            |
| Wisconsin                               | 1000/200          | 200/50            | 200/50            | 0                 | 0                 | 0                 | 0                 | 200/50            |
| Wyoming                                 | 200/50            | 0                 | 0                 | 100/25            | 100/25            | 200/50            | 200/50            | 1000/200          |
| Puerto Rico                             | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 200/50            |
| Virgin Islands                          | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 200/50            |
| Swan Island                             | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 100/25            | 500/100           |
| Serrana Bank                            | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 100/25            | 500/100           |
| Roncador Key                            | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 100/25            | 500/100           |
| Navassa Island                          | 500/100           | 100/25            | 0                 | 0                 | 0                 | 0                 | 0                 | 200/50            |
| Baker, Canton,<br>Enderbury,<br>Howland | 100/25            | 0                 | 0                 | 100/25            | 100/25            | 0                 | 0                 | 100/25            |
| Guam, Johnson,<br>Midway                | 0                 | 0                 | 0                 | 0                 | 100/25            | 0                 | 0                 | 100/25            |
| American Samoa                          | 200/50            | 0                 | 0                 | 200/50            | 200/50            | 0                 | 0                 | 200/50            |
| Wake                                    | 100/25            | 0                 | 0                 | 100/25            | 0                 | 0                 | 0                 | 0                 |
| Palmyra, Jarvis                         | 0                 | 0                 | 0                 | 0                 | 200/50            | 0                 | 0                 | 200/50            |



The Skywide ARC operated the Radio Society of Ontario's station, VE3RSO, at the Toronto Sportsman Show March 8-17. The display helped secure a nice write-up in the Toronto Telegram, too.

### SUSPENSIONS — FEEDBACK

A typographical error crept into the article on license suspensions, page 81 of the May issue. The second sentence should read: "John D. Allyn, W7YGN; Richard W. LeMassena, Jr., W7WVE; and Donald W. Stribling, W7VGQ of Seattle apparently set up a station at W7VGQ's location . . ."

### EXTRA PRIVILEGE CLARIFIED

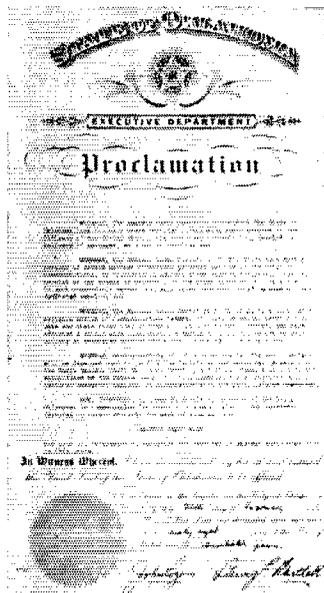
In the amendments to Section 97.7 which resulted from the incentive licensing matter, Docket 15928, some confusion was caused when the Extra Class phone segments 3800-3825 and 21,250-21,275 kc. were omitted from the listing of privileges effective November 22, 1969. By an Errata released April 16, 1968, the commission has clarified the matter. The chart in paragraph (a) has been amended to read (with changes in boldface):

| Frequencies                                                                                                                  | Class of license authorized      | Effective Date       |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------|
| 3500-3525 kc/s<br>3800-3825 kc/s<br>7000-7025 kc/s<br>14000-14025 kc/s<br>21000-21025 kc/s<br>21250-21275 kc/s               | Amateur<br>Extra Only            | November 22,<br>1968 |
| 3500-3550 kc/s<br><b>3800-3825 kc/s</b><br>7000-7050 kc/s<br>14000-14050 kc/s<br>21000-21050 kc/s<br><b>21250-21275 kc/s</b> | Amateur<br>Extra Only            | November 22,<br>1969 |
| 3825-3850 kc/s<br>7200-7225 kc/s<br>14200-14235 kc/s<br>21275-21300 kc/s<br>50-50.1 Mc/s                                     | Amateur<br>Extra and<br>Advanced | November 22,<br>1968 |
| 3825-3900 kc/s<br>7200-7250 kc/s<br>14200-14275 kc/s<br>21275-21350 kc/s<br>50-50.25 Mc/s                                    | Amateur<br>Extra and<br>Advanced | November 22,<br>1969 |

### FCC REJECTS THREE PROPOSALS

FCC has rejected three proposals for changes in the amateur rules. RM 1171, filed by Sam McCluney of Watertown, New York, asked for creation of a "telegraphy free class" without code test, for operation in the 147 Mc. band. Bobby Glover, Wilson, North Carolina submitted RM 1185, requesting a renewable beginners' license for telegraphy on bands between 160 and 20 meters, or alternatively requesting that the Novice license be issued for five years and be renewable. RM-1064 was offered by Don Greer, WA5KWH. It sought Technician privileges in the 28.0-29.7 Mc. band; reduction of General Class code from 13 to 5 w.p.m.; credit for first and second class commercial phone licenses toward amateur written tests; and permission to use reference books while taking written exams.

The Commission felt that most of these proposals were inconsistent with the goals of incentive licensing, adopted only last autumn in Docket 15928, and indeed, that most of them had been considered and rejected during the course of that proceeding. Amateur examination elements relate essentially to amateur radio regulations, amateur practices and techniques not required knowledge for commercial operators; therefore, credit for commercial tests is not appropriate. "Open book" exams are usually of the essay type; for administrative reasons, amateur exams must remain multiple choice, and use of references cannot be permitted. Accordingly, the three petitions were dismissed.



Rhode Island AR Week is June 15-21 with a special activity for hams (see p. 107). The Mayor of Englewood, N.J. issued a proclamation for June 16-22. And the clubs of Oklahoma got Governor Dewey F. Bartlett to proclaim the week of June 2 as AR Week (see above) as Texas also did to honor the ARRL National Convention at San Antonio.

## Behind the Diamond

Number 5 of a Series



This month we're proud to salute Noel B. Eaton, VE3CJ, director from the Canadian Division of ARRL. Noel took office as vice director on January 1, 1960 and just five months later became director when the late Alex Reid, VE2BE, was elected vice president. Just two years later, Noel was elected to the ARRL Executive Committee, an event which has been repeated every year since. He's also served on the Membership and Publications, Public Relations and Planning Committees, and for the past two years has been chairman of the Finance Committee.

Canada's delegate to the first IARU Region II Congress at Mexico City in

1964, Noel was promptly named as treasurer of the Inter American Union of Radio Amateurs and a member of its Executive Committee, to which posts he has since been reelected.

Noel got his first license in 1937 (although his first receiver, circa 1922, is a museum piece!). His experience led to wartime duties as Chief Signal Officer, Western Air Command, supervising installation and operation of both radio and radar installations in British Columbia — sort of a periodical Field Day, he says. In 1943, he was posted to England, as Chief Signal Officer for the Canadian Bomber Group, responsible for radio, radar and electronics counter measures. At the end of the war he did staff work in Ottawa, leading formation of the Air Force Amateur Radio System in Ottawa.

VE3CJ served two years as president of the Hamilton Amateur Radio Club and was first president of the Ontario Amateur Radio Federation, predecessor of the Radio Society of Ontario.

Now retired as president and general manager of the Eaton Knitting Co. Ltd., Noel and his wife Julie live in Waterdown, Ontario, and also have a summer place farther North. Noel is well known to DX operators as VP5BP (Now ZF1BP, where this picture was taken in 1963), G3SDA and 6Y5BP in Jamaica.

### ARRL SUPPORTS SHUT-IN DOCKET

ARRL has filed comment in support of Docket 17989, which proposes to allow examinations for Extra and Advanced Class under supervision of a volunteer examiner, where the applicant is unable to appear in person at an FCC testing point, because of physical disability. The text of the League's filing reads:

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

In the Matter of

Amendment of Parts 0 and 97 of Commission's Rules to permit disabled persons to obtain Amateur Extra Class and Advanced Class licenses by mail examinations.

DOCKET NO. 17989

TO: The Commission

#### COMMENTS IN SUPPORT OF PROPOSED RULE MAKING

The American Radio Relay League, Incorporated, a non-profit organization of amateur radio operators of the United States and Canada, respectfully sub-

mits the following comments in support of the amendments to Parts 0 and 97 of the Commission's Rules as proposed in a Notice of Proposed Rule Making released February 5, 1968 (FCC 68-103).

When various incentive licensing proposals, including that of the League (RM-499; Docket No. 15928), were before the Commission, numerous comments were received from amateurs expressing concern that they might not be able to appear at regularly scheduled examination points because of physical disabilities.

The League is pleased that the Commission has recognized the very real concerns and problems of disabled amateurs who are unable to appear for Commission supervised examinations, and wholeheartedly supports the proposed amendments which would permit examinations-by-mail for the Amateur Extra Class and Advanced Class licenses to be administered by volunteer examiners.

Adoption of the proposed amendments of Parts 0 and 97 of the Commission's Rules at an early date is requested.

Respectfully submitted,

**THE AMERICAN RADIO RELAY LEAGUE,  
INCORPORATED**

By Robert M. Booth, Jr.  
Its General Counsel

April 1, 1968.

**SUSPENSIONS OF HAM LICENSE**

The General Class amateur license of Russell E. Jantzen, W6TBN, has been suspended effective March 12, for the remainder of the license term (it expires July 1, 1968). The FCC found that the amateur had "wilfully and maliciously interfered with, or caused interference to, radio communications or signals of other radio stations" specifically on February 21, 1967 and January 14, 1968. The operator, whose home is in Garden Grove, California, did not request a hearing. (*Violations of Section 303 (m) of the Communications Act of 1934; Section 97.125 of the Amateur rules.*)

In a case which earlier brought unfavorable publicity on the ranks of amateurs, FCC suspended the General Class license of James R. Van Der Maaten, WB6QZL, Sacramento, California for six months, effective March 18. The licensee "used or operated a radio station on Police Radio Service frequencies without a license in that behalf," FCC said. Press reports alleged that Van Der Maaten had made disparaging remarks about the police on the channel

assigned to the local force. A hearing was not requested. (*Section 301 of the Act.*)

**LICENSES FOR IMMIGRANTS**

A bill has been introduced into the House, HR 16764, which would amend the Communications Act of 1934 so as to allow aliens who have filed a "first papers" to become licensed as amateurs. The sponsor is Representative Ted Kupferman of New York.

Arguments in favor of the bill have been eloquently presented in "Correspondence from Members," February and May QSTs. The big enemy of the bill at this point is time - it will take a great deal of response by citizens to get the bill through Congress before adjournment, late this month or early next. Support for the bill should be registered with Congressmen and Senators right away, and especially with those who serve on the respective Commerce Committees.

Also, HR 14910 may still need a push to be passed by the Senate before adjournment. This is the "anti-noise" bill discussed here last month.

**WHO THE DEVIL IS WHO?**

*Still Another Two-letter Call Conversion Chart*

Following up on April and May, here are some more calls of amateurs taking advantage of new rules which allow Extra Class licensees licensed 25 years ago or longer to acquire two-letter calls. As of April 1, FCC had issued more than 860 W6 and W4 two-letter calls are now all in use and K6/K4 are calls being issued. The second call area will follow suit shortly.

| Now  | Was    | Now  | Was    | Now  | Was    | Now   | Was    |
|------|--------|------|--------|------|--------|-------|--------|
| W1DS | W1LJO  | W3HH | K3ZMQ  | W5DV | W5MKV  | W6ZM  | W6LCP  |
| W1DW | W1IZY  | W3IE | W3LWQ  | W5EL | W5JFS  | W6ZN  | W6NRF  |
| W1EC | W1NLL  | W3JM | W3JHR  | W5FF | W5BRN  | W6ZO  | W6KEV  |
| W1GN | W1DVX  | W3KE | W3RNY  | W5FH | W5QFY  | W7BE  | W7POU  |
| W1HH | W1MQV  | W3NJ | K3FER  | W5FO | W5ODS  | W7BG  | W7BRS  |
| W2CY | W2PZI  | W3KO | W3VLG  | W5FW | W5FEC  | W7DB  | W7CJN  |
| W2DU | W2FCY  | W3LR | W3CGF  | W5GC | W5IYU  | W7DG  | W7JKZ  |
| W2FD | W42EKY | W3LX | W1LLN  | W6AG | W6QYR  | W7DY  | K7MKW  |
| W2FJ | W2FYT  | W3MJ | K3KEE  | W6AN | W6OAZ  | W7FJ  | K7BGN  |
| W2FL | WB2NMP | W3MK | WA3DDW | K6AR | W6UMI  | W7HV  | W7FTR  |
| W2HH | W2DNG  | W3MQ | W3INH  | W6BH | W6PQW  | W7GH  | K7ICV  |
| W2IK | W2EYF  | W3MR | K3BGX  | K6CL | W6PCP  | W7IR  | W7PGX  |
| W2IS | W2OAZ  | W3NB | W3AYS  | W6CU | W6FAR  | W8AN  | W8TZO  |
| W2JS | W6CIW  | W3NJ | K3FER  | W6FL | W6UBB  | W8BH  | W8NYN  |
| W2KA | W2WFL  | W3NV | K3MVP  | W6FQ | W6ZPX  | W8BW  | W8KNP  |
| W2KX | W2CZQ  | K4AK | WA4LXD | W6GB | K6GMA  | W8DA  | W8SCU  |
| W2LL | W2ESO  | W4BQ | W4AHX  | W6JO | W6UYM  | W8DB  | W8ZJM  |
| W2LT | K2ZZF  | W4EY | K4DGL  | W6MH | W6DII  | W8DH  | W8PFF  |
| W2LX | W2DQT  | W4FS | WB4BXO | W6MV | W6NAO  | W9AO  | W9OQN  |
| W2MB | W2JKH  | W4GA | W44YKL | W6NS | W6ZJD  | W9AT  | W9OUP  |
| W2MK | W2SSG  | W4KD | W4IY   | W6ON | W6DZQ  | W9BC  | K9TSK  |
| W2MT | W2KGN  | W4KE | W4GXU  | W6OR | K6QNI  | W9BG  | W9RBI  |
| W2MU | W2VJO  | W4KO | K4OBM  | W6PT | K6BNX  | W9BY  | W9JUX  |
| W2NE | K9CTV  | W4LE | W4EPA  | W6QC | W6MIUB | W9CI  | W9CSZ  |
| W2NF | W2GCV  | W4MG | K4MJJ  | W6SE | W6ECP  | W9CK  | W91EV  |
| W2NG | WA2DYO | W4NM | K4IYY  | W6SI | W6MIW  | W9CL  | W91JP  |
| W2NI | W2GFH  | W4OB | W2CPE  | W6SO | W6DLF  | W9CM  | W9UIT  |
| W2OC | W2MXJ  | W4OE | W4CXO  | W6SV | W6KWQ  | W9AS  | W9GTU  |
| W2OH | W2SDZ  | W4OX | W2HZA  | W6TA | W6EYF  | W9BU  | W9WBM  |
| W2OL | K2AAI  | W4PE | W4ERT  | W6VB | W6BJU  | W9CA  | W91IC  |
| W2OM | WA2KQN | W4QQ | W4RMH  | W6VD | W6QNJ  | W9CM  | W91YV  |
| W2ON | W2AFC  | W4RB | K4SMO  | W6VG | W6CBE  | W9DX  | W9NWX  |
| W3BF | W3HJK  | W4UM | W4YEA  | W6VK | W6PLS  | W9EA  | W9MTM  |
| W3CO | K3NTK  | W4UX | W4DGC  | W6VR | W6NXY  | W9GH  | W9HDD  |
| W3CV | W3ZAO  | W4YD | K4COQ  | W6YG | W6APMX | W9GS  | W9TPK  |
| W3FC | W3LML  | W5BG | W5HUA  | W6YO | W4VOF  | KH6AD | KH6GEW |
| W3FE | K3EKO  | W5CR | W5KWI  | W6ZG | W6NBX  |       |        |

# Ham'n'Gravy

BY CONNIE EVANS\*  
(XYL of W9TJC)

ONCE upon a time way back in the early dawn of civilization when man first decided on a hobby, he then and still does have two problems to overcome; that of obtaining the best, and last but far from least — getting the items safely past his wife.

Today in this electronic age, Amateur Radio offers a big challenge. Once you get the basic station it then becomes an easy matter to bring home small items such as tubes, resistors, condensers, etc. in your pockets. To all XYLs one tube, resistor, or condenser looks like another. Fishermen slip all kinds of flies or lures home to tackle boxes while Hi-fiers slip records home in a folded newspaper. Dealing in larger items, Amateur Radio offers a real challenge in getting them past the high command.

The first order of business is to acquaint the XYL with ham friends. This accomplished, it is then easier to discuss the purchase of a receiver to hear these friends and far away places. Then, with her interest building, point out that a transmitter would enable one to also reply to these friendly voices, as what YL or XYL can listen for long without wanting to talk also, a big selling feature for a transmitter is that *contact can be made with friends and relatives in the far corners of the United States.*

Now that you have your foot in the door for the basic station, you will need a phone, keyer and speaker, which you point out are necessary for operating. With mixed emotions she says, "Okay," with the admonition, "Don't spend too much."

You immediately grab your hat and run to the nearest dealer — *alone!*

Arriving at the local electronic store, and having done your homework well, you're not too confused at the selections spread before you. You look over the models and decide on an outfit costing twice the amount you had intended to spend. On the way home you try to concoct a good story.

Arriving home, you exclaim what a steal it was and show her the shiny receiver with numerous knobs and dials.

"How much?"

"It's last year's model," you answer.

"How much?"

"They threw in the keyer free," you counter.

"How much?"

"We can even get Africa," you hedge.

"How much?"

After an hour or so of this cat-and-mouse game (with neighbors warning, "Quiet!") you give her a price of about  $\frac{1}{2}$  of the cost.

"Take it back."

You plead, "It's on a week's trial." Then you hope time will be a healer.

"IT'S LAST YEAR'S MODEL AND THEY THREW IN A KEYSER FOR FREE!"



Next morning, after a night on the sofa and a silent and cold breakfast, you anxiously turn the dials hoping for something to break through the humming. By now with the promise of Sunday dinner at the best place in town, things are beginning to look up. A week passes and little is said about returning it and you are beginning to feel it's really yours. Of course, you have already hidden your catalogs so prices cannot be checked.

Time passes and by now you are well on the way to getting your BD (Bachelor of Deceit) degree. The ham shack is beginning to look crowded and you are ready for something better, so you bring it in place of the present equipment and explain very matter of factly, "It's used and since mine is almost new we were able to make a swap." Then get her out to a theatre before what you have said sinks in.

Holidays are the best of all. You are asked by the XYL what you would like for Christmas and you reply, "A 6 Meter Heterodyne Converter," for example. Upon her professing ignorance of such you quickly suggest, "Give me the ten dollars and I will get it myself." This means you will probably make up the difference out of your own pocket.

By the time you are ready for your BD, you have added such refinements as fake lottery tickets, with your receiving a phone call a week later declaring you the winner. You pick up your prize at the store (carefully destroying the sales slip.) One word of warning at this point: this will work only once, so save it for that dream purchase.

The final test before receiving your BD is to join a ham radio club and ask the XYL for a night out for radio club meetings. You just might be surprised . . . she may be glad to get you away from the house (and the shack) once-a-week!

\* 5204 E. Pleasant Run Parkway N.D., Indianapolis, Ind. 46219.

QST



June 1943

... The cover shows a manual tape perforator built by George Grammer, W1DF. Real professional-looking, it was designed by F. C. Beekley, W1GS, and George put it together and reports on its performance. Its main use at present is for code practice groups which have a Wheatstone transmitter but lack a source of suitable tape. Samples of the punchings are given, as well as photographs. ... Clinton B. DeSoto, W1CBD, writes this month's editorial, devoting himself to a discussion of what hams are doing in the war effort. By actual count and by statistical analysis, he shows that just about every ham in the country is serving in one way or another. About fifty percent are in active military service and the League is trying to keep up-to-date the published lists of who is where. ... James P. Saunders, W1BVD, authors a good article on teaching radio in high schools. He is assistant principal of the Northbridge (Mass.) High School, a long-time ham and a very competent fellow. Numerous photographs show the extent of his classes. They are doing a first class job.



**Georgia** — The Atlanta Radio Club will hold its annual Hamfest, June 15 and 16 at the North DeKalb Shopping Center. There will be a banquet on June 15. For further information contact John M. Fearon, W4WKP, 4165 Club Drive, N.E., Atlanta, Ga. 30319.

**Illinois** — The Rock River Radio Club, Dixon, Ill. will hold their second annual Hamfest June 16 at the Lee County 4-H Club Center, located one mile east of Junction U.S. 30 and 52 near Amboy, Ill. A cordial invitation is extended to all hams, CBers, Electronic hobbyists, and others. Hours 9:00 a.m. to 5:00 p.m. Lunch refreshments and unlimited parking. Advance ticket donation is \$1.00, \$1.50 at the door. For additional information contact Chuck Randal, W9LDU, 1414 Ann Avenue, Dixon, Ill. 61021.

**Illinois** — The Starved Rock Radio Club has announced that June 2 will be the date of their annual Hamfest.

**Kansas** — The annual Central Kansas ARC Hamfest will be held Sunday, June 9 at the Salina County 4-H Building, Salina, Kansas. For more information contact Darwin L. Gray, WA8JFC, 315 South Connecticut, Salina, Kansas 67401.

**Kentucky** — The Paducah ARC will hold their annual Ham Picnic at the Noble Park Community Center, Paducah, Ky. It will be an all-day affair on July 14. Lunch will be served on the grounds. Bring along your swap material and equipment. Further information from Don Fuller, WA4LME, 247 Seminole Drive, Paducah, Kentucky 42001.

**Maine** — The 9th Augusta Hamfest sponsored by the Augusta RC will be held Sunday June 16 at the Calumet Club, West River Rd., Augusta, Highway 104 North. Registration and get acquainted time at 9:00 a.m. At 12:30 p.m. there will be a turkey dinner and all the fixin's followed by a speaker. At 2:30 p.m. there will be a hidden transmitter hunt. Saturday evening, June 15, there will be a dance and informal get-together at the Calumet Club. Mobile talk-in

These are pre-induction courses. I can't help thinking that some of them will wind up as good truck drivers, as did I in WW1!

... Inverse feedback is thoroughly discussed in a nice piece by Philip C. Erhorn, W2LAH. Diagrams for voltage, current and bridge types of inverse feed-back are shown. The voltage type appears to be the most suitable.

... Looking for a commission in the Armed Forces? In "U.S.A. Calling," the dope is given on what qualifications you should have, such as an E.E. degree, etc. George Bailey, W1KH, our President, also heads up specialized branch of the Signal Corps which is looking for highly trained men to become officers. Rumor hath it that this group is working in classified microwave applications.

... "Sourdough" tells how to make a gadget that will automatically take you off the air if you inadvertently get too close to the edge of the band. The actuating circuit was shown last month.

... McMurdo Silver (all you OTs remember him, of course) talks about watts or decibels with relation to what puts a readable signal on the other fellow's receiver. Very practical ideas. He concludes that 100 watts into a good antenna can easily be as good as 500 watts into a poor radiator. Jumping from 500 watts to a kilowatt is a senseless waste of money, says he, for the 3-db. gain is hardly to be noticed at the receiving end.

... George Grammer, W1DF, continues his series on "Elementary A.C. Mathematics." This time it is all about reactance and impedance. Don't worry about a little calculus. It all cancels out in the end.

— W1ANA

on 3960 kc. and on six and two meters. Prepaid registration is \$4.25 per person, deadline June 12. Registration at the door, \$5.00 per person. Children under 12, \$3.25. Tickets will be held at the door unless a self-addressed stamped envelope is sent with the remittance. Make your remittance to Phillip Young, W1JTH, 47 Longwood Ave., Augusta, Maine.

**Missouri** — The Suburban Radio Club of St. Louis County will hold its third annual Hamfest on Sunday, June 30 at the Creve Coeur Lake Memorial Park, St. Louis County, Mo. Bring the family. Food and playgrounds adjacent to the Hamfest. Advance registration is \$1.00 from K0AHD, W6MUX or W0JUY.

**Nebraska** — The PRARC picnic will be held on June 2.

**Nebraska** — The Smoke Signal Senders picnic is June 1-2 at Chadron State Park.

**New York** — The Rome Radio Club presents its 15th consecutive Ham Family Day on Sunday June 9 at Beck's Grove, ten miles west of Rome, N. Y. Features include technical talks, mobile judging, c.w. contest and an afternoon of entertainment for the ladies and children. Registration starts at 12 noon with that famous chicken and steak dinner at 5:00 p.m. Advance adult registrations, \$4.50, at the gate, \$5.00. Kids under 12, \$1.75, under six, free. Send registrations to Rome Radio Club, Box 721, Rome, N. Y. 13440.

**Pennsylvania** — The Foothills Radio Club, Inc. of Greensburg will hold its first annual Swap and Shop at the Rustic Drive-In Theatre at Unity, Pa. on the Mount Pleasant Rd. on June 30 from noon to 8:00 p.m. Mobile check-in on 50.4 Mc. and 29 Mc. from 11:00 a.m. to 6:00 p.m. For more information write WA3GZF, Jerry Stevens, 6 Lentz St., Irwin, Pa. 15642.

**Pennsylvania** — The West Branch ARA and the Milton RC will link forces Sunday June 9, starting at 1:00 p.m., to sponsor the Penn Central Hamfest at the Union Township Volunteer Fireman grounds, Route 15, Winfield, Pa. Indoor and outdoor facilities provided. Contests, auction, swapping, gabfest. No speeches, no formal dinner. Bring your own refreshments or eat at the snack stand. Registration \$2.00 at the gate, family included. For information contact Harvey C. Follmer, Jr., WA3BZO, 800 Upper Market St., Milton, Pa. 17895.

**Pennsylvania** — The Cumberland Valley Radio Club will present their second annual Jam-Fest, June 9 at Willow Mill Park, 2 miles north of Hogestown, midway between Harrisburg and Carlisle on Route 11. The 80-meter band will be monitored for talk-in (WA3HKA). Displays, entertainment and camping facilities. For information contact Jam-Fest Committee, Box 23, Newville, Pa. 17241.

**Quebec** — Le Congrès annuel de l'Association provinciale du Québec (RAQI) aura lieu cette année les 28-29 et 30 juin à Plessisville. Tous les amateurs du Québec et leurs amis sont cordialement invités. Il y aura de magnifiques attractions pour tous et les conférenciers du Congrès aborderont des sujets d'actualité tels que le DX et le VHF. Comme par les années passées, des prix de présence de haute valeur seront offerts à tous les congressistes. Bienvenue à tous.

**Tennessee** — The Mid-South ARC and the Delta RC will hold its combined annual Hamfest on June 2 in Memphis at Audubon Park. Informal banquet will be on June 1. For further details please contact K4NRV.

**Washington** — The 1968 annual meeting of the Northwest Chapter of the QCWA will be held on June 8 and 9

at the Holiday Inn, Tacoma, Washington. Registration will begin at noon, Saturday, following which will be a tour of the extensive FAA facilities at Auburn, Wash. A no-host dinner, preceded by a cocktail hour at 6:00 p.m. will be highlighted by a skit of T.O.M. presented by K7AN and a slide show of an European trip taken by W7PHO. Sunday will see the annual business meeting at 10:00 a.m. followed by an auction of radio equipment at noon. A group picture will be taken prior to the banquet at 1:30 p.m. The speaker is Mr. George Webber, Jr., WA7GPE, recently returned from the Antarctic, and who will be talking about four experiments conducted at the site of the World's longest and highest antenna. Register with Mr. Charles Emigh, W7ER, 752 South Monroe St., Tacoma, Wash. 98405. For further information contact Eugene Dodge W7BTV, 7020 9th St., Tacoma, Wash. 98406.

**West Virginia** — The Tri-State ARA will hold its 6th annual Hamfest at Camden Park, Rt. 60 West, Huntington, W. Va. on Sunday June 2 at 11:00 a.m. to 5:30 p.m. For further information contact club members or write P.O. Box 1295, Huntington, W. Va. 25715. QST

## ARRL WEST VIRGINIA STATE CONVENTION

**Weston June 29-30**

The tenth annual ARRL West Virginia State Radio Convention will be held at Jackson's Mill, Weston, on June 29 and 30. Highlights of the convention include a hidden transmitter hunt, a code copying contest, meetings of Army, Navy and Air Force MARS, a ARRL forum featuring R. L. Baldwin, W1IKE, Assistant General Manager of ARRL, and of course initiation into the Royal Order of the Wouff Hong at midnight Saturday. Special guest for a DX forum will be Gus Browning, W4BPD.

Full registration for the convention including four meals and a night's lodging will be \$9.25 for adults and \$5.00 for children under eight years of age. Preregistration may be made through Mr. George Current, K8HHV, RFD #5 Box 175, Grafton, West Virginia, 26354. Registration-only tickets are available at \$2.50 from Mr. Bill Godwin, RFD #2, Elkins, West Virginia, 26241. Trailer sites may be arranged through Harley V. Cutlip, Jackson's Mill 4-H Camp, Weston, West Virginia, 26452. See you at the Mill.

## ARRL SASKATCHEWAN PROVINCE CONVENTION

**Saskatoon June 29-July 1**

The Saskatchewan Province ARRL Convention will be held at the Bessborough Hotel in Saskatoon, June 29 thru July 1, 1968. A three day program includes meetings, exhibits, contests, a dance and banquet, plus field day activities. As an added attraction the Province-sponsored "Pion-Era" will be held in Saskatoon starting Monday, for a week of reliving the pioneer days of western Canada with outstanding exhibits and programs.

Convention registration is \$10.00 per couple, or \$6.00 per single and includes the Saturday evening dance, Sunday evening banquet, and Monday field day picnic. For further information and reservations, write: Les Sadler, VE5DU,

Convention Manager, Box 751, Saskatoon, Saskatchewan.

## ARRL ROCKY MOUNTAIN DIVISION CONVENTION

**Cheyenne June 29-30**

The ARRL Rocky Mountain Division Convention will be held under the joint sponsorship of the Shy-Wy Club, Casper Wyoming Amateur Radio Club, and the Ft. Collins Colorado Club at the Hitching Post Motor Hotel, Cheyenne, Wyoming, June 29-30. The program will include an ARRL Forum, Royal Order of the Wouff Hong initiation, a banquet, and more. Sunday morning chuck wagon breakfast (free!), speakers include W6SAI, K6LAR, W0INK, W1LVQ, and W1NJM.

Convention registration is \$4.00 in advance, \$5.00 at the door. Banquet tickets are \$4.00 per person. Hotel reservations direct to Hitching Post at convention rates, \$10.00 and up. For reservation and details, write Shy-Wy ARC, Inc., P.O. Box 164, Cheyenne, Wyo. 82001.

### COMING A.R.R.L. CONVENTIONS

June 1-2 — New England Division, Swampscott, Mass.

June 7-9 — NATIONAL, San Antonio, Tex.

June 29-July 1 — Saskatchewan Province, Saskatoon.

June 29-30 — Rocky Mountain Division, Cheyenne, Wyoming.

June 29-30 — West Virginia State, Jackson's Mill.

August 3-1 — Central Division, Springfield, Ill.

August 30-31 — Kentucky State — "Louisville Ham Kenvention," Louisville.

August 31-September 2 — Southwestern Division, Phoenix, Arizona.

September 28-29 — Roanoke Division, Greensboro, N. C.

October 12-13 — Hudson Division, Tarrytown, N. Y.

# I.A.R.U. News



INTERNATIONAL AMATEUR RADIO UNION

## CARIBBEAN EMERGENCY NET

The Inter-American Union of Radio Amateurs — Region II of IARU announces the activation of the Caribbean Emergency Net (CEN) a sub-net of an eventual Pan-American Emergency Net.

The objective of this sub-net is to link countries in the Caribbean area in cases of emergency, as well as to provide for handling third party traffic and exchanging meteorological reports among countries permitting such.

The Caribbean Emergency Net shall comprise the following countries and territories grouped around four key-cities for better control and coordination of communication: (1) Tallahassee, Florida, U.S.A. (Coordinator W4MLE, Deputy W4YPX); Bahama Is., Cuba. (2) Kingston, Jamaica (Coordinator 6Y5EM, Deputy 6Y5LA); Puerto Rico, Haiti, Dominican Republic, Cayman Is., St. Thomas. (3) Merida, Yucatan, Mexico (Coordinator XE3AF, Deputy XE3LK); British Honduras, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama. (4) Willemstad, Curacao, B.W.I. (Coordinator PJ2CE, Deputy PJ2LZ); Trinidad, Tobago, Grenada, Barbados, St. Vincent, St. Lucia, Martinica, Dominica, Guadeloupe, Antigua, Barbuda, St. Kitts, Nevis, Montserrat, St. Martin, St. Croix, Virgin Is., Northern coasts of Venezuela and Colombia.

CEN meets each Sunday at 1500 GMT on 14.225 MHz. Amateurs and nets in the area served by CEN may obtain further information by writing Mr. F. Castro Herrera, XE1AX, Director CEN, Union Interamericana de Radio Aficionados, Apartado 907, Mexico, D.F.

## QSL BUREAUS OF THE WORLD

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

For service on incoming foreign cards, see list of domestic bureaus in most QSTs, under "ARRL QSL Bureau." **Bold face listings indicate corrections or additions.**

*Aden:* Amateur Radio Club, Signal Squadron, RAF Khormaskar, B.F.P.O. 69, London, England  
*Algeria:* G. Deville, 7X2RW, 21 Blvd. Victor Hugo, Alger  
*Angola:* L.A.R.A., P.O. Box 484, Luanda

*Antarctica:* KC4AA cards go to the Office of Antarctic Programs, National Science Foundation, Washington 25, D. C. KC4US cards go to KINAP, COMCBLANT, USN, CBCEN, Davisville, E. Greenwich, R. I.

*Argentina:* R.C.A., Carlos Calvo 1424, Buenos Aires, BA  
*Austral/Antarctic French Lands:* via Malagasy Republic  
*Australia:* VK1, VK2 QSL Bureau, WIA Box 1734, GPO Sydney, N.S.W.; VK3 QSL Bureau E. Trebilcock, 340 Gillies Street, Thornbury, Vic. 3071; VK4 QSL Bureau, Inwards QSL Officer, Box 638J, G.P.O., Brisbane QLD 4001; 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, VK0, Federal QSL Bureau, 23 Landale Street, Box Hill E. 11 Victoria.

*Austria:* Oe. V.S.V., Box 999, Vienna 1/9

*Azores:* via Portugal

*Bahama Islands:* Bahama Amateur Radio Society, Box 6004 Nassau

*Bahrain:* (All MP4) Ian Cable, MP4BBW, P.O. Box 425, Awali

*Barbados:* Amateur Radio Society of Barbados, High-gate Signal Station, Flagstaff Road, St. Michael

*Belgium:* U.B.A., Postbox 634, Brussels 1

*Bermuda:* R.S.B., P.O. Box 275, Hamilton

*Bolivia:* R.C.B., Casilla 2111, La Paz

*Brazil:* L.A.B.R.E. Caixa Postal 2353, Rio de Janeiro

*British Guiana:* D. E. Yong, VP3YG, Box 325, Georgetown

*Bulgaria:* Box 830, Sofia

*Burma:* Box 830, Sofia

*Burma:* B.A.R.T.S., P.O. Box 800, Rangoon

*Burundi:* via Congo (9Q5) QSL Bureau

*Canada:* See page 124

*Canal Zone:* Gloria M. Spears, KZ5GS, Box 407, Balboa

*Cape Verde Islands:* Radio Club de Cabo Verde, CR4AA

*Praia, Sao Tiago*

*Ceylon:* 4S7WP, P.O. Box 907, Colombo

*Chagos:* via Mauritius

*Chile:* Radio Club de Chile, P.O. Box 13630, Santiago

*Colombia:* L.C.R.A., P.O. Box 581, Bogota

*Congo:* (TN8) QSL Bureau, P.O. Box 2239, Brazzaville

*Congo:* (9Q5) U.C.A.R. QSL Bureau, B.P. 3748, Elisabethville

*Cook Island:* ZK1 QSL Bureau, % Radio Station Rarotonga, Rarotonga

*Costa Rica:* Radio Club of Costa Rica, Box 2412 San Jose

*Cuba:* ANRAC QSL Bureau, P.O. Box 6996, Havana

*Cyprus:* C.A.R.S. QSL Bureau, P.O. Box 216, Famagusta

*Czechoslovakia:* C.A.V., Box 69, Prague 1

*Denmark:* E.D.R. QSL Bureau, OZ6IHS, Ingstrup

*Dominican Republic:* R.C.D., P.O. Box 1157, Santo Domingo

*Ecuador:* Guayaquil Radio Club, P.O. Box 5757, Guayaquil

*El Salvador:* Club de Radio Aficionados de El Salvador, QSL Bureau, P.O. Box 517, San Salvador

*Ethiopia:* Kagnew Station Amateur Radio Club, ET3USA, APO, New York, N. Y. 09843

*Faeroes Islands:* P.O. Box 184, 3800 Torshavn

*Fiji Islands:* P.O. Box 184, Suva

*Finland:* S.R.A.L., Box 10306, Helsinki 10

*Formosa:* (BV1US calls only) Taiwan American Radio Club USARSCAT, Box 8, APO, San Francisco, Calif. 96283

All other BV stations: QSL Bureau, C.R.A., Box 2007, Keelung, Taiwan, Rep. of China

*France:* Taiwan, Rep. of China

*France:* R.E.F., Boite Postale 70, 75 Paris 12

*France:* (F7 only) F7 QSL Bureau, % Base MARS station APO, New York, N. Y. 09083

*French Oceania:* Radio Club Oceania, P.O. Box 374, Papeete, Tahiti  
*Germany:* (DL4 & DL5 only) MARS Radio Station, Hqtrs. 93rd Sig. Bn. APO, New York, N. Y. 09175  
*Germany:* (Other than above) D.A.R.C., Box 99, 8 Munich 27  
*Ghana:* G.A.R.S. QSL Bureau, P.O. Box 3773, Accra  
*Gibraltar:* RAF Amateur Radio Club, New Camp, RAF  
*Great Britain:* (and British Empire): R.S.G.B. QSL Bureau, 32MI, Bromley, Kent  
*Greece:* George Zarakis, P.O. Box 564, Athens  
*Greece (SV0s only):* Signal Officer, Hqtrs. JUSMAGG, APO, New York, N. Y. 09223  
*Greenland:* via Denmark  
*Greenland (KG1, OX4 and OX5 calls only):* KG1A-KG1E (OX5) to MARS Director, OX5BX, APO, New York, N. Y. 09023, KG1F-GK1Z (OX4) to MARS Director, OX4FR, APO, New York, N. Y. 09121  
*Guam:* M.A.R.C., Box 445, Agaña, USPO 96910  
*Guantanamo Bay:* Guantanamo Amateur Radio Club, Box 55, FPO, New York, N. Y. 09593  
*Guatemala:* C.R.A.G., P.O. Box 115, Guatemala City  
*Haiti:* Radio Club d'Haiti, Box 943, Port-au-Prince  
*Honduras:* Jacobo Zelaya, Jr., HR1JZ, Bo. Buenos Aires, 13 Calle 505, Tegucigalpa, D. C.  
*Hong Kong:* Hong Kong Amateur Radio Transmitting Society, P.O. Box 541  
*Hungary:* H.S.R.L., P.O. Box 214, Budapest 5  
*Iceland:* Islenzkir Radio Amateur, Box 1058, Reykjavik  
*India:* A.R.S.I. QSL Bureau, P.O. Box 534, New Delhi 1  
*Iran:* Amateur Radio Soc. of Iran, APO, New York, N. Y. 09205  
*Ireland:* I.R.T.S. QSL Bureau, 21 Wicklow St., Dublin 2  
*Israel:* I.A.R.C., P.O. Box 4099, Tel-Aviv  
*Italy:* A.R.I., Viale Vittorio Veneto 12, Milano 401  
*Jamaica:* Mr. Lloyd Alberga, Jamaica Amateur Radio Association, 76 Arnold Rd., Kingston 5  
*Japan:* (JA only): J.A.R.L., Box 377, Tokyo Central  
*Japan:* (Ka only): F.E.A.R.L.-M-, APO, San Francisco, Calif. 96525  
*Johnston Island:* KJ6BZ, % MARS Stn., Det. 1, 1957 Comm. Gp., APO, San Francisco, Cal. 96305  
*Kenya:* RSEA QSL Bureau, Box 30077, Nairobi  
*Korea:* Korea Amateur Radio League, Central Box 162, Seoul  
*Korea:* (HL0) HL QSL Bureau, Signal Section, USFK/EUSA, APO, San Francisco, Calif. 96301  
*Kuwait:* Alhalf Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf  
*Laos:* Houmphanh Saignasith, XW8AL, P.O.B. No. 46, Vientiane  
*Lebanon:* R.A.L. QSL Bureau, P.O. Box 1217, Beirut  
*Liberia:* Liberian Radio Amateur Ass'n., Post Box 1477, Monrovia  
*Libya:* 5A QSL Service, Box 372, Tripoli  
*Liechtenstein:* via Switzerland  
*Luxembourg:* R. Schott, 35 rue Batty Weber E sch-Alzette  
*Macao:* via Hong Kong  
*Madeira Island:* via Portugal  
*Malagasy Republic (Madagascar):* P.O. Box 587, Tananarive  
*Malawi:* 7Q7RM, P.O. Box 472, Blantyre  
*Malaya:* QSL Manager, M.A.R.T.S., Box 777, Kuala Lumpur  
*Maldives:* via Alden  
*Malta:* R. F. Galea, 9H1E, "Casa Galea," Railway Road, Birkirkara  
*Mariana Islands:* see Guam  
*Marshall Islands:* KX6 QSL Bureau, via KX6BU, Box 444, FPO, San Francisco, Calif. 96555  
*Mauritius:* Paul Caboche, VQ8AD, Box 467, Port Louis  
*Mexico:* L.M.R.E., P.O. Box 907, Mexico, D.F.  
*Midway Island:* KM6BI, Box 14, FPO, San Francisco, Calif. 96643  
*Monaco:* Pierre Anderhalt, 3A2CN, 49 rue Grimaldi  
*Mongolia:* JT1KAA, Box 639, Ulan Bator  
*Morocco:* A.A.E.M., P.O. Box 299, Rabat  
*Mozambique:* L.R.E.M. QSL Bureau, P.O. Box 812, Laurencio Marques  
*Netherlands:* V.E.R.O.N., Postbox 400, Rotterdam  
*Netherlands Antilles:* VERONA, P.O. Box 383, Willemstad, Curacao  
*New Zealand:* N.Z.A.R.T., P.O. Box 489, Wellington  
*Nicaragua:* Mike Murciano YN1MD/W4, Box 902, Coral Gables, Florida, U.S.A.  
*Nigeria:* NARS QSL Bureau P.O. Box 2873 Lagos  
*Northern Island:* via Great Britain  
*Northern Rhodesia:* see Zambia  
*Norway:* N.R.R.L., P.O. Box 21, Refstadv, Oslo 5  
*Nyasaland:* see Malawi  
*Oklaawa:* O.A.R.C., APO, San Francisco, Calif. 96331  
*East Pakistan:* Mohd, AP5CP, Tiger Amateur Radio Club  
*Dacca Signals, Dacca 6*  
*West Pakistan:* Ahmed Ebrahim, AP2AD, P.O. Box 65, Lahore  
*Panama, Republic of:* L.P.R.A., P.O. Box 9A-175 Panama 9-A,  
*Papua:* VK9 QSL Officer, P.O. Box 204, Port Moresby (or via Australia)  
*Paraguay:* R.C.P., P.O. Box 512, Asuncion  
*Peru:* R.C.P. Box 538, Lima  
*Philippine Islands:* P.A.R.A. QSL Bureau, P.O. Box 4083, Manila  
*Poland:* PZK QSL Bureau, P.O. Box 320, Warsaw 1  
*Portugal:* R.E.P., Rua de D. Pedro V., 7-4, Lisbon  
*Puerto Rico:* KP4YT, P.O. Box 1061, San Juan, Puerto Rico 00902  
*Rhodesia:* R.S.S.R., P.O. Box 2377, Salisbury  
*Roumania:* Central Radio Club, P.O. Box 95, Bucharest  
*Rwanda:* via Congo (9Q5) QSL Bureau  
*Samoa (American):* Clark Browne, KS6AX, Comm. officer (Government of American Samoa, Pago Pago 96920  
*Saudi Arabia:* HZ1AB, 7244th ABRON-COMM., APO, New York, N. Y. 09616  
*Scotland:* via Great Britain  
*Senegal:* Ch. Tenot, 6W8BF, P.O. Box 971, Dakar  
*Sierra Leone:* Radio Society of Sierra Leone, P.O. Box 907, Freetown  
*Singapore:* QSL Manager, M.A.R.T.S., P.O. Box 777  
*South Africa:* S.A.R.L., P.O. Box 3037, Cape Town  
*Spain:* U.R.E., P.O. Box 220, Madrid  
*St. Vincent:* QSL Bureau, P.O. Box 142, St. Vincent, West Indies  
*Surinam:* QSL Manager (PZ1AR), Surinam Amateur Radio League, P.O. Box 240, Paramaribo  
*Swan Island:* Swan Island, West Indies via Tampa, Florida  
*Sweden:* Sveriges Sandare Amatorer, S-122 07 Enskede 7  
*Switzerland:* U.S.K.A., 6233 Buron/LU  
*Syria:* P.O. Box 35, Damascus  
*Tanzania:* RSEA, P.O. Box 2387, Dar es Salaam  
*Trinidad and Tobago:* Les A. Thomas, 9YALT, Los-Iros Road, Erin, South Trinidad  
*Uganda:* R.S.E.A. QSL Bureau, P.O. Box 3433, Kampala  
*United States:* See page 124.  
*Uruguay:* R.C.U., P.O. Box 37, Montevideo  
*U.S.S.R.:* Central Radio Club, Box 88, Moscow  
*Vatican:* HV1CN, Domenico Petti, Radio Station, Vatican City  
*Venezuela:* R.C.V., P.O. Box 2285, Caracas  
*Virgin Islands:* Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, V.I. 00820  
*Wake Island:* Jack A. Chalk, KW6EJ, P.O. Box 415, Wake Island 91930  
*Wales:* via Great Britain  
*West Pakistan:* Lahore Amateur Radio Society, P.O. Box 65, Lahore  
*Yugoslavia:* S.H.A., P.O. Box 48, Belgrade  
*Zambia:* Radio Society of Zambia, P.O. Box 332, Kitwe

## Strays

A self-addressed stamped envelope (a "must") will get HBR-13C builders (see pages 12 and 13 October, 1965, *QST*) a sheetful of all important modifications and improvements made in the schematic to date. Write WA4ZNI, 916 Croton Drive, Alexandria, Virginia 22308.

# SWITCH TO SAFETY!





# Correspondence From Members -

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

## APRIL ISSUE

❑ Concerning "Crystal Stable Frequency Control With Your Old V.F.O." in April *QST*, what advantage does this circuit offer over the crystal oscillator alone? It is true that any drift will be cancelled by double mixing, but so will any desired change in the v.f.o. frequency. You still have a 9.0-MHz. output no matter what the v.f.o. frequency.

Possibly a little proof reading is in order. — *James W. Lamb, W4GAP, Livermore, Calif.*

❑ The approach to stable frequency appears sound but I have two questions:

1) In the example used, why even use the v.f.o.? The output frequency is the same as the crystal.

2) By increasing or decreasing the frequency of the v.f.o. the output will remain the output of the crystal frequency. Again, why the v.f.o.? — *B. E. Lanning, W4SKT, Winter Harbor, Me.*

❑ Is the article your idea of April fool joke? — *Ed Kirchhuber, W4NLI, Huntsville, Ala.*

❑ After reading the W0JH article on c.p.s.-to-Hertz conversion I thought I had defused the April issue. Then, reading from back-to-front as usual, came the article on the very-stable v.f.o. How could you be so unfeeling? It was like taking candy from a baby. Those straight lines were so beautiful! — *Franklin M. Cist, W7ARO, Phoenix, Arizona.*

❑ Every year I forget that it is the April issue I am reading until I'm  $\frac{3}{4}$  way thru the @ & . . . ! article! — *Eugene Hastings, W1VRK, Swampscott, Mass.*

❑ Boy, studying for that Extra exam is paying off! Six months ago I couldn't understand those *QST* technical articles, but now I'm really proficient. For example, from the April issue I used the three articles combined in "Raiding the Junk Box" to convert my old v.f.o., then fed the output to an RG-8/U closed-loop dummy load and presto — an accurate means of converting c.p.s. to Hz.

Thanks, fellas, for all my new skills!!! — *Bill Shepherd, W3ZSR, Bowie, Md.*

❑ I actually tried to build a "magnetic keyer paddle" as described in April *QST*. You can imagine the laugh that I had when I finally realized that this was your April Fool's article. If it hadn't cost me so much time and labor, I would certainly vote this as the funniest April Fools article I had ever read! Keep up the good work. — *Leonard C. Brenner, K3NPC, Malvern, Penna.*

❑ The articles in April *QST* by the eminent sciolists W4TZB, DJ7HS, and W0JH were quite refreshing. The introduction to the articles was nearly accurate — after construction of W4TZB's circuit, I had the opportunity to replenish my junk box . . .

It is interesting to note that while *QST* limits itself to publishing articles of this quality during the

month of April, other ham magazines print this stuff the year around! — *Lee Jones, WB6OLD, Sylmar, Calif.*

## SHAPE UP

❑ Please, please do something to improve *QST*. I find it appalling that the journal of the largest amateur radio organization in the world should leave technological leadership to its competitors. If it is necessary to buy competent authors, then do it! — *C. R. Somerlock, W3WCP, Ellicott City, Md.*

## QST, DELIVERY, ETC.

❑ In view of your own experiences with mail, as stated in paragraph 2 of "League Lines" on page 10 of April *QST*, you should be both embarrassed and ashamed to have to print the Post Office Department propaganda paragraph appearing at the bottom of page 104.

As a thirty-one year Post Office Clerk I can assure you that it is not working that way. Service has never been worse; nor has it ever been more frustrating to the public, and you publishers should let the Department know it! — *(Name withheld.)*

[Editor's Note: We've put in some pretty strong complaints to the Post Office, with no tangible results. The purpose of that phrase in *QST* is to get members in the habit of using their zip codes in correspondence with us, not to praise the post office for its "promises."]

❑ I forgot Murphy's Law when I blamed your transmitter for all the delaystortion in receiving my copies of *QST*, and did not think of troubles in the channel itself.

The "Stampshouse Channel" is the one introducing all the delaystortion. According to "League Lines," April *QST*, it is becoming a very dangerous action to tune your station. Thing is that there is not only delaystortion, but deliveryshift, as well.

Imagine a contact with ARRL and instead of getting my honest order of wormfeed, after weeks of delaystortion, I receive a pretty feminine LSB wear.

My wife would never believe again that the L in ARRL stands for League, and instead think that it stands for lady. — *Gabriel Figueroa, Guynabo, Puerto Rico.*

## NEW HANDBOOK — continued

❑ This is the first chance I've had to look over the '68 *Handbook*, and I just want to tell you that you've done a magnificent job! Congratulations! Best *Handbook* out in years! Keep it up. — *Nels Corcoran, Jr. W1GLM, Middlebury, Conn.*

❑ The ARRL *Handbook* is a tremendous bargain as anyone who has bought reference books can tell you. My thanks to all of you at headquarters for a fine job. — *David B. Ficklin, WB6FAP, Madera, California.*

¶ I have just received my new 1968 ARRL *Handbook*, clothbound edition, from your circulation department, for which I would say thanks.

I have been buying ARRL *Handbooks* off and on in my travels in various places in Canada since the middle thirties, and they have all been of great value and interest to me and have helped me considerably.

I would sincerely like to congratulate you and all your headquarters staff writers for this new 1968 edition. In my opinion, this is the greatest *Handbook* to ever hit the market. I am very, very pleased with this new copy. The more I get into this lovely copy, the more I am pleasantly surprised. You really have come up with a wealth of material that is exceedingly well presented. I am sure going to be able to make a lot of use with this new *Handbook*, not only for my use and education, but also for several young fellows I am helping to coach towards getting their ham tickets. You can count on me to spread the good word to promote your sales of this wonderful *Handbook*. — *Phil Muncaster, VE2BYU, Pointe Claire, P. Q., Canada.*

### FREE AIR — Continued

¶ Careful, there. Someone is going to get a black eye! Through all the incentive licensing, the editor of *QST* did not find it necessary to add comments to a member's correspondence such as that following WB6VSP in the April *QST*.

I don't care whether he was right or wrong. His politics were showing and now so are yours. I'm surprised when the subject gets around to politics how no one can resist having the last word.

His mind was already made up, and it appears yours is too. Those of us who read the Correspondence for ideas, I think, are capable of drawing our own conclusions. I feel you owe OM Davidson an apology.

I do congratulate you, however, on the restraint you showed during incentive licensing, in confining your comments to the editorial column where they belonged. — *Craig G. Chanlor, W7TZL, Reno, Nevada.*

¶ I normally am not a vocal person, and usually do not write letters like this. However, I recently read Mr. Davidson's letter in the April 1968 issue, and quite frankly, I don't believe I have ever disagreed with anyone more.

In short, Mr. Davidson expresses the view that the government has no right to regulate terms as to how the amateur should be allowed to operate. Instead, he suggests that the amateur should dictate terms to the government as to how the government should be allowed to dictate terms to the amateur (Let's see you figure that one out!).

Basically, my point is this. In his letter, Mr. Davidson says we should "return to the ideal of government of the people, by the people, and for the people." This is all well and fine except for one thing. As I understand it, the principle of a democratic form of government is government by the majority. To my knowledge, there are approximately one-quarter million amateurs in the U. S. today. According to the latest estimate, there are approximately two hundred million Americans in the U. S. today. This gives the amateur the vast majority of one-eighth of one per cent of the total population. As one can see, we are a powerless group. Fortunately, thanks to the ARRL, the amateur has

a much larger voice in the affairs of the FCC. All the same, I don't see how Mr. Davidson sees fit to place us in a position to dictate terms. Quite frankly, I am very glad that the other ninety-nine plus percent of the population decided to allow me to be an amateur. — *Jerry V. Pelk, WA7EVI, Layton Utah.*

### COMMERCIAL GEAR INDEX

¶ Just a couple of lines to say thanks for publishing "Index of *QST* items on Commercial Gear" (*QST* April '68 p. 56). For me it was just what the doctor ordered as I like to dabble with older ham gear and the index does help out to locate reviews, modifications and advertisements of past ham gear. Tnx agn to ARRL and individuals who compiled above index. — *Stan Zuchora, W8QKU, Detroit, Michigan.*

### THANKS

¶ Just writing to thank you for the literature I received. I requested some hand-out material for the Jackson Tennessee Science Fair and received it special delivery just in time! The pamphlets were put to good use and amateur radio was well represented at the Regional Fair. Your interest was certainly appreciated and you can be assured that I will always be a firm supporter of the ARRL. Thanks again. — *Kenneth Gregg, WB4EQZ, McKenzie, Tennessee.*

[*EDITOR'S NOTE: We're always pleased to be able to assist with hand-out material. Please try to give us four weeks notice for shipping.*]

¶ What a very pleasant surprise to receive the League's Public Service award.

As you so aptly put it, 'The Public Service Award' is not the type of award that is specifically worked for, asked for or expected. Nevertheless, it gave me quite a thrill.

One of the many features of amateur radio, and one which I thoroughly enjoy, is being of service. I consider it a privilege to be licensed and in turn feel that any contribution I can make to be of help to others is the least I can do in return.

I still don't know how it came about, but let me thank you and those concerned. — *John H. Kantrowe, WA6PVK/W8RHH, Malibu, Calif.*

### A TESTIMONIAL

¶ I have been a member of the American Radio Relay League since August, 1964. I was an Associate Member for a year before gaining my Novice license, with the help of the League's many excellent publications, and a long-standing League member, Harold Mahlke, W8DOI. I joined the League in the first place, because so many people I talked to gave me very good reasons why I should do so. I joined out of "blind obedience" because I figured that those folks knew what they were talking about. And you know, they were very right! From time to time I get the "brag sheets" from the three leading national radio clubs. Of course, since the League is by far the largest of them, its image will seem to carry a little more dignity, but the difference goes far beyond that. The basic attitude of the League, in my opinion, reflects the true spirit of amateur radio. The many diverse articles in *QST* still manage to stay related to amateur radio, and not wander off into CB, hi-fi, and miscellany like most other electronics magazines do. Not that I object to CB (when

(Continued on page 130)



CONDUCTED BY BILL SMITH,\* WB4HIP

### QRM Via the Moon—On 1296 Mc.!

Good Friday, April 12, was a busy time for the moon. Not only was this the occasion of a total eclipse, but the Crawford Hill V.h.f. Club chose this weekend to bang away at the lunar surface on 1296 Mc. Both events came off in fine style.

We do not have complete details at this writing, as Dick Turrin, W2IMU, wants to be sure that he has heard from all participants before releasing a summary of the weekend tests, but this much is known. On Friday evening, W2NFA (the club station, Holmdel, N. Y.) worked G3LTF, HB9RG and WB6IOM. G3LTF and WB6IOM were worked again on Saturday, and a partial exchange was made with K6MYC. WB6IOM (author of the 1296-Mc. amplifier article in January *QST*) was running a ring amplifier at 500 watts output, and had the strongest signal, averaging 6 db. above the noise level. G3LTF had 100 watts output and HB9RG 300 watts. All were using parametric amplifiers in reception. At one point on Friday, W2NFA had QRM, with G3LTF and HB9RG running close to the same frequency!

### Central States V.h.f. Conference

The tentative program for the August 16-18 Central States V.h.f. Conference has been announced. W0KEI will speak on u.h.f. amplifier design and will undoubtedly display several that he has constructed, K0RZU's topic will be matching antennas and transmission lines, and W0LPE will present a program on antennas. K5WXX, well known in 2-meter circles for his noise blander designs, will speak on that subject. W1HDQ is also scheduled on the program, and W0EYE is making arrangements for a 432 MHz. antenna gain contest. I, too, hope to attend these sessions to meet more of the clan and gather column material.

Further information about the conference may be found in last month's column.

### OVS and Operating News

50 MHz. conditions were generally good through late winter and early spring with several *TE* openings between the states and South America, and some interesting sporadic *E*. The peak of the summer *E* season is upon us, and we would appreciate detailed reports of unusual *E* conditions, especially multi-hop and out-of-country contacts.

A program organized by K6EDX and K6RNQ was begun March 1 to observe *TE* propagation to South America. The tests involved several stateside

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

stations and KE1PY, OA4C and CE3QG. Openings reported thus far include signals exhibiting the typical *TE* flutter and multi-hop *Es*. WA6HXW says during 1967 there were at least four openings between North and South America that were propagated by a combination of *Es* and *TE*. This appears to have been the case on March 5 when OA4C worked a Kentucky station at 0200 GMT on what sounded like *Es*, but K4FKO says W4TZG in LaFollette, Tennessee was working CE3QG and CE3MI at nearly the same time on what was probably *TE*. This opening also permitted contacts between the Chileans and 8s. *TE* was noted March 11 when WB6NMT and CE3QG worked at 0200 GMT, and on the 12 W6ABN worked the same station, also at 0200. March 17 K5WIB in Texas worked LU4DFN at 2200 GMT.

### 2-METER STANDINGS

|               |    |      |               |    |       |
|---------------|----|------|---------------|----|-------|
| W1JSM.....33  | 8  | 1398 | W5UKQ.....29  | 8  | 1150  |
| W1AZK.....33  | 8  | 1384 | W5HFV.....27  | 10 | 1285  |
| K1ABR.....32  | 8  | 1374 | K6TQP.....27  | 7  | 1254  |
| K1WHT.....25  | 8  | 1300 |               |    |       |
| K1WHS.....23  | 8  | 1300 | K6HMS.....11  | 4  | 1258  |
| K1UGQ.....22  | 7  | 1250 | K6JYO.....9   | 4  | 1240  |
| K1MTJ.....19  | 6  | 1225 |               |    |       |
| K1J1X.....18  | 6  | 800  | K7NII.....24  | 5  | 1290  |
| K1RJE.....16  | 6  | 675  | K7ICW.....16  | 4  | 1246  |
|               |    |      |               |    |       |
| W2AZL.....35  | 8  | 1380 | W8VHG.....12  | 6  | 415   |
| K2HLA.....32  | 8  | 1300 | K9SGD.....42  | 9  | 1300  |
| K2YCO.....20  | 7  | 750  | W9DOT.....40  | 9  | 1200  |
| WB2FXB.....20 | 6  | 915  | W9AAG.....37  | 9  | 1200  |
| K2DNR.....19  | 6  | 1010 | W9YF.....32   | 8  | 1050  |
| W42PMW.....19 | 6  | 1000 |               |    |       |
| W2CRS.....19  | 6  | 710  | W0BFB.....45  | 10 | 1350  |
|               |    |      | W0DQY.....41  | 9  | 1300  |
| W3GKP.....32  | 8  | 1108 | K0MQS.....41  | 9  | 1150  |
| W3KWH.....26  | 8  | 1335 | W0LFE.....36  | 9  | 1040  |
| W3BDP.....22  | 7  | 1100 | W0EYE.....34  | 8  | 1380  |
| K30RT.....21  | 7  | 930  |               |    |       |
| K3CFA.....21  | 6  | 950  | FRDO.....1    | 1  | 5100  |
| W3HB.....17   | 6  | 677  |               |    |       |
|               |    |      | OH1NL.....1   | 1  | 5850  |
| K4IXC.....36  | 8  | 1403 |               |    |       |
| K4EJQ.....36  | 8  | 1125 | VE2HW.....11  | 5  | 800   |
| W4FT.....33   | 8  | 1080 | VE3AIB.....20 | 8  | 1340  |
| K4QIF.....29  | 8  | 1150 | VE3ZC.....27  | 8  | 1150  |
|               |    |      | VE3ASO.....21 | 7  | 850   |
| W5UGO.....42  | 10 | 1398 |               |    |       |
| W5AJG.....33  | 9  | 1360 | VK3ATN.....3  | 3  | 10417 |

The figures after each call refer to states, call area and mileage of best DX. Revised May, 1968

### 220- and 420 MHz. STANDINGS

|                 |   |      |              |   |      |
|-----------------|---|------|--------------|---|------|
| <i>390 MHz.</i> |   |      |              |   |      |
| K1J1X.....11    | 4 | 600  | K4BJQ.....8  | 4 | 500  |
| K1BFA.....7     | 3 | 225  | K4QIF.....8  | 4 | 435  |
|                 |   |      | W4FJ.....7   | 4 | 300  |
|                 |   |      |              |   |      |
| K2CBA.....16    | 5 | 660  | W5AJG.....7  | 3 | 1010 |
| K2DNR.....6     | 3 | 175  |              |   |      |
| K2YCO.....3     | 2 | 225  | K7ICW.....4  | 2 | 225  |
| K3IUV.....4     | 4 | 310  | W8RQI.....10 | 6 | 425  |
| W5AJG.....3     | 2 | 1050 | K8REG.....8  | 4 | 300  |
| VE3AIB.....7    | 4 | 450  |              |   |      |
|                 |   |      |              |   |      |
| <i>480 MHz.</i> |   |      |              |   |      |
| K1J1X.....10    | 4 | 385  | W9AAG.....12 | 4 | 600  |
| K1BFA.....6     | 2 | 250  | W9NKT.....9  | 3 | 400  |
|                 |   |      |              |   |      |
| K2CBA.....11    | 5 | 3000 | W0DRL.....10 | 4 | 565  |
| K2YCO.....8     | 6 | 550  |              |   |      |
| K2UYH.....9     | 4 | 350  | VE2HW.....2  | 2 | 350  |
|                 |   |      | VE3ZC.....6  | 4 | 510  |
| W3RUE.....13    | 6 | 585  | VE3AIB.....6 | 4 | 450  |
| K3IUV.....9     | 4 | 310  |              |   |      |

Revised May, 1968

In the far north, W8KNC/KL7 at Fairbanks, Alaska reports aurora on March 27 and 29 at 0430 and 0530 GMT, respectively. Contacts were made both days with VE8BY and KL7FNL. W8KNC/KL7 monitors 50.17 daily and will be active during the June contest. You may write him at 320 Bentley East, Fairbanks, Alaska.

More *TE* from W6ABN, who on March 28 worked LUs 1DMA, 2AU and 6DLB between 2206 and 2230 GMT. W6ABN also notes *F2* backscatter on April 2 and 3, and other South American *TE* contacts on April 6, 7, and 9. WA7FJQ, Arizona, caught CE3QG on March 31 at 1435 GMT. April 7 was outstanding; CE3QG worked 49 stateside stations in 2 hours. W4GJO in Florida heard South Americans for 4½ hours and W1FZJ/KP4 got in on the fun. The 12th was good also with CE3QG and OA4s C and BR working stateside. My thanks to those who sent reports, I'd like to hear from more OVS appointees, and especially our South American friends. W3KWH says HR2GK in British Honduras is now active with a SB-110. The line forms on the low end.

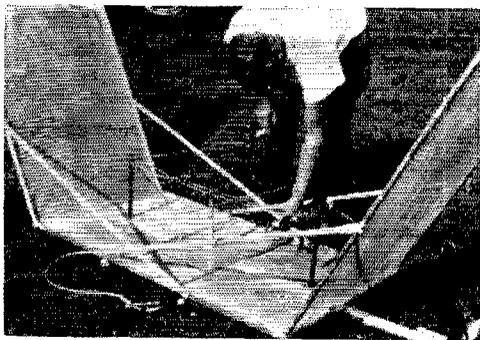
W0EYE, who had earlier announced beacon transmissions on several bands, lost his antennas to high winds just before the tests were to have started. However, Don has the 50.015 signal beamed east between 0200 and 0400 and 1300 and 1400 GMT daily. See the November, 1967 column for further details on the tests which should also be activated on 144.015, 220.015 and 432.003 by the time this issue reaches you.

For those needing Nevada, K7ICW remains very active and WA7GXM is now available. Also, W7BYF (W6DOR) is arranging schedules for each weekend in June, July and August. You may write him at 4100 Worthington Drive; North Highlands, California 95660. Need Utah? Try Bob Findlay, W6NZX/7, 2216 Wellington Street, Salt Lake City. Bob frequents the low end, s.s.b. and c.w., for scatter signals. And if you're looking for a VE5, VE5US is transmitting on 50.095 every hour and for the 15 minutes thereafter. Then for the next 3 minutes 50.110 will be monitored with a tape recorder for replies indicating calls, location, time in GMT and transmitting power of the station making the report. The automatic operation for propagation study is the work of the University of Saskatchewan Amateur Radio Club. Schedules will be arranged.

*144-MHz.* DXers found some good bursts in the April Lyrids shower. Early reports list successes on the 20th between K1MTJ, Maine, and WA4LTS in South Carolina on a 30 second burst, and K4QLF snagged number 29 from Virginia when he and W5ORH, Oklahoma, worked. On the 21st, W0EYE in Colorado and Pennsylvania's W3KWH chatted on a 90 second burst over a 1380 mile path! The burst lasted long enough for them to arrange a six meter scatter schedule, which was also quickly completed. By the way, W3KWH ended his day with a 50-MHz. contact with Argentina.

K0MQS says random meteor scatter was poor for about three months, but was picking up about mid-April. Dick is considering a fixed rhombic on California hoping to add another state, but new ones are getting more difficult after 41 worked!

W4CKB, Florida, was pleased April 21 when CO3NR, Cuba, answered a CQ! It was the Cuban lad's first day on 144 and he promises to be active on 144.075. When W4CKB worked him the Cuban station was using an a.m. only transmitter, but can copy c.w. and could probably be encouraged into active DXing. Why not drop him a letter; Milton



It is a somewhat unusual antenna that W9YOI, Chicago, has built. The 432 MHz. Moulin trough is ten feet high and 3½-foot wide, mounted for horizontal polarization, and built of angle iron and steel plaster screening. Keeping it on his 40-foot tower must be no small trick. (K9AHK Photo)

Roig, CO3NR; LaGunas 19; LaHabana, Cuba. His location is about 50 miles from Havana.

We rarely hear from Canada's first call district, but VE1PL says he has become DX-minded after some prodding from VE1AFB. The two stations are keeping schedules over a 230-mile path and find 144 more reliable than 50 MHz. VE1PL runs a kw. on 2 meters into stacked 14-foot Yagis at 90 feet. A 2N3819 preamp and 417A do the receiving. Both stations are building converters and antennas for 432.

VE3EZC is again ready for schedules, after losing his 20-element array in one of those tough Canadian winter storms. Cliff has put up a pair of wide-spaced 8-element Yagis for 144 and a pair of 15-element Yagis for 432. Cliff is a fine operator, but tricky at times when he doesn't believe the signal reports he receives, and will accept tropo or meteor scatter schedules.

K6KYO says interest in 144 is increasing on the West Coast as more stations employ s.s.b. and noise blankers in heavily-populated urban areas. He says ducting is quite common and that a number of stations are experimenting with so-called aircraft scatter. That type of scattering has been observed to increase signal strengths by as much as 40 db. How much other work is being done with aircraft scatter?

Several periods of good to excellent tropo conditions occurred in early spring. Especially noteworthy was April 7 when K4IXC started the day working WA8TYF/4 in Kentucky over a 750-mile path. K4IXC says the contact, made at about 1415 GMT, may have been sporadic E, but K4GL in South Carolina was hearing both ends of the contact and says "tropo." Whatever the mode of propagation, we know that April 7 produced *Es* and *TE* to South America on 50 MHz., and that the evening hours brought extremely good tropo conditions from South Carolina to New England and all points in between.

A considerable number of stations in the midwest and east are monitoring 144.1 for sporadic E as mentioned in last month's column. When conditions look favorable, midwestern stations will transmit the first 30 seconds of each minute, listening towards the east the second 30 seconds. We are most interested in learning immediately of any such observed openings.

(Continued on page 132)

# YL news and views

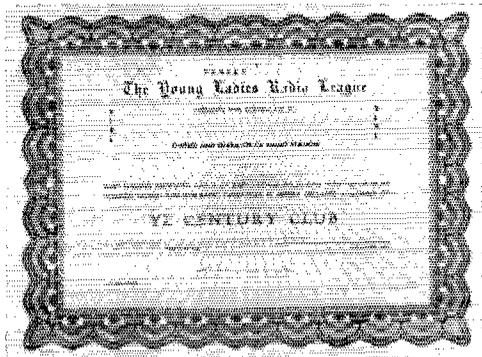
CONDUCTED BY LOUISE RAMREY MOREAU, \* WB6BBO

## 100 YLs

CERTIFICATES are the tangibles of amateur radio. They mark the achievements we have made and are, in a way, the only method of showing our unlicensed friends what we have accomplished. After we've been on the air for a while we find we have acquired quite a rainbow of these pieces of paper that are available for all sorts of operating activities. None are really easily acquired, which is why we display them so proudly. Some are much more difficult than others, but each one signifies a certain goal, or phase, of amateur radio.

One of the more difficult is the YL Century Certificate (YLCC). Think it isn't? Of the entire amateur radio population only a fragment are YLs. No one has ever come up with an exact total because so many names can be either masculine or feminine, but it has been estimated that about 9000 or 10,000 are YLs. The first step is to try to find and work 100 different stations. Not too easy because among all the thousands of signals we hear on all the amateur frequencies, we must sift out only the feminine operators. Once this has been accomplished, and the contacts confirmed, then it is possible to acquire the lovely certificate.

\*YL Editor *QST*, Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, Calif 91001.



YL Century Club Certificate

Acquisition of YLCC is not the finish of this particular quest, there are also endorsement stickers for having worked 50 additional YLs. Since this award has been first issued by YLRL, there have been 756 certificates and 754 endorsement stickers awarded. W2QHH holds the record of having worked 1500 YLs. No one is close to Howie, but others with enviable totals are: W4SGD, 1000; W8HWX, 750; K5OPT, 700; W2OWL and K5BNQ are tied with 650 each; K6EXQ and K6KCI are another dead heat at the 550 mark. Those who have worked 500 YLs are: W1YPH, W1RLQ, W1ZEN, W4VCB/3, W4HLE, W5JCY, WA6AOE, W6BIS, W6YZV, W7KOI, W8NAN, and K9GIC.

Recently some of the privately published lists of various certificate regulations have omitted some of the requirements for the YLCC award. This has resulted in disappointment for some of the applicants. Here are the rules:

- 1) Two-way communication must be established on authorized amateur bands with stations, mobile or fixed, operated by *100 different licensed women amateurs*. Any and all amateur bands may be used.
- 2) All contacts must be made from the same locations. Within a given community one location may be defined as from places no two of which are more than 25 miles apart.
- 3) Contacts may be made over any period of years, provided only that all contacts are from the same location.
- 4) Contacts with YLs anywhere in the world are recognized, provided only that confirmations clearly indicate the stations were operated by duly licensed women amateur radio operators.

\* 5) *100 QSL cards, or other written communications, from the stations worked confirming the*



Onie Woodward, W1ZEN. YLRL custodian of the YL Century Club certificate.

necessary two-way contacts, accompanied by a list of claimed contacts, including the full name of the operator, alphabetically arranged (last name first), the call letters, and the date of each contact must be submitted by the applicant directly to the YLCC custodian. Sufficient postage must be sent with the confirmations to finance their return by first class mail. The YLRL will not be responsible for any loss or damage to same.

6) Endorsements: Confirmations of contacts, accompanied by alphabetical list, as described above, from stations operated by additional YLs may be submitted for credit each time 50 additional confirmations are available. Endorsements will be made to the original certifications as application is approved. Gold stickers will be awarded to applicants who have worked their additional contacts from the same location (or within 25 miles radius). Silver stickers will be awarded, provided *only* that the holder of the certificate, in moving, retains the same call letters that appear on the original certificate.

All inquiries regarding the cards, applications, or the certificate should be addressed to the Custodian, Onie Woodward, W1ZEN, 14 Emmett Street, Marlboro, Massachusetts, 01752.

### Barbara Buford, WAZIPA

A desire to be able to chat with her husband in Las Vegas, during the summer months when she was in Los Angeles, plus a ten-year interest in radio, made Barbara decide to get a license for herself.

A member of the Las Vegas Amateur Radio Club, the Las Vegas Repeater Association, and MARS. Barbara's main operating frequencies are on v.h.f. 6-meter MARS activity is "low band" for her because her major operating time is spent on 2-meter f.m. and 432 Mhz.

Barbara has found that radio has opened new doors for her in her work, as well as in her scouting activities. It is a great help in teaching electronics and communications to her students. She also uses it when on camping trips with her Girl Scout troop. They go to very remote areas in southern Nevada where radio is the only means of communication.

Besides being a Den Mother in Cub Scouting, and an Outing Assistant in Girl Scouts, she teaches Junior High School Sunday School. Both she, and OM, Tom, K7TDQ, are very active in Civil Defense, and ham travel-trailer groups.



Barbara Buford, WAZIPA.



Rare snapshot of 1RA (now W2RA) Robert Anders, and 7CB (originally licensed as 7FG in 1917) Winifred Dow. Picture taken in Tacoma, Washington, in 1920. (photo courtesy W2RA).

### Omissions and Corrections

The April *QST*, YL News and Views, carried a partial list of the first YLs in amateur radio. Some corrections are necessary to make the list complete.

1910 Gernsback *Blue Book*

OHK, assigned to Henry Kalning, and Olive Heartberg, New York, N. Y.

1911 Gernsback *Blue Book*

AB, Alice A. Ball, Seattle, Washington, JAS, Joyce A. Sherman, Bowling Green, Ohio.

Ed Lamb, W7HJU, sent information that "9TZ, Rea Lamb" listed in the 1916 *Government Call Book*, was his brother, and definitely *not* a YL.

There has been some question as to whether the "Glass" in the 1910 *Gernsback Blue Book*, was a YL since the first name was not given, W6YPM assures us that Miss Glass was indeed a woman. She was one of the students of Douglas Perham. With the addition of the OHK call, we have Olive Heartberg as well as Miss Glass as the earliest known YL operators, in 1910.

### Last Call for Denver!

Not long after this issue of *QST* is received the gals will be gathering in Denver, Colorado at the Airport Holiday Inn, for the quadrennial YLRL International Convention. This event is the equivalent of midnight at a masked ball when the call letters suddenly reveal the faces and personalities of so many with whom we have developed firm on-the-air friendships, but have never met.

It isn't too late to register, so if you have put it off and would like to attend, just come and join the fun. All YLs, whether YLRL or not, are welcome.

The Colorado YLs have applied for a special YLRL Convention call, not sure yet whether it will be WA0YL, or K0YL, listen on 7.250 s.s.b., 14.265 s.s.b. Tangle Net at 1800 GMT Thursday and find out. K0ZSQ, and K0DCW will be in charge of the station. W0HEP is in charge of the a.m. station on 29.60 Mhz. Any YL who wishes to operate the station must have her license with her.

Marte, K0EPE, chairman of this convention advises: "YLRL '68 is planned for you to have a wonderful casual week-end. You won't need to be "too fancy" at either the luncheon or the banquet."

(Continued on page 138)

# How's DX?

CONDUCTED BY ROD NEWKIRK,\* W9BRD

## Wow!

Ever since he sharpened up his beam we hadn't heard much from Grommethead Schultz. We knew he was active, though, and very busy as chairman of the club's Air Pollution Committee. *He* was the guy who dug up our 1968 DXHPDS DX Hog of the Year and issued him the Ruined-10,000-QSOs award, earning among many of us the tag Sherlock Schultz. Rig troubles? We wandered over to check.

Found him snooping on 20, transmitter filaments off, surrounded by a flock of scribbled tables, graphs and charts. "Ah, a *new* one!" he shouted, checking a jumpy oscilloscope pattern.

"New what?" we asked. "All we hear is noise."

"That's it!" he snapped, consulting his papers. "New oil burner at 7509 Fisk street."

"Come, now, Grom. Without triangulation?"

"I triangulate by phased reflections off the Wimple factory in that quadrant," Schultz barked impatiently, logging his catch and swinging the quad. We shut up, watched him closely and listened to his running commentary.

"Hmm — Mrs. Flubb has a new mixer over on Fourth avenue. Six minutes. OM Flubb hates waffles — must be pancakes. . . . Oh-oh, more guppies at Fobble's, another fish tank aerator. . . . Krepe Laundry is a half hour late at the Smiths'. She makes him ring two longs and a short. . . . Flynk overdid it again last night. Shaving at *this* hour. . . . Grandpa Phiff's bursitis is kicking up, hot-pad right through lunchtime. No, he didn't just go away and leave it on; it's jiggling. . . . One-two-three, scratch-scratch. Edna Mulch just switched from *Edge of Blight* to *Forever Go-go*. Lousy contacts on Eight. . . . Ouch! Glurk's phone dial, homebrew extension. XY7-5775, short call, doubtless another sell order to Byam & Flinch, his broker. . . . Ah, the Blapps' TV. Radicals, you know, always watching Channel 68. . . . Radar range at Yeesh's Grill is turning out extra pie a la mode today. Oh, sure, the Caribou luncheon. . . . Uh-h-h — now *this* is interesting! . . ."

We craned over Grommethead's shoulder. He was working up a quick graphic from a fresh noise source. "What is it, Grom?" The drawing took shape. *Some* shape!

"Elementary," chuckled Schultz. "That cute blonde over on Brack street. She's quite good with her aunt's old sewing machine. Unless we missed part of the message it's a one-piece bikini."

## What:

What, indeed — *what* a year for DX! Activity has boomed to the point where we're forced to further subdivide our "How's" Bandwagon tours. This month, to stay within space allotment, we'll spot-check the bands on a phone-only basis, giving codebounds the July limelight. Twenty-meter activity was scanned in the past two columns, so 14 Mc. draws a pass. As usual, figures in parentheses are kHz. above the bottom band limit, numerals outside parens being GMT whole hours. Up, up and away! YY . . .

**75 phone**, though warm-weather atmospherics move in up our way, still may turn up C'E6EZ, CN8AW, CR4BC, CTs 1LN 1M Q 2AA 2AP, scads of Gs and DJ/DK/DLs, EA3JE, EP2GI, ET3s FMA USA, F3RT, FP8CY, GW8AX, HBs 9HT 0LL, HC1TH, HI8LC, HK3RQ, HP1JC, HV3SJ, JW2BH, K4RSH/KG4, KP4ST, KZ5s ML MV, LA2PH/mm, MP4TAH, OA8V, OD5EJ, OK1XN, OYs 4OV 7ML 7S, PZ1CF, SM4GZ, SP6AAT, TAs 1HA 2BK, TF5TP, TI2s NA WR, UAs 2KAW 9KLV, UD6BR, six VO1s, VPs 5AA 7NS, VS6DO, W1PZJ/KP4, YUs 2HDE 3CTN, YVs 4HN 5AXU 5BBW 5BTS, ZB2s A AP RM, ZDs 3F 8NK, 4A1AC, 4U1TU, 4X4s CW MR RW WN, 5W1AT, 5Z4s KL LG, 7X6AH, 8R1G, 8Z4AB, 9J2BC, 9M2s DW and NF, mostly sidebanders between 3700 and 3800 kc.

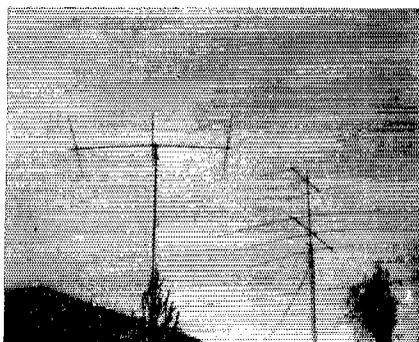
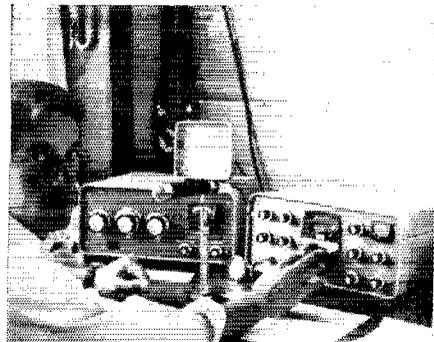
**40 phone**, described by Ws 3DWG 8YGR, WB2UVD and s.w.l. P. Kilroy with help from the clubs new-hawks — offers CN8AW, CRs 4BC 6EL, CT1LN, some DJ/DK/DL and G chaps, DUs 3FL 9AO, EAs 3JE 8BQ 8EZ, EL2AJ, EP2GI, ET3FMA, GW8AX, I1KBD, IS1CZQ, JA1SVL, a half dozen KH6s, KL7FMW, KP4s AJ ATQ CQY (235) 3-4, KR6UD, KV4EY 8, KX6BQ, KZ5s MW NX, MP4BEU, OA6BU, OY7s, PA0XPQ, PJ2CU, plenty of PYs, PZ1CF, SM3CXE, SVs 1AB 1BL 0WL, TA2BK, TI2s JIC NA, UAs 2KAW (78) 2, 9FC 9KDL, UR5KAW, VKs 2FU (90) 5, 3ZL, VPs 1PV (225) 12-13, 2AC 2SC 9BY 9DL, VR2DK, VS6DO, YNs 1BCD 3KM, ten YVs including ZDF and 9AA, ZB2AP, ZC4s CN RB, oodles of ZL and ZS friends, 4A1s CNN HT SD 2, 4X4s IX VO, 5W1AT, 5Z4AA, 8P6BH, 8R1G 8, 9Y4s AR 0L LA VT and that magnificent multibander, 7X6AH.

**15 phone**s *way* out, judging from reports by Ws 2DY 3DWG 4JVN 8YGR 9LNQ, K4TWJ, WAs 1CJE 1DJG 3DSD 5PIF 5PUQ 7AUW 8SLW 9RVR, WB2YEM and Mr. K., concerning such dandies as AP2s AD 13, SG



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

— Reprinted from August 1956 QST



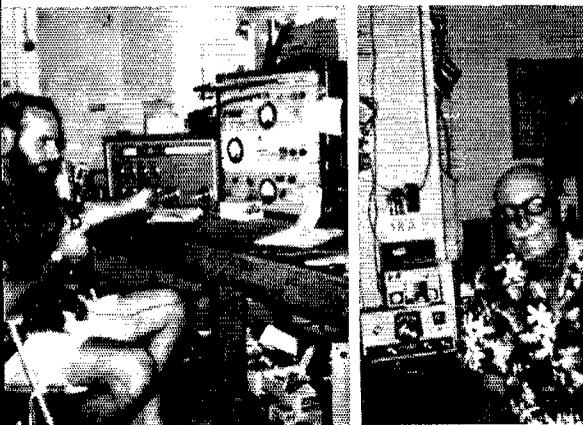
HC5s KA and EJ, left and right, share this gear at Cuenca, frequenting 10, 15 and 20 meters with homegrown wide-spaced yagis. "Sixty per cent of our DX is worked on 10 where one can avoid the 59 QRM barriers," write Ted and Ernie. "Wyoming and North Dakota were our most difficult States."

(335) 11, CE5 3BK 6EZ 9AT 1, 0AE (255) 14, CN8s BB ML (305) 11, CB, COs 5PP 8RA, GP5 5AA 5AK (328) 22, 5EC (322) 23, 8AU, CRs 3AO 4AC 4AD 4AE 4BA 4BJ 4BL 5SP (325) 21, 6AK 6AO 6CK (300) 21, 6DU (292) 23, 6GM 6GS 6IU 6KT 6LI 7BF 7CY 7DS 20-21, 7GJ, CTs 1JJ (300) 13, 2AA 2AC 11, 2AP (300) 14, 2AR (292) 19, 3AM, CXs 7AP 8XD, DM2AND, EAs 6BG 14, 6BJ 8BJ 8BQ 8FG 19, 9AQ, E1BAK, ELs 2A 2AL 2NH 2V 2Y (220) 18, 9A, EP2s DA DW, ET3s FMA (268) 23, RB (340), REL 21, USA 22, FBSWW, FG7s XM XT, FO8s BS BV, FP8CS 17, FR7ZD 4, G6ZY/CN, GC3s DVC 19, MLR 19, HB0AG 16, HC5s 1MF 1MX 1WJ 8FN (300) 23, H1s 3AGS LAL 15, HK5 5AOA 6F1 7PU 6A10BKW 0BKX (260) 21, HL9s KA KD KITY (310) 2, HP1s PC RC, HR1s CAS KAS (340) 15, taboo HSs 1CB (250) 17, 3DR (298) 16, 3RF, HV3SJ (290) 19, IS1s EP (350) 14, PEM PPB, IT1s ATK JR, JAs 1DWN 1EDZ 2AA 3COX 3FDA 3HVC 3MV, JH1s BED UJ (300) 10, JWs 2BH 14, 6GL, Ks SNHW/XV5 0LL/KG6, KAs 2KK 5, 5MC (345) 10, 7AB, KC4s USB (365) 23, USM (340) 2, USP, KGs 4AM (412) 16, 6AAY (310) 9, 6ALY 6SK 6IG, KJ6CD, KL7BJW, KM6BI (310) 22-23, KP4s CRD DBR 23, TIN, KR6s AX (330) 16, CF CL DI, KJ UD (320) 5, USA, KR8EA, KS4AE (295) 21, KV4s AD FA FL, KX6s BQ (410), CU (331) 3, DC GJ (320) 10, FM (310) 2, KZ5s AA IK 22, WH, LA0AD (190) 3, LU0F, LX1AE, LZs 1KSA 2KKZ (305) 17, MP4s MAY (355) 9, MBB MBC (312) 16-17, OAs 4AY 4CL 4WG 6BU (312), 0ENP, OD5s EJ (248) 16, ER, OEs 348A 3RE (270) 14, 5XEB, OY5S (300) 13, PJs 2AQ (300) 16, 2CC 3CD 5BC (340) 22, Pys 4BLH 9HL (200) 23, SPs 5AKG (322) 17, 6AAT, SVs 1DL 0WJ 0WII 0WL 18, 0WM 0WP 18, 0WQ, TAlBN, TF2s WJZ WKM (300) 21, WKR WKV, TCs 7BS (265), 9DF (225) 18, 9XX 2, TI2s IO (190) 13, JCC LA W, TJ1s AG (300) 22, AJ (356) 21, AL (245) 12-13, TU2s AE 21, BC BO (290) 7-8, BX, UAs 2KBD 2WJ 9BE 9ET (345) 2, 0H (250) 23, 0SK, UB5s FG WF 15, KAW, UD6s BR CC 5, UF6PE (298) 9, UH8A, E, UJ8K 5, UL7BF 5, UQ2s AN 12-13, IQ, VKs 9GN 21, 9LR (388) 10, 9WD 9XI 0JW 14, VPs 2AA (300) 15, 2AC 2DAE 2DAJ (268) 22, 2GBC (323) 3, 2KW 22, 2GBC (323) 3, 2MK (350) 18, 5AA 5AM 7NO 0, 7NS 3, 7NV 8HZ 8JC 9FU, VR1L, VSs 6BE 6CO 6D0 9MB, VU2s BK CQ DKZ KX (190) 7-8, VR6TC (355) 0, VO9L, XW8AX 15, YAls HD ZC, YJ8BW, YN1s ER GLB (366) 13, RBF, YO5LC, Ys 1MS 2, 1UPE 23, 3FH (205) 19, ample YVs, YU4IM, ZB2s A (340) 12, AZ, ZC4s GM RB 14, ZDs 7KH (320) 19, 8HAL 8NK 8RK 9BE 9BJ (330) 17, ZEs 6JL 8JN 8JY (280) 20, ZF1Es, a mifut of ZLs, ZSs 3JJ 3YF 9L, ZVs 5BR 5KA 5KN 6CW, 4As 1CK 23, IYG 3, 3DE, 4U1TU, 4X4s CW KM 7E, 4Z4HF 18, 5H3s JL (365) 16, KJ 19, KZ 22, 5N2s AAF 21-22, ABH ABK, 5R8s AH 18, AS, 5U7s AC (330) 17, AK 22, AN AW, 5W1s AS AT 3, 5X5JK, 5Z4s KK (330) 20, KO, 6O1GB (360) 20, 6W8s BM DY (302) 21-22, 6Y5CB (185) 18, 7P8AR 21, 7Q7EC, 7Xs 2AH (260) 19, 0AH 10-11, 0VP 0WV, 8P6s AY CC CE (280), 8R1s C G (350) 21, S (373) 9, 9G1s DM FF FL HM (300) 15-16, 9H1s R 15, S (300) 9, 9J2s BC WR, 9L1s JJ (300) 23, NL 9M2s CP 12, PO, 9N1MM (319) 13, 9Q5s CE DG 22, DR EH HF (232) 20, QG TR SE (354) 20, 9U5s AF CM CR DP (414) 20, SK (265) 20, TT, 2V101, 9X5s AA (313) 18, IH (355) 19, MW (300) 18, PB (287) 23, 9Y4s LA LO MM 1 and TP (248) 16, about eighty per cent s.s.b.ers.

**10** phone swings north-south again for the summer but don't count out other paths entirely. Late spring finds Ws 2VOZ 4VQK 5GQZ 8YGR 9LNO, K4TWJ, WAs 1CYT 1DJG 5PUQ 8SLW, WB2UVD, K6C6IC, KH6BZF, KP4DBJ and Turner Kilroy awaiting multicolored wallpaper

from such as CE5 3RC 17, 3TV 3UQ 0AE (322), CN8s FV (655) 19, MZ, COs 2HQ 2JC 2JL 5PP (420) 18, 7HQ, CPs 5CC 17, 6EK (615) 16, CRs 4AJ 4BC 16, 6AS 6BF 6GS 13, 6JT 6KC 6KT (600) 10-11, 7CZ 7PC (580) 18-20, CTs 1MO 1MW 2AC 2AO (430) 19, 2AP 3AS, CXs 1AAQ (650) 23-0, 2CO 6BA 9PP, DUIFH 0, EAs 8FO 0AH (635) 16, EI1BB (525) 19, ELs 2AL 2E 2Y 8I (552) 13, 8J, EPs 2AA 2BQ 2GI 3AM, ET3s FMA (645) 16, REL USA, FG7s TH XL XV, FO8BV (610) 3, G3UHR/VO2 19, GC2FMV 13, GD3RFK (680) 15, HB0s AG (577) 17, LL (502) 16, HC5s 1PC 1WF 17, 2OA 5EL (628) 14, 5KA 8FN (55) 16, HG6KRD, H1s 8AGS 8MMN 8XMT (571) 15, HKs 1BHP 3CI 3RQ, HL9s KA 23, TS 0, HP1s PC RC, HR1s 1JML 4DHS, banned H1s CB (552) 8, DR (621) 10, HV3SJ, HZ1AB, IT1JR (570) 15, JA9BSQ, KI1FS/KG4 (570) 17, KC6s AO BY (640) 0, KGs 4CO (539) 15, 6AAY (605) 21-23, 6ALV (580) 23, 6ALY 6ARN (560) 22, 6IC (560) 22, 6SA (630) 6, 6SM (610) 23-0, KH6s BI (590) 20, 6ZL (570) 21, 6QA (510) 22, SP (670) 23, KL7s AHB ALZ (527) 22, PPR (623) 21, WAH (597) 23, KM6BI, KP4DCL, KR6s QF 0, RD SE (595) 1, TAB, KS6CQ (610) 23, KV4AD (640) 19, KW6EJ (550) 22, KX6s BU (518) 23, FA FH (622) 1, KZ5s JJ WH (900) 21, LUs 2ECC (570), 31JY 5DJZ 6BM 8DB 16-17, LX1RM, LZ1s AM (570) 15-16, UF, MP4s BIA (610) 13, BEU (560) 12, BPJ MAY, OAs 1KW 4JR 4OS 4PH 4YL 5AY 6BU (600) 2, 7AY, OD5s AI 12-13, BA (640) 9, BE (570) 16, BZ 13, CN 15, EJ 16, EP 9, OHs 2BEM 5BA 5TS, OX3WX, PJ3CC (563) 19, many PYs including 9AI (570) 18, PZ4s BK BX (688) 22, CE, SVs 1AA 1AE 1AN 0WII (735) 12-14, 0WL (640) 16, 0WU, TAls IB TV, TCs 8IA 9EP (595) 18, 9JN 9RN 9US 9XX (581) 19, TLs 2JIC (612) 2, 2LA (590) 18, 8CAB, T3AJ, TN8AA, TU2BQ (602) 15, UAs 1EFA 1KAB 13, 2ACS 14, 3AAs 3ACF 3AFB 3APK 3DRG 3KPM 3KHD 3MPE 3MRH 3NUE 3PJG 3RWB 3SW 13-14, 9KBW 91DM 9TE 0KJ, UB5s APK BZs DJI FGC GFT GPU (WC 14, KPU, UC2EBB, UD6s CR (620) 11, UF6CR, UH8s AE (610) 12, AWE, UJ8KAJ, UL7FR, UNIKDI, UO5s KAT OT TI, UP2s OV VPV, UQ2s AN 15, ASO LR, UT7s KHT OV VP, UVs 3AJ 3AM 3BA 3ABW 3AEB 3AGA 9PP, UAs 1KAK 1KAT 3KPO 3LZ 6AU 0SX, UY5s HB HI (415) 10, VKs 6CF 6KL (604) 12, 6MK 6NM 7NR 8AG 8KK 8NO (600) 22, SUG 9DH (598) 10-11, 9XO, VOIDW, VPs 1PV (600) 16, 2AC 2GSM 18F (532) 16, 2MK (600) 17, 2VM 7NO 8HZ 8JT (600) 16, 9DL 9FU 9GB (510) 18, 9CP 9L 9WB (635) 15, VOs 8CC (600) 16, 9DH, VRs 1L 7, 2DK (595) 20, VSs 6FX 9MB, VU2s JM KX QR, WA2CWG/OA6 (600), XW8s AX (597) 2, BS (580) 9-10, BX, YAlAD, YN1GLB 16, YO211, YJ8WV, YS1XE (555), YU8NEQ, piles of YV fellers, ZB2BC 18, ZC4s MO (620) 14, RB, ZVs 3E 5R 7DI (715) 13, 8LNR (736) 22, 8NK 15, 8RK (642) 14, ZEs 1CX (630) 19, 2JA 15, 2KL 5UJ 8YV, ZF1GC, ZLs 1HW (520) 23, 1TU (599) 12, 2JK 22, 3BM (481) 20, 3CN, ZPs 5JB 9AC (446) 20, ZSs 3HT 3HX (500) 16, 9L (663) 3 and other South Africans, 4As 1AE 1DO 1GJR (548), 2WG 3DE, 4U1TU (580) 18, 4X4CW (610), 5A0ZZ, 5H3KJ 17, 5N2s AAF ABG 12-13, 5R8s AX (630) 15, CQ, 5U7AN, 5V4EG, 5W1As (670) 0-3, 6Y5s GB NY, 7P8AR, 7Q7LZ, 7Xs 2AP 0WV 15, 8P6s AH BR BU CA CC (600) 17, 9G1s KM (612) 16, SV, 9H1s BA BR, 9J2s BC DT 15, WR, 9K2s BK BV (580) 15, 9L1s GQ (570) 13-14, JW, 9M2s NF (600) 10, PO PU (625) 11, 9N1MM, 9Q5s CP (650) 13, DG (350) 21, RB (280) 20, IF ME (660) 14, PC (350) 21, 9U5BB (655) 11, 9X5AA (605) 15, 9Y4s LQ and VS, about four to one in favor of single sideband.

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VR3DY (left) rolled up 4200 QSOs in fancy Fanning DX work earlier this year, including 1869 phone contacts in the ARRL DX Contest. Ed used an HW-32, HX-500, SX-101A, 18-AVQ, dipoles for 20 and 40, and a home-spun triband quad. VR3DY now signs KH6GLU at the home pad but Phil, VR3C (right) remains available as the island's only resident ham.

I still need his logs for last November and December." . . . . The widow of W7MLL tells W4YON she receives many requests for ET3FMA QSLs. Slip-up somewhere . . . . "Anyone needing QSLs from EL2s AW and/or D for QSOs between October 25, 1965, and March 18, 1968, should send cards with s.a.s.e. to K3JXO," instructs 6L2D . . . . W0DAK credits 9L1TL with the Attractive QSL of the Month.

Later on we'll review the c.w. action of (10) Ws 1AYK 1VAH 3HMR 4YOK 5QZG 8YGR, Ks 1FKW 3CUI, WAs 1GYT 1DJG 1FHU 5P1F 5PPZ 8MCO 9QBM, 11ER; (15) Ws 1AYK 1DAL 1VAH 3HMR 4YOK 7BE 8IBX 8YGR 9LNQ 9CVZ, Ks 1FKW 2UPD 5MHG 5YUR, WAs 1GJE 1CYT 1DJG 1FHU 3DSD 4YOK 5MIN 5PUQ 7BE 8PVN 8VRB 8RVE, WBs 2FPG 8SK, WNs 11ON 11SH 4GRN 4GSS 4GTI 4IF 8YHN, 11ER; (40) Ws 1DAL 1VAH 3HMR 4YOK 7VE 8YGR, Ks 5MHG 9UIY, WAs 1CYT 1DJG 1FHU 3DSD 5MBC 3PUQ 8MCO 8PVN, WBs 2FPG 6UBC, WNs 3INI 4GSS 4GTI 4IF; (80) Ws 1DAL 1VAH 1SWX 4YOK, WAs 1CYT 1FHU 1GXE 8MCO, WNs 11ON 4IF; (20 phone) Ws 1AYK 1DAL 7BE 8IBX 8YGR 9LNQ, Ks 2UPD 9UIY, WAs 1FHU 5PPZ 5PUQ and 8KRE. Gotta hit old 160, too, where great things are happening! WIBF reports the east coast gang grabbing ZC4RB and Z4LE for some firsts in late March on 1.8 Mc. Yep, '68's been just first rate — so far.

### Where:

**OCEANIA** — "All QSLs owed by VK6IA of Macquarie will be forwarded as soon as I get clear," assures VK7ZKJ, also busy with VK6CR's confirmational matters. Ill health and a change in address (see list) further complicate Greg's efforts. "Unlike VK6MI, Dave requests that his VK6CR QSLing be done on receipt of inward cards only. Once things get started replies should really fly fast." . . . . VK9GN advises, "No QSLs left here. All requests must go to my manager, K7YDO, S.a.s.e. for direct reply, of course, and please use only GMT." . . . . QSOs with VR6TC after February 26, 1968, are to be confirmed by Tom himself from Pitcairn, according to G. Watts and *DX News-Sheet* . . . . "Thanks for all self-addressed stamped envelopes," acknowledges KG6IC operator K8WXY.

**ASIA** — AP2AR undertook an AP5CP QSL hunt in K0EZH's behalf but found the old Tiger Amateur Radio Club station QRT and dismantled, personnel departed and scattered. "Nobody knows where the logs are or where QSLs have gone. Apparently there is no sign that TARC will reactivate." . . . . K3UWQ apprises, "I'll be acting as QSL manager for HL9US starting March 28, 1968. Self-addressed stamped envelopes will be necessary for direct replies to W/Ks and non-s.a.s.e. requests will be answered through the bureau once each month." . . . . "Had to wait till I got back to the U.K. to get more QSLs," writes ex-V89AJH to WA4UHK. You can catch up with Joe via his current G3SMO address . . . . "I'm still QSL manager for 9K2BV but my call is now W5GM," notifies ex-W5EGR, specifying the customary s.a.s.e., or s.a.c. plus International Reply Coupon, from each petitioner . . . . ZC4GM (G3MCO) writes, "My QSLing has always been 100 per cent. Now that W3CTN is looking after it, exchange will be even more efficient." . . . . *DX News-Sheet* notes that 1967's 4W1C QSLd via HB9MP, the 1964 version via HB9NL . . . . 9M2PO helped WB2CGW dig up the ex-9M6MG address in the list to follow. "A note to lan met with immediate response and QSL."

**AFRICA** — "Again please stress that U.S. postage is all not usable in Canada," requests VE4SK, new QSL side to 6W8DY as of this March first. Skip also assists DL5YL, ON8XE, TF3EA and VP1SB . . . . "I was QSL manager for ZD8FNS from December 26, 1966, until December of '67 when he transferred to Guam," observes WA4UHK. "Haven't heard from Jack since then, and

**EUROPE** — SKs 2AZ 3AK 4AV 5AA 6AB 6AG 7AX 8AI and 8AL quickly put Sweden's new club-station prefix into circulation. The SL tag still holds for military-amateur installations. . . . W4SSO has no QSL managerial connections, OY or otherwise, and OY7ML says there is no OY1Z . . . . WB6LJO, QSL tender for W/K/VE/VO QSOs with YU3TXT, has the latter's February and March, 1968, logs on hand. Want yours direct? Send s.a.s.e. . . . . F9UX tells W1SWX he has no Andorra QSL connections . . . . W4YOK says that operator Mike of UB5KED collects stamps — hint-hint.

**SOUTH AMERICA** — "Logs are slow in coming from CE6AE, so outgoing QSLs also are slow," remarks WA5PUQ. "I have records for October 1 to December 13, 1967. Anyone who has not received a card for QSO between those dates please reapply. QSLs arriving without s.a.s.e. are eventually answered via bureaus." . . . . HC5KA reports, "QSLing for HC5E EJ and KA has started via VE1ASJ, also from Cuenca for cards coming direct." . . . . WB6SSO has no QSL managerial arrangements with CE6s or 5U7s. TI8ABL keeps Steve quite busy enough.

**HEREABOUTS** — For especially quick QSL response "How's" correspondents Ws 1AYK 1DAL 1DVT 1SWX 8YGR 0DAK, Ks 2UPD 9LFB, WAs 2HUU 5HPV 5MIN 5PUQ 8SLV, WNs 11ON and 8YHN nominate the following colleagues as your "QSLers of the Month": CE24J, C06RAI, C1R6K, DL1QV, EA0TU, E17BK, Fz 5LD 8TC, FG7XK, Gs 2NN 3PUM, GD3AIM, HG1TH, HL9KA, IIs ER, LLZ, J11HIM, KC4JSM, KG6SA, KH6EDY, LX1CF, OZ7BI, OEs, IZ 5ANT, PA0PN, PJ5MJ, SM5CAK, UC3WP, VK6RU, VP9GA, WGs 8CBY 8CC 9JW, VR4TC, VU2s KV, LN, VZ, YA3TNC, ZL4HZ, ZS6VJ, ZW1AT, 7X9s AH, WW, 8P6BU, 9L1TL and 9U5BB, as well as QSL tenders Ws 2CTN 4ZKI 6BCT 8U7Q 9QKC, WA9AE3, WB2NZU and W3TNC's OM. Any fast ones we missed? . . . . *Ha!* W9LNC awaits word on JT2AD, and WA8SLW wonders about HB9AG, KX6FN, OH0AA and 4M4A. Any 'alp? . . . . K9UY and WA2BPL stand ready to perform as QSL managers for needful overseas DX ops . . . . April fool! Grabbed up eagerly as possible "new ones", those 4A fellers turn out to be XEs bearing, in most cases, their normal suffixes. Something to do with the Olympics, perhaps. Incidentally, 4A4A's QSLs go via 4A2YP from North and South America, others via DL7FT . . . . "I am forced to resign as QSL manager for VP6BW," regrets WA9IBT. "The one shipment of logs from Bruce came over a year ago, no word since. Try direct." . . . . Let's turn the mailbox upside down and see what individual recommendations flutter out. Remember that each datum is necessarily neither accurate, complete nor "official". . . .

- BV2A, Tim Chin, 6-144 Hsin Sheng S. Rd., Section 1, Taipei, Taiwan
- CE4LO, Casilla 52, San Fernando, Chile
- CT2AS, Box 183, 1605th CAMS, APO, New York, N. Y., 09106
- ELs 1I 2AB (via W2YTO)
- ex-EL2s AW D (to K3JXO)
- EL2NJ, Box 1445, Monrovia, Liberia
- EP2EE, % U.S. Embassy, Box 500, Tehran, Iran
- F6ABP/FC, B.P. 44, L'Ilerousse, Corsica, France
- F0FS (via REF or VF2NV)
- FG7TG, G. Procida, B.P. 460, Pointe-a-Pitre, Guadeloupe
- FG7TH, B.P. 387, Pointe-a-Pitre, Guadeloupe
- FH8CF, P.O. Box 72, Moroni, Comoro Is.
- FM7WO, M. Laurent, P.O. Box 237, Fort-de-France, Martinique
- G3SMO, J. Holmes, 99 Concyregy Spinney, Flintham, Newark, Notts., England
- G3XEM/IZ, P. Booth, Airwork Svc., Box 2142, Jeddah, Saudi Arabia

HC0BY, Box 289, Quito, Ecuador  
 HL9US (via K3UWQ; see text)  
 Is 4RU8CLG, P.O. Box 511, Florence, Italy  
 I0ARI, P.O. Box 200, Catanzaro, Italy  
 JW6GL, % Bear Is. Radio, Bjornoya via Tromso, Norway  
 K5KFT/KP4, J. McKinley, P.O. Box 279, APO, New York, N. Y., 09815  
 KG6SK, P.O. Box 18, Capital Hill, Saipan, Marianas, 96950  
 KG6ST, Box 25, Saipan, Marianas, 96950  
 KH6DEM/XV5, R. Bolden, FAA Sect., Hq. USARV, APO, San Francisco, Calif., 96375  
 KP6AP-KX6BK (to KH6GLU)  
 KX6CJ, P.O. Box 8515, APO, New York, N. Y., 09106  
 ON4MX/W4, E. Vertenten, M.D., 920 Caroline Av., Winston-Salem, N. C., 27101  
 PK8YDS, P.O. Box 8, Bandoeng, Indonesia  
 PX1CW, Box 86, Zaragoza, Spain  
 SK6AB, P.O. Box 25049, Goteborg 25, Sweden  
 SK7AX, DX Club, Box 24, Vaggeryd, Sweden  
 ST2SA, Dr. S. Ahmed Ibrahim, P.O. Box 244, Port Sudan, Sudan  
 TJ2JH, P.O. Box 2259, San Jose, Costa Rica  
 TJ1A0, J. Bernal, B.P. 5209, Douala, Cameroun  
 VE2ASL/LX (via REF or VE2NV)  
 VE3GUS/VP2K (via VE30DX)  
 VK9KS, Box 530, Rabaul, T.N.G.  
 VK9RI, R. Wirth, % OTC, Nauru Island, Central Pacific  
 VK0IA, % G. Johnston, VK7ZKJ, 23 Cottesloe St., Lindisfarne 7015, Tasmania, Australia  
 VQ8CJ, J. Hassam, 38 Trotter St., Beau Bassin, Mauritius  
 VQ8CS, J. Labat, Commercial Centre, Rose Hill, Mauritius  
 VR4EK, J. McInnes, % Postmaster, Honiara, Solomons  
 W4UAF/KI16 (non-W/K/VE/VOS via DL7FT)  
 W6HUQ/mm, D. Earnest, Federal Electric Corp., USNS Range Tracker, % FPO, San Francisco, Calif.  
 WV4FN, P.O. Box 1438, St. Thomas, V. I.  
 XE1WU, P.O. Box 1911, Mexico 12, D.F., Mexico  
 XE2JJE, P.O. Box 267, New Laredo, Mexico  
 ZD5V, V. Ingraum, Box 541, Manzini, Swaziland  
 ZD8LMR, % Bendix, NASA, Ascension AAFB, Box 4187, Patrick AFB, Florida  
 4A1EK (to XE1EK; see text)  
 5LZS 2RL 8RL, P.O. Box 1477, Monrovia, Liberia  
 5N2ABG (W/K/VE/XEs via W9SCD)  
 5U7A BS WS, P.O. Box 277, Bilma, Niger  
 6W8DY (via VE4SK; see text)  
 ex-9M6MG, S/C I. Body, GRSE, RAF Chivenor, Barnstable, N. Devon, England

ex-AP5CP (see text)  
 EA6AFG (to HB9AFG)  
 G3XJO (to VE5JS)  
 GB2OHE (via G3PUO)  
 GB3BSE (via G3IRM)  
 ex-HA1R (to K9IFB)  
 HB8SJ (to HB9SJ)  
 HC8RS (via SM5EAC)  
 I9RB/4U (to I1RB)  
 IT7GAI (to IT1GAI)  
 JW2AP (via NRRL)  
 KW2BH (via LA5YJ)  
 KM6DE (via KM6BJ)  
 PJ5MM (to K9GCE)  
 PX1KT (to F1KT)  
 SK2AZ (via SM2BHX)  
 SK4AY (via SM4CLU)  
 TI8ABL (via WB6SSO)  
 VK9GN (see text)  
 VP2VO (via VE3ACD)

Our geographical benefactors this trip: Ws LAYK ICW  
 IDAL ISWX 2VOZ 4YOK 8BIL 9LNQ, Ks 2UPD 8EKG  
 9UUY, Was 1PHU 4UHK 5PPZ 8SLW 8VRB, WB2CGW,  
 KH6BZF, P. Kilroy, T. Grieco, Canadian DX Association  
 Long Skip (VE3DLC), Columbus Amateur Radio Association  
 CARAscope (W8ZCQ), DARC's DX-MB (DL3RK),  
 DX News-Sheet (G. Waits, 62 Belmore Rd., Norwich,  
 Nor.72.T, England), Far East Auxiliary Radio League  
 (M) News (KA2LL), Florida DX Club DX Report  
 (W4BRB), International Short Wave League Monitor  
 (A. Miller, 62 Warward Ln., Selly Oak, Birmingham, 20,  
 England), Japan DX Radio Club Bulletin (JA1DM), Long

Island DX Association DX Bulletin (W2GKZ), Newark  
 News Radio Club Bulletin (L. Waite, 39 Hannum St.,  
 Ballston Spa, N. Y., 12020), North Eastern DX Association  
 DX Bulletin (K1IMP), Northern California DX Club  
 DXer (Box 408, Menlo Park, Calif., 94025; attn. KG6QF),  
 Southern California DX Club Bulletin (W46GLD), Utah  
 DX Association Bulletin (W7LEB) and VERON'S DXpress  
 (PA6s FX LOU TO VIDV WWP). Well done, sirs.

**Whence:**

ASIA — Taiwan DX soloist BV2A tells W6BIL he hunts  
 A U. S. Fours on 20 c.w. to clinch WAS. Clin formerly  
 signed AC3YW, C3YW and XU6A as far back as 1930  
 ----- WA1FHU learns that 4X4VO-G5AAD will close  
 shop by fall for return to W6DLX. ----- ARST's VU2CZ  
 announces this year's VU2/457 DX Contest dates as the  
 7th-8th (c.w.) and 14th-15th (phone) of September,  
 participation particulars to come later for your convenience  
 ----- "Turning in long days and week ends here doing  
 many things with the Loran systems," declares K8WXY  
 at KG6IC. (Hooray for 160!) "K5AMT" dropped in to help  
 work on our 1350-ft. tower." WIDTY adds, "Don is setting  
 up classes for several Ivo Jima people interested in getting  
 ham tickets." ----- KA7AB, due back in the States  
 this summer, had to corner WIDTY way down on 80 c.w.  
 for New Hampshire in the ARRL Test. ----- "The best  
 160-meter signals from Japan have been those of JAs  
 1CJQ 1RST 2CLI 3AA 7CQB and 9BIS," notes WA6IVM  
 who claims QSOs with some 4000 JA stations over the years  
 on all bands. Ray will visit Japan again this year. "The  
 fifty-day trip will be completely managed by JA hams.  
 Overwhelming friendliness!" Check with JARL, P.O. Box  
 377, Tokyo, for details on AJD, WAJA and JCC certifica-  
 tions based on QSOs with Japanese call areas, prefectures  
 and cities, respectively. ----- "Always delighted to con-  
 tact U. S. stations," writes ZC4GM. "Should any W/Ks  
 want skeds for DXCC, the ZC4 award, etc., I am always  
 ready to oblige." ----- K3UWQ advises, "K3ZCA and  
 myself keep schedules with HL9US daily at 1130 GMT  
 around 14:215 kc. after which he's available for QSOs  
 until 1300. HL9US also intends to be very active on 15-meter  
 c.w. and sideband." ----- AP2AR, tells K6EZH he's  
 busy modifying his DX-100B for single-sideband action  
 ----- From W5GM, formerly W5EGR: "9K2BV  
 operates daily around 1400-1600 GMT s.s.b. and c.w.  
 mostly 20 and 15 with a kilowatt and 3-el. beam. Duane's  
 home call is W5MAE; he previously signed SV0WPP."  
 ----- 4W1RC likes 14,180 kc. or so at 1800 GMT for  
 Swiss skip. ----- "My next QTH will be Panjim, Goa,"  
 writes VU2DIA in NCDXC's lively DXer.

AFRICA — "ZD8LMR is a new operator on Ascension  
 island," observes WA8SLW. "Larry operates daily  
 from 1700 to 2300 GMT or so, 28,733 kc." W6BHY is on  
 the scene, too, signing ZD8Z until his own ZD8Z or other  
 call comes through. ----- WA9UFV saves two ops will  
 keep Zaria University operational as 5N2AAU -----



9N1MM remains one of the rarest of rare DX brethren  
 in far-off Nepal. You'll often find Father Moran's side-  
 band near 14,200 kc. at 1000-1200 GMT or so. (Photo  
 from WA5EFL of Arkansas DX Association via W1CWV)



KG6IC is very big on 10 and 15 meters thanks to the efforts of K8WXY. Traffic skeds for the two Jima service gang preclude much DX chasing but Don heads as many calls as possible. (Photo via W1s DTY YYM and KH6BZF)

"EL2s AW and D are closing down after a very pleasant three years in Liberia," announces the latter, known hereabouts as K3JXO . . . African addenda via aforementioned literature of clubs and groups: ZD5V (G3UUK) plans a beam to go with his KW-2000A on 20 voice. . . 5LZs 2RL and 8RL frolicked in Liberia's late-March field day. . . VQ9JW totes a bagful of stirring DX memories back to G3UDU. . . 5Z4KL returns to GM3VLB for the summer. . . ZD3GRC puts Gambia Technical College on the air. . . VQ8AI, convalescing from heart trouble, would welcome DX correspondence. . . ZD9BJ helps Tristan da Cunha outfit with 32S gear and a 21-Mc. dipole. . . ZE8JW's ground conductivity shrinks at the rate of 10,000 oz. of fine gold each month. Vast mining center.

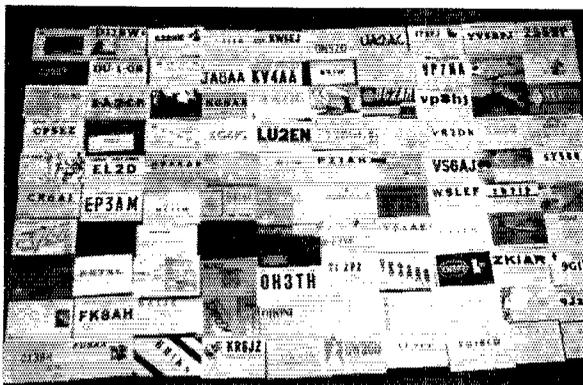
**OCEANIA** — VR6TC and spouse were guests of W6HS before returning to Pitcairn from their extensive U. S. tour. "Tom and Betty kept skeds with home from here," remarks Mert, "and now we have Tuesday s.s.b. contacts at 0600 GMT on 14,225 kc." . . . "Was off ship for several months awaiting our fourth harmonic," comments W6HU/mm. "Now back on USNS *Range Tracker* chasing missiles around the Pacific." You may have worked Dave earlier as HZ1AB, KA2s RB ZZ and KG6ICD . . . "Nice surprise," chuckles WA1FHU (ex-HA4SA). "Called 'YU6FN' in a Test pile-up and came out with KX6FN!" . . . KH6GLU recounts, "After a million-plus points in the ARRL DX Test phone section as VR3DY it seemed that everybody I talked to later was in an echo chamber." Rest and chow rapidly cut down Ed's reverberation factor . . . Oceaniagrams via the clubs press: DUIDBT has a Vee to go with his 40- and 80-meter sideband, a quad for 20. . . W2BQM found K1YRO at the DU1FH mike. . . Some VE6s are said to be cooking up a Pacific DXcursion for the fall season. . . VK9RJ plans a bigger Nauru signal on or near 14,190 kc. at 1130 GMT. . . PK7s MAA MAC SAC and SAF joined the PK8 gang on 21-Mc. carrier a.m. . . VR4EK, on two-year assignment, likes 14-Mc. s.s.b. around 1000 GMT.

**EUROPE** — You don't need that 2000-ft. tower to hear Albania at WN1ON's location. "In certain parts of Menotomy Rocks Park, my QTH, a cheap transistor BC set pulls in Radio Tirana on 1395 kc. at sunset. It would be no problem to work ZAs on 160." On the other hand, Mark has an awful time hearing Asians on any band at any time . . . Check with IIVAD of the Venice ARI branch concerning Diploma Serenissima, an award occasioned by

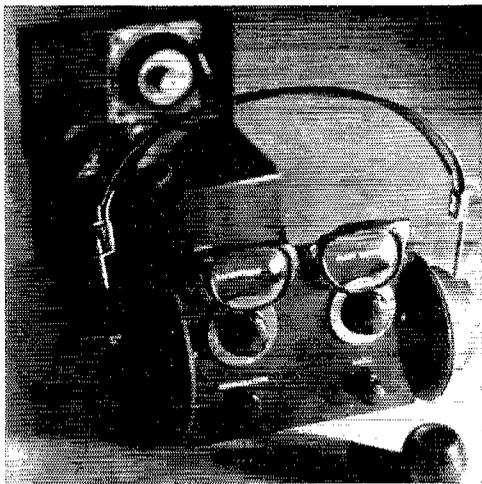
"DXCC<sup>2</sup>" is a little game we play to encourage contact between Century Club members, and to drum up displays of QSLs from outstanding DX stations you've probably worked, heard or heard worked. This one's from W5ODJ, No. 53 and the third from Fiveland, Fred's collection of cards from a hundred or more active DXCCers in as many different countries.

St. Mark Day festivities . . . VE2ASL sometimes puts his SB-101 to work on 10, 15 and 20 meters as VE2ASL/LX and F8FS . . . WA1FHU finds former HA1KSA operator Fred now hanging away at HA5KFZ. K9IFB (ex-HAIR) and WA1FHU were ham buddies in Hungary some thirty years ago . . . "Around my station there are many hills," laments OE3SAA. "Hard to work DX but I have been very active since February, 1966." Anton has managed 200 sideband countries in two years with his SR-150 and ground-plane . . . "Very pleased to get six c.w. multipliers on 1.8Mc. in the ARRL DX Contest," writes G3LEW (G3IEW) to WICW, "about 1650 exchanges and 194 multipliers all told. Very few contacts seemed to appreciate that I was on Guernsey, not Jersey." . . . W1AYK likes contest work with the British and DJ/DK/DL boys to boost his U. K. county and DOK credits. "GM counties are tough." . . . That's W8GTA (ex-EP2BK-9V1LP) behind the key at LAØAD . . . PX1CW was the handiwork of EA2s CW and DV.

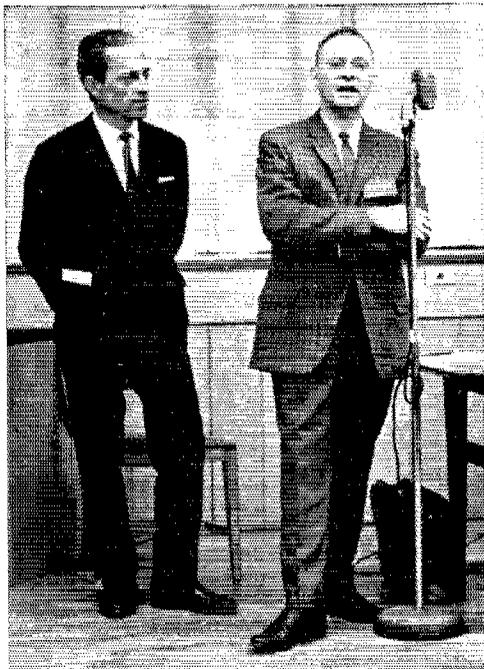
**HEREABOUTS** — Circle September 14th on your shack calendars, group, the date announced by W9 Central Division DX Century Club 1968 chairman W9EWC for the annual W9-DXCC conclave near Chicago. The usual power-packed program is a-buiddin' . . . Furious s.s.b. contest work and loads of fun are reported by K9GCE as PJ5MM and F87TI. FG7TI promises WR1BX other St. Martin maneuvers to come . . . W8CA collected jumbo joys and DXcitement as VP2KW on Anguilla this spring, 2245 QSOs worth on 80 through 10 meters. A dropped KWM-2, 50-knot gales, a penetrating tropical deluge, touchy transportation and licensing problems heightened the DXpeditionary flavor, Nick concludes, "I don't believe there are any more astute operators than U.S.A. c.w. men. They were calling me after my initial tune-up!" . . . "The W/K boys can keep you busy at almost any time on any band," find HC5s EJ and KA. "Cuenca Radio Club (HC5CRC) members now are coming to realize the tremendous DX possibilities of 10 and 15 meters." . . . WB2YEM (ex-WA9NHIZ) holds Rag Chewers Club confabs with OD5AI, 4X4CW, 9X5AA and other goodies when pile-up pressures slacken. Peter has all continents RCC-member style and now concentrates on an RCC-oriented DXCC, all via 21-Mc. sideband . . . New Utah DX Association officers are K7s JVF pres., RAJ v.p. and ZLA secy-treas. UDXA has twenty members around thinly ham-populated Utah, eight holding DXCC . . . "QSLs are going back up on the wall," kids W9LNQ, irked by our parlor-type ham shack ribbing in March. One of the differences between amateur radio stations and other inferior breeds . . . It took DX convert WØDAK no time at all to discover the hiding spots of rare ones. "Just look beneath W/Ks (1) tuning up, (2) calling CQ DX, (3) berating each other as lids, (4) making 10-ke. wide key clicks, or (5) signing their calls madly with collective unintelligibility. Then, after tuning in the DX station, carefully follow his instructions, call him up five or ten ke., and listen to him answer the guy who stays near zero beat." Oy! . . . W1DTY of *Ham Radio* recently counted 49 Yank lads consecutively QSOing a DX station before the latter's callsign was revealed. Check those tail-ending regs, OMs! . . . Novice notes: WN1ISH took second place in his high school science fair with "Oscillators and their Associated Waveforms," harmonic problems have WN4GTI chasing his DX on 40 instead of 15 lately, and WN1ION caught his fifty countries with only one crystal, 21,132 kc. . . 9Y4AT (W3ZQ) signs KV4AM much of the time . . . VPSIE vacations in Britain for the summer . . . 6Y5GB emcees the West Indies Net on 14,192 kc. at midnight GMT, Tuesdays, and Caribbean goodies abound . . . W8ZCQ, in the *C.A.R. scope*, wonders why some transceiver artists insist on tuning DX frequencies with hair trigger VOXs activated. The "pardon me" is as bad as the sneeze. **QST**



# Strays



Just so the readers will not think that our QST covers just "happen" each month, here's one of the ideas that was definitely turned down by the editor-in-chief. This idea was a takeoff on the general theme shown on this month's cover. Oh well, ya can't win 'em all, and rightfully so! Just because a piece of equipment seems to have a personality all of its own is no reason why it should take on the identity of a human being, as seems to be the case here. Anyhow, several ideas are submitted each month for the cover photo. The best of the group is chosen.



In a recent U.S. visit, PY2TI was guest speaker at a special meeting of the Kanawha Radio Club in Charleston, West Virginia. Shown from left are PY2TI and KRC official W8BT (formerly W8PQQ).



Looking for a worthwhile club project? Recently, the Pioneer Radio Club of Fremont, Nebraska donated collections of amateur radio beginner's publications to several local school and public libraries. Shown above (from left) are William McDermott, Librarian, Fremont Public Library, Tom Bracket, KØJFN, and Pat Snyder, WAØTTW.



Recently, Arthur H. Lynch, W4DKJ presented to the ARRL museum a 112 MHz transmitter-receiver assembly which he built as W2DKJ, 25 years ago. The presentation was made at a meeting of the Gold Coasters, an organization of radio old-timers. Pictured are Paul F. Godley, W4DKJ; OOTC President, W4AZ; League museum curator W1ANA; and, Gold Coasters President, W4OIY.



# Operating News



GEORGE HART, WINJM, Communications Manager

ELLEN WHITE, W1YYM, Deputy Comms. Mgr.

Administration: LILLIAN M. SALTER, W1ZJE

**DXCC:** ROBERT L. WHITE, W1CWB

Contests: ROBERT HILL, W1ARR

Training Aids: GERALD PINARD

**Going on Field Day?** What a question! Of course you are! Isn't everybody? On the weekend of June 22-23 new but temporary antenna masts will be sprouting everywhere, the countryside will be ringing with putt-putts and whistles and quacks as club and other amateur groups vie frantically with each other for that highest score, while un-affiliated non-amateurs watch in amazement and nod significantly to each other, tapping their temples gently.

How did it all start? The most common misconception is that Field Day was originally intended as a test of emergency preparedness. Those with old files of *QST*<sup>1</sup> can look up the original Field Day announcement<sup>1</sup> in which nowhere is emergency preparedness or public service mentioned. "The real object," the announcement states, "is to test 'portables.'" The second announcement<sup>2</sup> did mention emergency preparedness secondarily: "... in addition, it facilitates operator preparation to render constructive service in time of emergency." The power multipliers broke at 20 and 60 watts and were said to be for the purpose of giving "all stations an equal chance," not as a reward for using low power.

Almost instantly successful, FD quickly became and has remained through the years our biggest, most popular operating activity. We have often asked ourselves why. Just what is FD, anyway, that it should have this drawing power?

We think the answer lies in its multiple-appeal. FD is not *just* anything, or even *primarily* anything. It is an activity with so many facets that at least one of them appeals to *any* amateur, regardless of the type of guy he is. As a contest, it appeals to the intense type to whom rivalry and competition mean so much. To the joiner, it presents an opportunity to take part in a group activity. To the dedicated, it gives a purpose both in terms of club-help and public service. To the outdoor type, it is a unique adventure. To the extrovert, it is a social opportunity. To the shy type, it can present freedom from mannerisms and graces required in society. To the family man, it can be either the opportunity to shed his family responsibilities and pressures for a long weekend, or to include his family in a camping outing, as the case may be. To the young amateur, it is climbing trees and stringing wires and showing his agility. To the experienced old shellback, it is a chance to make use of his ageless knowhow. To the nature lover, it can be very much a back-to-nature experience.

Yes, there is something in Field Day for everybody. There isn't a ham in existence who won't fit in with some FD group, somewhere, and find a weekend of enjoyment — enjoyment he won't often really appreciate until weeks after the event is over. So don't sit at home watching TV that weekend — get out there and suffer with the rest of us!

**Staff Notes.** We regret to announce the departure from the CD Staff of Bill Owen, W1EEN, for reasons of health. This leaves a key

<sup>1</sup> June, 1933, *QST*, p. 15.

<sup>2</sup> June, 1934, *QST*, p. 8.

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

| June                                                            | July                                                         | August                                                             |
|-----------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------|
| 2 <b>LO Time</b> (League Officials only)                        | 3-5 <b>FEARL DX Field Day</b>                                | 2 <b>Qualifying Run, W6OWP</b>                                     |
| 8-9 <b>VHF QSO Party</b> (p. 57, May <i>QST</i> ).              | 7 <b>LO Time</b> (League Officials only)                     | 4 <b>LO Time</b> (League Officials only)                           |
| 8-10 <b>New York State QSO Party</b> (p. 108, May <i>QST</i> ). | 11 <b>Qualifying Run, W6OWP</b>                              | 10-11 <b>WAEDX</b> (c.w.)                                          |
| 13 <b>Qualifying Run, W1AW</b>                                  | 12 <b>Qualifying Run, W1AW</b>                               | 17 <b>Qualifying Run, W1AW</b>                                     |
| 14 <b>Qualifying Run, W6OWP</b>                                 | 13-15 <b>GD Party</b> (c.w.)*                                | 17-18 <b>Indiana QSO Party</b>                                     |
| 15-21 <b>Rhode Island Amateur Week</b> (p. 107, this issue).    | 20-21 <b>Independence of Colombia</b> contest                | Sept. 7-8 <b>VHF QSO Party</b><br>14 <b>FMT</b>                    |
| 18-20 <b>Rhode Island QSO Party</b> (p. 120, May <i>QST</i> ).  | 20-22 <b>GD Party</b> (phone)*                               | Oct. 12-14 <b>GD Party</b> (phone)<br>19-21 <b>GD Party</b> (c.w.) |
| 22-23 <b>Field Day</b> (p. 58, May <i>QST</i> ).                | * League Officials and Communications Dept. Appointees only. | Nov. 9-11 <b>SS</b> (phone)<br>16-18 <b>SS</b> (c.w.)              |

vacancy on the staff which needs immediate filling. Anyone interested should write for an application form. Other vacancies which have existed for some time include assistant ARPSC coordinator, assistant contest and DXCC checker and assistant maintenance man at WIAW. We are primarily interested in young single amateurs who are willing to start at the bottom and are interested in making a career of being a part of the ARRL headquarters staff. Any takers? If so, let us hear from you. — WINJAM.

### CLUB COUNCILS AND FEDERATIONS

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

Amateur Radio Council of Arizona, Inc., Mr. Jimmy J. Wortham, W7GNP, Secy., 3812 N. 14 Ave., Phoenix, Ariz. 85013.

British Columbia Amateur Radio Association, Mr. Ken Gorman, VE7ABS, Secy., 12530-103rd Ave., North Surrey, B.C., Canada.

Central California Radio Council, Mr. Russell Deck, K6IUW, Secy., 3580 South Court Ave., Palo Alto, Calif. 94306.

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

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

Hudson Amateur Radio Council, Mr. Fred J. Brunjes, K2DGL, Secy., 22 Ivy Dr., Jerico, N. Y. 11753.

### A.R.R.L. AFFILIATED CLUB HONOR ROLL

One of the requirements for ARRL affiliation is that 51% or more of a club's membership be ARRL members. This is hardly a difficult attainment in most cases, but to make the 100% category is something else again. As the annual affiliated club questionnaires are received, we make note of those who have 100% ARRL membership and put them aside for separate honors. This includes an honorary listing in *QST* and a special certificate each year this is accomplished.

Although all questionnaires have not yet been received, we take pleasure in listing herewith those clubs which so far have officially indicated that their members are all members of ARRL. A supplementary listing will appear in the December issue.

- Aeronautical Center ARC, Oklahoma City, Okla.
- Amateur VHF Institute of New York, Maspeth, N. Y.
- Anderson Radio Club, Anderson, S. C.
- Athens Amateur Radio Club, Athens, Ga.
- Band Hoppers Radio Club, Ferguson, Mo.
- Beacon Radio Amateurs, Philadelphia, Pa.
- Blossomland Amateur Radio Association, St. Joseph, Mich.
- Brush Creek Plaza Bird-Watching and VHF Society, Kansas City, Mo.
- Central Iowa Amateur Radio Club, Marshalltown, Iowa
- Central Kansas Radio Club, Inc., Salina, Kansas
- Chisholm Trail Amateur Radio Club, Inc., Duncan, Okla.
- The Cincinnati Buckeye Netters, Cincinnati, Ohio
- Connecticut Wireless Association, Inc., Newington, Conn.
- Dunsmuir Amateur Radio Club, Inc., Dunsmuir, Calif.
- Easton Amateur Radio Society, Easton, Md.
- Elizabeth-Forward High School ARC, Elizabeth, Pa.
- Fidelity Amateur Radio Club, Cranston, R. I.
- Fountain City Radio Club, Fountain City, Tenn.
- Golden Crescent Amateur Radio Club, East Bernard, Texas.
- Haddonfield Teen Hams Association, Haddonfield, N. J.
- IRC Amateur Radio Club, Philadelphia, Pa.
- Johnson City Radio Association, Inc., Johnson City, Tenn.
- Larkfield Amateur Radio Club, East Northport, L.I., N. Y.
- Laurentian DX Club, Dollard des Ormeaux, P.Q., Canada
- Lockheed Amateur Radio Club, Burbank, Calif.
- Long Island DX Association, Middle Village, N. Y.

- Loudon County Amateur Radio Club, Lenoir City, Tenn.
- Lower Columbia Amateur Radio Assn., Longview, Wash.
- Massillon Amateur Radio Club, Massillon, Ohio
- Miami Valley Amateur Radio Contest Society, Centerville, Ohio
- Murphy's Marauders, Cromwell, Conn.
- Newton Amateur Radio Association, Newton, Iowa
- Northern New Jersey Radio Association, Hackensack, N. J.
- Notre Dame High School Radio Club, Niles, Ill.
- O.B.P. #1 Club of St. Louis, Mo.
- 128 Contest Club, Chelmsford, Mass.
- Order of Boiled Owls of New York, Levittown, N. Y.
- The Order of Boiled Owls, Columbus, Ohio Chapter, Columbus, Ohio
- Parma Radio Club, Inc., Cleveland, Ohio
- Pioneer Radio Club, Fremont, Nebraska
- Radio Amateur Transmitting Society, Nashville, Tenn.
- Radios, Lancaster, N. Y.
- Rome Radio Club, Inc., Rome, N. Y.
- Skagit Amateur Radio Club, Skagit County, Wash.
- Southern Berkshires Amateur Radio Club, Sharon, Conn.
- Southington Amateur Radio Assn., Southington, Conn.
- Submarine Base Medical Research Laboratory Amateur Radio Club, New London, Conn.
- Theodore Roosevelt Amateur Radio Club, Dickinson, N. D.
- Townsend Amateur Radio Society, Townsend, Mass.
- Tri-State Amateur Radio Club, Inc., Luverne, Minn.
- Walton Radio Association, Walton, N. Y.
- Washington Radio Club, Washington, D. C.
- West Branch Amateur Radio Assn., Montoursville, Pa.
- Wichita Amateur Radio Club, Wichita, Kansas
- Willamette Valley DX Club, Inc., Portland, Oregon

### 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

### RESULTS, FEBRUARY FREQUENCY MEASURING TEST

The February 10, 1968 FMT, open to all amateurs, brought entries from 285 participants, who made a total of 1273 measurements. Of these, 67 ARRL Official Observers submitted 252, and 218 Non-OOs made 1021 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 empire's readings otherwise establish this order of listing.

August *QST* will announce details on the September 14 ARRL FMT, open to all amateurs.

| Observers   | Parts/<br>Million | Non-<br>Observers | Parts/<br>Million |
|-------------|-------------------|-------------------|-------------------|
| W1BGW W4CMP |                   | W2PVG W3PYW       |                   |
| K4HDX W4JUI |                   | W4QTT W5QMI       |                   |
| W5FMO W6GQA |                   | WB8AAL W6BXX      |                   |
| K6KA        | (0 to .4)         | K6ITS W6KEV W6KT  |                   |
| W2AIQ       | .....1.0          | WA9ZOY K8ZSZ/3    |                   |
| W4NTO       | .....1.0          | WA9GOP W9TZN R.   |                   |
| W4FFH       | .....2.4          | Ireland J. McHugh |                   |
| K8QKY       | .....2.5          |                   | (0 to .4)         |
| W5PQY       | .....3.5          |                   |                   |
| W3RDZ       | .....4.2          |                   |                   |
| K9WMP       | .....5.5          |                   |                   |
| K9GSC       | .....6.9          |                   |                   |

**DXCC NOTES**

All W/V/E applicants for DXCC awards and endorsements are reminded that a membership statement must be submitted with the cards, in lieu of the service charge. If you use the CD-164 (R1067) DXCC application forms you'll be sure to comply with all the rules and expedite your credits. Forms available on request (self-addressed stamped envelope, please) from the ARRL Communications Dept., 225 Main St., Newington, Conn. 06111.

good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must meet the following requirements prior to deadline date listed below: (1) Holder of amateur Conditional Class

license or higher. (2) A licensed amateur for at least two years immediately prior to nomination. (3) An ARRL full member for at least one year immediately prior to nomination.

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

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.



**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, 1968 and are shown alphabetically by call.

|                    |                   |                   |                  |                   |
|--------------------|-------------------|-------------------|------------------|-------------------|
| G3FKM... 322/338   | W5POA... 319/336  | W2HTI... 317/332  | W5UKK... 316/329 | G3HCT... 314/324  |
| W6A... 322/346     | W5UJ... 319/333   | W2PCJ... 317/333  | W6KEV... 316/337 | HB9TL... 314/329  |
| W6GUV... 322/344   | W6BZE... 319/338  | W2RCY... 317/332  | W6KUT... 316/335 | TIAMU... 314/332  |
| W8EWS... 322/345   | W6CVV... 319/336  | W2SAW... 317/333  | W6TZO... 316/336 | K3UPG... 314/337  |
| L1U6DJX... 321/344 | W6RKP... 319/332  | W2ZGB... 317/332  | W6WX... 316/323  | K8LSC... 314/324  |
| W1HX... 321/340    | W8DAW... 319/342  | W3EGR... 317/333  | W6YY... 316/335  | K9BCB... 314/322  |
| W5ABY... 321/337   | W8JIN... 319/343  | W4AIT... 317/339  | W6EY... 316/329  | VK4QM... 314/336  |
| W8JBI... 321/339   | W8ELA... 319/341  | W4BI... 317/328   | W7CMM... 316/326 | W1HZ... 314/331   |
| W8KIA... 321/344   | W8SYK... 319/336  | W5OSU... 317/335  | W7CNM... 316/334 | W9ZYB... 314/337  |
| HB9J... 320/343    | CE3AG... 318/341  | W5KC... 317/339   | W8BRA... 316/338 | W2AYJ... 314/332  |
| HB9MO... 320/336   | DL1IN... 318/333  | W5OK... 317/327   | W8DMD... 316/337 | W2CYS... 314/335  |
| K6ENX... 320/336   | DL3RK... 318/334  | W6ID... 317/335   | W8PHZ... 316/330 | W2LPE... 314/334  |
| O6IER... 320/341   | K2OEA... 318/333  | W6KZL... 317/332  | W8ZCO... 316/329 | W2MES... 314/321  |
| ON4DM... 320/338   | K4TJL... 318/326  | W6LDD... 317/337  | W9AMU... 316/332 | W2MJ... 314/325   |
| W62NV... 320/336   | K6EO... 318/331   | W6OSU... 317/328  | W9LNM... 316/338 | WA2OJD... 314/327 |
| W1GLX... 320/342   | K6EVR... 318/334  | W7ENW... 317/340  | W0AII... 316/330 | W6FOZ... 314/332  |
| W1GKK... 320/344   | VL3CFG... 318/331 | W7GBW... 317/340  | W0PGI... 316/331 | W8QJR... 314/330  |
| W2AGW... 320/343   | W1BAN... 318/330  | W8IRN... 317/334  | 4X4DK... 316/333 | W8WZ... 314/335   |
| W2JTF... 320/338   | W1BII... 318/341  | W8NGO... 317/333  | D19OH... 315/325 | W0BFB... 314/331  |
| W3WZ... 320/342    | W2BQM... 318/330  | W9HJZ... 317/336  | G2PH... 315/337  | G13VJ... 313/327  |
| W4CXB... 320/340   | W2HO... 318/335   | W9SPR... 317/330  | G3HDA... 315/326 | DL7A... 313/324   |
| W4ML... 320/339    | W2LAX... 318/334  | W0NLY... 317/332  | K2BZT... 315/331 | JA1BK... 313/320  |
| W4OM... 320/341    | W2OKM... 318/335  | W0OGI... 317/332  | W1FH... 315/340  | K2SHZ... 313/324  |
| W4VPD... 320/336   | W2SSC... 318/333  | ZL1HY... 317/340  | W2DXX... 315/320 | K4ICK... 313/324  |
| W6WVQ... 320/336   | W2YTH... 318/335  | G2BOZ... 316/333  | W2FXA... 315/327 | K4RPK... 313/321  |
| W7AG... 320/343    | W2ZX... 318/336   | G2BYN... 316/333  | W2LY... 315/333  | K8IKB... 313/323  |
| W8BFE... 320/340   | W3CT... 318/341   | K4AIM... 316/329  | W2RD... 315/328  | K8ONV... 313/321  |
| W8MPW... 320/337   | W3VGH... 318/332  | K4TWF... 317/330  | W2WMG... 315/325 | VE7ZM... 313/336  |
| W8POQ... 320/336   | W4LRN... 318/329  | K6LGF... 316/327  | W3CGS... 315/333 | W1CBZ... 313/327  |
| W8UAS... 320/340   | W4OPM... 318/332  | K6VVA... 316/324  | W3LMA... 315/336 | W1ME... 313/335   |
| W9NDA... 320/343   | W4PLL... 318/332  | K7GGM... 316/323  | W3NKM... 315/331 | W2DOD... 313/330  |
| W9YFV... 320/343   | W4TMI... 318/339  | W1CKA... 316/325  | W4AVY... 315/326 | W2EXH... 313/318  |
| W0DU... 320/341    | W5MMK... 318/338  | W2CR... 316/332   | W4LTV... 315/334 | W2UVE... 313/330  |
| W0QVZ... 320/340   | W6CUP... 318/342  | W2FXN... 316/329  | W5OLG... 315/335 | W92RAU... 313/313 |
| DL3LL... 319/334   | W6EPZ... 318/338  | W2JVU... 316/336  | W6LN... 315/334  | W3AFM... 313/322  |
| G4MJ... 319/335    | W6GPR... 318/338  | W2QHH... 316/336  | W6UOV... 315/328 | W3GRS... 313/324  |
| G8KS... 319/336    | W6NJU... 318/331  | W2SHC... 316/330  | W7AOB... 315/328 | W3JNN... 313/336  |
| L1U4DMG... 319/334 | W7PHO... 318/335  | W2TOS... 316/334  | W7UMJ... 315/322 | W3RNO... 313/330  |
| P40FX... 319/338   | DL6BN... 317/331  | WA2ELS... 316/320 | W8HGW... 315/339 | W4NDF... 313/315  |
| VK3KB... 319/341   | DL7BA... 317/333  | WA2ZS... 316/332  | W8ONA... 315/330 | W5CE... 313/328   |
| W1JYH... 319/341   | IT1TAI... 317/332 | W3LMO... 316/328  | W9DWO... 315/327 | W5IGJ... 313/330  |
| W1MY... 319/335    | K2DDA... 317/333  | W4AAU... 316/334  | W9GIL... 315/331 | W5OGS... 313/328  |
| W2BXA... 319/342   | K2LWR... 317/329  | W4BYU... 316/333  | W9RCJ... 315/326 | W6HOC... 313/325  |
| W2CXA... 319/338   | K4LNM... 317/330  | W4DOS... 316/322  | W0BMO... 315/327 | W8KPI... 313/330  |
| W2NUT... 319/334   | L4ZY... 317/338   | W4LYV... 316/335  | W0MLY... 315/330 | W8LKH... 313/332  |
| W3SUC... 319/335   | DL3LL... 317/333  | W4RFB... 316/335  | W0PNQ... 315/336 | W9WYB... 313/327  |
| W2TP... 319/327    | W1RFZ... 317/335  | W5AFX... 316/340  | DJ1RZ... 314/311 | W9YSX... 313/329  |
| W3GAU... 319/341   | W2BOK... 317/333  | W5KBU... 316/333  | DJ2BK... 314/330 | YV5AB... 313/331  |
|                    | W2FZY... 317/329  | W5LGG... 316/335  | DL1KB... 314/332 |                   |

*Radiotelephone*

|                    |                  |                   |                  |                   |
|--------------------|------------------|-------------------|------------------|-------------------|
| W3RIS... 321/345   | G3FKM... 317/330 | K4AIM... 315/328  | HB9TL... 314/328 | W4ANE... 313/327  |
| W8GZ... 321/343    | PY4TK... 317/333 | K8RTW... 315/323  | O6IME... 314/326 | W8MPW... 313/321  |
| W2ZX... 320/338    | K5MSM... 317/336 | W1BAN... 315/333  | T1ZHP... 314/335 | W8QJR... 313/329  |
| W8FE... 320/340    | W2P... 317/332   | W1FEP... 315/329  | W2VZ... 314/332  | W92RAU... 313/313 |
| ON4DM... 319/337   | G8KS... 316/329  | W2HTI... 315/329  | W0OVZ... 314/328 | YV5AB... 313/331  |
| W2BXA... 319/340   | K4TJL... 316/324 | W2PTE... 315/331  | DL6EN... 313/325 | K1IXG... 312/318  |
| W6AM... 319/342    | W6RAF... 316/325 | W4PDL... 315/324  | D19OH... 312/323 | VK3AHO... 312/322 |
| W7PHO... 319/336   | W6RKP... 316/324 | W8HGW... 315/336  | TIAMU... 313/331 | W1FH... 312/333   |
| W8PQQ... 319/335   | W6YV... 316/335  | W9NDA... 315/334  | W1ONK... 313/328 | W1LLF... 312/324  |
| L1U4DMG... 318/333 | W9WHM... 316/331 | 4X4DK... 315/332  | W2RCY... 317/332 | W2BQM... 313/329  |
| W2IT... 318/331    | DL1IN... 315/329 | 5Z4ERR... 315/336 | W3JNN... 313/333 | W2OKM... 312/327  |
| W6GYM... 318/338   | DL3LL... 315/330 | DJ2YI... 314/328  | W3WGH... 313/321 | WA2RAU... 312/312 |
| W0JYW... 318/334   |                  |                   |                  |                   |

The following nominating form is suggested. (Signers should be sure to give city, street address and zip code to facilitate checking membership.)

Communications Manager, ARRL [Place and date]  
 225 Main St., Newington, Conn. 06111  
 We, the undersigned full members of the.....  
 .....ARRL Section of the.....  
 Division, hereby nominate.....  
 as candidate for Section Communications Manager for  
 this Section for the next two-year-term of office.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

—George Hart, W1NJM, Communications Manager

|                    |                     |                      |                  |
|--------------------|---------------------|----------------------|------------------|
|                    |                     |                      | <i>Present</i>   |
| <i>Section</i>     | <i>Closing Date</i> | <i>SCM</i>           | <i>Term Ends</i> |
| Santa Barbara..... | June 10, 1968       | Cecil D. Hinson..... | Aug. 10, 1968    |

|                       |                |                               |                |
|-----------------------|----------------|-------------------------------|----------------|
| Eastern New York..... | June 10, 1968  | George W. Tracy.....          | Feb. 10, 1968  |
| East Bay.....         | June 10, 1968  | Richard Wilson.....           | Feb. 10, 1968  |
| Western               |                |                               |                |
| Pennsylvania.....     | June 10, 1968  | Robert E. Gawryla.....        | Aug. 7, 1968   |
| Iowa.....             | June 10, 1968  | Owen G. Hill.....             | Aug. 17, 1968  |
| Idaho.....            | June 10, 1968  | Donald A. Crisp.....          | Aug. 17, 1968  |
| Western New           |                |                               |                |
| York.....             | June 10, 1968  | Charles T. Hansen.....        | Aug. 17, 1968  |
| San Joaquin           |                |                               |                |
| Valley.....           | June 10, 1968  | Ralph Saroyan.....            | Aug. 20, 1968  |
| West Indies.....      | July 10, 1968  | Albert R. Crumley,<br>Jr..... | Jan. 10, 1968  |
| Alaska.....           | July 10, 1968  | John P. Trent.....            | Resigned       |
| Montana.....          | July 10, 1968  | Joseph A. D'Arcy.....         | Sept. 9, 1968  |
| Northern Texas.....   | July 10, 1968  | L. L. Harbin.....             | Sept. 12, 1968 |
| Nevada.....           | Aug. 15, 1968  | Leonard M. Norman.....        | Oct. 22, 1968  |
| New Hampshire.....    | Aug. 15, 1968  | Robert C. Mitchell.....       | Oct. 26, 1968  |
| San Francisco.....    | Sept. 10, 1968 | Hugh Cassidy.....             | Nov. 19, 1968  |

### ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections,

From March 1, through March 31, 1968, DXCC Certificates based on contacts with 100-or-more Countries have been issued by the ARRL Communications Department to the Amateurs listed below.

### New Members

|              |               |              |              |              |              |
|--------------|---------------|--------------|--------------|--------------|--------------|
| W7QPK...302  | JAI1GHH...123 | WA3ATX...110 | W7CRT...105  | DJ8VI...101  | K5YUR...100  |
| G2TA...226   | K2EUR...120   | WB4CGY...110 | W9USP...105  | G2FAS...101  | SM5BTX...100 |
| VE3CTX...222 | WABELE...119  | W6JKR...110  | SP1BHX...104 | K8QYG...101  | VE3DTC...100 |
| W8HJ...210   | OH3UQ...115   | VE2DCW...109 | WA9AUM...104 | WA1DXI...101 | W1S8M...100  |
| W8CWY...193  | W0BTU...114   | W62QJB...109 | K2BUL...103  | WA6VJD...101 | WB2BJJ...100 |
| X1IAZ...146  | OH6NH...113   | JAIERB...107 | LA4AF...102  | W71VI...101  | WA3EJK...100 |
| DJ4VP...144  | JA3BP...112   | DJ9AL...106  | W5WZ...102   | WA9QAM...101 | WA5PTQ...100 |
| WA9VFR...137 | WB2DWR...112  | WA90TF...106 | WA8OY...102  | H45BY...100  | WB8SCQ...100 |
| DJ5CQ...129  | ZD8HAL...112  | G3RJK...105  | WA0KQQ...102 | K4DSN...100  | W9IBX...100  |
| W8MRK...128  | PY2OU...110   | K4R8SM...105 | YO5LD...102  | K5USU...100  | W9TGN...100  |
| OK2BLF...127 |               |              |              |              |              |

### Radiotelephone

|              |               |              |             |              |              |
|--------------|---------------|--------------|-------------|--------------|--------------|
| W7GBW...270  | JAI1JAN...142 | W7QON...111  | W0BUL...108 | WA0JCP...102 | K2BUL...100  |
| G2TA...204   | F8RV...139    | K0YIP...110  | W8WLF...107 | WA90TF...102 | W34QH...100  |
| WA3ENZ...178 | W5HLJ...133   | YO8JU...110  | K4HUO...103 | OB8AY...101  | WA7FGA...100 |
| VE6AQL...173 | VP8IE...122   | WA0MQM...109 | K9RTH...103 | W3NQV...101  | WA8TOY...100 |
| W7MVC...169  | WA8REU...118  | G3TUF...108  | LA8RI...102 | W7GIB...101  | W9PFW...100  |
| W4R1L...160  | HA5FE...111   | W7P1Y...108  | W9DDL...102 | F8HB...100   | 5U7AL...100  |
| WB2UKP...148 | K2EUR...111   |              |             |              |              |

### Endorsements

Endorsements issued for confirmations submitted from March 1, through March 31, 1968 are listed below. Endorsement listings through the 300 level are given in increments of 20, above 300 level they are given in increments of 10. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

|            |            |            |            |            |            |            |            |        |
|------------|------------|------------|------------|------------|------------|------------|------------|--------|
| <b>320</b> | W7BA       | ZLIAJU     | WA4FDR     | W2HC       | VE4SA      | SM7DQK     | W3EAI      | K4VZI  |
| W8KUT      | YV5BOA     | <b>240</b> | W7YEX      | WB2NYM     | VQ8AD      | SM7DX      | W3FNV      | K91IG  |
| W8SQP      | ZL3IS      | W8JPL      | WA8HPN     | W4JFW      | WB2CGW     | V86AJ      | W5KFN      | VE3CKW |
| W7BTH      | K0JPL      | W5JRU      | W0PJK      | W4R1J      | W4R1J      | W1YPH      | W6LJN      | W1DAY  |
| W8KBT      | <b>280</b> | W6USG      | YV5BNR     | W6ABJ      | W5DWB      | WB2OLN     | W7GGO      | W1HTE  |
| W9KXK      | DJ0KQ      | W7AZG      | <b>200</b> | W6BJU      | W7VSM      | W3XJ       | W8XQ       | WA1CJE |
|            | DI1HH      | <b>220</b> | DL1MD      | W6JWD      | WA7BOA     | W9QWM      | W9KYK      | W2EG1  |
|            | K4CEB      | K4RSY      | E15F       | WA6OTU     | WA8OVC     | WA9NHQ     |            | W2QJ1  |
| W31NH      | W81LC      | K5LNN      | KIGUD      | W9ABM      | WA9JDT     | <b>140</b> | <b>120</b> | W3DHG  |
| W6FZJ      |            | SM0MC      | OK2BCL     | W9NNC      |            | K9FHG      | DL6CL/W2   | W4RXT  |
|            | <b>260</b> | VE7BW      | VE3FKL     | W0MVG      | <b>160</b> | W1AA       | HC1TH      | WA4BNI |
|            | W2J5X      | VP7NA      | VE6AQL     | <b>180</b> | OZ3PO      | W2LFL      | JA8KB      | W6BMYK |
| K4EZ       | W6KNH      | W4WHF      | WA1ERM     | HB9RX      | SM7BEM     | WA2TF      | K2JFE      | WA9DJO |
| W1QJR      | W0TW       |            |            |            |            |            |            | WA9LMY |

### Radiotelephone

|            |        |            |            |        |            |        |            |            |
|------------|--------|------------|------------|--------|------------|--------|------------|------------|
| <b>330</b> | W4NJF  | W9TKD      | <b>220</b> | PY1JR  | YV5CIL     | W10KG  | <b>140</b> | <b>120</b> |
| G3DO       | YV5AIP | <b>260</b> | VE5CTX     | PY2AQQ |            | W20EH  | DL1MD      | K1HBM      |
|            |        | G3AAE      | W3BFW      | PY2ASO | <b>180</b> | W20VZW | HK5ACI     | K2CPR      |
|            |        | HK5A0H     | W4ELB      | SM0MC  | H1GZ       | WA4FDR | PY2DSC     | W1DAY      |
|            |        | W1JWX      | W6CUB      | W4WHF  | WB2CGW     | W50FG  | VE2BFK     | W2BHF      |
|            |        | W6FZJ      | WA8HPN     | W6ABJ  | W7VSM      | W6ZBS  | W1AA       | WB8MVK     |
|            |        | W7BTH      | W9KXK      | W60HU  | YU6CB      | W6RMBZ | W2ESC      | W8WRP      |
|            |        | <b>280</b> | W08FU      | W8ICC  |            | W90PD  | W30JW      | WA6OAH     |
|            |        | WA4W1P     | <b>240</b> | W9WYB  | <b>160</b> | 6Y5DW  | W8GKM      | VE4BJ      |
|            |        | W6KNH      | OE1PC      | XE2WH  | K8CQG      | 9Q5FV  | XE1AZ      | YA5RG      |
|            |        | YV5ANQ     |            |        | V86AJ      |        |            |            |
|            |        |            |            |        |            |        |            |            |

completing their election in accordance with regular League policy, each term of office starting on the date given.

|                       |                             |               |
|-----------------------|-----------------------------|---------------|
| Maritime              | W. J. Gillis, VE1NR         | Mar. 11, 1968 |
| Louisiana             | J. Allen Swanson, Jr., W5PM | June 10, 1968 |
| Quebec                | James Ibey, VE2OJ           | June 11, 1968 |
| Eastern Massachusetts | Frank L. Baker, Jr., W1ALP  | June 15, 1968 |

In the Ohio Section of the Great Lakes Division, Mr. Richard A. Egbert, W8ETU, Mr. Wilson E. Weckel, W8AL, and Mr. Harry A. Tummonds, W8BAH, were nominated. Mr. Egbert received 758 votes, Mr. Weckel received 566 votes and Mr. Tummonds received 408 votes. Mr. Egbert's term of office began March 28, 1968.

which Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example!* In converting, 0130 GMT June 13 becomes 2130 EDT June 12. Each month the ARRL Activities Calendar notes the qualifying run dates for W1AW and W6OWP for the coming 3-month period.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualifications is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Code practice is sent daily by W1AW at 2330 and 0130 GMT, simultaneously on all listed c.w. frequencies. At 0130 GMT Tuesday, Thursday and Saturday, speeds are 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sundays, speeds are 5 7½ 10 13 20 and 25 w.p.m. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests. At 2330 GMT daily, speeds are 10 13 and 15 w.p.m. The 0130-0220 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending in step with W1AW (but not on the air!) and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0130-0220 GMT practice on those dates:

- Date Subject of Practice Text April qsr.
- June 12: *It Seems to Us*, p. 9
- June 18: *A Transceiver for 7-Mc. C.W.*,\* p. 11
- June 21: *Getting Rid of Low-Frequency Harmonics*, p. 26
- June 27: *Evolution Of An Amateur Weather-Satellite Picture Station*,\* p. 28

Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition

- July 1: *Modulator Power*, p. 87
- July 10: *The Modulation Transformer*, p. 88

(Continued on page 132)

\*Speeds will be sent in reverse order, with highest speed first.

## SUGGESTED OPERATING FREQUENCIES

**RTTY 3620, 7040, 14,090, 21,090 kc.**  
**WIDE-BAND F.M. 52.525 146.94 Mc.**

### GMT CONVERSION

To convert to local time-subtract the following hours:

ADST -3, AST -4, EDST -4, EST -5, CDST -5, CST -6, MDST -6, MST -7, PDST -7, PST -8, Hawaiian -10, Central Alaska -10.

A convenient conversion card is available free from the ARRL Communications Department, 225 Main St., Newington, Conn. 06111. 

## CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made June 13 at 0130 GMT. Identical texts will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted June 14 at 0100 Greenwich Mean Time on 3590 and 7129 kc. **CAUTION!** Note that since the dates are given per Green-

## W1AW SCHEDULE, JUNE 1968

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

| GMT*                   | Sunday                 | Monday                                                                           | Tuesday                | Wednesday                                       | Thursday               | Friday                 | Saturday               |
|------------------------|------------------------|----------------------------------------------------------------------------------|------------------------|-------------------------------------------------|------------------------|------------------------|------------------------|
| 0000                   |                        | CW-OBS <sup>1</sup>                                                              | CW-OBS <sup>1</sup>    | CW-OBS <sup>1</sup>                             | CW-OBS <sup>1</sup>    | CW-OBS <sup>1</sup>    | CW-OBS <sup>1</sup>    |
| 0020-0100 <sup>4</sup> |                        |                                                                                  | 3.555 <sup>6</sup>     | 14.1                                            | 14.1                   | 7.08 <sup>6</sup>      | 14.1                   |
| 0100                   |                        | Phone-OBS <sup>2</sup>                                                           | Phone-OBS <sup>2</sup> | Phone-OBS <sup>2</sup>                          | Phone-OBS <sup>2</sup> | Phone-OBS <sup>2</sup> | Phone-OBS <sup>2</sup> |
| 0105-0130 <sup>4</sup> |                        | 145.6                                                                            | 3.945                  | 145.6                                           | 50.7                   | 1.82                   | 21.41                  |
| 0130                   |                        | <b>Code Practice Daily<sup>1</sup> 15-35 w.p.m. TThSat., 5-25 w.p.m. MWFSun.</b> |                        |                                                 |                        |                        |                        |
| 0230-0300 <sup>4</sup> |                        |                                                                                  | 3.555                  | 7.08                                            | 1.805                  | 7.08                   | 3.555                  |
| 0300                   | RTTY-OBS <sup>3</sup>  |                                                                                  | RTTY-OBS <sup>3</sup>  | RTTY-OBS <sup>3</sup>                           | RTTY-OBS <sup>3</sup>  | RTTY-OBS <sup>3</sup>  | RTTY-OBS <sup>3</sup>  |
| 0310-0330 <sup>4</sup> |                        |                                                                                  | 3.625                  | 14.095                                          | 3.625                  | 14.095                 | 3.625                  |
| 0330                   | Phone-OBS <sup>2</sup> |                                                                                  | Phone-OBS <sup>2</sup> | Phone-OBS <sup>2</sup>                          | Phone-OBS <sup>2</sup> | Phone-OBS <sup>2</sup> | Phone-OBS <sup>2</sup> |
| 0335-0400 <sup>4</sup> |                        |                                                                                  | 7.255                  | 3.945                                           | 7.255                  | 3.945                  | 7.255                  |
| 0400                   | CW-OBS <sup>1</sup>    |                                                                                  | CW-OBS <sup>1</sup>    | CW-OBS <sup>1</sup>                             | CW-OBS <sup>1</sup>    | CW-OBS <sup>1</sup>    | CW-OBS <sup>1</sup>    |
| 0420-0500 <sup>4</sup> |                        |                                                                                  | 3.555 <sup>6</sup>     | 7.08                                            | 3.945                  | 7.08 <sup>6</sup>      | 3.555                  |
| 1700-1800              |                        | 21/28 <sup>5</sup>                                                               | 21/28 <sup>5</sup>     | 21/28 <sup>5</sup>                              | 21/28 <sup>5</sup>     | 21/28 <sup>5</sup>     |                        |
| 1900-2000              |                        | 14.28                                                                            | 7.255                  | 14.28                                           | 7.255                  | 14.28                  |                        |
| 2000-2100              |                        | 14.1                                                                             | 14.28                  | 14.095                                          | 21/28 <sup>5</sup>     | 7.08                   |                        |
| 2200-2300              |                        | 21/28 <sup>5</sup>                                                               | 21.075 <sup>6</sup>    | 21/28                                           | 7.255                  | 14.28                  |                        |
| 2300                   |                        |                                                                                  |                        | RTTY-OBS <sup>3,7</sup>                         |                        |                        |                        |
| 2330                   |                        |                                                                                  |                        | <b>Code Practice Daily 10, 13 and 15 w.p.m.</b> |                        |                        |                        |

<sup>1</sup> CW-OBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.555, 7.08, 14.1, 21.075, 50.7 and 145.6 Mc.

<sup>2</sup> Phone OBS (bulletins) on 1.82, 3.945, 7.255, 14.28, 21.41, 50.7 and 145.6 Mc.

<sup>3</sup> RTTY OBS (bulletins) on 3.625, 7.045, 14.095 and 21.095 Mc. 170/850 cycle shift optional in RTTY general operation.

<sup>4</sup> Starting time approximate. Operating period follows conclusion of bulletin or code practice.

<sup>5</sup> Operation will be on one of the following frequencies: 21.075, 21.1, 21.41, 28.08 or 28.7 Mc.

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

<sup>7</sup> Bulletin sent with 170-cycle shift, repeated with 850-cycle shift.

Maintenance Staff: W1QIS W1WPR. \* All times/days in GMT, general operating frequencies are approximate.

## ATLANTIC DIVISION

**DELAWARE**—SCM, John L. Penrod, K3NYG—RM: W3EEB, PAM: W3DKX. A new traffic monitoring net has been established for the purpose of shuttling traffic up and down state. All amateurs with 2-meter gear are requested to monitor 145.260 Mc. from 7:30 to 8:00 p.m. Mon. through Sun. WA3DDW is now W3MK. W3HGA cured his electric fence interference. K3URP is convalescing from a broken foot. 40- and 20-meter DX has been plentiful for WA3DUM. K3GKF completed the first quarter with 115 QO notices sent out. K3NYG is now Extra Class. W3DKX spent Easter vacation in Somerset County, Penna. Because of lack of volunteers, there will be no Delaware Hamfest this year. DEPN reports QNI 55, QTC 6; DTMM reports QNI 37, QTC 2; DSMN reports QNI 48. Traffic: W3EEB 103, W3DKX 19, WA3DUM 12, K3NYG 5, WA3GSM 2, WA3HWC 2.

**EASTERN PENNSYLVANIA**—SCM, George S. Van Dyke, Jr., W3HK—SEC: W3AES. RMs: W3EML, K3MVO, K3YVG, W3MPX. PAM: K3MYS, V.H.F. PAM: W3FGQ. EPA, QNI 407, QTC 424; PFN, QNI 585, QTC 473; PTTN, QTC 340; FOAEP&TN, QNI 700, QTC 279; EPA V.H.F., QNI 322, QTC 365. OO reports were received from W3BFP, W3KEK, K3MYS, K3RDT, K3HNP, W3FGQ and W3NCC; OBS reports from WA3AFI, K3WEU, K3BHU, K3RDM, WA3HGX, WA3-EC, W3CBH; OVS reports from WA3BIV, WA3CQO, W3CL, WA3BJQ, W3ZRR, WA3HGX, WA3HIT, WA3-EEC, W3FGQ. New Officers Dept.: Penn State ARC—WA3BSV, pres.; WA3CFU, vice-pres.; WA3GSH, secy.-treas.; K3DSQ, station director; K3PBL, asst. station director; K3KQY, WB2OEM, K3QNY, executive board. Reading ARC—K3TJ, pres.; K3PSX, vice-pres.; W3-1'QC, secy.; K3MGO, treas. Villanova ARC—WA3HGX, pres.; K3ZUN, vice-pres.; K3RDM, secy.; WA3OFA, treas. The following made the BPL: W3CUL, W3VR, W3EML, K3MYS, W3FGQ, W3MPX, WA3CQO, W3FAF is remodeling his QTH. K3HNP reports a successful auction at Penn. Wireless Assn. W3LHF reports the same for the Pack Rats. W3VR is trying out his green thumb in the garden. W3MPX is on 6 meters. WA3GUL got his WAS. K3NSN has a new job. K3MVO says the keyer works fine. K3NPC has a new base-loaded vertical antenna. WA3EMO reports the school station, WA3-JKH, will be on soon. K3WEU found out he already had cards for WAC. WA3JED has a new Swan 250. W3EU is working on some antennas. OO K3RDM is active on 40 meters. K3KTH is going to computer school. The EPA V.H.F. Net moved to its new frequency only to find it had landed on someone else's and went back to 50.2 Mc. until new crystals can be procured for another spot. The EPA Two-Meter Trc. Net is underway. The EPA V.H.F. Book Review Net reviewers are improving with experience. The traffic pick-up point at Philadelphia City Hall gave traffic a little boost. W3ID reports W3YPF, club station, is getting into RTTY. We need ECs; anyone interested should contact W3AES. Traffic: W3CUL 2781, W3VR 902, W3EML 762, K3MYS 646, W3FGQ 576, K3MVO 319, WA3JCA 298, W3MPX 290, K3VBA 265, WA3CTP 248, WA3CQO 213, W3CFD 200, WA3ATQ 197, WA3AJT 178, W3AIZ 169, K3YVG 135, WA3GLI 98, WA3AOJ 95, WA3AFI 87, WA3EXW 87, WA3CKA 85, W3FPC 85, WA3EMO 84, WA3EEC 81, WA3FPC 68, WA3IDQ 66, WA3FPM 63, W3CBH 52, W3NNL 50, K3KCO 49, W3HK 46, K3WAJ 46, WA3CND 45, WA3EO 43, W3KJK 37, WA3GAT 34, W3VAP 31, K3MFD 29, WA3HGX 25, K3BHU 24, WA3HVR 23, K3FOB 21, WA3EXB 20, W3KX 16, K3KTH 16, K3-RUA 15, WA3HDI 14, K3SLG 14, W3AES 13, K3PSO 13, WA3EMO 12, W3IVS 12, W3BUR 11, W3NJJC 11, K3-WEU 11, W3RLT 10, W3RV 10, W3OY 8, WA3AIB 6, WA3IOB 6, W3CL 4, K3NSN 4, K3HNP 3, W3PZY 3, W3BFF 2, WA3BJQ 2, WA3IAZ 2, W3OML 2, WA3BIV 1, W3EU 1, W3FAF 1, WA3GUL 1, WA3HIT 1, W3ID 1, WA3JED 1, W3NJLF 1, W3KEK 1, K3NPC 1, K3RDM 1, K3RDT 1, W3YPF 1, W3ZRR 1.

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

| Net  | Freq. | Time  | Days  | Sess. | QTC | QNI  | Mgr.       |
|------|-------|-------|-------|-------|-----|------|------------|
| MDD  | 3643  | 0000Z | Daily | 31    | 241 | 12.8 | K3OAE, RM  |
| MDDS | 3643  | 0130Z | Daily | 31    | 45  | 5.6  | W3'CBG, RM |
| MEPN | 3920  | 2200Z | M-W-F |       |     |      | K3NCM, PAM |
|      |       | 1700Z | S-S   |       |     |      |            |

• 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.

|           |       |         |    |    |      |            |
|-----------|-------|---------|----|----|------|------------|
| MDCN 3920 | 2200Z | T-T-S-S | 18 | 75 | 12.8 | K3GZK      |
| AREC 3920 | 2100Z | Su      | 5  | 0  | 8.0  | W3LDD, SEC |

New appointees: WA3ELO and K3ZVM, Asst. ECs for Cecil County. This is to notify all ARRL members in the MDC Section that your present SCM, K3JYZ, will not be a candidate for reelection this December. With the coming of spring W3FA has planted his antenna patch. W3CBG is recruiting both new members and traffic for MDDS. W3TN makes the BPL for the fourth time this year. WA3GDG reports high activity on the Frederick AREC 2-Meter Net as well as building a signal generator kit. WA3JBY is the newest regular on the MDD and MDDS traffic nets. W3ADO, as reported by WA4QLP/3, has the new 80/75-meter sky wires up. W3-CDQ was active in the YL/OM Contest. W3JPT was one of the leather-lung operators at K3CG during the DX Phone Contest. The Montgomery County AREC 2-Meter Net shows high activity, as reported by WA3-BMM. W3CZ sends a photo proof of his transistorized operation from Charles County. K3ANA has relocated to Bowie and is back on the air with a quad and dipoles. WA3JAM sends his first report as an OO with the added information that he is now Extra Class. W3FU continues his unassisted Intruder Watch activity. WA3HKF, of the Chesapeake ARC, has an active program going, one part of which is a theory course for upgrading licenses. W6HOH/ET3FMA has returned home for a short visit. W3MSK/VU2MSK/V86/JA/KH6 has returned home for good, or at least until he can get his station back in order. W3TMZ estimates that the PVRC rolled up 34.5 million points in the past DX Contest. W3UE still is in the hospital at this writing. Traffic: W3TN 255, WA3EKP 167, W3CBG 158, WA3HTQ 137, K3GZK 102, W3ADO 96, W3ATQ 88, K3JYZ 71, W3PRC 62, K3ZLE 41, WA3JBY 33, WA3CCN 30, W3LDD 26, WA3ERL 22, K3ORW 18, W3FA 17, WA3FRL 16, WA3CBC 15, W3N-1YS 14, K3LFN 14, WA3GDG 10, WA3BMM 6, W3BWT 2.

**SOUTHERN NEW JERSEY**—SCM, Edward G. Raser, W2ZL—Asst. SCM: Charles E. Travers, W2YPZ. SEC: W2FK. RMs: WA2KIP, WA2BLV, PAM and NJPN Net Mgr.: W2ZL. How about giving your local Emergency Coordinator some help? He is trying to organize the local v.h.f. nets. See your local EC—soon! NJN reports QNI of 485, traffic total 415. NJPN reports QNI of 694, traffic total 307. The S.N.J. V.H.F. Net meets on 51.25 Mc. Sat. and Sun. at 7 p.m. NCSs are WB2UVB and WB2YEH. The SJRA 2-Meter Net meets on 145.3 Mc. Wed. at 9 p.m. OBS reports were received from W2EIF, W2ORS and K2BG. OVS reports from WB2UVB. New appointments: W2EIF as OPS, WA2ABY as ORS, WB2SZK as OO, WB2UVB as OVS, W2BZJ traded his call for W2FK and made Extra Class. Your SEC gave a talk at the DVRA Club meeting in Mar. on AREC/ARPS. WB2IBE is moving to Barnegate, N.J., in June. W2SJI, K2PI and W2FK are moving to Florida. W2ZYW was high man again in the Jan. C.D. Party, both c.w. and phone. The Burlington Co. RC meets at the Court House, 2nd St., Moorestown, every Thurs. of each month. K2SOL now is NCS for the 4th Dist. Navy MARS Net, W2PU, Princeton Univ. Club station, had the highest traffic total for the month. WB2UVB made the BPL in Jan. and Mar. Thanks, fellows for all the birthday greeting messages and cards received Apr. 1. Yup, I'm an April Fool! Traffic: W2PU 267, WB2-IVB 185, WA2KIP 172, W2YPZ 139, WA2ABY 117, W2ZL 108, W2ORS 100, WB2BGH 99, WA2BLV 42, WB2-VMQ 30, W2CKE 22, K2SOL 18, WB2VEJ 14, WB2LM 11, WB2SFN 11, WA2KAP 10, W2FK 9, K2JJC 6, WB2-APX 5, K2MBW 5, K2SHE 5, W2U 1.

**WESTERN NEW YORK**—SCM, Charles T. Hansen, K2HUK—SEC: W2RUF. PAM: W2PVI. RMs: W2FEB

and W2RUF. NYS C.W. Net meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800, NYSPTEN on 3925 kc. at 2200 GMT, NYS C.D. on 3310.5 and 3993 kc. at 0900 Sun. and 3510 kc. at 1930 Wed., TCPN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT, NYS County Net on 3510 kc. at 1400 GMT Sun. and 2345 GMT Mon. Appointments: K2PFC as EC Steuben County, W2LYG as ORS, WB2ZDP as OVS. Congratulations to W2FR on his appointment as manager of 2RN. This is an important cog in NTS and we know Howie will do a good job. Congratulations to Extras W2MK and W2KX, formerly W2SSG and W2CZQ. Don't forget Field Day. If your club isn't doing a job, get some of your buddies together and go out on your own. This is a major activity and you're missing a lot of fun and experience if you don't participate. Congratulations to the following clubs which recently were approved by the League's Executive Committee for affiliation: Central District Radio Club, Utica N.Y., WA2ANE secy.; Old Timers Radio Club, Vestal, W2APE secy.-treas.; Rochester V.H.F. Group, Webster, N.Y., WB2UM secy.; South Towns ARS, WB2YNR, pres. WAIUY/2 got his Extra. All amateurs are invited to report to their SCM via Form 1 report cards, available for the asking from ARRL. All appointees are reminded that regular reporting is a requisite for reappointment, which is done on a yearly basis. Look at the date on your certificate (and your license); you may be surprised. Traffic: W2FR 446, WB2OYE 304, WA2HSB 277, W2MTA 147, WB2GLA 134, W2RUF 118, W2HYM 110, WB2SMD 108, W2LYG 79, W2FEB 62, WB2YUT 61, W2RFQ 39, K2JBX 34, K2DNN 33, K2-OBV 25, W2FCG 23, K3IAM 23, WB2VND 17, W2CFP 15, W2PVI 14, WA2ANE 12, W2BLO 7, WA2GLA 7, W2PNW 4, WB2NZA 1.

**WESTERN PENNSYLVANIA**—SCM, Robert E. Gawryla, W3NEM—SEC: W3KJP. PAM: K3YPI (v.h.f.). RMs: W3KUN, W3MFB, W3UHN, K3SOH. Traffic nets: WPA, 3585 kc. daily at 7:00 p.m. local time. KSSN does not function from May 1 through Sept. 30. It is with regret that K3KMO had to give up his SEC appointment. I would like to thank Al for his fine work as SEC. W3KJP is now SEC and a very capable replacement for K3KMO. The Nittany ARC held its annual inauguration banquet with W3LNV as guest speaker. W3YA gave the club the latest news from ARRL prior to W3LNV's program. The Etna Radio Club set up a message center and relayed radiograms for shoppers at the local shopping center. New General Class licensees in the area are WA3ARJ and WA3ENI. Ex-WN3INX is now WA3INX with a General Class license. *Spark Gap* reports that K3MIMO still is telephone relaying into Guantamano and Canal Zone; WA3BLW now has a Galaxy mobile; WA3CAD has a new SB-101; K3LPI is out of the hospital. WA3BLE received his CP-35, his fifth BPL, has a new HT-32 and received word that he placed first in WPA for the c.w. portion of the 1967 Sweepstakes. K3KMO advises he now has his QST collection complete from Jan. 1925 to the present. The WPA Mobilizers Net meets Wed. at 9:00 p.m. on 29.360 Mc. It is with deep regret that we announce W3QBX as a Silent Key. W3KUN reports the WPA C.W. Traffic Net had 31 sessions, 308 messages, 424 QNS plus 12 visitors during Mar. Traffic: WA3BLE 507, W3NEM 218, WA3ELI 198, W3KUN 156, WA3TPU 143, W3LOS 121, WA3AKH 109, W3BLZ 93, K3SOH 87, K3HKK (W2KAT/3, K3AHT ops) 73, WA3CQJ 72, WA3EPQ 56, K3PYS 46, K3SJM 40, K3HCT 35, K3-RZE 26, K3ASI, 25, K3SMB 17, WA3HSI 15, WA3GPK 14, W3YA 11, W3LOD 3, WA3HAL 2, W2KAT/3 1.

### CENTRAL DIVISION

**ILLINOIS**—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. RM: W9EVJ. PAMs: WA9CCP and WA9RLA (v.h.f.). Net reports:

| Net     | Freq.      | Times    | Days      | Tfc       |
|---------|------------|----------|-----------|-----------|
| LEN     | 3940 kc.   | 1400Z    | Sun.      | 8         |
| ILN     | 3760 kc.   | 0000Z    | Daily     | 190       |
| NCPN    | 3915 kc.   | 1300Z    | Mon.-Sat. | 253       |
| NCPN    | 3915 kc.   | 1700Z    | Mon.-Sat. | 232       |
| IL PON  | 3915 kc.   | 1615 CST | Mon.-Fri. | 468       |
| IL PON  | 3915 kc.   | 1645 CST | Mon.-Fri. |           |
| IL PON  | 3915 kc.   | 0830 CST | Sun.      |           |
| TNT PON | 145.5 Mc.  | 0200Z    | MWT       | 30        |
| TNT     | 145.36 Mc. | 0200Z    | Sun.-Fri. | no report |

W9QLW reports that the 9th RN traffic count was 525. New calls heard in the Peoria area are W9WZX, W9N-WZY, W9WZZ and W9WJP. All are graduates of the Peoria County c.d. class. The League's Executive Committee has approved the application of the Crystal Lake Community High School Amateur Radio Club for ARRL affiliation. W9QKK has a new R-4B receiver. W9VLY is the new editor of the Kankakee Area Radio Society *Newsletter* and has passed the General Class exam. New appointees include WA9QZE and WA9TCW

as OBS and WA9SDT, WA9TCW and WA9QZE as OVSs. Mr. Fritz Franke, well-known engineer of Hallcrafters, spoke at the Apr. 3 meeting of the Chicago Area Teleprinters Society. WN9VOK passed the General Class exam. K9RAS's XYL is now WN9YFH. K9UFG, K9WMP, K9FAV and WA9SDT are operating on 1296 Mc. K9TXJ received his WAS certificate. WA9LSW is now working 6 meters. Illinois Sesquicentennial QSL cards are still available from the Illinois Sesquicentennial Commission, Room 1016, Myers Bldg., Springfield, Ill. 62701. The "34th Hamfest-Sesqui '68" will be held at Santa Fe Park Sun., Aug. 11. K9UFG and K9-WMP passed the Advanced Class exam. BPL awards went to WA9HHH, WA9MHU, W9KII and WA9PPA (Feb.). Traffic: (Mar.) WA9HHH 584, WA9MHU 471, W9KII 363, W9NXG 139, W9JXV 120, W9EVJ 115, WA9-PPA 100, W9DOQ 94, WA9OTD 62, K9BTE 51, WA9-RCQ 48, W9HT 46, W9KFC 32, WA9QVU 24, W9CWH 22, W9PRN 22, WA9SFB 15, WA9SPA 13, K9TXJ 13, K9HSK 11, W9IDY 9, WA9POZ 8, K9WMP 7, W9LNO 6, WHPG 5, WA9QBM 3, W9SXL 3, K9HRC 2, K9RAS 1. (Feb.) WA9PPA 548, WA9QBM 8, K9RAS 2.

**INDIANA**—SCM, William C. Johnson, W9BUQ—Asst. SCM: Al. Roberta Kroulik, K9IVG. SEC: W9JUK.

| Nets     | Freq. | Time                     | Tfc. | Mgr.   |
|----------|-------|--------------------------|------|--------|
| 1FN      | 3910  | 1330Z Daily              | 230Z | K9IVG  |
| 1SN      | 3910  | 0000Z M-F 2300 Sat.-Sun. | 701  | K9CRS  |
| QIN      | 3656  | 0100Z Daily              | 190  | W9HRY  |
| IPON     | 3910  | 1250Z Sun.               | 255  | K9EFY  |
| IPON VHF | 50.7  | 0200Z M-T                |      | WA9NLE |

I regret to report the following amateurs as Silent Keys: WA9RYU, K9UIV, W9VGD, W9LUU reports Feb. traffic for the Great Lakes Emergency Net as 55. W9ZNC is the new pres. of the Evansville ARC. At the Evansville ARC meeting W9GFS gave a talk on old radio. W9-FII, instructor of the code and theory class at the Columbus ARC, reports nine new Novices. W9UC reports that the Fort Wayne ARC code class has 150 signed up. The McCullough Jr. High School ARC at Marion, WA9-YJB, also has code and theory classes. Randolph County ARC's new officers are WA9GKF, pres.; WA9MBT, vice-pres.; WA9QDD, secy.; W9VJX, tras. The Kekianga ARC, at the Institute of Technology at Fort Wayne, has been reorganized. W9FJT the trustee reports the new club call is W9BRH. K7UGA was a visitor there and the club members had an eyeball QSO with Barry. At the Indiana Radio Club Council meeting W9HFG, Central Division Director, gave a talk on the future of amateur radio. W9BUQ was in Des Moines, Iowa, on a Sat. for a Navy MARS meeting and was back Sun. for the IRCC meeting. The IRCC Picnic will be held at Brown County State Park July 14, 1968. WN9YIU is the nephew of W9HRY, who reports that W9JDK received his ORS certificate. The Purdue ARC reports that W9NTP, gave a talk on both slow-scan and fast-scan amateur TV. Aug. 17-18 are the dates of the Indiana QSO Party. Contact K9HYV for full details. The ARRL Central Division Convention will be held at Springfield, Ill. Aug. 3-4. Make your plans to attend, and make your reservation early. For full details contact W9PRN, vice-director and SCM of Illinois. QIN Honor Roll: WA9MTY 29, W9BDP 28, WA9KOH 28, K9VEY 28, WA9KAG 26, K9JDK 24, W9KII 23, WA9VZM 22, W9QLW 18, W9JUK 17, WA9MXG 17. BPL for Mar.: K9IVG. *Amateur radio exists because of the service it renders.* Traffic: (Mar.) K9IVG 932, K9FZX 230, W9-HRY 209, WA9TI/WA9MTY 184, WA9LQG 87, WA9-BGI 71, K9CRS 60, K9STN 60, W9BUQ 57, K9RWQ 55, W9JUK 40, K9EFY 37, WA9BHG 33, K9CBy 33, WA9-KOH 33, K9VHY 31, W9YXX 30, WA9IPS 29, W9FVH 27, WA9GJZ 25, W9LG 23, K9QVT 23, W9SNQ 20, W9CUC 17, K9GBR 16, K9WGN 14, WA9AXF 13, W9CMT 13, W9DZC 13, K9JQY 10, W9DGA 9, K9FUJ 9, K9ILK 6, WA9AB 2, K9ATV 2. (Feb.) W9QLW 150, W9JUK 127, W9QUH 66.

**WISCONSIN**—SCM, Kenneth A. Ebnetter, K9GSC—SEC: W9NGT. RMs: W9DND, K9KSA and W9CBE. PAMs: W9NRP, WA9QPK, WA9QNI, K9DBR and WA9IZK.

| Net    | Freq.      | Time  | Days      | QNI  | OSP | Mgr.          |
|--------|------------|-------|-----------|------|-----|---------------|
| BWN    | 3985 kc.   | 1145Z | Mon.-Sat. | 458  | 319 | W9NRP         |
| BEN    | 3985 kc.   | 1700Z | Daily     | 765  | 173 | WA9QKP        |
| WSBN   | 3985 kc.   | 2200Z | Daily     | 1468 | 293 | WA9QNI        |
| WIN    | 3662 kc.   | 0045Z | Daily     |      |     | W9DND         |
| WSSN   | 3780 kc.   | 2330Z | Daily     |      |     | new net K9KSA |
| WRTTYN | 3625 kc.   | 2330Z | Sat.      |      |     | new net W9CBE |
| SWRN   | 50.4 Mc.   | 0200Z | Mon.-Sat. |      |     | 4 K9DBR       |
| SW2RN  | 145.35 Mc. | 0130Z | Daily     | 336  | 66  | WA9IZK        |

Two new nets are in operation as shown above. The

Slow Speed Net and an RTTY net. Net certificates were sent to WA9VNV, W9IHW and WA9QHP for WBSN; WA9WKJ and WA9NVJ for BEN; WA9BBL, WA9OFF, K9LJM, WA9PKM, WA9SVF, W9NUC, K9YTS, W9N9VCK, WA9SZH, WA9DXW, K9WALA, W9FX and WA9-IZK for SW2RN. New appointments: W9CBE, K9KSA and W9DND as RAs, K9DBR and WA9IZK as V.H.F. PAMs; W9ESJ as OPS. Renewed appointments: WA9-ORF as OV9, WA9NPB as ORS, WA9PNB and WA9-NBU as OPSs and W9ITW, W9MNG, WA9BNU and WA9IZK as ECs. The WNA Picnic will be held in Fond Du Lac July 14. W9WMMV received his license at age 11. W9UIT received the new call, W9CMI. The Nicolet HS ARC has become affiliated with the ARRL. W9-BCH has a new HW-12, and WA9PKM a new SB-200. Traffic: (Mar.) W9AOV 684, W9DND 199, W9ESJ 162, K9CFM 142, W9DYD 141, WA9QKP 130, W9BCH 79, W9DXV 73, K9KSA 72, W9QDD 69, K9FHI 67, W9AYK 59, WA9NVJ 53, W9KRO 44, WA9OMO 44, K9TBY 40, W9CBE 36, W9IHW 34, W9NRP 34, WA9PKM 24, K9JFS 23, WA9LRW 23, K9GSC 15, W9RTP 13, WA9NPB 11, W9IQW 5, K9FYM 4, K9QKU 4, WA9OFF 2. (Feb.) K9JFS 25.

**DAKOTA DIVISION**

**MINNESOTA**—SCM, Herman R. Kopischke, Jr., W0-TCK—SEC: WA0IEF. RMs: K0ORC, WA0EPX. PAMs: WA0MMV, WA0HRM. MSN meets daily on 3685 kc. at 2330Z. MJN meets Tue.-Sun. on 3685 kc. at 0000Z. Noon MSPN meets Mon.-Sat. on 3945 kc. at 1705Z Sun. and holidays at 1400Z. Evening MSPN meets daily on 3945 kc. at 2315Z. K0CNC received an OPS appointment. EC appointments renewed: W0AZR Mower Co., WA0DFT Nicolet Co., K0ICG Blue Earth Co., W0LW Wilkin Co., K0XSP Beltrami Co. Other appointment renewals: WA0HRM, K0ICG and W0-TCK as OPSs; W0TIV as OO. K0CNC recently built an 800-watt grounded-grid linear using a pair of 813s. He also assembled a Heath SB-301 receiver. WA0EZQ and WA0PZY lost their antennas to a recent ice storm. The Minneapolis ARC had a large turnout at its annual auction. W9SQM is now on the air as WA9WYR. New Generals in the area are WA0RRJ, WA0QVN, WA0RQO, WA0TUU and WA0NAX. WA0YIM and W0TCK passed the Advanced Class exam recently. The St. Paul FCC has moved to a new building at 691 Federal Bldg., U.S. Court House, Fourth and Robert, St. Paul, and now gives the code tests by speaker instead of with earphones. Olmstead and Waseca Co. AREC members have been working to improve their antenna systems at their respective c.d. headquarters. Waseca Co. also is busy equipping a semi-truck and trailer with communications gear. WA0JKT received the BPL award for March traffic. Traffic: WA0JAW 308, K0CNC 148, WA0JKT 134, WA0EJ 95, K0ZRD 92, K0ORK 98, WA0MMV 79, WA0LVK 52, W0UMX 45, W0JSI 43, WA0EPX 39, K0PTI 39, WA0HRM 39, K0ZBI 39, W0TCK 35, W0HEN 29, WA0YIM 23, W0KNR 22, K0SNC 20, K0PIZ 18, K0DEF 17, W0RUC 16, W0-SZJ 15, WA0DFT 13, WA0DOT 13, W0EQO 11, W0-ATO 10, W0KLG 9, WA0JPR 8, WA0EZQ 3, WA0SSN 1.

**NORTH DAKOTA**—SCM, Harold I. Sheets, W0DM—SEC: WA0AYL. OBS: K0SPH. PAM: W0-CAQ. RM: WA0ELO. WA0DX77 keeps in touch on 20 meters with the Grand Forks gang. WN0RFG now is General Class. K0OVE received a birthday present of a Heath Compact. W0MQA is back and will be on when the antennas get up. WA0PPK recently received No. 7180 from the YL International S.S.B. Net. WA0QVW lost some antennas in the recent sleet storm. WA0OAT came up from Bismarck for the State Basket Ball Tournament. New Novice calls from the Valley Jr. High Radio Club are WN0TYA, WN0TXY and WN0-TXZ. A new class has been started for Novices as well as work on the General. W0DM has been instructing those classes while the Forx Radio Club has been holding classes, too. Newcomers are welcome. Two-meter activity is picking up in the Bismarck-Mandan area with WA0MSJ, WA0QVT, WA0HDA, W0DXC and W0BF on the air. W0BF has been giving exams for Novices and Conditional Class licenses and acts as NCS for the C.W. Net. His son, WN0RQY, soon will have an antenna on the SAE House at U.N.D. W0HDD will be W0GH. W0FVX has been recuperating from a stint in the hospital. The committee for the International Hamfest has been real busy getting out the publicity and setting up the program. W0BHI is home from the hospital.

NDRACES Net Sess. 22 Check-ins 814 Tfc. 77  
K0SPH, W0EFJ, W0CAQ  
W0GFE, W0HJU, K0PZK  
NDCW Net " 14 QNI 52 Tfc. 39  
WA0FLO, WA0HUD, W0BF  
YL WX Net " 20 Check-ins 459 Tfc. 18  
WA0GRX, WA0MND

Traffic: WA0ELO 143, WA0HUD 126, K0SPH 22. W0-BF 17, W9QNI/Ø 14, K0PZK 11, W0DM 10, WA0JPT 7, WA0TBR 6, W0DXC 4.

**SOUTH DAKOTA**—SCM, Seward P. Holt, K0TXW—SEC: WA0CPX. PAM: WA0CWW. RM: W0IPF. New calls: WA0SKJ, Vermillion; WN0TXG, Brookings. K0KXR has started a slow-speed c.w. net on Tue. and Thurs. at 2030, informal. A fruitful planning meeting was held by the Brookings Radio Club attended by the SCM, SEC, PAM, net managers and others. Recent appointments: K0KXR as ORS, WA0LLG, WA0PNB, WA0RIQ, WA0CWW, WA0CPX, K0KXR, WA0CWX as OPSs; K0KXR, WA0PNB, W0SCT as OBSs. Net reports: Early session Phone Net, QNI 361, QTC 22, 52 informals; late session, QNI 1150, QTC 65, 124 informals. N/Q Net, QNI 386, QTC 73. Sioux Falls 2-Meter Net, QNI 13 in 4 sessions. SDN-C.W., both sessions, QNI 146, QTC 31. SDN *Keych*, published by RM W0LDF, reports increased interest in SDN. Traffic: W0ZWL 864, WA0PNB 84, W0SCT 63, WA0RIQ 36, K0VYY 23, W0IPF 20, W0BQS 16.

**DELTA DIVISION**

**ARKANSAS**—SCM, Curtis R. Williams, W5DTR—SEC: WA5HS. PAM: WA5PPD. RM: W5NND. The EC appointment of K5ABE has been endorsed for another year. W5MS reports a new father-son Novice team in Camden: WN5ULA-WN5TVE. The Severe Weather Net continues to function smoothly on 3990 and could use your support. Excellent club bulletins were received from the Southeast Arkansas ARC, Ft. Smith ARC and the ARC of the U. of Arkansas. All report excellent response to their radio classes. Net reports for Mar.:

| Net    | Freq.    | Time                         | Sess. | Traffic | Stations | Mgr.   |
|--------|----------|------------------------------|-------|---------|----------|--------|
| OZK    | 3790 kc. | 0000Z                        | 31    | 36      | 240      | W5NND  |
| RN     | 3815 kc. | 2330Z                        | 31    | 42      | 888      | WA5PPD |
| APN    | 3885 kc. | 1100Z                        | 26    | 10      | 620      | K5ABE  |
| APON   | 3925 kc. | 2130Z                        | 21    | 67      | 326      | W5MJO  |
| WX Net | 3990 kc. | During severe weather alerts |       |         |          |        |

WA5QPI reports progress with the AREC in Central Arkansas. K5BLV received WAC-c.w., WAC-phone, WAS and CP-30. W0BD made the BPL in March. Come on, gang, let's have those traffic reports. Traffic: W5OBD 1394, W5NND 130, W5MJO 50, W5DTR 37, WA5-QPI 20, K5BLV 5, W5BED 2.

**LOUISIANA**—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: W5CEZ. V.H.F. PAMs: WA5DXA, W5UQR.

| Net      | Freq.  | Days  | Time/GMT  | Net Mgr. |
|----------|--------|-------|-----------|----------|
| LAN      | 3615   | Daily | 0030/0400 | W5MBC    |
| Delta 75 | 3905   | Sun.  | 1330      | W5EUVU   |
| LaPON    | 3870   | Sun.  | 1300      | W5KC     |
| La RTTY  | 3612.5 | Sat.  | 0100      | W5GHP    |

W5CEZ urgently needs coverage in Shreveport, Natchitoches, Leesville, Houma, Jennings and Morgan City on LAN. WA5LQZ was presented with a TA-33 by his XYL, K5ANS, who is our only known RTTY OBS, reminds the gang that sked time remains 6 p.m. local time regardless of DST. WA5LGO reports the Wimshoro HARC has two new Novice members. WA5OJG says his 813 linear is back on the air. WA5NYY reports the Jefferson ARC will hold Public Field in the interest of PICON. E5WOD reports that the Springfield ARC has four new Novice members. W5MBC is buggy by business activities. W5B again is more active on 3990 each morning with the OT Round Table. WA5OHH's family will move to Canada in June but he will continue his studies at La. Tech. for the remainder of 1968. W5-JFB built the PET converter from the *Handbook* and was amazed at how quiet it operates. There have been good 2-meter openings recently with s.s.b. from S. America heard. W5FSA, comm. off. of the civil defense organization in Slidell, recently presented the club a program on local c.d. WA5FDD was recently named NCS for the club's 6-Meter Net. The GNOARC urgently appeals to the New Orleans gang to assist on many important committees. Check with WA5CST. The Lafayette ARC again is helping in that city's Cancer Drive. W5NQR has been visiting in Oklahoma while W5NQQ has been visiting in Illinois. WA5RKL, it is reported, is holding Novice classes in Breau Bridge. By the time you read this I will be en route to the Maine woods for some fresh-water fishing and starting on a seven-week tour of the Northeast. W5PM will be on 3990 mobile throughout the trip. Traffic: W5CEZ 134, W5GHP 132, W5MBC 102, W5MXQ 96, WA5LQZ 78, W5KRX 75, WA5KQ 15, WA5OHH 14, WA5NYY 10, K5ANS 5, W5LGO 4, K5OKR 4, W5PM 4, WA5OJG 2.

**MISSISSIPPI**—SCM, S. H. Hairston, W5EAM—SEC: W5JDF. Please note the new frequency of the Miss. Sideband Net: 3947 kc. daily at 1815 CST. Net control stations are WA5VIMQ, WA5OKI, W5LEA, W5BW, WA5PTE, WA5KEY, WA5OHQ and WA5MPQ. WNS-SIM has passed the General Class exam. WA5QQT is working lots of c.w. on 80 meters, also phone on 75. WA5RRA still is using a 20-A barefoot but is working on a linear. WNSUMQ is a new Novice in Olive Branch and WNS5TMC is new in Falkner. W5BW now has a potent signal since he acquired a linear. WA5JWD is operating portable now in Indianola on 75. He is installing a new antenna system. New officers of K5TYP are K3FC, pres.; WA4UPE, vice-pres.; WA8WNK, secy.; K3RFC, materials officer; OE2HLL, librarian; K2-DEM, trustee; WA4KJB, traffic manager. W5ODV has been very active with the Boy Scouts and the Delta Radio Club. He holds classes for the Scouts on amateur radio. His SB-10 and Apache are doing a job for him, especially on 15 meters. Traffic: W5ODV 48, W5BW 36, K5TYP 23, WA5JWD 4, WA5RRA 4.

**TENNESSEE**—SCM, Harry A. Phillips, K4RCT—Asst. SCM: Lloyd Shelton, WA4YDT. PAMs: W4PFP, WA4CGK, WA4EWW, WB4GHL, RM: WA4YEM.

| Net  | Freq. | Days   | Time  | Sess. | QNI              | QTC   | Mgr.   |
|------|-------|--------|-------|-------|------------------|-------|--------|
| TSSB | 3980  | M-Sat. | 2330Z | 26    | 1580             | 191   | WA4CGK |
| TPN  | 3980  | M-Sat. | 1145  | 31    | 1268             | 123   | W4PFP  |
|      |       | Sun.   | 1300  |       |                  |       |        |
| ETPN | 3980  | M-F    | 1040  | 21    | 505              | 48    | WA4EWW |
| TCN  | 3980  | Thurs. | 0100  |       | (Wed. night CST) | W4CGG |        |
| TN   | 3635  | Daily  | 0000  | 31    | 175              | 47    | WA4YEM |
| TTN  | 7290  | Daily  | 2100  | 31    | 403              | 74    | WB4GHL |

Appointments: WB4ESE as OBS: WB4EHD, WA4CRU as OPSs. Endorsements: W4FX, W4WBK, W4HPN as ORSs. Hamfests: Humboldt, May 26; Memphis, June 1-2; Crossville, July 20-21. Appointment certificates will be endorsed at the Crossville Hamfest. All section net controls will be presented with special certificates at Crossville for their outstanding work in the section nets. Ready for Field Day? EC WA4URA reports that a communications link will be maintained between the Montgomery County Net and the Davidson County Net. EC WA4YFG reports that Humboldt ARC graduated 6 new Novices, thanks to the hard work of W4IGW and K4BEZ, who served as instructors. OPS WB4EHD has received WAS (low-power c.w.). Lebanon High School is sponsoring code classes. EC WB4EHK reports good results of AREC practice in March. Traffic: W4OGG 238, WA4YDT 148, WB4ESE 126, WA4YEM 108, W4FX 82, W4SQE 79, WA4GLS 45, WB4HNX 39, WA4TWL 35, W4PFP 33, K4MQI 31, K4COT 19, W4WJH 16, WA4-AJB 15, WB4HY 15, WA4CEG 14, WA4EWW 11, WA4-RXH 10, W4PRY 10, WA4NEC 7, WB4FCE 5, WA4-ZBC 5.

## GREAT LAKES DIVISION

**KENTUCKY**—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: W4OYL. Appointments: WB4BK as PAM, WB4EQN as OVS. Endorsements: WB4CY as ORS, W4KJP as OPS, W4ISF as OVS and OPS.

| Net  | Freq. | Days  | GMT       | QNI | QTC | Mgr.   |
|------|-------|-------|-----------|-----|-----|--------|
| KRN  | 3960  | M-F   | 1130      | 552 | 35  | K4KIS  |
| MKPN | 3960  | Daily | 1330      | 370 | 50  | K4TRT  |
| KTN  | 3960  | Daily | 0000      | 859 | 540 | WA4AGH |
| KYN  | 3600  | Daily | 0000/0300 | 464 | 311 | W4BAZ  |

The FACTN meets on 50.7 Mc. at 0200 Mon., Tue. and Fri. with liaison to KYN and KTN. WB4AFH has moved to Indiana. WB4FOT has a new 6er. W4JRW is now Extra Class. Active RTTY calls are K4OAN, WA4-WQZ, WA4TFD, K4YZU, W4MGT and WA4AGH. Communications during the Russellville Flood Apr. 4 were provided by WA4RTI, WA4SWV and WB4CFH mobile on 75, and W4OYL, W4TOY, K4UDZ, W4MMY and WB4OH mobile. KTN and KYN went on extended sessions to assist. WN4IZX and WN4IZY are new Owensboro Novices. 1968 Officers of the ARTS are W4PSE, pres.; W4WQC, vice-pres.; W4BTA, secy.-treas. The ARTS will sponsor the 1968 Kenvention to be held Aug. 30/31. Officers of the Kentuckiana Club are K4KGE, pres.; K4KZH, vice-pres.; K4SAY, secy.; K4ZZK, treas. WB4FGE is now Advanced Class. Traffic: WA4-DYL 270, W4BAZ 128, WA4AGH 126, W4NRZ 124, WA4WWT 114, WA4KFO 105, WA4YUE 97, WB4AIN 91, WA4IBG 78, K4MAN 73, WA4UAZ 68, WA4SMS 61, W4KKG 42, WB4FOT 23, W4OYL 23, WA4UHR 26, W4CDA 22, WB4EOR 22, WA4GHQ 21, K4TRT 21, K4FPV 18, WB4RKG 16, WA4GMA 16, WA4WSW 16, WB4BTM 13, W4BTA 12, K4HOE 11, W4KJP 11, W4-SZB 11, K4YDO 10, W4MWX 6, WB4AFH 4, K4UMN 3.

**MICHIGAN**—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8FWQ, W8RTN, WA8OGR, K8-KMQ. PAMs: W8WVF, K8JED, V.H.F. PAMs: W8CVQ, W8YAN. Appointments: WA8GVK, W8UIC, K8KJL as ECs; W8REZ, W8DET, W8HKT, K8IRC/3, K3KRK/8, W8NOH, K8QKY, W8QQK, W8UAM, W8ZJE as ORs; W8TIC as OPS; WA8VOG as OBS; W8MBAM, W8NOH as OVSs; Silent Keys: W8ILM and W8ZTU.

| Net        | Freq.  | Time | Days   | QNI  | QTC | Sess. | Mgr.   |
|------------|--------|------|--------|------|-----|-------|--------|
| QMN        | 3663   | 2300 | Dy.    | 1076 | 495 | 62    | W8FWQ  |
| WSSB       | 3935   | 0000 | Dy.    | 1025 | 153 | 31    | K8AYJ  |
| UPEN       | 3920   | 2230 | Dy.    | 476  | 29  | 29    | K8ZSM  |
| PON-DAY    | 3955   | 1600 | M-Sat. | 353  | 258 | 27    | WA8OGR |
| PON-CW     | 3945   | 2400 | M-Sat. | 140  | 38  | 26    | V8DPO  |
| B/R        | 3930   | 2230 | M-Fri. | 793  | 110 | 21    | W8ZBT  |
| M6MTN      | 50.7   | 2400 | M-Sat. | 314  | 46  | 26    | WA8LRC |
| LENAAVEE 2 | 145.36 | 0200 | Dy.    | 255  | 34  | 30    | WA8UWQ |
| NOON 50    | 50.41  | 1700 | M-Sat. | 205  | 3   | 26    | WA8FXR |
| QWN        | 7160   | 2230 | M-W-F  | 42   | 81  | 13    | WA8VOG |

New officers: Kent RC—K8CGD, pres.; WA8LZD, vice-pres.; W8RVD, secy.; WA8MZG, treas. Detroit ARA—W8BXO, pres.; W8AP, vice-pres.; W8SRK, secy.; K8-DYI, treas. Sunday morning your SCM will be on 3663 kc. to take FD messages. Please see that they are in proper form. The TAWAS RC is now the Oscoda ARC. K8AIZ and K8NUI are putting up a 2-meter repeater station, sponsored by the Great Lakes Repeater Assn. for the Detroit area. W8HZF has a new HW-100. W8MWG worked KH6BS and LU3AEF. WA8SKU QSOed 5H3JL. WA8NYK has a Gonset G76, and he and WA8EMJ will DXpedition to Alaska this summer. W8-IWG has a new SB-101. W8OHS got lost—in Plymouth! K8JQK had his AF87 stolen from his car, locked in his own backyard. BPLers: K8KMQ, WA8LXY, W8IV, WA8ZDE, from Yale (Michigan) will be on the nets. W8KNP is now W8BW. W8MGG is W8AP. W8IQS is W8CC. Cliff Harding is W8CO. Traffic: (Mar.) K8KMQ 369, WA8LXY 279, WA8SQZ 219, W8UAM 209, W8IWF 187, W8IV 184, W8ZJU 165, K8MXC 153, K8KRK/8 120, W8-QQK 120, WA8OGR 73, W8TDA 70, W8IAQ 69, W8-RTN 66, W8FX 64, WA8VOG 63, K8GOU 62, K8ETU 60, WA8LRC 56, WA8UPB 55, W8UIC 52, W8NOH 47, W8VVL 46, W8BEZ 45, W8EU 45, W8DET 44, W8KME 40, W8MRM 39, W8UFS 38, K8JED 33, WA8UWQ 32, W8YAN 29, W8FWQ 25, WA8MCQ 24, W8TBP 23, W8MO 21, WA8ENW 18, W8HKT 16, W8IHD 13, W8SWF 13, WA8ORC 12, WA8VQ 12, W8DSE 11, WA8UY 11, W8AUD 9, W8AKRH 9, W8RHF 8, WA8LNE 6, W8OWG 6, WA8TSP 6, WA8JDF 4, W8SCW 4, WA8PIM 2, (Feb.) WA8KME 35, W8ILP 8.

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

| Net                | Freq.    | Time       | Mgr.   | QNI  | QTC | Sess. | %    |
|--------------------|----------|------------|--------|------|-----|-------|------|
| BN                 | 3580 kc. | 0000/0300Z | WA8CFJ |      |     |       |      |
| OSN                | 3580     | 2325       |        |      |     |       |      |
| OSSBN              | 3972.5   | 2345       | K8UBK  | 1860 | 944 | 58    | 16.3 |
| Ohio Six Meter Net |          |            |        | 139  | 52  |       |      |

I want to congratulate W8ETU on being elected as Ohio's new SCM and wish him all the success in the world. Your new SCM is Richard A. Egbert, W8ETU, 6479 Red Fox Road, Reynoldsburg, Ohio 43068. I want to thank all my friends for voting for me in the past five terms. I tried hard to serve you. Greater Cincinnati ARA's *The Mike & Mike* tells us the club held its Annual Spring Dinner Dance, heard Robert Herrmann explain where electrical noise and interference comes from and how to correct it and W8PPT is now WA8-SHZ. Inter-City RC's *IRC News Bulletin* informs us W8DVM was in the hospital in Mansfield and Columbus and W8QJF spent two weeks in Florida, also W8DVM was invited to become a member of the North Pole Expedition, which he turned down but will serve as medical consultant. Seneca RC held its annual auction. Toledo's *Ham Shack Gossip* tells us WA8DU had his Hallicrafter SR-34 transceiver stolen. W8SZTB and W8SZTE are new Novices. K8WDZ and WA8ADV are reorganizing the 2-Meter YL Net on 145.8 Mc. at 9 A.M. EST. WA8RPL is in a VA hospital, WA8INU and W8N-WHE are in the hospital, the Buckeye Bells held its annual meeting at Columbus. Henry County ARC's 1968 officers are WA8FVC, pres.; W8NWH, vice-pres.; WA8TZH, secy.-treas. and the Tri-State Weather Net elected W8CDA, pres.; K8OCL, vice-pres.; WA8EWV, secy.; and Toledo RC's 1968 officers are WA8GEL, pres.; W8WHA, vice-pres.; K8DTL, rec. secy.; K8-MYN, corr. secy.; K8GOP, treas. W8FFK is now W8-DH. K8WVZ has a new HQ-180A receiver. The Ohio Six Meter Net needs more coverage. Contact WA8ADU. W8RZX reports that WA8VHR moved to N.Y. W8-AJD was W8USV. Springfield ARC's *Q-Five* says K8-

WQE received his Advanced Class license, WA8HHC has joined the Silent Keys, WA8LYM was in the hospital. WA8ADJ reports that the Bedford High School ARC's club station, WA8VIB, is operating teletype on 14 Mc. with a Model 15 printer and an MT-1 transmitter and is wondering if there are other high schools on RTTY? WA8UOE reports the Walnut High School RC's club station, W8QIH, will be on soon. W8GVX is a new member of the QCWA. W8WVCC received his Advanced Class license. WA8COA's "Ham Call" in the *Cincinnati Enquirer* relates that the Ohio-Kentucky-Indiana Amateur V.H.F. Society celebrated its ninth anniversary with a dinner. K8PMW was home on leave after completing electronics school and WA8ZPK, formerly WA1CRR, moved back to Cincinnati. K8BXT reports K8CTM is home from the Air Force and now on 2 meters. W8LRW is on 2 meters, as is W8RQL, with a new Clegg 22-er. WA8UPR received his General Class license and WN8ADI is a new Novice in Niles. The Apricot Message Net, organized by K8ONA, received letters of appreciation for its services from the Governor of Ohio and Asst. Secretary of Defense. Parma RC's *PRC Bulletin* states that W8CZM was in the hospital and W8VM, ex-NVL, joined the Silent Keys, Massillon ARC's *MARC Feedback* reports WA8WNL is a new ham in Massillon. Nov. 8, 1968 is creeping up on us and if we don't better our license situation we'll be on the outside looking in wishing. Your new SCM reports the following: K8DDG is Asst. SCM and W8IMI is a new RM. 1968 SET reports were received by the SEC from W8ETU, K8DHJ, K8-SUB, K8CKY, W8JDJ, W8VZE/RO, K8LFI, WA8TGA, W8OFE and WA8NHO. Recent Extra Class licensees: WA8CFJ, W8OUU, K8EHU, W8IMI, CARA (Columbus) is running a Homebrew Competition. A few of the goals established for this term of office: Increase traffic/emergency net liaison, promote v.h.f. traffic nets for improved coverage, expand the AREC program, promote unified NTS/AREC SET participation, stimulate League membership and support, encourage training programs for beginners and license upgrading, establish a monthly on-the-air forum on the h.f. and v.h.f. bands to discuss issues with the section membership. Your comments are welcome. Traffic: W8UPH 40, WA8POL 336, W8QZK 285, WA8AUIZ 267, K8ONA 238, W8IMI 261, WA8PPK 147, WA8TWC 143, WA8TYF 142, W8UDG 140, W8GVX 123, WA8QFK 120, W8ERD 105, WA8FSX 101, W8SZU 94, W8NAL 92, W8CHT 91, W8OCU 87, WA8LVT 84, W8OUU 82, WA8SP 77, WA8OCG 76, W8FGD 69, WA8LAM 69, WA8SED 67, W8DAE 61, W8LRE 61, W8RYP 60, W8SMB 56, W8OE 51, W8GOE 41, WA8SX 40, W8WEG 40, W8IWX 38, WA8MYV 38, K8UBK 38, W8TV 34, K8WZI 34, WA8MHO 31, WA8ADU 30, K8BYR 24, W8ARW 23, WA8UTX 23, W8WDU 23, WA8VNU 22, W8LAG 20, K8DHD 19, W9LCL 16, W8PNU 16, K8QYR 16, W8GRT 14, WA8NJR 13, K8DMZ 12, W8RFR 11, K8LFI 10, K8LRK 9, WA8YDB 8, WA8MTS 6, K8DDG 5, K8DHJ 4, W8BZX 3, W8EFQ 3, K8VCW 1, W8VVL 1, WA8ZGC 1.

### HUDSON DIVISION

**EASTERN NEW YORK**—SCM, George W. Tracy, W2EFU—SEC: W2KGC, RM: WA2VYS, PAM: W2JIG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3500 kc. nightly at 2300 GMT. Appointments: WA2BHN as ORS and WA2WGS as OBS, WB2VUK, an OVS, is now serving in the U.S. Army. Nice to hear from the White Plains High School ARA, whose call is WA2ELI. The club secy. is WA2CLX. The pres., WB2YBQ, would like to hear from other H.S. clubs in our section. WA2SFP was the featured speaker on receivers at the Schenectady Club March meeting. With three AREC nets operating weekly, Schenectady is starting a v.h.f. RTTY net. March was membership budget approval at the RPI Club. W2SZ, according to pres. WB2MOX. We hope that the requested increase was approved, fellows. Coffee, refreshments and renewing acquaintances were featured at the Albany Club meeting. The Hermits Net has been reactivated each Sun. on 3835 kc. at 1300 local time. W2GM is the new boss. Club members at New Rochelle are proudly wearing new call-letter-name badges at each meeting. The Rip Van Winkle Club in Catskill has a new 2-meter net that meets twice weekly. K2QBW is back on the air with a KWM-2 and trap vertical. A new Advanced Class licensee in Millbrook is WB2YQU, an OVS. WA2ZPJ operated low-power 6 meters from his dorm room at RPL. His second call is WB2ZBX. Traffic: WZTHE 392, WA2VYS 251, W2UHZ 221, WA2VXT 116, W2EAF 106, WB2VYS 121, WB2SOA 85, W2ODC 84, W2FOA 62, W2CVR 40, W2VJ 38, K2SJJ 36, W2ANV 24, WA2WGS 15, WB2UEQ/1 15, WB2PZL 9, WB2RBG 9, W2URP 9, WA2JWL 4, WA2HGB 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 Nightly | WA2UWA-RM  |
| NLI VHF*   | 145.8 Mc. | 1930 MTWTF   | WB2RQF-PAM |
| NLI Phone* | 3932 kc.  | 1600 Daily   | WB2ZET-PAM |
| NLS Slow*  | 3715 kc.  | 1845 Nightly | WB2UQP-PAM |
| Clear Hse  | 3925 kc.  | 1100 MTWTF   | WA2GPT-Mgr |
| Mic Farad  | 3925 kc.  | 1300 Ex Sun. | K2UBG-Mgr  |
| Mic Farad  | 3610 kc.  | 0001 Nightly | K2UBG-Mgr  |
| All Eye    | 3925 kc.  | 1300 Sun.    | K2AAS-Mgr  |
| NYSPTEN    | 3925 kc.  | 1800 Daily   | K2AAS-Mgr  |

\*Section nets. All times shown above are local. WA2UWA earned a BPL for Mar. traffic. W2GKZ says it is rather interesting to overhaul a big rotor that is going soft! WB2UQP, who holds PM for NLS and PAM for NLIPN, has resigned as PAM after performing yeoman service in that slot. WB2ZET was appointed PAM for NLIPN as of Apr. 15. W2EW still is being visited by Murphy's Law and after the mishaps of last month had more than half of the antennas come tumbling down! WB2PJH was part of the NYC Science Fair and was a finalist with a nuclear magnetic resonance spectrometer. WB2JW reports that his mobile department has been unduly reticent since the unexpected demise of his vehicle because of the persistence of a big fat truck in the sharing of his NYC parking space. Needless to say, the big fat truck won! WB2DRW says that with the several thousand stations in the NYCLI area you would think that more of them would be checking into the traffic nets such as NLI, NLIPN, NLI/VHF and NLS! WB2VKL picked up about 30 new countries during the DX Contest and was half way to DXCC when the rig quit. W1LVQ was the guest speaker at the Annual Amateur Radio Luncheon held during IEEF week. We were saddened to learn of the passing of W2MM, QCWA pres., who became a Silent Key Mar. 7, 1968. WB2QIL reports the C.W. Post ARC is having difficulty finding a location on campus for its new proposed station. Operating at WB2UGP has been limited to week ends since starting college at Stony Brook. K2JFE skeds Father Jim, CP6HT, every week end on 15 meters. WB2WJF now has an SB-100 to play with. W2YF is interested in starting a "Swan Sheet" describing various modifications and operating hints for Swan 350, 500, etc. Others interested in the same may obtain information by sending an SASE to W2YF. WA2FTS, who is headed for the Navy finally received his call letter places but before he could put 'em on the mobile got squished. WA2GPT needs Schuyler and Hamilton Counties in order to make WAS-N.Y. WA2HQL, who has been an exchange student/teacher in Mexico, is reported to have developed an excellent set of picture slides and commentaries. Congratulations to WA2BSP, who went from Novice to Advanced and to WB2UFG, who went from Tech. to Advanced Class. WB2MZE is doing a fine job on NLVHF, as are WA2ACJ and WA2JSB of the Passaic Valley Emergency Net, who provide liaison with NLI/VHF. Traffic: (Mar.) WA2UWA 974, WA2GPT 359, K2UBG 211, W2GKZ 80, WB2RQF 79, WB2UQP 55, WB2HYK 49, WB2AEK 45, W2EW 39, WB2PJH 36, WB2JW 22, WB2DRW 19, W2EC 14, W2DRQ 10, WB2YKL 10, W2PFF 8, WB2OIL 8, WB2UGP 7, K2JFE 4, WB2WJF 2. (Feb.) WA2GPT 624.

**NORTHERN NEW JERSEY**—SCM, Louis J. Amoroso, W2LQP—Asst. SCM: Edward F. Erickson, W2CVW. SEC: WA2ASM, RMs: WB2VE and WB2RKK. PAMs: W2PEV, K2KDQ, WA2KZF, WA2TEK and WB2YO.

### ARPS Section Net Schedules.

| Net   | Freq.       | Time      | Days   | Sess. | ONI | Tfc. | Mgr.   |
|-------|-------------|-----------|--------|-------|-----|------|--------|
| NJN   | 3695 kc.    | 7:00 P.M. | Dy.    | 31    | 485 | 415  | WA2KIP |
| NJSN  | 3725 kc.    | 6:00 P.M. | Dy.    |       |     |      | WA2RKK |
| NJPN  | 3928 kc.    | 6:00 P.M. | M-Sat. | 31    | 694 | 307  | W2ZT   |
| NJPON | 3928 kc.    | 6:00 P.M. | Sun.   | 5     | 134 | 53   | WA2TEK |
| NJAN  | 50,300 kc.  | 8:00 P.M. | M-F    | 20    | 221 | 68   | WA2KZF |
| PVETN | 145,710 kc. | 7:30 P.M. | Dy.    | 31    | 393 | 194  | K2KDQ  |
| ECTN  | 146,700 kc. | 9:00 P.M. | Dy.    | 31    | 296 | 170  | WB2YFO |

Endorsements: WA2CCF and WB2TKP are OPSs. New club officers of the East Brunswick ARC are WB2CGI, pres.; K2EWA, vice-pres.; WB2ZAN, secy.; WB2MMV, treas.; WA2RQV, act. mgr. The club meets at 8 p.m. the 2nd Wed. of the month in the Municipal Bldg. on Ryders Lane. New officers of the Bergenfield Mt. Club (BARK) are WB2RJJ, pres.; WN2DRJ, vice-pres.; WN2FZL, secy.; WN2EZZ, treas. This club meets the 1st and 3rd Wed. of the month in the c.d. room in the Municipal Bldg. on Washington Ave. Both clubs are looking for new members. WB2TKP received his Advanced Class license. WA2BHL acquired an SB-401 to replace the 15-watter he used to work 23 states. WB2UVP passed the Advanced Class exam and joined Army MARS. W2JFH made WAS. WB2DXW has a Comm. IV. K2AKB is on with the S/Line and the

Henry 2-K. The NJDX Roundup was a big success and the club reports now handling 22K QSLs per month. WA2TBS and WA2IGQ made the first annual ECTN Dinner a big success with over 40 attending. K2DEL/2 will be heard on week ends this summer from Warren County on 6 and 2. WN2AYZ passed the Tech. Class exam. WB2ZSH worked his first KL7. WB2AMV is enjoying the traffic nets. WB2FXF is now on 6. K1KKK and K2ITY joined the Knight Raiders. WA2CCF's DXCC total is now 154. W2LWP has a Swan 500 and W2PBZ a Swan 350. WA2ACJ now is using a Viking 6 and 2. W2CCK and WB2ISX made the A-1 Operator Club. WN2EQT and WN2EQL are new hams in the Fairlawn ARC. W2NTT is building a 2-meter slot antenna for Field Day. WN2DZE reports 30 states worked in his first 3 months. WN2EUX is a new ham in the Chester area. Read the new FID rules and make it a safe one. Haste makes waste. Good luck and let's have a few more winners. Traffic: (Mar.) WA2IGQ 619, WB2REK 446, WB2SEZ 301, WB2VLC 236, WB2DDQ 219, WB2TKP 200, WB2NZU 187, WA2TBS 136, WB2NSV 134, K2KQD 125, WA2ZDA 113, WB2ZSH 108, W2QNL 98, WA2ACJ 89, WA2ASM 82, WA2TEK 70, WA2CRF 69, WA2CCF 46, WB2IYO 40, WB2AMV 32, W2DRV 30, WB2BCS 28, WB2BXX 27, W2CVW 24, W2LQP 22, K2JSJ 21, WA2KZF 20, WA2NJB 20, WB2CGI 19, K2ZFI 18, W2EWZ 17, W2TFM 16, WB2SJI 14, WA2WGR 14, K2DEL 12, WA2GLI 11, K2EQP 10, K2MFX 10, W2PEV 10, WA2BNF 8, WB2NSE 8, W2JDH 6, WB2YPQ 3, WN2DRJ 1. (Feb.) W2CVW 47, WA2UOQ 32, K2EQP 23.

### MIDWEST DIVISION

**IOWA**—SCM, Owen G. Hill, W0BDZ—Asst. SCM: Bertha V. Willits, W0LGG. SEC: K0BRE. PAM: W0NGS. RM: W0TIU. Dick Bischoff, formerly W0QVA, now has a new call, W0GA. Dick has been active since 1938. W0YDV, formerly of Oakland, is now in operation from Omaha. W0EKB is a new OVS. Silent Keys: K0LVP, Joe Phillips, and W0LUF, Len Collett, former resident of Sioux City and ex-Midwest Director. K0AAR has a new tri-band cubical quad. New officers of the Central Iowa ARC (Marshalltown) are K0GVG, pres.; K0LVB, vice-pres. Tom Willits still is secy.-treas. after about seventeen years. OVS W0PFP reports conditions on 50 Mc. were a bit quiet during March. W0QQA has been spending some time in the hospital. Partial listing of some of the nets operating in Ia.: Ia. SSB Net, 3970 kc. daily 0001Z; Ia. 75-Meter Phone Net, 3970 kc. daily 1830Z; Ia. 160-Meter Net, 1815 kc. daily 0100Z; Ia. WX Observers Net, 3850 kc. daily 0100Z; Ia. 160 Meter Net QNI 821 QTC 12 Sess. 31 Ia. 75 Meter Phone Net QNI 1397 QTC 130 Sess. 26. At the present time no reports are being sent to this office from the other nets. Traffic: W0LCX 400, W0PZO 311, W0LGG 103, WA0GYD 31, W0NGS 31, WA0SDC 23, WA0MIT 16, K0TDO 14.

**MISSOURI**—SCM, Alfred E. Schwaneke, W0GS—SEC: W0BUL. Please note that W0TPK has changed to W0GS, above. In addition, my new mailing address is Route 1, Box 169, Rolla, 65401. In case you forget, the old Edgar Star Route address is all right for a while. The new call at the old place is WA0SNE. WA0DGG renewed as OPS. K0YBD has been appointed RM, replacing W0TDR as manager of MON. W0TDR resigned because he is working nights and cannot make the net. W0GCL has moved to Lebanon, WA0OVG, who was EC of St. Clair and Hickory Counties, has moved to Camdenon. WA0PFU moved but still is in K.C. WA0XS reports that the Ritenour Sr. High School ARC (WA0JB) has 5 new Nov. C1. licensees, WN0TPG, WN0TQL, WN0TSH, WN0TTK, WN0TVR; one new Gen. C1, WA0RTO; and one new Adv. C1, WA0XS. K0DEQ received DXCC. The Linn Technical College ARC is a new ARRL affiliated club. K0RWG was in the hospital for a while so W0EZM and W0AVX installed an antenna and rig so Ken could operate there. W0HVJ appointed K0ONK asst. mgr. of MoPON. W0EEE is back with a new SB-401 and the SB-200 linear. K0JXI assembled the SB-401 for the club. K0GOB built a 4-1000A linear now being used on a.m. K0JPJ has a new S/Line and pair of 813s final. MEN Net certificates go to W0BHC, WA0CXG, WA0FQX, W0HTI, WA0LKF, WA0LX and W0SQB. W0QEV (Washington U. ARC) is new on MON. Net reports for Mar. (Note: Daylight time will shift all nets 1 hour earlier GMT.):

| Net   | Freq. | Time  | Days   | Sess. | QNI | QTC | Mgr.  |
|-------|-------|-------|--------|-------|-----|-----|-------|
| MEN   | 3885  | 2330Z | M-W-F  | 12    | 174 | 9   | W0HBL |
| MON   | 3585  | 0100Z | Daily  | 29    | 186 | 151 | K0YBD |
| MNN   | 7063  | 1900Z | M-Sat. | 25    | 83  | 82  | W0UOD |
| MoSSB | 3963  | 2400Z | M-Sat. | 25    | 727 | 139 | W0RTO |

MoPON 3930 2100Z M-F 245 149 W0HBL  
PHD 50.4 0130Z Tue.(GMT)4 75 2 WA0KHU

Traffic: (Mar.) K0ONK 1208, W0UOD 227, WA0HTN 163, K0YBD 111, K0JPF 102, W0HVJ 73, WA0JII 66, K0ORB 54, W0BY 42, K0VVI 37, WA0DGG 29, W0BUL 27, W0RTO 23, WA0TIL 21, WA0PFO 20, K0DEQ 11, WA0KHU 11, WA0PYJ 7, K0GOB 5, WA0HIV 1, W0KIK 1. (Feb.) WA0PFU 13.

**KANSAS**—SCM, Robert M. Summers, K0BXF—SEC: K0EAB. PAM: K0JMP. RMs: WA0MLE, WA0JFY. V.H.F. PAMs: WA0CCW, W0HAJ, WA0LSH. Reports of the nets for Mar.:

| Net                   | QNI | QTC | Mgr.   |
|-----------------------|-----|-----|--------|
| KQN                   | 24  | 3   | WA0JFC |
| KSN                   | 791 | 158 | K0JMF  |
| KPN                   | 264 | 32  | K0JMF  |
| KPN                   | 953 | 164 | W0LXA  |
| KQS 1st               | 171 | 61  | WA0MLE |
| KQS 2nd               | 155 | 54  | WA0MLE |
| Kans PI Net, 2 meters | 17  | 0   | WA0CCW |

WA0PQL will be compiling QKS reports for the summer months. ARRL still is looking for more amateurs to participate in the Intruder Watch Program. WA0NFP has been telephone relaying messages. V.h.f. nets, including ACARA, NCK, Zone 7, 11 and 15 and Newton, compiled 39 sessions, QNI 235, PTC 29. The following club bulletins were received by your SCM: *Feedback*, Johnson Co. Amateur Radio Club; *Hambutchers Net News*; *Grounder Grid*, Wichita Amateur Radio Club; *Chit-Chat*, Tec-Ni-Chat Radio Club; *Bulletin*, Wheat Belt Radio Club, Inc.; *QRZ*, Pilot Knob Amateur Radio Club; *Auto-Call and Ham Monitor*; *Groundwave*, Air Capitol Amateur Radio Assn. AREC Nets: Zone 11, 75 meters, QNI 104, QTC 8; 2 meters, QNI 50, QTC 4. Mer. K0JDD, Zone 7, 75 meters, QNI 34, QTC 0. Mgr. W0FII, Zone 13, 75 meters, QNI 69, Mgr. K0LPE, Zone 15, 75 meters, QNI 61. Mer. K0UVH. Traffic: (Mar.) W0NII 251, WA0MLE 160, WA0LLC 152, K0HJI 114, W0LXA 101, K0EAB 94, K0BXF 76, K0JMF 71, K0LPE 67, W0PSN 59, WA0VX 54, K0JDD 48, WA0CCW 45, WA0NFP 37, K0MRI 32, K0JY 27, WA0PQL 24, WA0KPE 21, WA0JDG 20, WA0JY 20, WA0RDI 13, K0UVH 13, W0FII 9, WA0OZT 9, WA0JFC 7, WA0QOH 5, W0FDJ 3, WA0JFV 3, WA0KDO 1, W0KHN 1, WA0TAS 1, WA0TEF 1. (Feb.) K0BXF 55, W0FII 6.

**NEBRASKA**—Acting SCM, V. A. Cushon, K0OAL—SEC: K0OAL. Monthly net reports for Mar.: Nebr. Emergency Phone Net, WA0GHZ, QNI 1778, QTC 61. West Nebr. Phone Net, W0NTK, QNI 801, QTC 27. Nebr. Morning Phone Net, WA0JUF, QNI 1099, QTC 26. Nebr. C.W. Net, WA0QMZ, 0100Z session, QNI 116, QTC 20; 0400Z session, QNI 105, QTC 21. AREC C.W. Net, WA0EEL, QNI 12, QTC 6. AREC Phone Net, W0IRZ, QNI 176, QTC 0. Dead End Net, WA0MNX, QNI 206, QTC 6. Nebr. Storm Net, WA0LOY, 2330Z session, QNI 685, QTC 102; 0030Z session, QNI 963, QTC 55. 160-Meter Phone Net, WA0CBJ, QNI 513, QTC 3. Cornhusker Teenage Net, WA0OCW, QNI 293, QTC 51. The 160-Meter Phone Net has suspended operation from mid-April throughout the summer months. The PRARC Picnic will be held June 2; the Smoke Signal Senders June 1-2 at Chadron State Park. ECs are requested to complete and forward a Form 5 to the SEC whenever there is a change in AREC membership. Traffic: WA0DUO 219, WA0OCW 97, WA0GHZ 82, K0KJP 44, K0JTW 34, WA0GOH 34, K0ATE 26, WA0QNZ 24, WA0OMY 21, K0FRU 20, K0DGW 19, WA0JUF 19, W0GEQ 17, K0HNT 14, K0OAL 14, W0PFA 11, W0IXY 10, WA0PI 10, W0VFA 9, WA0KHF 7, W0AGK 6, W0CRK 6, WA0GAT 6, WA0IVV 6, K0JPP 6, WA0EEI 5, WA0KGD 4, WA0LOY 4, WA0PCJ 4, WA0JN 3, W0LOD 3, W0ATU 2, W0BFN 2, W0BVF 2, W0HOP 2, W0NYM 2, K0PTK 2, WA0RPB 2, W0WRZ 2, WA0FIO 1, WA0IBL 1, WA0JAV 1, W0NTK 1, K0ODF 1, W0SWG 1.

### NEW ENGLAND DIVISION

**CONNECTICUT**—SCM, John J. McNassor, W1GVT—SEC: W1PRT. RM: W1ZFM. PAM: W1YBI. Net reports for Mar.:

| Net | Freq.    | Days      | Time  | Sess. | QNI | QTC |
|-----|----------|-----------|-------|-------|-----|-----|
| CN  | 3640     | Daily     | 18:45 | 31    | 366 | 354 |
| CPN | 3880 M-S | 1800 Sun. | 1000  | 31    | 561 | 263 |

High QNI: CN—W1HNS, W1GTF, W1GIX, CPN—W1LEG 30, W1GVT and K1YS 27, W1EEJ 26, W1PXS 24, W1HEW 23, K1DGK 22, W1LH 21, K1EIC, (Continued on page 107)

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has a rugged 500 watt tetrode that is ready to talk before you are.

We knew you weren't satisfied with ordinary push-to-talk mobile and airborne UHF/VHF communications systems. Why? They took up to 60 seconds to warm-up. You needed more power and you needed it with "instant talk" speed.

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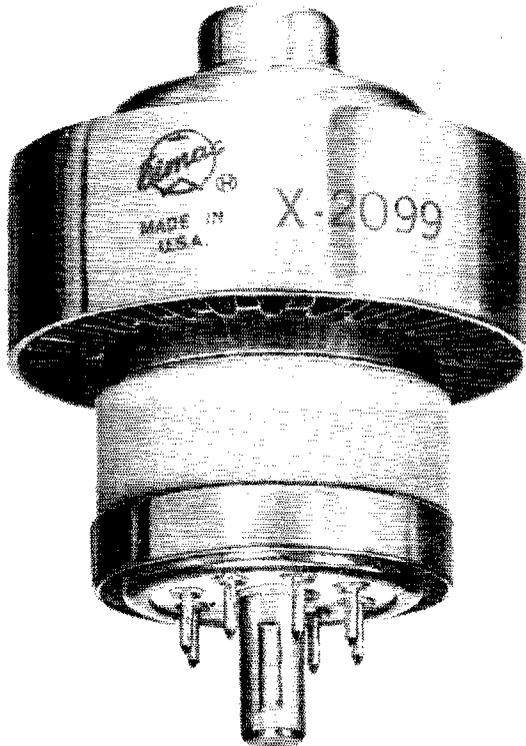
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TYPICAL OPERATING CHARACTERISTICS  
Class AB<sub>1</sub> Radio Frequency Linear Power Amplifier

|                                                  | DC Plate Voltage |      | V  |
|--------------------------------------------------|------------------|------|----|
|                                                  | 1600             | 2600 |    |
| DC Screen Voltage . . . . .                      | 200              | 250  | V  |
| DC Grid Voltage . . . . .                        | -24              | 34   | V  |
| Zero-Signal Plate Current . . . . .              | 250              | 225  | mA |
| Max Signal DC Plate Current . . . . .            | 455              | 370  | mA |
| PEP or CW Plate Output Power . . . . .           | 400              | 500  | W  |
| Third Order Intermodulation Distortion . . . . . | -36              | -38  | dB |
| Fifth Order Intermodulation Distortion . . . . . | -54              | -46  | dB |
| Filament Voltage . . . . .                       | 2.5              | 2.5  | V  |
| Filament Current . . . . .                       | 10.0             | 10.0 | A  |
| Warm-up Time (to half power) . . . . .           | 250              | -    | ms |

**EIMAC**  
Division of Varian  
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# EIMAC

## 3-500Z's used in Drake's linear amplifier for 2 kW PEP at 3.5-30 MHz

The R. L. Drake L-4B linear amplifier shown here uses two of EIMAC's new 3-500Z zero-bias triodes in grounded grid circuitry to achieve 2-kW PEP SSB input and 1-kW dc input on CW, AM, and RTTY. Drive power is 100 watts PEP and 75 watts CW, AM, and RTTY.

Drake chose EIMAC 3-500Z's because these rugged, compact, high- $\mu$  power triodes are ideal for grounded grid operation. They can provide up to 20 times power gain in a cathode driven circuit. And the two tubes have a total plate dissipation rating of 1000 watts.

For more information on EIMAC's line of power tubes for advanced transmitters, write Amateur Services Department, or contact your nearest EIMAC distributor.

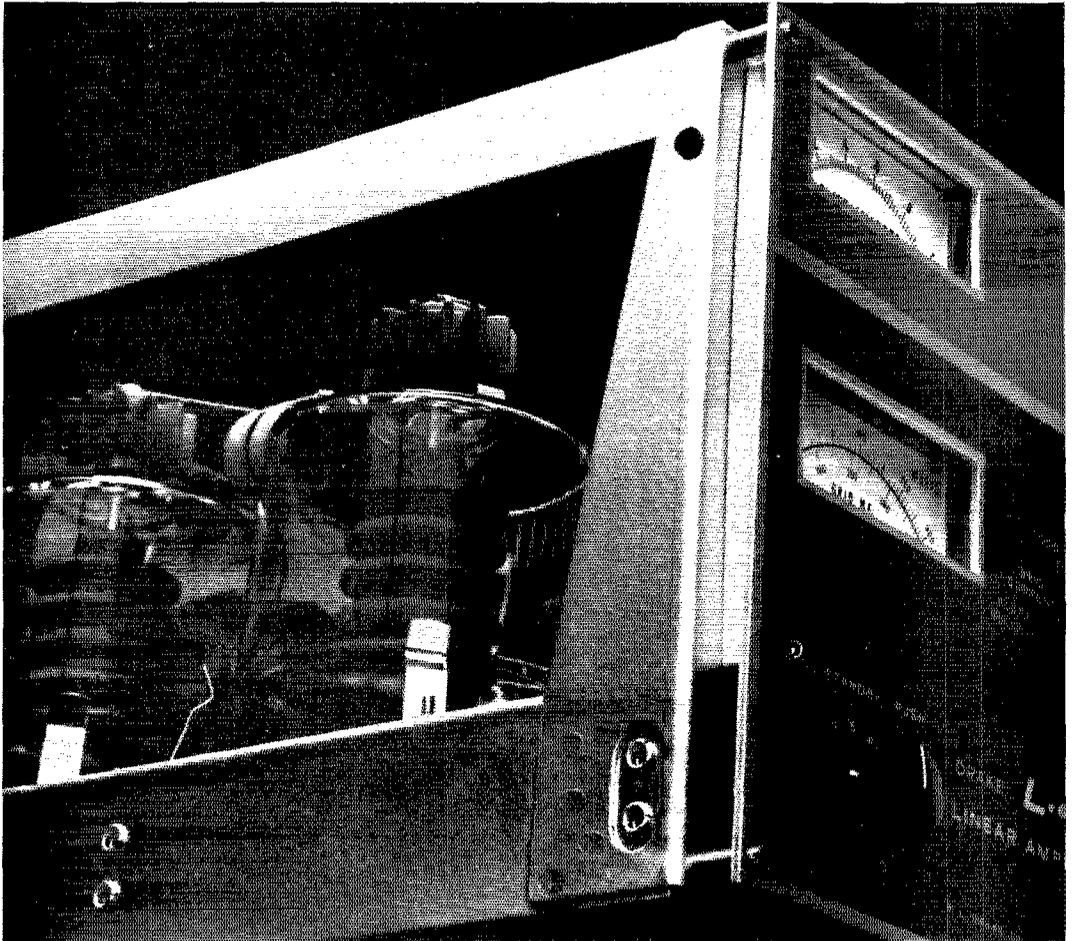
### 3-500Z TYPICAL OPERATION\*

|                                           |           |
|-------------------------------------------|-----------|
| DC Plate Voltage .....                    | 2500 V    |
| Zero-Sig DC Plate Current** .....         | 130 mA    |
| Single-Tone DC Plate Current .....        | 400 mA    |
| Single-Tone DC Grid Current .....         | 120 mA    |
| Two-Tone DC Plate Current .....           | 280 mA    |
| Two-Tone DC Grid Current .....            | 70 mA     |
| Peak Envelope Useful Output Power .....   | 500 W     |
| Resonant Load Impedance .....             | 3450 ohms |
| Intermodulation Distortion Products ..... | -33 dB    |

\*Measured data from a single tube

\*\*Approximate

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Division of Varian  
San Carlos, California 94070



WAIHLP and WAIWN 18, WAIHEK, K1SRF and WIYB 17, 6-Meter Net: 50.6 Mc. 9 p.m., 21 sessions, 200 QNI, 33 QTC. EA Slo Net: 3740 kc. 6 p.m., 31 sessions, 217 QNI, 124 QTC. SEC WIPRT suggests that clubs reactivate local EC programs during Field Day. Club bulletins are improving and increasing. The *CN Bulletin* has complete roster and traffic operator information. The *Talcott Mountain U.H.F. Society News* is of interest to u.h.f. operators. The *Murphy Message* is put out by Murphy's Marauders, a brand-new club for all interested in contest and DX work. The *Candlewood ARC Newsletter* has a wealth of information in every issue. *Harascope*, by the Hamden ARA, has resumed publication and seems better than ever. Section Net certificates were presented at the 15th Annual Net Dinner Meeting Apr. 6. Our sincere thanks to WAIHNS for making all arrangements. New officers: Talcott Mountain U.H.F. Society—KITZD, pres.; K1YON, vice-pres.; WAI1AO, treas.; W1RNT, secy. Hamden ARA—W1JBG, pres.; WAI1EZE, vice-pres.; WAI1EQN, secy.; W1UKX, treas. Congratulations to WAI1VH and W42YU/1 on making the BPL in Mar. to W1BDD, WAI1CYT, WAI1ERN and WINJM on Extra Class licenses; WAI1EG on Advanced Class license; to WAI1G5 and WAI1GMT on General Class licenses and to WAI1GN and WAI1HP on the CP-25 sticker! Be sure to check the new Field Day rules! Hope all take an active part. Traffic: (Mar.) W1EFW 331, WAI1VH 238, WAI1SN 270, K1RQ 165, WAI1HE 100, W42YU/1 140, WAI1PNJ 107, W1KAM 107, WAI1EG 100, W1AW 30, W1WCG 81, WAI1GN 75, K1UDD 74, WAI1GN 69, WAI1CYV 68, W1GWT 52, WAI1GX 51, K1SRF 42, WAI1IGF 41, W1QV 41, W1LXW 40, W1BDD 32, WAI1HP 29, WAI1EZE 27, WAI1PS 26, WAI1GFV 23, K1SXF 22, WAI1HW 20, W1YB 20, W1BNN 14, WAI1EHK 14, WAI1DUV 12, W1CUB 11, W1CTI 10, W1CHR 9, WAI1CWT 8, WAI1WG 7, K1YGS 6, K1LMS 3, W1BTHZ/1 3, WAI1CJE 2, (Feb.) WAI1GY 21. (Jan.) WAI1GY (correction) 157, W1GLX 51.

**EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—Don't forget the New England Division Convention at Swampscott June 1 and 2.** W1AOG, our SEC, back from Florida, received reports from W1s BB, IAU, RFF, ZMO, EHT, WAI1DXI, K1MPD. Sorry to report that W1BL, our State Radio Officer is a Silent Key. K1GFR says that W1BSG is going to take over. The fellows are getting their call letter plates now for \$2.00 extra. The Quincy Vocational Technical Radio Club has the call WAI1JFY. The South Shore Club had a meeting and a talk by W1DTY on transistors. W1KTI/W1RGX passed the Extra Class exam. W1YZG has a new yacht. W1GN is ex-W1DVX-W3CLR. W1IPZ is in the Massachusetts ARC Net. WAI1JDR has an HA-460, S-40B and five-element beam. WAI1JBK, who was "MCT" in 1911, about 75 or 80 years young, joined the Barnstable RC. W1NHFA gave a talk to the Stoneham DeMolay on amateur radio. W2AZO/1 has a new SB-301. WAI1OE on 10/15 is building a rig for 6. W1N1BE now is on the air. W1NHCH worked his first DX on 15. G3SVH, K1EKM has his General Class license. WAI1JFD and W1N1JHM are new in the New Bedford area. WAI1BFD has 70 confirmed now. The 8-Meter Crossband Net had 20 sessions, 137 QNI, 2 traffic. W1s RSR and SMW and WAI1EPU helped W1EHT out during the flood in Wayland. W1JLL said the Dedham gang was on also. WAI1EY is in the Army at Fort Gordon, Ga. New officers of the Massachusetts ARA are W1W1Z, pres.; W1AUU, vice-pres.; W1CUY, secy.; WAI1EBG, treas. K1ZCU is active in MARS. W1DBY has a new class for amateurs up his waz. WAI1GDL is now General Class and will be on 80-10 and 2. W1N1SH won 2nd place at the High School Science Fair with his project on oscillators. W1ALP was at a meeting at W1BB's QTH with his c.d. group; he showed pictures of his trip to the Orient. The Eastern Mass AR On-the-Air Assn. held a meeting at Wellesley arranged by WAI1FSI and K1PNB. Those present were W1s ATX, DFS, EAE, DAL, AOG, ALP, EHT, JKB, IFT, SMO, EMG, WAI1DWS, HVZ, FHU, HCD, DRS, FHS, FSI, K1s PNB, YUB. WAI1FBH has his Advanced Class license. W1CFU has RK-38s on 160-meter and 7-Mc. c.w. W1DYS is working on vari-a-cos. K1EMU is rebuilding receivers. W1USH has an RTTY receiver. W1LNU worked VP7VL on 160 c.w. with 16 watts. W1NF has been on 00 for 21 years. W1REP is the new EC for Canton. WAI1DRS is a new ORS. Appointments endorsed: W1s HKG, IPZ, PST, DBY, RM, K1MPD as ECs; W1FJF, WAI1EY as ORS; WAI1AG as OVS/OPS; W1HXK as 00. WAI1EZE passed the General Class exam. W1KBN made the BPL in Feb. on Radio Day. K1OJG has a 1-kw. rig for 2, and is working on a 40-element stacked Yagi. He also is going on 220 Mc. The Capeway RC met at K1HGT's QTH. W4SFD keeps in touch on Tue. nights. The Massachusetts ARA showed slides of members shack and antennas. WAI1EBG has a new SB-301. The Yankee RC

is going to meet at the Jubilee Yacht Club in Beverly. EMNN had 11 sessions, 63 QNI, 25 traffic. Traffic: (Mar.) W1OJM 438, W1PEX 346, WAI1EY 270, W1FJI 165, WAI1FAD 160, W1EMIG 156, WAI1HXF 106, W1DAL 103, K1CLM 78, W1CTR 48, WAI1EUU 33, W1AOG 18, WAI1DED 16, W1SMO 16, WAI1DEC 15, W1DOM 10, WAI1AJN 8, K1YUB 8, K1LCQ 3, K1OKE 2, (Feb.) W1KBN 166, WAI1HXF 142, WAI1FSI 57, WAI1GX 16, W1UJF 4.

**MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1CLF, RM: W1BJG, PAM: WAI1FLG.** Traffic nets: Sea Gull Net meets Mon. through Sat. on 3940 kc. at 1700. Pine Tree Net meets daily on 3596 kc. at 1900 c.w. The North East Area Barn Yard Net meets Mon. through Sat. on 3960 at 0800; W1UDD is net manager. The Augusta Radio Club is holding the Augusta Hamfest this year at the Calumet Club on June 16. WAI1DXU is busy on RTTY and having a nice time there. WAI1BEB is busy with his QRP rig running a half-watt and working the world on it. K1TZH is NCS on the OOTC Thurs. nights and sure sounds nice while doing a good job. Looks like K1GAX did a fine job in the 34th SS. There is a need of liaison stations between the SGN and the PTN to better handle traffic and all. Traffic: W1GU 87, WAI1FLG 33, W1NND 32, W1YA 11, K1SOW 9.

**NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: K1QES, PAM: K1APQ, RM: K1BCS.** The GSPN meets at 0000Z Mon. through Fri. and Sun. at 1430Z. The NHEEPN meets at 0000Z Sat. Both are on 3945 kc., while on 3685 kc. the c.w. net, NHVTN, starts at 2330Z Mon. through Fri. Welcome to new hams: WAI1JDS, WAI1JGD, W1N1JEA, W1N1JZD, W1N1JFL and W1N1JFV. W1BYS has been vacationing in Florida. K1LIK has a new quad on 20, 15 and 10 and is glad to be active again after a year in Vietnam. K1QES says the NHEEPN is doing very well and reports 112 check-ins and 55 traffic. W1KGG and committee plan a ham repenter on top of Mt. Uncanoonoc. WAI1AOH is helping as NCS on NHEEPN. K1PQV is having key click problems. PAM K1APQ reports 790 check-ins and 82 traffic on GSPN. The Manchester Radio Club meets the 1st and 3rd Fri. of the month at the South Main Street Fire Station. Also the club station, W1HPM, has the net every Fri. at 7 p.m. on 50.4 Mc. Welcome to a new ham at Greiner Field, WAI1JW. The Nashua Mike and Key Club held a fine banquet and get-together at Howard Johnsons in Nashua with about 68 present. The following are looking for a N.H. contact for WAS: W4AJJ and VE7ASY. If you hear them on give them a shout. Traffic: K1PQV 47, W1M1HX 35, K1QES 7, K1TK 5, W1SWX 1.

## Rhode Island Amateur Radio Week

June 15-21, 1968

The amateur radio clubs of Rhode Island invite all amateurs to participate in the third R.I. Amateur Radio Week Achievement Award. Operating times are from 0001 GMT June 15 to 2400 GMT June 21. Awards: All stations outside R.I., Mass., and Conn. are required to contact 3 different R.I. stations, Mass. and Conn. amateurs must contact 5 different R.I. stations and R.I. amateurs must contact 10 different R.I. stations. DX stations, including KH6 and KL7, are required to contact 1 R.I. station during this period. Any band or mode may be used. All amateurs who submit logs meeting the above minimum requirements will receive a certificate signed by the governor.

The general call will be CQ RI on c.w. and calling any Rhode Island station on phone. Rhode Island amateurs will identify themselves by signing DE W1XXX RI on c.w. and "this is W1XXX in Rhode Island" on phone. All contestants will exchange a signal report, their county and state. Logs must indicate the date, time and band on which the contact was made.

Suggested frequencies: 3600, 3720, 3850, 7030, 7170, 7250, 14050, 14250, 21150, 21320, 28650, 29000 kc. 50.2, 50.7 and 145-147 mc.

Logs should be postmarked no later than July 20, 1968 and sent to: K1N0G, 31 Marcy Street, Cranston, R.I. A self-addressed stamped envelope should be enclosed for the return of your certificate.

**RHODE ISLAND**—SCM, John E. Johnson, K1AAV—SEC: K1LIL, RM: W1BTV, PAM: W1TXL, V.H.F., PAM: K1TPK, Endorsements: WA1EEJ as OPS, W1BTV as RM, OO and EC, R1SPN report: 31 sessions, 407 QNI, 78 traffic. The Fidelity RC had an exhibit at the Midland Mall in Warwick Apr. 12 and 13. The WIAQ Club of Rumford is preparing for Field Day. A large area has been picked to set up tents and equipment. K1LIL informs us that the club is working on new equipment for the coming year. W1BTV would like all R.I. c.w. men to communicate with him regarding the c.w. nets. He would like to have nets filled and will instruct them in proper procedure. The SCM would like all clubs to send information they wanted printed in *QST* by the first of the month. Information of life has been received too late to be published and must wait another month. Traffic: (Mar.) W1TXL 526, WA1EEJ 514, W1BTV 82, W1YKQ 63, K1VYC 51, K1TPK 14. (Feb.) W1TXL 367.

**VERMONT**—SCM, E. Reginald Murray, K1MPN—

| Net        | Freq. | Time  | Days | QNI | QTC | Net Mgr. |
|------------|-------|-------|------|-----|-----|----------|
| Gr. Mt.    | 3855  | 2130Z | M-S  | 709 | 31  | W1VMC    |
| V.L. Phone | 3855  | 1300Z | Sun. | 127 | —   | W1UCL    |
| VTHN       | 3685  | 2230Z | M-F  | 112 | 55  | K1UZG    |
| VTCO       | 3980½ | 1400Z | Sun. | 40  | 16  | W1AD     |
| Carrier    | 3855  | 1300Z | M-F  | 308 | 4   | W1KGD    |
| VTSB       | 3909  | 2130Z | M-S  | 807 | 86  | W1CBW    |
|            |       | 1230Z | Sun. |     |     |          |

Congrats to new Technician WA1JCE (Steve—St. Albans) and to WA1ET (Stephanie—Bellows Falls) on passing the General Class exam. A big hand to Con Farr who passed his 1st-class commercial radiotelephone license and now is employed at Burke Mt. ETV station. W1IDM and W1JLF joined the retired group. Traffic: K1BQB 340, K1UZG 26, W1FRT 22, K1MPN 22, WA1-GUV 8, K1RMG 6, W1MRW 5, W1IDM 1.

**WESTERN MASSACHUSETTS**—SCM, Norman P. Forest, W1STR—RM W1DWA reports 30 sessions with a total traffic count of 109 with attendance in the order of activity: W1DWW, K1AEC, K1WZY, K1JIV, Don and K1RQF, of Hinsdale, are planning to set up at the telephone tower in Peru as W1DWA/1. WA1EYF has agreed to take over the PAM position for the WMPN until Sept., when he expects to enter college. We wish to thank W1FJI for holding the net together since K1DQG left for Ill. Help Steve keep the net going by calling in at 6:15 daily on 3913 kc. The HCRAI expects a large turnout at the annual dinner on June 8. Field Day will see the HCRAI at Middlefield; the Valley Club in Ludlow and Hare Mt. will be on, W8LFG/1 is running theory classes for beginners Fri. evenings at the Leominster Red Cross quarters on Merriam Ave. W1ZPB, at Mt. Hermon, built an SB-610 during vacation and is now transceiving with an SB300/SB400 set-up. He reports three new Novices licensed during March at W1-IPN (Mt. Hermon Radio Club.) The QSL Bureau reports things are running smoothly. Nice going, K1-PMK, on organizing an efficient group of wonderful people. This section could use more appointments. Please contact me anytime. Traffic: W1EOB 166, W1DWW 72, K1AEC 68, K1WZY 23, WA1EYF 15, W1STR 15, W1ZPB 12, WA1ABW 6, W1BVR 5.

**NORTHWESTERN DIVISION**

**ALASKA**—Acting SCM, Albert F. Weber, K1AEQ—K17GER is being transferred to Colorado. We want to thank him for the bang-up job he has done as SEC and wish him "lotsaluk" down below. K17FLS soon will be on 2 running a full gullon. It seems that her OAI likes to build goodies and is in the process. W8KNC/K17 informs us he monitors 50.0 to 50.5 Mc. daily between 1530 to 1600Z. K17FLR operates WA1DJU when in port at New London and is always looking for K17s. K17-DFW, the S.E. Alaska EC, will be making a bunch of AEC appointments in the outlying areas soon. Anyone interested should contact Lou on the S.E. Emergency Net at 0300Z on 3915 kc. Question of the month: How come so many little 11-meter loaded whips are appearing on cards that have call letter plates around the Fairbanks area? Traffic: K17CAH 181, K17FLS 134.

**IDAHO**—SCM, Donald A. Crisp, W7ZNN—The FARM Net convenes on 3935 kc. week days at 0200 GMT. W7TY again is active with traffic work after being in the hospital. W7JRO and W7JAL are new hams in Lewiston. WA7EDT is building a new linear. K7CSL received an OPS appointment. WA7HOX re-

ports good DX on 10 meters. W7FBL is moving to Fallon, Nev. WA7ETO is issuing quite a few OO notices. SCM W7ZNN and SEC K7TEK spoke to the Eagle Rock Club at Idaho Falls. W7DZH is conducting an electronics youth training course at Idaho Falls. The Eagle Rock Club is sponsoring an Explorer Scout group. W7DQU built a transistorized 160-meter phone rig. The W1MU Hamfest is scheduled for Aug. 2, 3 and 4 at Mack's Inn, Idaho. K7OAB is building a new radio room. K7KRO is organizing an Emergency Corps at Shelly. WA7FFZ has installed a new antenna and is building a new HW-100 kit. FARM Net reports: 21 sessions, 896 check-ins, 81 traffic handled. Traffic: WA7-ETO 69, K7OAB 20, W7ZNN 12, K7CSL 6.

**MONTANA**—SCM, Joseph A. D'Arcy, W7TYN—Asst. SCM/SEC: Harry Roylance, W7RZY, PAM: W7ROE.

|                     |            |          |          |
|---------------------|------------|----------|----------|
| Montana Traffic Net | 3910 kc.   | 0100 GMT | M-F      |
| Montana PON         | 3950 kc.   | 1515 GMT | Sun.     |
| Montana RACES       | 3996.5 kc. | 1600 GMT | 1-3 Sun. |
| Montana Section Net | 3950 kc.   | 1700 GMT | Sun.     |

Appointments: K7SVR, W7EKB and K7NSL as ECs. Endorsements: W7DB and W7OIO as OVsS. K7ELW is instructing several students in c.w. in the Laurel area. W7UN is busy working on a ham band receiver. W7IBG is back on mobile with a new car and a new rig. The following stations are on 2-meter f.m. in the Butte area: W7BC, W7DB, W7OIO, W7ROE, K7MRZ, K7-ZEM, WA7FBN, WA7FBJ, W7TYN and K7NDV. The frequency they are using is 148,760 Mc. The following stations are on 2 meters in the Missoula area: W7CRD, WA7HQ, W7NEG, K7MGL, W7COH, W7VWS, K7IMZ and W7JZ. We are saddened to report the passing of W7GEF to Silent Keys. Don't forget the Glacier Park and the W1MU Hamfests, MTN traffic: 183. Traffic: WA7DMA 163, K7DCH 148, WA6MDL/7 18, WA7IZR 9, W7FIS 8.

**OREGON**—SCM, Dale T. Justice, K7WWR—RM: W7ZFH, PAM: K7RQZ. Section net reports: W7ZFH reports for the OSN for Mar., sessions 22, check-ins 105, traffic 57. K7IFG reports for the BSN for Mar., sessions 62, check-ins 1132, traffic 157, contacts 192. WA7AHW reports for the AREC Net, sessions 31, check-ins 852, traffic 34, contacts 98. QSTs 1, maximum number of counties 20. WA7DLE reports for the Portland Area AREC Net, sessions 21, check-ins 504, traffic 11. New appointment: W7UYU as EC for Tillamook County succeeding K7IGD, who recently passed away. Many stations were active in the ARRL DX Contest and three multi-operator stations had a real race for top honors. WA7JNH is a new call in Forest Grove. Larry has held calls in the 2, 9, 8 and 7 call areas previously. New calls in the Grants Pass area include W7JMY, W7J-KX, WA7HRG, WA7BC and W8NHO/7. A new call in Cave Junction is WA7ISX. WA7FQM is working European stations. K7YQM is on all bands through 2 meters. WA7GCS is experimenting with a helical antenna for 2 meters. WA7GFE is now serving in the Air Force. WA7ACV is on active duty with the Navy for two years. Traffic: (Mar.) K7RQZ 253, WA7BYP 213, K7IFG 170, WA7BOO 142, WA7GFE 110, W7ZFH 100, W7ZB 70, K7WWR 69, K7OUF 34, WA7EQE 33, WA7-GLP/WA7DOX 32, WA7HKV 31, WA7AHW 22, WA7-DLE 17, W7DEM 12, W7MLJ 8, K7YQM 5. (Feb.) W7KTG 3.

**WASHINGTON**—SCM, William R. Watson, W7BQ—SEC: W7UWT, RM: K7CTP, PAM: W7BUN.

|       |          |       |     |      |         |     |          |    |
|-------|----------|-------|-----|------|---------|-----|----------|----|
| WSN   | 3590 kc. | Daily | QNI | 337  | Traffic | 291 | Sessions | 31 |
| NTN   | 3970 kc. | Daily | QNI | 945  | Traffic | 338 | Sessions | 30 |
| WARTS | 3970 kc. | Daily | QNI | 1482 | Traffic | 123 | Sessions | 31 |
| NSN   | 3700 kc. | Daily | QNI | 360  | Traffic | 62  | Sessions | 27 |

The time is close for the re-registration of all nets with July 15 as the deadline at ARRL Headquarters. This is most important as many nets in the low end of the bands will move up before Nov. 22, when the bands will be changed under the incentive licensing program. Nets do not have to be ARRL affiliated to get in the Net Directory. Apply for cards from your SCM, RM or PAM for net registration. Look for more detailed information regarding the Washington State Hamfest at Yakima July 13-14 in July *QST*. New appointments: K7EFB as ORS, W7LOF and WA7CYX as ECs, K7-OVN as OPS. The N.W. Tech. Net entered its 4th year Apr. 9 with another go-around of the new Advanced and Extra material with some Novice and General material on 3970 kc. Sun. at 4:00 p.m. PDST. SCM W7BQ attended the Grays Harbor and Bremerton meetings in Mar. Field Day was the major topic at club meetings. The Walla Walla Club keeps actively engaged in



auctions and bingo in its well-equipped club house. The BEARS reports a new Novice Net on 7.157 Mc. Mon. at 1900 PST. The Clallam County ARC received an FB write-up in the local press of joint efforts with the local CB group in technical training. Holiday Inn, near Tacoma, will be the setting for the QCWA Annual Meeting June 8-9. The Rodeo City Radio Club is organizing emergency operation under AREC. Twin Cities Amateur Clubs will furnish communications during the Water Polities Boat Races in July on 145.65 kc. WA7GCV is comm. chairman. WA7FKM is a new AEC for Snohomish County. W7PI reports a break for a California vacation. K7KWV is home from the hospital after a bad accident in Jan. W7AXT reports regular AREC drills using state AREC frequency 3930 kc. W7IEU appeared again as NCS on WSN after many years of other varied amateur activities. Traffic: WTBA 1211, WA7DXI 723, W7DZX 421, W7ZIV 365, WA7DZL 194, W7HMA 187, K7CTP 178, W7EJY 160, W7KZ 156, W7AXT 146, W7PI 129, WA7BZY 95, W7BQ 89, W7BTB 71, K7TCY 65, W7IEU 57, WA7HKR 54, W7APS 50, K7KPA 46, K7VNB 46, W7GYF 37, K7THG 36, WA7EDQ 35, WA7GVP 31, W7UWT 24, W7BUN 17, WA7PKM 17, K7OXL 17, WA7DBQ 15, K7YFI 14, WA7EYN 13, W7OEB 12, W7RXH 12, W7ZHZ 12, WA7HSJ 11, K7SUX 7, W7UW 3, W7BNV 1.

## PACIFIC DIVISION

**HAWAII**—SCM, Lee R. Wical, KH6BZF—SEC: KH6GHZ. PAM: KH6EEM. RM: Vacant. RACES NETS (40, 10, 6 and 2 meters) coordinate with KH6AIN.

| Net                   | Freq.      | Time (GMT) | Days  |
|-----------------------|------------|------------|-------|
| League Appointees     | 7.290 Mc.  | 0700Z      | Wed.  |
| Friendly Net          | 7.290 Mc.  | 2030Z      | M-F   |
| Pacific Interland Net | 14.330 Mc. | 0830Z      | M-W-F |

WOLTE passed through town recently for some business, surf and sun. K1ZJT KH6 has been busy with DX. The NCDXC on the West Coast reports that its DX bulletins can be heard on 14.002 at 1800 GMT Sun. Listen for W6TI. The Aloha DX Club met recently and approved its by-laws and charter. KH6GKL has been very active telephone relaying for the fellows on the U.S. Coast. Guard Vessels returning from "Operation Deepfreeze" in KC4-Land. KH6GLU and KH6BZF were nominated for ISSB membership recently. KH6GHZ, who has been consistently running traffic in and out of Honolulu on the old c.w. portion of the bands, now has been heard on s.s.b. working contests. W8JWU/KH6 reports that he's reconstructing his quad. KH6DQ is on with a new Tri-Bander passing out KH6 contacts on c.w. KH6EQA, the Emergency ARC, is on with an S/Line and a 30S-1. Operators KH6FNB and KH6GHC were on during the recent ARRL DX Contest. V83DY gave a fine presentation of his slides taken during his business trip DX-pedition to Panning Isle. K8WXY writes from K6GIC, on Iwo Jima, that he wishes to thank the fellows on the Mainland who helped with his telephone relaying. Keep the cards, letters and reports coming in. See page 8 for my address. Traffic: (Mar.) KH6GHZ 193, W6PAN 1. (Feb.) KH6GHZ 366.

**NEVADA**—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU, W7ZT was the recipient of a 50-ft. tower; he has been rendering outstanding services for Armed Forces personnel in Vietnam. W7HX was W7CMG. W7FJM was WA7EZV. The W7DDB repeater has been modified to 146.340 and 146.940 Mc. receive and 146.940 and 147.840 Mc. output. WA7ESM is the new EC for North Las Vegas. W7YDX is active on 6 meters. WA7IQR is a new amateur in Ely. K7ZOK worked W6DQJ on 2-meter s.s.b. K6LES and WAOPPS are new amateurs in Boulder City. WA7GXM has been working W6DOR on 6 meters. K7VYT is now Advanced Class. WA7BEU has been kept busy sending RTTY birthday greetings to servicemen for the Rotary. W7YKN reports lots of 2-meter i.m. activity in the Reno area; the code and theory class is doing FB. WA7ESM, K7NYU and K7RKH, instructors of the North Las Vegas code and theory amateur license class, have started a new semester. W7PBV and WA7BEU attended the Director's meeting in Oakland. W7TCK and his XYL are turquoise mining. K7ICW still is active on v.h.f./u.h.f. despite power supply and other rig modifications. K7BSU reports more activity fishing than hamming. Traffic: W7BIF 18, WA7BEU 14, W7PBV 1.

**SACRAMENTO VALLEY**—SCM, John F. Minke, III, WA6JDT. ECs: WB6MXD, K6RHW, W6SMU, WB6RSY, WA6TQJ. RM: W6LNZ.

| Net                | Freq.  | Time  | Days  | Mgr. or NCS |
|--------------------|--------|-------|-------|-------------|
| NCN                | 3630   | 0200Z | Daily | WB6HVA      |
| NCN/2 (slow-speed) | 3630   | 0330Z | Daily | WB6HVA      |
| Yolo County CD     | 146.94 | 0200Z | Tue.  | WA6TQJ      |
| SCEN               | 146.25 | 0500Z | Wed.  | WA6CXB      |
| Nevada County      | 145.50 | 0230Z | Wed.  | W6UZU       |

W6GML, WA6JDT and WB6VBB all live on the same street and are 100% ARRL members. Sacramento Valley members attending the Pacific Div. Director's meeting in Oakland were WA6CXB, WB6HAW and WB6RYR for Sacramento ARC, WB6WGO for McClellan ARS and WA6JDT. Our new Director is ready to speak at any club; those interested, please contact Doc or your SCM. A Pacific Division Convention is planned for 1970 in Fresno. Those of you who want to take your Advanced or Extra Class exams in San Francisco should be there by 0830 local time. W6MIW is now W6SI in Sacramento. W6DOR reports working CE3QG on 6 meters. EV states that the CE also was worked by WB6WPH and WB6YCL. Those interested in a "club project" to build 220-Mc. gear should contact W6DOR or WA6GER. W6ZJW is pleased with his new six-element tri-bander. The Grass Valley gang is stirring up 160-meter activity on 1980 kc., including K6KQ "Radio Free Rough and Ready." Rough and Ready was once an independent republic within Nevada County. Traffic: (Mar.) WB6RSY 168, W6LNZ 33, WB6MAE 14, W6NKR 10, K6KRL 6, WA6CXB 2, WA6JDT 2. (Feb.) K6IEV 11, W6NKR 11.

**SAN FRANCISCO**—SCM, Hugh Cassidy, WA6AUD WA6BYZ and W6KVQ made the BPL again in Mar. W6EAJ is a new OO in the Humboldt County area. W6GQA is now W6RQ. W6KG and W6DOD were speakers at the Marin Club in April. Another change in calls finds W6ON in place of W6DZQ. W6BYS handles traffic for the maritime-mobiles in the Pacific. WB6JQP sent his Form 1 in this month from Yokahama. W6HST was in the hospital with some problems with his pump. K6ING was shipwrecked near the Straits of Magellan when the SS *Leonor* sank after hitting a rock. W6JXK has gone to RTTY to handle traffic. WB6UJO has added a new linear to help with his DXing. W6PTS has added a 220 sticker to his DXCC certificate. W6GCG is being heard on the Mission Trail Net. W6BIP expects to operate from the Indian Ocean sometime this year, mostly likely from VQ9-Land. Seen at the Division Meeting were K6OJO, W6WLV, WA6DPJ, WA6QEV, WA6DJI and WA6AUD. WB6AGP reports ready to go with RTTY on all bands. The Petaluma Radio Club is reorganizing. K6JGX was in KH6-Land operating portable recently. WB6VNK has worked the problems out of his rig and is on daily from Eureka. W6BQAT reports that his next stop will be the Extra Class license. W6RQ is trying to master an electronic keyer. WB6LFT has gone 2-meter mobile to join the Sonoma County group working 146.65 Mc. WA6NDZ has moved to Burlingame. WA6IVM passed the Advanced Class exam. JAIYF visited WA6IVM recently. W6YMN passed the General Class test. Stan, as a Novice, worked 49 states and needs Delaware for WAS. The Marin DX Club met with some other DXers at the Imperial Palace in San Francisco with Lloyd and Iris Colvin in attendance and adjourned to K6KQN's QTH. The offer of a copy of the *Section Courier* is still open to those who send in a Form 1 to the SCM. K6QQI was a recent check-in with the San Francisco Station Net. Traffic: (Mar.) W6KVQ 542, W6WLV 194, WA6BYZ 151, K6TJW 82, WB6LFT 39, W6BYS 20, WA6AUD 18, WB6WV 15, WB6AGP 8, K6ITZN 8, WB6IMO 7, W6ON 6, WB6JQP 4, W6MTJ 3, W6YMN 2. (Feb.) W6JXK 45, WB6LFT 34. (Jan.) WB6LFT 55.

**SAN JOAQUIN VALLEY**—SCM, Ralph Saroyan, W6JPU—The Kern County Radio Club, Inc., meets the 2nd Wed. of every month at the USNRTC, 4200 No. Chester, and all hams in the Bakersfield area are invited to attend. Officers are WB6JEH, pres.; WB6IKU, vice-pres.; WB6ZWG, 2nd vice-pres.; K6SAM, treas.; W6WCV, secy. The Madera Amateur Radio Club meets at the Court House. K6KLV is pres. and W6BWM is vice-pres. Heard on 6 meters: W6ARC and WA7BUP, who is in the Veteran's Hospital. WB6UYG is now 6 s.s.b. The Kingsburg High School dedicated its new radio club, W6HKV. The club has 13 members and WB6GJG is the trustee. K6RGZ has a Heath Marauder. WA6ZSB is active on AF MARS. WB6RFH has a Swan 140. WB6YCK has a 5V and is on 2-meters i.m. WA6FCR is mobile with a Swan 500. WB6INO is mobile with a Swan 350. K6KOL is experimenting with antennas. The Touloume County Radio Club will hold FP in Alpine County. This is a chance for all interested in working Alpine County. W6GOJ and WB6RZI are on AF MARS. W6UTU is on 15 working DX. W6WGR is now a General Class licensee. W6ADB passed the Extra Class exam. K6SMZ is now an Advanced Class licensee. Traffic: WB6NO 528, W6ADB 266, W7AAF/6 219, WB6HVA 142, K6KOL 141, WA6SCCE 115.

**SANTA CLARA VALLEY**—Acting SCM, Edward A. Gribi, WB6ZF—Asst. SCM: Ed Turner, W6NVO. SEC: W6VZE. RM: WA6LFA. Section meeting places:

Bay Area AREC Net, 3900, Sun., 1930 GMT.  
Northern California Net, 3630, Daily, 0300 GMT.  
Monterey Bay Emergency Net, 147.16 Tue, 0400 GMT.

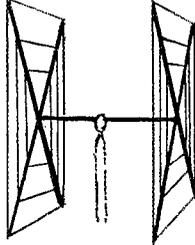
## GOTHAM'S AMAZING ANTENNA BREAKTHRU!!

How did Gotham drastically cut antenna prices? Mass purchases, mass production, product specialization, and 15 years of antenna manufacturing experience. The result: The kind of antennas you want, at the right price! In QST since '53.

**QUADS** Worked 42 countries in two weeks with my Gotham Quad and only 75 watts . . . W3---

### CUBICAL QUAD ANTENNAS

— these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!



### 10/15/20 CUBICAL QUAD SPECIFICATIONS

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

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

Dimensions: About 16' square.

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' x 1 1/4" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Steel wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' x 1" OD aluminum 'hi-strength' alloy tubing, with telescoping 7/8" 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 |
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| 15-20 CUBICAL QUAD . . . . .        | 32.00   |
| TWENTY METER CUBICAL QUAD. . . . .  | 25.00   |
| FIFTEEN METER CUBICAL QUAD. . . . . | 24.00   |
| TEN METER CUBICAL QUAD. . . . .     | 23.00   |

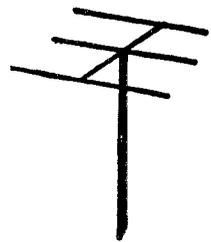
(all use single coax feedline)

How to order: Send check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect.

### BEAMS

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

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; 3/8" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.



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

\*20' boom

## ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, T12FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

|                                    |         |
|------------------------------------|---------|
| V40 vertical for 40, 20, 15,       |         |
| 10, 6 meters . . . . .             | \$14.95 |
| V80 vertical for 80, 75, 40,       |         |
| 20, 15, 10, 6 meters . . . . .     | \$16.95 |
| V160 vertical for 160, 80, 75,     |         |
| 40, 20, 15, 10, 6 meters . . . . . | \$18.95 |

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

WA6LFA is the new S.C.V. RM. Our sincere thanks to W6QMO for her years of service in that post. W6BPT has been reinstated as ORS. A goodly number of S.C.V. appointees and others attended the fine Director-called meeting in Oakland Mar. 23. W6DEF has a new 2-meter rig and is on Army MARS. W6VK "did fair" in the ARRL C.W. and Phone Contests. K6YRG and W6ACW are both active in Navy MARS. W6MIG reports at least 10 new Novice tickets out of the 23 who started classes with the San Carlos C.D. Radio Club. The club is deep in Field Day plans. W6HQD is the new EC for Burlingame and Millbrae. WA6HVN is deeply involved in regional disaster planning for the Red Cross. W6MIKE is a new Oscar director. WA6RNX is busy building up the new station. W6PIY, of the West Valley Amateur Radio Club. A group from the South County Amateur Radio Society attended a Redwood City Planning Commission meeting where W6CQK received his tower permit. W6B-1ZF is operating portable from Long Beach these week days. W6DQY has three new Notices in his group at Hunter Liggett Military Reservation. W6DVI, portable in King City, is now on the air with a vertical. W6B-ATK, WA6BNJ, KL7ELF, W6BRPL and W6ZUI are new members of the West Coast Amateur Radio Service. Traffic: (Mar.) W6RSY 1082, WA6LFA 230, K6DYX 103, W6YBY 122, W6DEF 92, W6VZE 60, W6AUC 51, W6OII 47, W6ZRJ 45, W6VK 30, W6ACW 19, W6BVB 5, W6BPT 1, W6IZF 1. (Feb.) W6VZE 35.

## ROANOKE DIVISION

**NORTH CAROLINA**—SCM, Barnett S. Dodd, W4-BNU—Asst. SCM: James O. Pullman, WA4FJM, SEC: WA4LWE, RM: K4CWX, PAM: WA4JT, V.H.F. PAM: W4HLZ, W4CJD is now operating as DLACE and says he will try to QNT the late sessions of the c.w. net soon. WA4ZLJ and WB4CEF both passed the 1st-class commercial radiotelephone examinations in Norfolk, Va., recently. WA4KWC has a new tri-band TH3MK2 beam up now. WA4NVO/DL4RR is back in the States and is going to OCS at Fort Benning, Ga. WB4GAN is now at the Naval Air Station, Norfolk, Va. WB4FRL is now Lt. jg in Jacksonville, Fla., with the Navy.

| Net    | Fren.    | Time  | Days  | QTC | Mgr.   |
|--------|----------|-------|-------|-----|--------|
| THEN   | 3933 kc. | 0030Z | Daily | 205 | W4ZZC  |
| NCN(E) | 3573 kc. | 2330Z | Daily | 188 | W4IRE  |
| NCN(L) | 3573 kc. | 0200Z | Daily | 121 | WA4CFN |
| 88BN   | 3938 kc. | 2330Z | Daily | 53  | WA4LWE |

Traffic: WB4BGL 253, W4EVN 152, W4LWZ 150, WA4-CFN 112, W4FDV 79, WA4GMC 66, WA4ZLK 58, K4EO 45, K4VBG 38, W4ZZC 32, WA4JT 23, K4TTN 23, W4-RWL 27, WA4VNV 24, WA4AKX 22, W4BNU 22, WB4JH 21, WA4VLJ 20, K4CWX 19, WA4FJM 18, WA4UQC 16, WB4BPH 14, W4NAP 10, K4PKE 10, K4VCL 8, WA4-KWC 7, K4ZKQ 6, WB4GAN 5, K4GHR 5, WA4RVI 2.

**VIRGINIA**—SCM, H. J. Hopkins, W4SHJ—SEC: K4-TAB, RMs: K4MLC, WA4EUL, PAM: W4OKN. C.w. bounds WB4DRB and WB4GTF have been active in phone traffic nets. WB4FDG has been awarded CP-20. The Virginia Beach Club is holding code and theory classes. Tidewater area amateurs monitor and recommend the use of frequencies 28.8 Mc., 50.4 Mc. and 145.8 Mc. for local coverage. GK4TSJ has earned a VSBN certificate. W4ZM an EAN certificate and K4KNP a 4RN certificate for ten years service. WA4URN is active on RTTY. Results of the Va. QSO Party indicate another record-breaking affair; if you still do not have details contact K4IKF or W4NLC. A Roanoke Division Convention will be held the last week end in Sept. in Greensboro, N.C. While Daylight Saving Time prevails, look for your NTS nets at all levels to be operating at the same local time—one hour earlier by GMT. Traffic: (Mar.) K4CG 264, WB4GTF 257, W4NLC 236, W4UQ 192, K4KNP 182, WA4HUL 138, WB4FDT 111, W4ZM 103, WB4DRB 102, WB4CVY 91, W4SZT 78, K4FSS 58, K4-NDH 56, W4OKN 55, K4MLC 46, WA4PBG 43, WB4GTS 39, W4RHA 35, K4TSJ 33, W4A 31, WB4DOY 24, WB4-FLT 24, W4HE 24, K4KJD 23, W4TE 21, W4KN 20, W4BZE 17, WA4OGZ 17, W4SHJ 16, WA4JFF 11, W4MK 10, K4VCY 9, K4GR 7, WA4WQG 5, W4KPC 4, WA4URN 4, W4GEO 3, W4WG 3, WB4GYV 2, W4UJ 2, W4ZAU 2. (Feb.) W4ZM 151, WB4GTS 87, WA4TKB 17, WA4FCS 16, WA4TCF 10.

**WEST VIRGINIA**—SCM, Donald B. Morris, W8JM—SEC: W8IRN, RMs: K8MYU, K8TFP, PAMs: K8CHW, W8YD. The West Va. Tech Club station W8AHZ now is ORS with WA8POS as trustee. The Tri-State ARC of Huntington moved to new quarters, has a fine code-theory class going and sponsors the Annual Hamfest to be held at Camden Park, June 2. K8MYU, net mgr., reports the WVN C.W. Net held 31 sessions with 189 messages. WA8NDY and WA8WCK, quite active in the c.w.-phone nets, assisted in the search for a downed plane and missing persons. WA8NDY, WN8YHH and

K8TPF assisted WN8AHF in getting his ticket under adverse conditions. W8DUV is active again on phone and c.w. with a new operating position set up by husband W8DUW. W8IRN and W8JM attended the LC meeting in Greensboro, N.C. Phone Net Mgr. WA8ROB received his Extra Class license and reports the Phone Net with 31 sessions, 987 stations and 169 messages. WA8YSB now is Official Observer. The Northern Panhandle ARC held its Annual YL-OM Dinner at Oglebay Park, Wheeling. WA8YSB, W8IRN and W8SSA are working on a QSL card design as a State Radio Council project. The West Va. Chapter of the QCWA held its Annual Spring Dinner meeting in Fairmont. Remember the ARRL State Convention, Jackson's Mill, June 29 and 30. Traffic: W8SQO 154, WA8NDY 109, K8MYU 67, WA8-YSB 65, WA8WCK 59, WA8ROB 46, K8BIT 25, W8CKX 23, W8HZA 21, W8JM 20, W8IRN 14, K8VEJ 13, W8ATZ 9, K8MOB 9, W8DUV 7, WA8LFW 7, WA8CRW 4, WA8-UNP 4, K8UPH 4, W8GUL 3, W8YD 3, K8QOS 3, WA8TWR 3, K8ZDY 3, WA8AGC 2, WA8AYB 2, K8CFT 2, WA8CKN 2, WA8LRF 2, K8PRC 2, K8QYG 2, WA8-ABN 1, WA8BUM 1, W8CUL 1, W8EFT 1, K8OOL 1, W8QEC 1, WA8UFX 1, W8VVE 1, W8WIX 1, WA8YOF 1.

## ROCKY MOUNTAIN DIVISION

**COLORADO**—SCM, Richard Hoppe, K0FDH—Asst. SCM: A. E. Hankinson, WA0NQL, SEC: W0SIN, PAM: W0CXW. Congratulations to the Colorado High Noon Net on taking top honors in the March traffic race. Net Mgr. WA0NJJ recently was featured in the *Rocky Mountain News* for his prowess as an artist. The Denver Radio Club has blossomed out into a fine example of what good leadership can do for an ARRL club. Under the tender loving care of its president, Warren Torrington, and W0SIN, editor of the *Round Table*, club membership is rapidly approaching the 200 mark. Welcome to the H-P Amateur Radio Club of Loveland and congratulations on its recent affiliation with ARRL. The Pueblo Radio Club soon will have a 2-meter repeater on the air, which will help considerably with v.h.f. communications in eastern Colorado. Traffic: K0ZSQ 732, W0KAU 98, W0UAT 88, WA0INL 82, K0DCW 55, W0LRN 50, K0ECR 41, W0BWJ 37, WA0JTB 23, K0IGA 16, W0LEK 13, K0MNN 11, WA0QFY 4.

**NEW MEXICO**—SCM, Kenneth D. Mills, W5WZK—New PAM WA5FFL will assume the duties of the net manager for the Breakfast Club and Emergency Phone Nets on 3,838 mornings. WA5FJK reports the NMN on 3,760 is off to an expected slow start but that there are bright spots. K5ZCA is running 30 minutes of code practice immediately preceding the net at 0200Z. K5IWI reports hearing sporadic a.m. signals in a foreign language on 6 meters with his beam headed N.W. Attend the Rocky Mtn. Division Convention in Cheyenne, Wyo., June 29 and 30. WA5RBU moved to California in March. W7PNY reports that W5PDO, Los Alamos, is putting an n.f.m. repeater on 146.34-146.94. Traffic: WA5FJK 31, W5MYM 30, W5NON 12, W5DMG 9, WA5MY 9, W5NUI 6, K5DAB 4, WA5JNC 3.

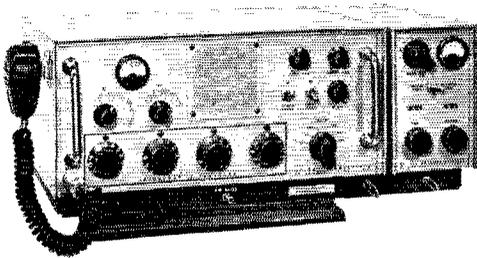
**UTAH**—SCM, Gerald F. Warner, W7VSS—SEC: W7-WKF, RM: W7OCX. Traffic nets:

|      |           |            |       |
|------|-----------|------------|-------|
| BUN  | Daily     | 7272 kc.   | 1930Z |
| UARN | Sat.-Sun. | 2987.5 kc. | 1500Z |

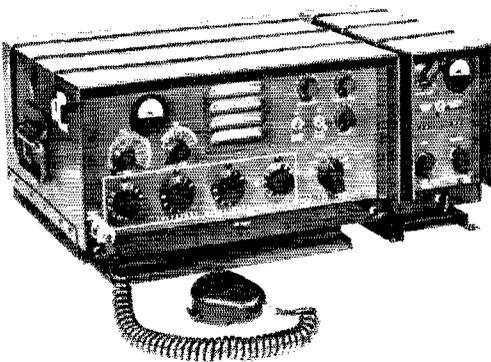
Among the new two-letter calls recently issued: W7HS to W7NPU. New officers of the Utah DX Assn. are K7JVF, pres.; K7RAJ, vice-pres.; K7ZIA, secy. The Utah DX Assn. has announced that trophies will be awarded for first place in the ARRL DX Test. The hamfest and convention season is approaching. Events of interest near Utah: The Rocky Mountain ARRL Division Convention at Cheyenne, Wyo., June 29 and 30. The WIMU Hamfest at Mac's Inn, Idaho, Aug. 2, 3 and 4. Both are fine events, hope you can attend. Your SCM has moved. Please note the following address, and send all correspondence to: 205 No. Carbon Ave., Price, Utah 84501. K7HEN now has an Advanced Class ticket. Traffic: W7EM 128, WA7BME 66, W7OCX 45, K7SOT 44.

**WYOMING**—SCM, Wayne M. Moore, W7CQL—SEC: K7NQX, RM: WA7CLF, PAMs: W7TZK, K7SLM, O8Ss: K7SLM, K7NQX. Nets: Pony Express, Sun. at 0800 on 3920; Y.O. daily at 1830 on 3610; Jacklope, Mon. through Sat. at 1215 on 7260; Wx Net, 0630 Mon. through Sat. on 3920. WA7HBY is attending the Colorado School of Mines at Golden and doing a good job of keeping the club station active. K7SDD was stranded during the early April snowstorm but made it back to Laramie the next day O.K. K7WRS spent some time in Cheyenne baby-sitting while the daughter underwent surgery. WA7BDI is home and recovering nicely from

# WHAT DO USERS SAY ABOUT THE RF-301 SSB TRANSCEIVER?



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NOMENCLATURED  
AN/URC-58



RF-301A  
NOMENCLATURED  
AN/GRC-165

With over 1500 RF-301 and RF-301A SSB Transceivers now in the field, typical comments from users include:

"She received twenty-five, two point seven five-inch rocket hits on the wheelhouse or bridge alone plus over a thousand rounds of 20 m/m machine gun hits. Five of the rocket hits were only six or seven feet from the URC-58, yet it was the only piece of electronics equipment that was still operational after the attack."

"The two that are installed on the repair barge are being run continuously and the remaining eight are run in cycles of three days on and one day off. Of these ten units, there have been practically no failures to speak of in the past year-and-a-half that they have been installed."

"At one point on the obstacle course, the vehicle's wheels were bounced three feet off the ground. The beating the 301 got was incredible but it continued to work perfectly."

"We have tested four military type SSB equipment and the RF-301 is the best of the lot."

Since March of 1965, R F Communications has delivered over 1500 RF-301 and RF-301A Transceivers to military customers. They have been procured by the U. S. Army, Navy, Coast Guard, Air Force and overseas users including: Australia, Belgium, Brazil, Chile, Ecuador, Germany, Great Britain, Iran, Pakistan, South Africa, Morocco, Nigeria, Portugal, Tanzania and many others. The RF-301 has been operated under combat conditions in the most severe environments and has proved to be rugged and reliable.

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- Military HF SSB Transceiver at a commercial price.
- Off the shelf—delivered in a matter of days.
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- Antenna Coupler matches any antenna from 9 foot whip to 150 foot long wire. • Largely solid state.

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major surgery. K7SLM spent some vacation time in Nebraska. K7OWT has won the State Science Fair and will go to the National. W7BXS has been getting in some golfing and sunshine in Tucson. W7CFL now is an official member of the FCC. Don't forget Field Day! Traffic: K7NQX 398, W7CFL 337, K7KSA 132, W7TZK 87, W7DZK 73, K7DEJ 67, W7FDC 55, K7ITW 13, K7VAW 81, W7BDE 21, K7SLM 13, W7EGK 5, K7LOH 2, W7FKF 1, K7NKR 1.

## SOUTHEASTERN DIVISION

**ALABAMA**—SCM, Edward L. Stone, K4WHW—SEC: W4FPI, PAM: W4AEEC. Lots of new Extras are showing up lately. Among the group are WNLLI, W4YER, K4KJD, K4KMG, W4KUP, K4ZYP and K4UKW. W4AVM has a new T-4XB. Glad to have W4XNW1 back in Alabama operating from Anniston. W4WGI and K4MNG both report excellent results with the PFT preamplifier from Jan. QST. We are looking for a good turnout during the V.L.F.E. QSO Party. A reminder to all clubs in the section: Field Day, with all the new changes, should be most interesting this year. Get your group together and let's see if the Huntsville Club can be topped. Don't forget to send your FD message to your SEC so that your score will qualify for the SEC award. Traffic: (Mar.) W4AYM 176, W4AEEC 144, W4AVEX 115, W4SYM 102, K4AOZ 77, WB4BLX 74, W4AUNC 40, K4VHW 36, W4AFYO 30, K4BSK 23, K4KJD 23, W4AROP 15, W4A4ZC 14, W4FPI 14, W4A-NW1 14, K4KJM 11, W4LXB 10, W4DGH 6, K4UCC 6, W4DS 4, K4KMG 3. (Feb.) W4AFYO 132, WB4ENX 36, WB4EKJ 27.

**CANAL ZONE**—SCM, Russell E. Oberholtzer, KZ5-OB—Welcome to our newly-appointed Canal Zone QSL Manager, Gloria Spears, KZ5GS. She will be using the same Post Office Box 407, Balboa, C.Z. She requests all KZ5s to send her their self-addressed stamped envelopes. Also please notify her of forwarding address when moving. She will be handling both incoming and outgoing QSLs. The CARC had a farewell party for KZ5GN and KZ5MW, who are rotating to Vietnam. The dinner was at the Elks Club in Brazos. Slides of Vietnam, VR6-TC's dinner party held a few months ago and a trip up the Pan-American Highway were shown by KZ5AD. W4YCY operated as KZ5HF while his ship, the *Fair-weather* was being repaired. KZ5EM has some s.s.b. with an HW-32. KZ5NN is back from a States vacation. Traffic: KZ5OA 148, KZ5NF 137, KZ5OB 61, KZ5WR 30, KZ5FN 27, KZ5PA 27, KZ5FX 13, KZ5FG 9.

**EASTERN FLORIDA**—SCM, Jesse I. Morris, W4-MVB—Asst. SCM: William J. Blasingame, Jr., W4-NEV. SEC: W4YTY. Asst. SEC: W4FP. RM: C.W.; W4LE. RM RTTY: W4RWL. PAM 75M; W4OGX. PAM 40M; W4SDR, V.H.F. PAM: W4AEMC. The 1968 Florida QSO Party is now past history and was a success. W4FP has suggested that all traffic-handlers indicate in their reports if they handled any traffic from Vietnam. This might help boost our image. W4PWF now has a new Swan 500C. K4VWV has a new Collins receiver, while WB2FYU/4 has a new transceiver. W8-RZY/4 has been QRT for some minor rig repairs but has them all taken care of now. W4A4FSF is now WB4FSF. Bonnie received her General Class license and hopes to have an s.s.b. rig soon. WB4FLW reports he has been ill lately and this has curtailed his traffic-handling to some degree. W4DFU, the club station at the University of Florida, has just completed participation in the Engineering School Fair, originating quite a large number of messages. K4DSN and W4YPX are both now operating 2-meter f.m. mobile. W4LE now has his XYL studying for the Novice exam. I would like to welcome W4IFM/4, who is stationed aboard the USS *Topka*, to our Florida ham family. W3CUL has returned to Pennsylvania. We look forward to Mae's visit each year. W4UBT had to resign as president of the Beaches Amateur Radio Society because of business reasons. W4-SME, the vice-pres., has replaced him for the remainder of the term. Traffic: (Mar.) W4ASC 437, W4AFGH 406, W4ANEV 398, W4LE 298, K4XSN 182, WB4ATW 172, W4ANBE 136, WB4EPD 133, W4HED 123, W4SDR 122, W4SNK 98, W4UQZ 95, W4ATWD 78, W4AD 74, W4-OHO 68, W4FP 60, W4ZAK 54, WB4FLW 52, K4DAN 47, W4SME 47, W4AKB 45, W4TRS 44, W4PWP 42, W4OGX 40, K4LEC 39, W4ACI 35, W4YTY 34, W4NGR 34, W4AFJA 30, W4JHT 29, W4DVO 28, K4COO 26, WB4-DSP/4 25, W4ROA 25, W4ABGW 22, W4FYU 20, K4SJT 39, W4FHZ 19, W4KHY 18, K4LPS 18, K4LBT 15, W4-XPX 15, W4TJM 13, W4PBK 11, W4BKC 10, K8LNE/4 9, K4EHY/4 9, W4VDC 7, K4EBE 3, WB4GUH 3, W4/PQ 3, W4CBE 2, W8RZY/4 2. (Feb.) W4ABGW 24, WB4FSF 16, W4UFO 14, K4DSN 5.

**GEORGIA**—SCM, Howard L. Schonher, W4RZL—SEC: W4DDY. Asst. SEC: W4HWQ. RM: W4CZN. PAMs: W4WQU and K4HQI. W4YE is recovering from surgery. W4HYW was active in the YL-OM QSO Party

and in lobbying against the special license plate bill. W4LRR made his first RTTY contact and first 2-meter s.s.b. contact. W4HYO is active in Doraville. The Dixie 6-Meter Net offers a nice certificate for three check-ins to any of the three nets. W4YNI, is on 2 meters. W4-BGK has a new beam. W4AGYZ now is in Athens. K4HQI reports monthly average MUF around 30 Mc. The Augusta Radio Club again is furnishing communications for the movie crew at the Masters. W4ASTH is on orders for Viet Nam. W4QBB went to Germany. W4DDY is on s.s.b. W4ASH/4 returned from Korea and is on orders for Germany. W4AWQU is experiencing rig trouble. W4KE needs Atlanta on 2.

| Net  | Freq. | Days          | Sess. | QNI | QTC          |
|------|-------|---------------|-------|-----|--------------|
| G5N  | 3505  | 0000-0300 Dy. | 62    |     | 169          |
| GTN  | 3718  | 2200 Dy.      | 31    | 86  | 7            |
| G5SN | 3975  | 0100 Dy.      | 31    |     | Not reported |

Dixie 6-Meter Net: 50,110 Sm. at 1330Z with W4ZQN as NCS. Mon. at 0200Z with W4BTW as NCS. Thurs. at 0200Z with K4RZB as NCS. K4TXK will graduate from the U. of the South in June. He is purchasing a Citabria (aerobatic plane) and plans aerobically on 2 and 75 s.s.b. Traffic: (Mar.) W4FOE 374, W4CZN 108, W4FDN 90, W4ARAV 76, W4DDY 59, W4PIM 50, K4-JFY 35, W44LLI 35, W4AJES 29, W4KE 24, W4ARI/4 13, K4TXK 12, K4BAT 7, WB4EMF 4, W4RZL 4. (Feb.) W4ARAV 141.

**WESTERN FLORIDA**—SCM, Frank M. Butler, Jr. W4RKH—SEC: W4IKB. PAM: H.F.—W7BNR/4; V.H.F.—W4UUF. RM: W4BVE. Section nets:

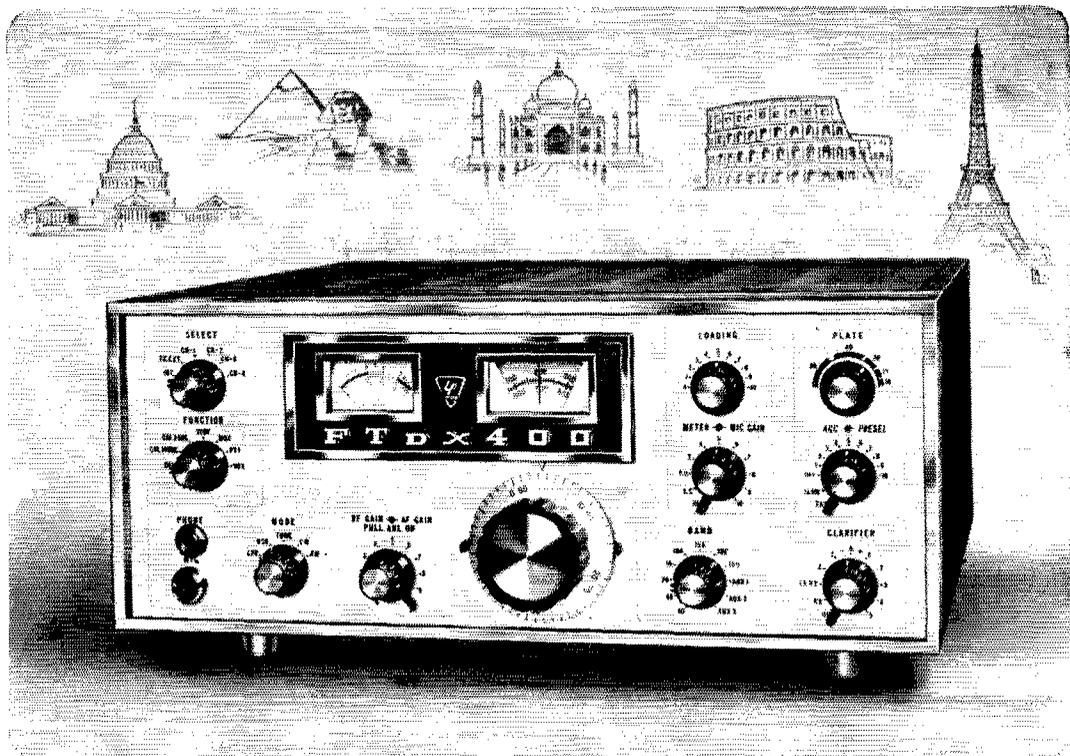
| Net  | Freq.    | Time       | Days  | Sess. | QNI | QTC |
|------|----------|------------|-------|-------|-----|-----|
| WFPN | 3957 kc. | 2300Z      | Daily | 31    | 767 | 114 |
| QFN  | 3651 kc. | 2330/0300Z | "     | 62    |     |     |

Pensacola: K4NMZ renewed OVS appointment. W4IZM is putting up a 60-ft. tower with TH-4 and 2-meter beams. Newly-licensed WN4JGY runs DX-40/HQ-110 and is a counselor at PJC. The Five Flags ARS sponsored an auction and swap shop. K4CFS is editor of the club's *Newsletter*. W4UUF reports several good 2-meter openings recently. Milton: WN4IYV just received his ticket. Fort Walton/Eglin AFB: W4LD went high power on 2 meters with an Ameco TX-62 and a v.t.o. The City of FWB donated its old police radio equipment to civil defense for 2-meter ham use. WB4GYX received net certificates for QFN and RN5. Panama City: W4AJM, W4VHW and W4RKH assisted in delivering an emergency message from Canada to a visitor in town. K4PTP is back home after retiring from the USAF. Four stations are on a.f.s.k. on 145.898 Mc. K4-VFY renewed appointment as ORS. W4A4MC is working on 2-meter f.m. gear. Chipley: W4TKB handled emergency traffic for the USS *Fandley* when the ship's regular radio went out. Tallahassee: W4JGD was appointed EC for Leon County. Madison: W4GHE is mobile on 2-meter f.m. Cross City: K1FVW/4 is building an 811A linear. Traffic: (Mar.) W7BNR/4 172, WB4DHZ 154, WB4GYX 54, W4BVE 31, W4JGD 28, W4AJM 24, W4-1KB 21, W4AEOQ 15, W4GHE 5. (Feb.) K4BSS/4 145.

## SOUTHWESTERN DIVISION

**ARIZONA**—SCM, Floyd C. Colyar, W7FKK—PAM: W7CAF. RM: K7NHL. Section nets: TWN on 3570 kc. nightly at 0300 GMT; Copper State Net on 3878 kc. Mon. through Fri. at 0200 GMT. Appointments: K7-RDH as OPS and W4TFD as ORS. W7EKE, ex-W9-ERU, now will be known as W7DI. Congratulations to all of our traffic stations on their fine work. All amateurs are invited to report monthly to their SCM via Form 1 report cards, available from Headquarters or your SCM for the asking. W4FNN, W4TFD, K7NHL and K7UYW are active on TWN. W7CAF is the first amateur in Arizona to become a Life Member of ARRL. Congratulations to DL6UK/W7 and his XYL on becoming U.S. citizens. Word has reached us that big things are planned for this year's Fort Tuthill Annual Arizona Statewide Hamfest, to take place July 26, 27 and 28 at the Coconino County Fairgrounds, near Flagstaff. Traffic: K7NHL 239, K7MITZ 98, W4TFD 44, W7FKK 7.

**LOS ANGELES**—SCM, Donald R. Etheredge, K6-UMV—The So. Calif. DX Club's 68 officers are W6FW, prexy.; W6FRZ, vice-pres.; W6DQX, secy.; W6EJJ, treas. The club meets the 1st Thurs. of each month at 7 p.m. at Clifton's Cafeteria, 648 So. Broadway, Downtown L.A. K6CPT sends code practice from San Gabriel on 145.3 and 29.63 Mc. at 8:30 p.m. local, 8-14 p.m. W6BTQS reports completion of requirements for his WAS and WAC. K6EA will be AIM for a couple of months. K6HZU is



## TOMORROW'S TRANSCEIVER TODAY BY YAESU

# FTdx-400

Latest arrival on the American scene, Spectronics presents the FT dx 400. Yaesu engineers have looked into the future to provide the present day amateur with a complete station in one package.

The usual "accessories" are standard equipment in the FT dx 400. Features built-in power supply, dual calibrators—100KC and 25KC, break in CW with sidetone, fully adjustable VOX system, four switch selected crystal controlled transmit channels in addition to VFO positions, and varactor controlled clarifier offers receiver offset tuning capability.

Remember, all these extras are included in this new imported transceiver. Check the specs and ask your local dealer for a demonstration dx trip with the FT dx 400.

**\$599.95** including power supply and all accessories except speaker.

SP-400 matching speaker **\$14.95**

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### SPECIFICATIONS

**FREQUENCY RANGE:** 3.5-4Mc, 7-7.5Mc, 14-14.5Mc, 21-21.5Mc, 28-30Mc (3 more 500KC receiver bands can be added).

**FREQUENCY STABILITY:** Less than 100 c/s drift in any 30 minute period after warm up.

**ANTENNA IMPEDANCE:** 50 to 120 ohm unbalanced.

**MAXIMUM INPUT:** 500W P.E.P. SSB, 440W CW, 125W A.M.

**CARRIER SUPPRESSION:** —40db

**SIDE BAND SUPPRESSION:** —50db (at 1,000 c/s)

**DISTORTION PRODUCT:** Down at least 25db

**AUDIO BANDWIDTH:** 300-2,700 c/s

**RECEIVING SENSITIVITY:** 0.5uV, S/N 20db (14Mc SSB)

**SELECTIVITY:** 2.3Kc (—6db), 3.7Kc (—55db)

**IF AND IMAGE RATIO:** More than 50db

**AUDIO OUTPUT:** 1 watt @ 5% distortion

**OUTPUT IMPEDANCE:** 8 ohm, 600 ohm

**TUBES AND SEMICONDUCTORS:** 18 tubes, 9 transistors and 33 diodes

**POWER SOURCE:** AC 117 volts, 50/60 c/s

**DIMENSIONS:** 15 $\frac{3}{4}$ " wide x 6 $\frac{1}{4}$ " high x 13 $\frac{3}{4}$ " deep

**WEIGHT:** 50 Pounds



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### FREE STANDING TOWER.

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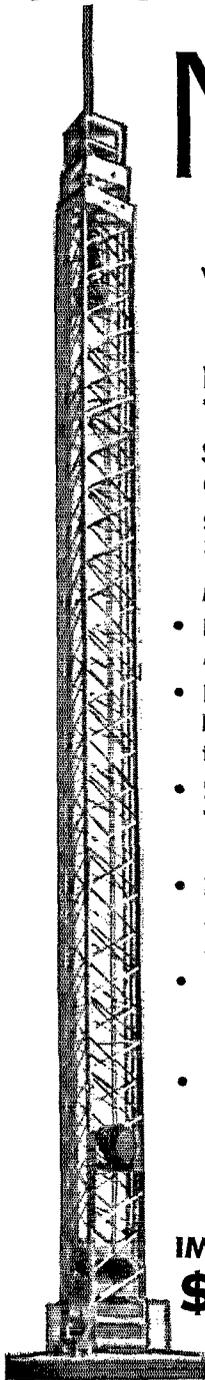
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- FREE: RIGID BASE MOUNT
- PRE-DRILLED TOP PLATE — For TB-2 thrust bearing.
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- EASY MAINTENANCE — No guys or house brackets needed.
- RISES TO 51 FT. — Nests down to 21 ft.
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now W6FW; W6PCP is now K6CL and just got a Section Net certificate. Congrats, Ed! WN6ZAS has a new antenna installation, thanks to W6TXJ. WB6OUD had 80-meter antenna troubles but is now back in business. K6-QPH/7 ran up a 140K score recently in a CD Party from Wyoming. WB6ZQK sports a new Swan 500 addition. WB6ZQK's XYL is WN6WGC and their daughter, WB6-WGG, passed the General Class 6 days after her 10th birthday! San Gabriel Valley AREC members recently provided communications for a La Puente parade. Participating AREC f.m. operators included Net Control WA6-JXG and W6YAN, K6LGR, WA6s BAE, CDR, FNT, KLA, QZY, WB6s HMM, IQT, LOY, LXP, MYD, OCA, PQV, SCR, URW and ZRK. AREC handled parade information while the local RACES group worked traffic control. The Federal Communications Commission location recently changed. The new address is F.C.C., Room 1758, 312 North Spring St., Los Angeles, Calif. 90012. Phone is 688-3276. W6MIN has begun work on a solid state modular receiver and exciter. WB6VZD is working on a 3-band quad. Our most recent OVS, WA6FRA, passed his 1st-class radiotelephone license and also finished up a power supply for his ATV sync. generator. WB6GHB expects to do work on a 220-Mc. walkie-talkie shortly. Los Angeles City Amateur Radio Club, K6RCC, and the West Valley Amateur Radio Club are new ARRL affiliated Clubs. Congratulations! A new SCN member is WB6-YHD. WB6LAL recently passed away. Everyone is making final preparations for Field Day locally. Remember the extra bonus for sending a message to the SCM (see page 6). The Southern Calif. Net meets at 7 p.m. local time on 3600 kc and 9:30 p.m. local time. All section amateurs with v.h.f./u.h.f. gear are requested to participate in the June ARRL V.H.F. Contest June 8 and 9. Traffic: (Mar.) W6GYH 1074, WB6CGL 907, W6-MLP 530, WB6BBO 329, W6QAE 296, WA6KZI 188, K6CDW 177, W6DSC 118, W6OEO 83, WB6TQS 60, WB6OLD 54, WB6K GK 38, WB6SCK 38, W6BHG 31, WB6YHD 29, K6EA 27, W6USY 25, W6PCP 23, K6UMV 21, W6FD 17, WB6THF 16, W6HUF 15, WB6AEL 13, W6MN 12, WB6WDS 11, W6AN 10, K6ASK 10, WB6-SXY 10, W6DQX 8, WB6SLG 8, W6DGH 5, WB6TMC 5, W6TN 4, W6TXJ 4, WB6VZD 4, W6RCV 1. (Feb.) W6-MLZ 26, K6EA 18, WB6K GK 15, WA6WKF 6. (Jan.) W6QAE 348, W6DSC 188, K6QPH/7 21, WA6WKF 5. (Dec.) W6OEO 146, WA6WKF 114. (Nov.) WA6WKF 27. (May) W6DSC 98.

**ORANGE**—SCM, Roy R. Maxson, W6DEY—WA1JHZ/6, asst. net mgr. for SCN, passed the Advanced Class exam last Feb. in Boston and heads back for Westover AFB in mid-June. EC WB6RVAI's new QTH is 9802 Chanticleer Rd., Anaheim, 92804, phone 635-7067. New officers of the Automotives Radio Club are WN6YWT, pres.; W6DLE, vice-pres.; WB6RWX, treas.-bus. mgr.; W6-HDP, secy.; K6DJR, mgr.-technical; WA6ROF, mgr.-pub. svc. The club station is applying for MARS affiliation. W6GB, ex-K6GMA, is very active now on 75 meters. K6BI is working to effect liaison between NTS

### Back Copies and Photographs

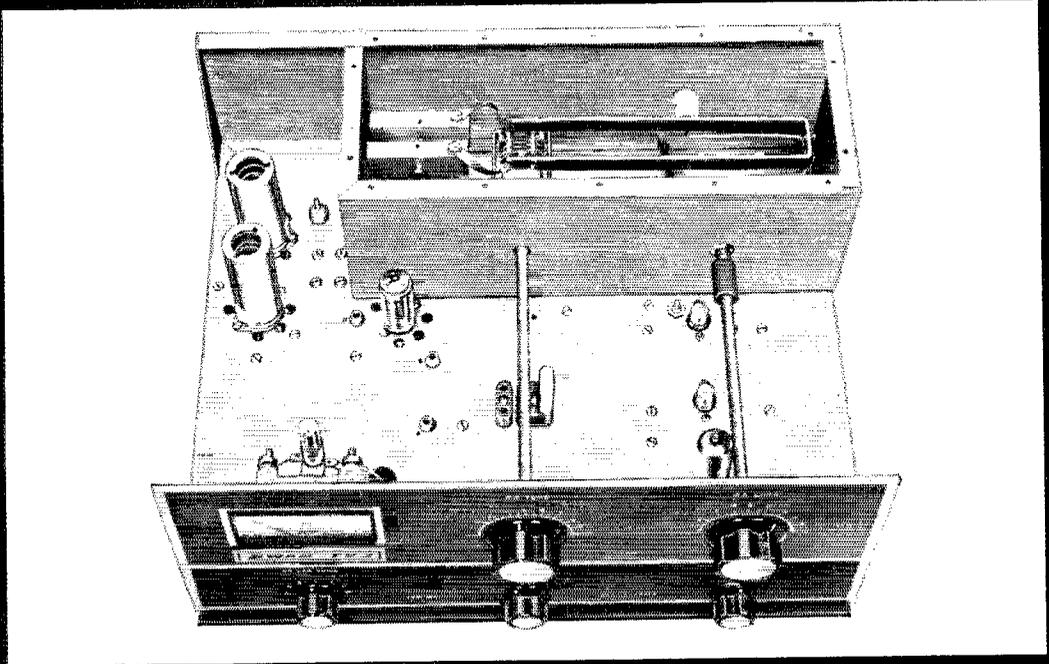
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# 2 METER SINGLE SIDEBAND

## 144-148 mc 240 WATTS P.E.P. INPUT



## THE NEW SWAN TV-2 TRANSVERTER

A receiving and transmitting converter for the 2 meter band, designed to operate with Swan Transceivers, models 250, 350, 350-C, 400, 500, and 500C.

### SPECIFICATIONS:

14 mc intermediate frequency is standard. Thus, when operating the Transceiver from 14 to 14.5 mc, the Transverter functions from 144 to 144.5 mc. Additional crystals may be purchased and switched in for other portions of the 2 meter band, such as 144.5-145, and 145 to 145.5 mc. Three crystal positions are available.

Alternately, the TV-2 Transverter may be ordered for an I.F. in the 21, 28 or 50 mc bands, if desired. Of course, for use with a Swan 250 six meter transceiver, the Transverter must be ordered for 50 mc. Otherwise, the standard 14 mc I.F. is recommended since bandwidth and frequency read-out will then be optimum. The Transverter can easily be adjusted in the field for a different I.F. range, if required.

A 5894 B Power Amplifier provides a PEP input rating of 240 watts with voice modulation. CW input rating is 180 watts, and AM input is 75 watts.

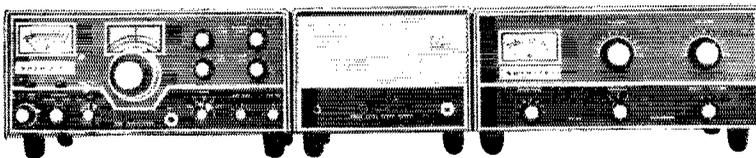
Receiver noise figure is better than 3 db, provided by a pair of 6CW4 nuvistors in cascode.

Only a Swan Transceiver and Swan AC power supply, Model 117-XC, are required. The power supply plugs into the Transverter, and the Transverter in turn plugs into the Transceiver. Internal connections automatically reduce the power input to the Transceiver to the required level.

Tube complement: 5894B Pwr. Amp., 5763 Driver, 12BY7 Transmit Mixer, 2N706 crystal osc., 6EW6 Injection Amp., 6CW4 1st rec. amp., 6CW4 2nd rec. amp. in cascode, 6HA5 rec. mixer.

The Swan TV-2 may also be operated with other transceivers when proper interconnections and voltages are provided. A separate Swan 117-XC power supply will most likely be required.

Dimensions: 13 in. wide, 5½ in. high, by 11 in. deep.  
Weight: 13 lbs. **\$265**



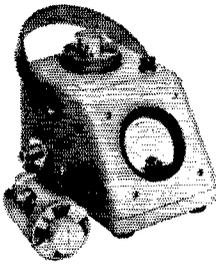
MODEL 250 ..... \$325  
MODEL 350C ..... 420  
MODEL 500C ..... 520

MODEL 117-XC  
AC POWER SUPPLY .. \$105

MODEL TV-2  
144 mc TRANSVERTER



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## Reads both forward and reflected power on 50 ohm lines

- 10 plug-ins, each with 4 power ranges
- Ranges of 2 to 1000 MHz, 1 to 5000 w
- Selector knob reverses power measurement
- Direct-reading VSWR scale
- Quick-changing "Twist-Off" connectors
- Plug-ins easily recalibrated in the field

Connect Sierra's Model 164B In-Line R-F Wattmeter directly into your transmission line. Read power delivered to or reflected from the load by a simple twist of the selector knob. No need to reverse r-f connections. Read VSWR directly on the calibrated meter.

Each of Model 164B's ten plug-in elements has four switch-selectable power ranges. A simple field adjustment calibrates each with factory precision.

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and NAV MARS traffic. W6FB, ARRL since 1921, had as March visitors W6DLA and K6SMN. W6WRJ changed cars and shelved mobiles temporarily. W6RUK still is operating mobile but working on permanent antennas. K6BNS is now a Silent Key. He will be missed by all, especially those operating on the 2-meter band. Please note that the Southwestern Division Convention is being held at Phoenix on the Labor Day week end, Aug. 31, Sept. 1, 2. Do not miss this one! C U there. Traffic: (Mar.) WB6TYZ 351, K6QEH 202, WB6DTC 169, WB6UCK 111, WA6ROF 107, WB6JFO 39, WB6RVM 37, K6IAE 22, W8RI, W6 18, W6WRJ 15, W6FB 4, W6RUK 1. (Feb.) WB6JFO 110.

**SAN DIEGO**—SCM, James E. Emerson, Jr., WB6GAM—The 10-meter section of the San Diego ARPS Net meets Tue. at 1900 local on 23,585 Mc. W6ZWF reports good DX on 10 with his new beam. K6BTO is using a Channel 9 TV Yagi cut to 222.5 Mc. and mounted for vertical polarization. WB6NMT got into Stockton, 460 miles, with his homebrew 4-watt solid state 2-meter rig. San Diego's Globe Trotter, W6FAY, just back from So. Viet Nam, says he's home to stay. W6QJ and his XYI are off to Europe, where Steve intends to excite many of his DX friends. Look for W6JJO in VE7-Land this summer, and maybe KLY-Land. Your SCM was given a complete guided tour of League Headquarters and WIAW by WINJA during a recent visit. W6LRU is now mobile on both 40 and 80 meters. ORS WA6QAY can be heard putting out bulletins daily at 0230 (GMT) on 3600 kc. with his Apache. We understand WB6PFO almost forgot how to spell his name, but passed the Extra Class exam anyhow. A new member of the Palomar Radio Club is WN6BZK. The North County frequency of 3920 kc., at 2100 local daily, is turning into almost an all-county meeting place. Good luck to all clubs in the coming Field Day. Your SCM will be on the San Diego ARPS Net Sun. morning, looking for FD traffic. Traffic: K6BPT 9125, W6EOP 500, W6VNO 469, W6BGF 318, K6CAG 244, W6SE 235, W6LRU 148, WA6QAY 59, WB6UMT 46, W6QJW 37, K6EAV 23, W6YKF 17, WB6PFO 11.

**SANTA BARBARA**—SCM, Cecil D. Hinson, WA6OKN—SEC: K6GV. W6ORW has new 2-meter equipment and hopes to be on the air soon. Checking into the Mission Trail Net from Ventura are K6EVQ, W6ORW (Stim), K6QXG and WA6RNE. The 3895 gang is assisting in the installation of a Hy-Power for WN6ZWM, who may be remembered as T19A. WA6JBE is back at work after the operation and a couple of weeks sick time. The WA6OKN/WN6ZWM ham station aboard the schooner *Swift* has returned to Santa Barbara after 3 months exposure to salt water. W6KZO has a new Swan 500 but is talking about a KWM-2. WB6DPV has his station moved to college and racked up 13,000 points in the C.W. DX Contest. K6GV is moving to the beach and has purchased a new cliff dweller for the installation. NE1PGR, of the *Aventura*, is on a year-long trip around the world and was a recent guest in the home of WN6ZWM. Traffic: W6ORW 15, WB6DPV 10, WB6BWZ 2.

### WEST GULF DIVISION

**NORTHERN TEXAS**—SCM, L. J. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYL. PAM: W5BOO. RM: W5LR. Occasionally I hear of some amateur who has failed to observe Safety First precautions and as a result we have another Silent Key. I would like to add another precaution to the many Safety First rules. If you have a history of high blood pressure or a heart condition, do not take chances by climbing towers or exercising that would put a strain on the heart. This warning is directed especially to you who are over 60 or in some cases over 50 years of age. I regret to inform you of the passing of W5SH, an old-time ham, who had high blood pressure and found it necessary to climb his 50-ft. tower to change his rotor. He used his safety belt and had a stroke while working on the rotor. The Fire Dept. was called to remove him from the tower but, unfortunately, was too late. Ed was very active in both local and DX work. By the time you read this you will probably be on the way to the West Gulf Convention at the HemisFair in San Antonio. I hope you made reservations in time to take part in this joint national and regular West Gulf Convention. Some thought should be given to the Election Notice in Apr. *QST*. The deadline for nominations for SCM of the Northern Texas section is July 10. As of Sept. this year I will have been your SCM for ten years and I expect to retire from my job with the Telephone Co. in March, 1969. I would appreciate it if you would give some thought to my successor. I appreciate your cooperation but my health is such that I can not continue to do justice to the responsibility of the office. Traffic: K5BNE 431, K5LZA 61, W5HYV 39, WA5TYH 39, W5PBN 33, WA5QJR 29, W5JSM 17, WA5QQQ 9, K7NCG/5 8, W5BNG 6.

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Combining maximum strength with optimum electrical performance, this 10.0 db gain antenna meets the increasing demand for rugged durability at minimum weight. Cat. No. 465-509, has a reflector 55 in. by 29 in., yet weighs only 20 lbs. Its rated wind velocity is 150 mph. The radiating element material is brass, reflector screen components are of high strength aluminum alloys, and mounting accessories are fabricated of hot galvanized steel. This CPC Corner Reflector Antenna is ideally suited for use in multiple corner arrays.

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# Corner Reflector Antenna

**Cat. No. 465-509**

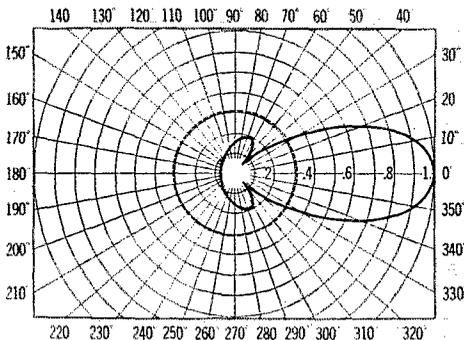
**Frequency Range 406-470 Mc**

### Electrical Specifications

|                         |                                                                               |
|-------------------------|-------------------------------------------------------------------------------|
| NOMINAL INPUT IMPEDANCE | 50 ohms                                                                       |
| FORWARD GAIN            | 10.0 db at 450 Mc                                                             |
| FRONT-TO-BACK RATIO     | 25.0 db                                                                       |
| MAXIMUM POWER INPUT     | 250 watts                                                                     |
| TERMINATION             | Type N Female with metal weather shield and Type N Male with Neoprene housing |
| VSWR                    | 1.5:1                                                                         |
| BANDWIDTH               | 406-470 Mc                                                                    |
| LIGHTNING PROTECTION    | Direct Ground                                                                 |

### Mechanical Specifications

|                              |                                                                 |
|------------------------------|-----------------------------------------------------------------|
| REFLECTOR                    | 55" wide by 29" high                                            |
| REFLECTOR MATERIAL           | 6061-T6 aluminum                                                |
| RADIATING ELEMENT MATERIAL   | Brass                                                           |
| RADIATING ELEMENT SIZE       | 13-1/4" long by 2" wide                                         |
| RATED WIND VELOCITY          | in excess of 150 MPH with no ice<br>85 MPH with 1/2" radial ice |
| LATERAL THRUST AT RATED WIND | 164 lbs. no ice<br>180 lbs. with rated ice load                 |
| WEIGHT                       | 20 lbs.                                                         |

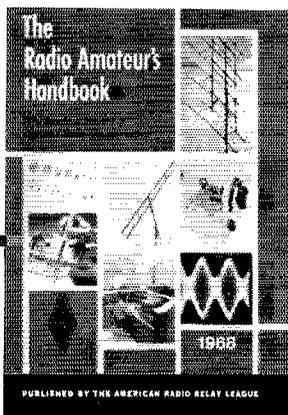


Horizontal field strength pattern; a dipole pattern is shown for reference.

Note: dbd gain indicated  
as per EIA RS-329



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**OKLAHOMA**—SCM, Cecil C. Cash, W5PML—SEC: WA5AOB, RM: W5QMJ, PAMS: W5MFX, 75: K5TEY, 40: WA5JU, 6: K5ZCJ, 2 meters. Congratulations to Extra Class ex-W5FEC, now W5FV, Other known two-letter calls recently issued from the Oklahoma City area are ex-W5MKW, now W5DV, and ex-W5BRN, now W5FF. The 4th Army Area MARS Net makes it real convenient for yours truly to arrange schedules after duty hours with Fort Polk, La., to talk to our son, who is taking his boot camp training there. The incentive licensing program is taking hold here very well. The Aeronautical Center Amateur Radio Club, FAA Center, Oklahoma City, has for some time conducted courses for all classes of advancement. The Lawton-Fort Sill Amateur Radio Club, Inc., started classes right after Easter. WA5DZP reports the boys around Ada also are studying hard. It is reported that K5KHA had some station damage because of a strike by lightning but it was not serious. Congratulations to W5PWG upon receiving Award No. 25 for 2500 counties worked. Congratulations to WA5NRJ who, after several tries, finally passed the General Class exam. Section net reports of NTS:

| Net  | Freq.(kc.) | Time (Z)    | Sess. | QNTs | QTCs | Mgr.   |
|------|------------|-------------|-------|------|------|--------|
| OLZ  | 3682.5     | 0100        | 19    | 91   | 26   | W5QMJ  |
| SSZ  | 3682.5     | 0345        | 9     | 42   | 22   | W5QMJ  |
| OPEN | 3850       | 1400 (Sun.) | 5     | 269  | 13   | WA5AOB |
| STN  | 3850       | 2330        | 26    | 843  | 147  | W5MFX  |
| OPON | 3920       | 2300        | 21    | 208  | 41   | WA5KZA |

Traffic: K5TEY 1807, W8VDA/5 130, W5QMJ 71, WA5AOB 69, W5MFX 48, W5PML 43, WA5KZA 38, K5SWL 35, K5DLP 22, WA5KFT\* 19, K5CAY 9, K5OCZ 8, WA5IMO 7.

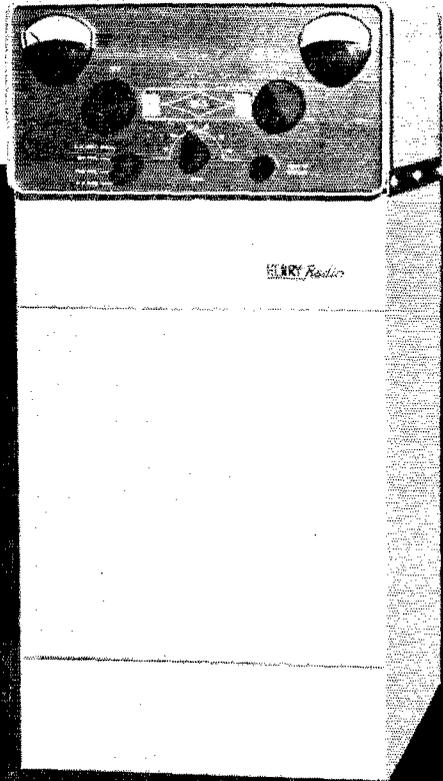
**SOUTHERN TEXAS**—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG, PAM: W5KLV, RM: W5EZY, WA5RXC, has been appointed EC for Brazos County, W7WAH/5, WA5MXY, W5EZY, W5ABQ, WA5MBC, WA5GZX, K2EIU/5, W5QJA, WA5INZ, W5KPB and K5DBJ all received Net certificates for their participation in c.w. traffic nets during 1967. The *Texas RACES Bulletin* advises that the tornado season is with us again. Texas had 232 tornadoes last year. *Be sure your emergency power is in working order.* EC W5DAA reports a new tri-band beam and tower going up and K5LGO has a new kw. linear, WA5QKE has been plagued with rig trouble but thinks it's all fixed now. He has a new Heath keyer, K5LQJ is looking for portable f.m. handsets. If you know of any get in touch with K5LQJ, care of W5AC, W5ABQ advises that San Antonio now has a QCWA chapter. For information, contact W5EDX, SEC K5QQG spent a week in the hospital for minor surgery on his eye but will be back in circulation soon. The Port Arthur and Beaumont ARC's made their annual journey to De Ridder, La., via railway Mar. 24. EC W5TFW says this probably will be the last trip as the train is being discontinued. K5HZR, EC Bexar County, says watch for W5AC. The San Antonio ARC station started operation from HemisFair Apr. 6, 1968. Great plans have been made for the 1968 National Convention. See you all there June 7-9. K5WYN traveled in Missouri during April. According to the *W3MS Bulletin* the Corpus Christi ARC is starting code and theory classes for prospective amateurs. WA5MBC has a new Micro TO keyer. It sounds good on TEX and Navy MARS. The Houston ARC had a good turnout for Old Timers Night. New officers of the HARC are WA5JDI, pres.; WA5IRD, secy.; K5CUY, vice-pres.; W5JVR, program chairman; W5WVR, treas.; WA5FJM, membership. Traffic: (Mar.) WA5MBC 102, WA5QKE 93, K5HZR 80, W5EZY 55, W5AC 54, WA5LVJ 46, W5TFW 45, W5KLV 36, W5ABQ 33, K2EIU/5 32, WA5JQL 30, W5BGE 28, K5WYN 12, W5AIR 8. (Feb.) W5AC 74, WA5MBC 27.

## CANADIAN DIVISION

**ALBERTA**—SCM, Harry Harrold, VE6TG—SEC: VE6FK, PAM APSN: VE6ADS, ECs: VE6SA, VE6SS, VE6XC, VE6PL, VE6AFQ, ORSs: VE6BR, VE6ATH, VE6ATG, OPSs: VE6HM, VE6SS, VE6ATH, VE6AFQ, OO: VE6HM, VE6TY, OPSs: VE6HM, VE6AIF, VE6VU is trying very hard to make it interesting for the members of the NARC with lots of activities, such as transmitter hunts, bunny hunts, homebrew awards, BO BO awards, president's award and dances with Klondike garb. In Calgary the CARA still is running the Stampede and Booster awards and also is having some interesting meetings, with a class coming up for exams. The Vulcan radio club held a *big big* banquet in April. Also another class is ready for exams. The ARLA soon will elect its new directors. The International Hamfest is shaping up very nicely. Don't forget to make your own camping arrangements and don't forget the dates, July 20 and 21. The Border Area Club is doing the cooking for this with the Vulcan Club on communications, the Lethbridge Club on location and the ARLA with Cal-

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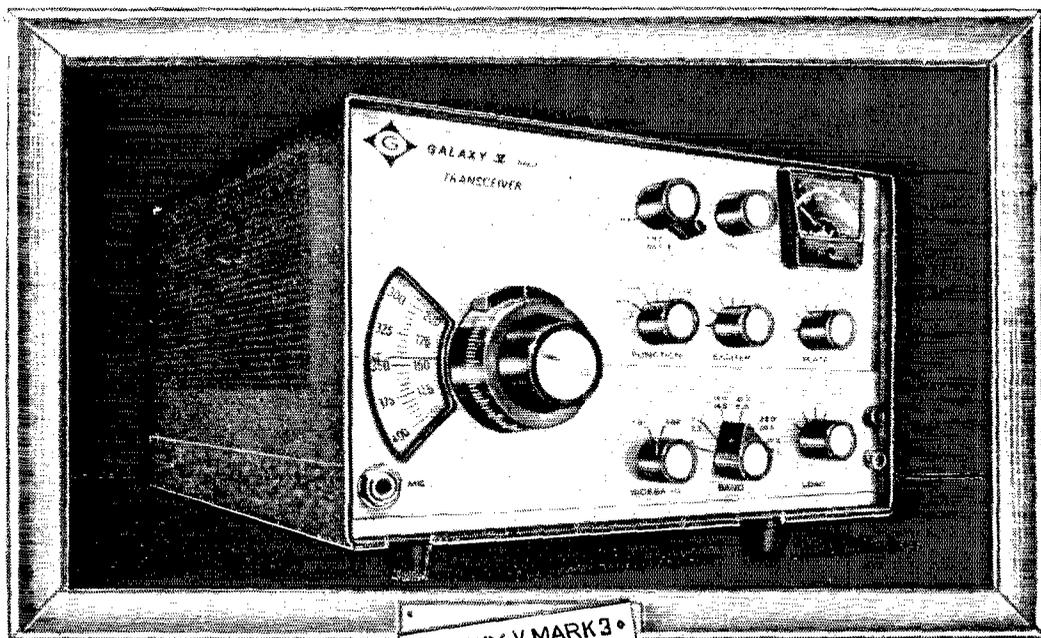
gary and Edmonton on the rest of it. Traffic: VE6HM 67, VE6ATH 42, VE6ATG 38, VE6A00 13, VE6SS 7, VE6AFQ 4, VE6FS 4, VE6KS 4, VE6FK 3, VE6HF 2, VE6H 1.

**BRITISH COLUMBIA**—SCM, H. E. Savage, VE7FB —VE7BHH is operating RTTY and is interested in knowing of others in Canada who are. Please write. VE7BLO is well on his way with WAS-Wns, The BCEN, BCEN slow-speed net meets on 3650 kc, at 0400 GMT. Everyone is welcomed. Appointments: VE7ZK as ORS, Herb's old call was VE7AEU, VE7AC will be operating a transistor c.w. rig. VE7BVG/W7 spent a week end here at VE7FB's and let VE7FB operate s.s.b. ORS VE7BQA writes that he is one of the disappearing breeds of Morse operators (ex-Navy and ex-Marconi) who used to handle mountains of traffic on point-to-point circuits. The Royal City ARA has completed its Centennial Project. The club requested and received all the QSL cards from the B.C. Section Bureau, which totaled thousands. All are now delivered. The BCARA Centennial QSO Contest, the Dogwood Trophy, a local cedar tray with the B.C. dogwood design and plaque, was awarded to W8AJW. Many certificates also were won. Traffic: VE7BHH 146, VE7FQ 79, VE7BQA 61, VE7BLO 44, VE7AC 30, VE7BLS 17, VE7ZK 16.

**MARITIME**—Acting SCM, William J. Gillis, VE1NR —Asst. SCM: R. P. Thorne, VO1EL, SEC: VE1HJ. Highlight of recent activities was the visit of Director VE3CJ to clubs and individuals in VE1- and VO1-Land. One point of interest during the trip was a visit to historic Signal Hill, St. John's, Newfoundland, the site of Marconi's reception of the first trans-Atlantic radio signals. During a recent fire in Twillingate, Newfoundland, which threatened loss of the local telephone office, VO1EF maintained on-the-air contact from the community until the emergency was over. VE1AK is on the air with RTTY. The P.E.I. gang is currently publishing a provincial bulletin. VE1MX is now settled in Pointe Claire, Quebec, and expects to be on the air again. We urge all amateurs to write the local Member of Parliament and Minister of Transport protesting the recently authorized increase in license fees. Traffic: VE1-AMR 88, VE1ABS 18, VE1OM 4.

**ONTARIO**—SCM, Roy A. White, VE3BUX—AREC Asst. National Coordinator: VE3YC, PAMs: VE3ETM, VE3BLZ, RMs: VE3BZB, VE3DPO, VE3EBH. It was sad to hear of the passing of VE3IA, Eric was a past SCM. About the hottest thing at the moment is the 400% increase in license fees, effective Apr. 1. Telegrams, letters, petitions and deputations are the order of the day. The comments were so hot that the power transformer on the transmitter of VE3CJ, our Canadian Director, gave up the ghost. VE3BVM is being moved to Saskatchewan and his loss will be felt. VE3PY is sporting a new SB-200 lineer. VE3BST is now VE3LX and VE3BOR has been visiting VP9-Land. VE3LM, VE3CT, VE3CDG and VE3PY are handling lots of traffic from VE8-Land. VE3CO is running a new 2000A. Congrats to VE3FZM and VE3FVZ on receiving their WAC awards. The Scarboro ARC is looking for man-power (or gal-power!) to operate VE3CNE Aug. 15 to Sept. 2. Any takers? It doesn't look as though we will have an ARRL convention in Ontario this year but we may have time and space at the RSO "Do" in Brantford Nov. 1 and 2. VE3BBQ is busy pounding brass these days. VE3DJK is back after a holiday skiing and then down to the Sunny South. Your SCM wants to visit as many clubs as possible but please, fellows, give me as much advance notice as possible. If you are looking for that long-awaited QSL card, it could be resting with VE3UW. Russ runs the QSL Bureau so send him a large size SASE and see what happens. VE3EBH and VE3BY are back from a trip to Blighty. Good luck to the fellows pressing the Ontario Govt. for call-letter license plates. The North-West Phone Net meets daily at 0015Z on 3.75 Mc. Congrats to VE3GMQ on making the RPL and a special thank-you to VE3GT and VE3DMU for agreeing to act as liaison between the Ontario Phone and ECN Nets. Nice to hear VE3BBT on s.s.b. with his new HW12-A. The Canadian Amateur Radio Teletype Group (CARTG) will sponsor the 8th World-Wide RTTY DX Contest in Oct. Exact date later. (See Feb. QST, page 65) Traffic: (Mar.) VE3DPO 90, VE3DV 70, VE3GI 88, VE3CCE 59, VE3EHL 37, VE3ATI 29, VE3AUU 23, VE3AWE 22, VE3BUR 18, VE3DU 18, VE3ETM 18, VE3BQL 12, VE3NO 10, VE3PWD 8, VE3WW 8, VE3GLD 6, VE3VD 5, (Feb.) VE3GMQ 141.

**QUEBEC**—SCM, J. W. Ivey, VE2OJ—SEC: VE2-ALE, RM: VE2DR, PAM (v.h.f.): VE2AGQ, PAM (h.f.): VE2BWL. We have an FC in all areas except two, Noranda and Gatineau. Here is the list: VE2AP (Quebec City), VE2BU (Pincoirt), VE2DK (Gagnon), VE2NT (West Sheffield), VE2WM (Mont Joli), VE2-ADE (Valleyfield), VE2AJD (Three Rivers), VE2ANH (St. Laurent), VE2AQI (Verdun), VE2AS (St. Barthelme), VE2ASP (St. Anselme), VE2RAI (Jonquiere), VE2BBY (Lennoxville), VE2BCB (Iberville), VE2BDU



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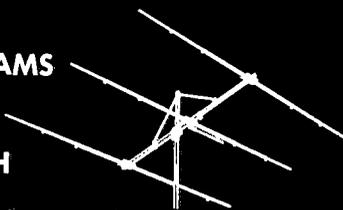
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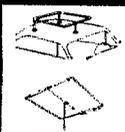
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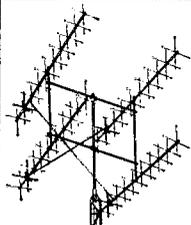
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(Sorel), VE2BKA (Ville d'Anjou), VE2BKR (Mont Gabriel), VE2BR0 (St. Jerome), VE2BTZ (Preville), VE2BWS (Cote St. Luc), VE2BVY (St. Hyacinthe), VE2BYS (Laval), VE2DDG (St. Marie de Beauce). The VE2UN (McGill U.) group has a new executive for 1968. Over the past two years we have been blessed with the excellent help of our SEC, RM and PAM appointees. We sincerely hope that the coming two years will be as well supplied with their fine talents. Thanks to VE2ASU, who sent the following: VE2AEM est le premier élève des cours du Radio Club de Québec (VE2CQ) à obtenir son permis d'opération. VE2CQ a l'intention d'aménager un kiosque au Congrès provincial; les amateurs de Québec désirent mettre en relief les grandes réalisations du radio club dans le domaine du 2 mètres. Traffic: (Mar.) VE2DR 91, VE2ALE 79, VE2BRD 56, VE2OJ 55, VE2AJD 36, VE2AE 34, VE2CP 29, VE2BVY 21, VE2BWL 21, VE2EC 19, VE2BGJ 11. (Feb.) VE2DCW 8.

**SASKATCHEWAN**—SCM, Gordon C. Pearce, VE5HP—You are reminded of the Saskatchewan Hamfest to be held in Saskatoon June 29, 30 and July 1 at the Bessborough Hotel. Make your reservations early. *The History of Amateur Radio* will be off the press and on sale at hamfest time. The Saskatoon Club is responsible for this great effort. Regina citizens by the thousands turned out night after night to search for a five-year-old boy who had disappeared. The lake was dragged and every foot of ground in and adjacent to the city was covered. A dozen or so Regina Amateurs turned out in their mobiles to provide communication for the effort. With the usual high interest and competition between the city clubs, together with several new and interesting rules, we expect a better-than-ever turnout for Field Day. Most of us in Canada are still trying to recover from the increase in amateur license fees. Maybe we should take the view that anything as good and as valuable as ham radio is worth paying for. Traffic: VE5HP 47, VE5LG 21, VE5BO 20, VE5LM 12, VE5HV 9, VE5TS 7, VE5EQ 6, VE5RE 6, VE5BD 5, VE5PZ 4, VE5TX 3, VE5FU 2, VE5IL 2, VE5PQ 2, VE5YR 2, VE5LK 1, VE5QN 1.

## A.R.R.L. QSL Bureau

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4 1/4 by 9 1/4 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—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, K4HXP, RFD 5, Box 804, Hickory, North Carolina.

WA4, WB4, WN4—Richard Tesar, WA4WIP, 2666 Browning St., Sarasota, Florida 33577.

W5, K5, WA5, WN5—Hurley O. Saxon, K5QVH, P.O. Box 9915, El Paso, Texas 79959.

W6, K6, WA6, WB6, WN6—San Diego DX Club, Box 6029, San Diego, California 92106.

W7, K7, WA7, WN7—Williamette Valley DX Club, Inc., P.P. Box 555, Portland, Oregon 97207.

W8, K8, WA8, WN8—Paul R. Hubbard, WA8CXY, 921 Market St., Zanesville, Ohio 43701.

W9, K9, WA9, WN9—Ray P. Birren, W9MSG, Box 519, Elmhurst, Illinois 60216.

W0, K0, WA0, WN0—Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minnesota, 55921.

VE1—L. J. Fader, VE1FQ, P.O. Box 863, Halifax, N. S.

VE2—John Ravenscroft, VE2NV, 353 Thorncrest Ave., Dorval, Quebec.

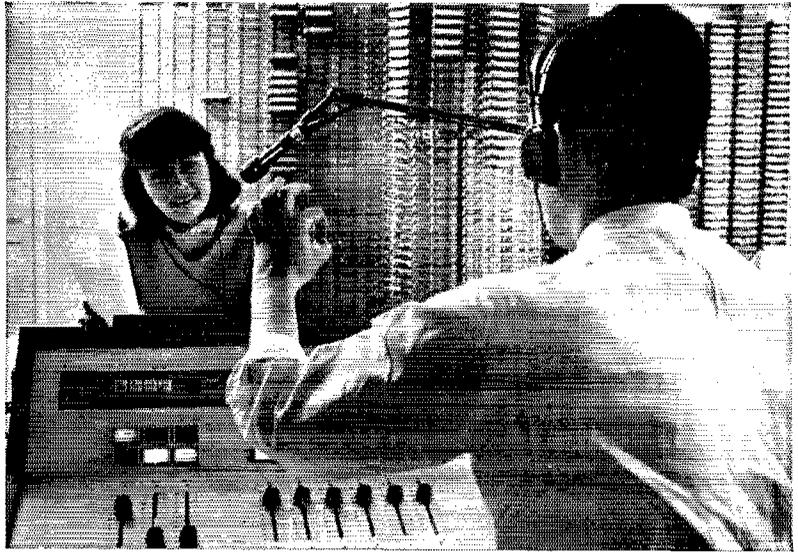
VE3—R. H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.

VE4—D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.

VE5—Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Saskatchewan.

VE6—Karel Teitelhaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.

*Performers appreciate the Broadcast Engineer's skill. He makes an important contribution to a smoothly-produced program.*



## HOW TO

# Get an Exciting Job "Inside" Radio or Television...as a Broadcast Engineer

**No college or high school diploma needed—just a Government FCC License. Here's how you can prepare in your spare time**

**L**OOKING FOR A JOB with more money and more excitement? Become a Broadcast Engineer!

When you work at a radio or TV station, you're where the action is. You're in on news as it breaks. You hear new records before they're released. You often know the behind-the-scenes stories of important events. You rub shoulders with famous people in show business, athletics and politics. And you may get to announce news or music and become a local celebrity yourself.

There are deeper satisfactions too. In emergencies you help save lives and restore order. During the great power blackout of 1965, radio helped prevent widespread panic.

Yes, broadcasting is exciting. And breaking into it is easier than you might imagine. Right now, there's a desperate shortage of broadcast engineers—a job that pays from \$185 to

\$215 a week at big-city stations once you have a little experience under your belt.

### All You Need Is a License

You don't need an engineering degree to qualify. You don't need a high school diploma. All you need is a Government 1st Class FCC License. If you have one, most stations will welcome you with open arms. In fact, *Radio-Electronics* magazine says: "If you can't get a good job with one...you'd starve to death in a candy store."

For some men, getting an FCC License is easy. For others it's hard. It depends on how much electronics you know when you take the licensing exam.

Our specialty is making it easy. For over 30 years, we've been teaching men electronics in their homes. No lost income—no classes to attend. Yet our graduates learn their electronics so well, 9 out of 10 pass the FCC exam. Without our training, two out of three men fail! For this reason we can back our license-preparation courses with our iron clad Warranty: Upon completion of your course, you must be able to pass the FCC exam...or your tuition will be refunded in full.

What makes our course so good? For one thing, we use AUTO-PROGRAMMED™ lessons. You build your knowledge of electronics the way you'd build a brick wall—one piece at a time. Each "piece" is small and easy to handle. And it rests securely on the pieces that came before it. It's easy to learn this way, even if you once had trouble with your studies.

And you get more personal attention than you might in a busy classroom. Your instructor doesn't merely correct and grade your

work—he analyzes your thinking to make sure you are staying "on the right track." Then he mails back your assignment the same day he received it, so you can read his notes and corrections while everything is still fresh in your mind.

### These 2 Free Books May Change Your Life

If you itch for a better-paying, more interesting job, the two books we offer may have your answer. One tells how to qualify for the many fabulous career opportunities in electronics. The other tells how to get your FCC License and break into broadcasting. Both are free. No obligation—just mail the coupon. It may be the turning point of your life.

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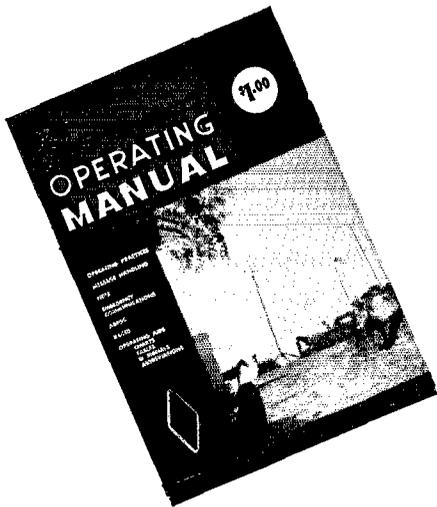


says Matt Stuczynski, senior transmitter operator, Station WBOE. "Even though I had only six weeks of high school algebra, CIE's AUTO-PROGRAMMED™ lessons make electronics theory and fundamentals easy.

After completing my CIE course, I took and passed the 1st Class FCC Exam. I now have a good job in studio operation, transmitting, proof of performance, equipment servicing. Believe me, CIE lives up to its promises. I really enjoy my work and I'm on my way up."

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VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.

VE8 — George T. Kondo, VE8 ARRL QSL Bureau of Department of Transport, Norman Wells, N.W.T.

VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.

VO2 — Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, Labrador.

KH6, WH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701.

KL7, WL7 — Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.

SWL — Leroy Waite, 39 Hanum St., Ballston Spa, New York 12020.

For other U.S. Territories and foreign countries, see the listing on page 80 of this issue.

† These bureaus prefer 5×8 inch manila envelopes.

## Silent Keys

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

W1BL, Raymond E. Boardman, Sudbury, Mass.  
W1BXU, William E. Goldthwaite, Concord, New Hampshire

W1YWQ, Robert D. Earle, E. Bridgewater, Mass.

W2CPO, Frank Roney, Sr., Waverly, New York

K2JTU, John S. Gaydoski, Clifton, New Jersey

K2SMV, Albert E. Bennett, Freehold, New Jersey

K2VPB, William E. Kane, Pittsford, New York

K2VUE, Florence G. Spennrath, New York, N. Y.

K2YWW, Clayton Smith, Somerville, New Jersey

W3KWL, Ernest J. Hinsky, Farrell, Pennsylvania

W3OQO, Robert J. Malone, Washington, D. C.

W4AGR, Forrest W. Dana, West Palm Beach, Fla.

W4AW, Theodore A. Sprink, Fort Lauderdale, Fla.

K4CRZ, Hershel Apple, Jr., Shelbyville, Tenn.

WN4INR, Robert E. Hawkins, Tampa, Florida

WA4MQF, George M. Fletcher, Alexandria, Va.

W4NTI, Howard L. Stewart, Chattanooga, Tenn.

WA4TPG, Eddie Chitwood, Memphis, Tennessee

K5AOS, Francis L. Dwyer, Paris, Arkansas

W5CE, George O. Welch, Houston, Texas

WA5MDX, Gus Levy, New Orleans, Louisiana

K6BNS, E. L. Wise, Fountain Valley, Calif.

W6DVV, Glen Alsbury, Dixon, California

W6EJL, E. M. "Brandy" Brandvig, Manhattan Beach, California

W6JRI, Dr. Elwood R. Eriksen, San Francisco, California

WB6LAL, Latham Pollock, Pacific Palisades, California

W6NCT, Henry H. Wilson, Santa Barbara, Calif.

WA6NSD, Daniel L. Sprague, Los Angeles, Calif.

ex-W6SNE, Harold "Hal" Babcock, Pasadena, California

W7AOJ, Mead S. Arbogast, Hereford, Arizona

W7QZF, Samuel H. "Chick" Foster, Seattle, Wash.

W7ZJM, Delbert E. Luhn, Longview, Washington

W8AJB, Herbert H. Reed, Maniton Beach, Mich.

W8IAU, Adrian H. Lagedrost, Hamilton, Ohio

W8ILAI, John V. Lembas, Warren, Michigan

ex-W8NKN, Marden Lacey, Milford, Michigan

K8ONZ, Russell L. Miller, Cleveland, Ohio

K8UBU, Charles West, Owosso, Michigan

W8ZTU, Earl A. Parker, Detroit, Michigan

W9CGY, Clarence J. Haltzman, Waukegan, Ill.

W9ITD, Ralph Block, Waupaca, Wisconsin

K9OUF, Gene L. Howard, Oshkosh, Wisconsin

WA9PYU, Leonard J. Sheean, Indianapolis, Ind.

K9UIV, Wilbur L. Cox, Anderson, Indiana

W9VGD, Richard Haynes, Hartford City, Ind.

K0AAB, Warren T. Rogers, St. Paul, Minn.

K0EPH, Dr. James H. White, Greeley, Colo.

K0JTM, Warren Liljegren, Des Moines, Iowa

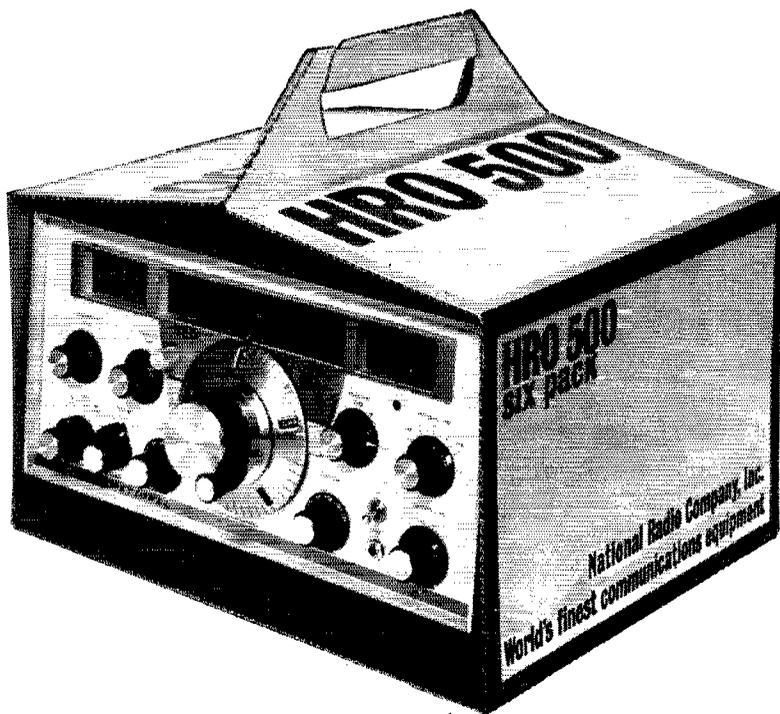
W0QIE, Derril Hundley, St. Paul, Minnesota

HK7PH, Eugenio Penagos, Miami, Florida

VE7AHP, Les A. Payne, Vancouver, B. C., Canada

VE7RT, E. Brian Stevenson, Vancouver, B. C., Canada

# six pack



National offers six of the world's finest receivers to meet *your* particular requirement.

Receiver number one provides greater amateur band performance and features than any amateur receiver ever built. ■ Receiver number two has the widest frequency range (from 5 Kc to 30 Mc) of any general coverage communications receiver ever built for lab or commercial application. ■ Receiver number three is *completely* solid-state for high reliability, versatility and portability. It operates from 12/24 V.D.C. or 115/230 V.A.C. This receiver draws less current than a couple of dial lamps (when its dial lamps are switched off), and provides instant-on operation. ■ Receiver number four incorporates specific features for high selectivity and has a six-pole filter to provide built-in steep-skirted 500 cps, 2.5 Kc, 5.0 Kc, and 8 Kc bandwidths with *passband tuning* for CW and SSB. Also *AGC threshold control* to knock out background QRM. Also a 50 db notch filter. ■ Receiver number five has a phase-locked frequency synthesizer to replace conventional high frequency oscillator crystals for superior stability and over-all calibration. ■ Receiver number six offers frequency meter performance with 1 Kc dial calibration and accuracy over its entire tuning range, 24 feet of bandspread per megacycle, and 10 Kc per turn tuning rate.

Each of these receivers is called the HRO-500. National's new HRO-500, at \$1675, is the finest *total* receiver you can buy . . . at any price. Interested in trying out National's new sixpack? See your National dealer for an opener.

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## TOROID CORES

Red "E" Cores-500 kHz  
to 30 MHz-  $\mu = 10$

| #       | OD    | ID    | H    | EACH   |
|---------|-------|-------|------|--------|
| T-200-2 | 2.00" | 1.25" | .55" | \$3.00 |
| T-94-2  | .94   | .56   | .31  | .75    |
| T-80-2  | .80   | .50   | .25  | .60    |
| T-68-2  | .68   | .37   | .19  | .50    |
| T-50-2  | .50   | .30   | .19  | .45    |
| T-37-2  | .37   | .21   | .12  | .40    |
| T-25-2  | .25   | .12   | .09  | .30    |
| T-12-2  | .125  | .06   | .05  | .25    |

Yellow "SF" Cores-10 MHz  
to 90 MHz-  $\mu = 8$

|        |      |     |     |     |
|--------|------|-----|-----|-----|
| T-94-6 | .94  | .56 | .31 | .95 |
| T-80-6 | .80  | .50 | .25 | .80 |
| T-68-6 | .68  | .37 | .19 | .65 |
| T-50-6 | .50  | .30 | .19 | .50 |
| T-25-6 | .25  | .12 | .09 | .35 |
| T-12-6 | .125 | .06 | .05 | .25 |

Black "W" Cores-30 MHz  
to 200 MHz-  $\mu = 7$

|         |      |     |     |     |
|---------|------|-----|-----|-----|
| T-50-10 | .50  | .30 | .19 | .60 |
| T-37-10 | .37  | .21 | .12 | .45 |
| T-25-10 | .25  | .12 | .09 | .40 |
| T-12-10 | .125 | .06 | .05 | .25 |

FERRITE BEADS: .125" x .125",  $\mu = 900$ . With Spec Sheet & Application Notes Pkg of 12, \$2.00

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## AMIDON ASSOCIATES

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formerly

Ami-Tron Associates

## Recent Equipment

(Continued from page 43)

on the tuning knob is adjustable by a lever. If desired, the friction can be increased to the point of locking the control.

On the inside, about 75 percent of the components are on etched circuit boards. The majority of components on these boards are plainly labeled with numbers corresponding to those in the circuit diagram.

### Performance

Important manufacturer's specifications are as follows:

Receiver sensitivity — 0.5  $\mu\text{v}$ . s/n 20 db.,

14-Mc. s.s.b.

Receiver selectivity — 2.3 kc. at — 6 db.

— 3.7 kc. at — 55 db.

Image rejection — 50 db.

Carrier suppression — more than 40 db.

Sideband suppression — more than 50 db. at 1000 cycles.

Distortion products — more than -25 db.

Laboratory measurements at A.R.R.L. showed that these specifications were met.

The measured c.w. output power at rated 440 watts input varied from 200 watts to 280 watts. P.e.p. output on s.s.b. was about the same, with the unit tuned according to instructions.

In response to the popular demand for high power in a small package, the design of the unit follows a recent trend toward taking advantage of the short duty cycle of s.s.b. and c.w. operation. Such design does not permit the sort of book-on-the-key testing to which many of us have been accustomed in the past. The instruction book outlines a tuning procedure and other precautions which should be taken literally, if permanent damage to the tubes in the final amplifier is to be avoided. A specified limit of 5 seconds key down on c.w. (c.w. tune-up procedure is used for s.s.b. as well), at maximum rated input appears to be well justified.

TVI shielding is on a par with most other similar units that have been tested. A low-pass filter will undoubtedly be advisable in all but strong-signal areas.

In c.w. operation, any intentional shaping of the keying characteristic is not evident from the diagram. A scope pattern shows that there is some incidental shaping on "make" (probably sufficient to avoid serious complaint), but no shaping at all was detectable on "break." Clicks were quite severe out to 5 kc. or so either side of the carrier.

In using the crystal calibrator, it was noticed that the calibrator signal shifted three or four hundred cycles when the 25-kc. m.v. was switched in. At first, it was assumed that the loading of the m.v. shifted the frequency of the 100-kc. oscillator. Closer examination, however, showed that most of the shift was caused by a change in v.f.o. frequency, apparently as a result of increased load on the transistor power source. Thus, it appears that the calibrator cannot be depended on for close frequency checks.

— WITS



# Free - a grain of salt!

Let's put it on the table! The Hammarlund HQ-215 is the fully transistorized receiver with:

**FREQUENCY RANGE:** 3.4 mHz—30.2 mHz. Crystal furnished for the following bands:

80 meters—3.4—4.0 mHz  
 40 meters—7.0—7.4 mHz  
 20 meters—14.0—14.4 mHz  
 15 meters—21.0—21.6 mHz  
 10 meters—28.5—28.7 mHz

Provision for 13 additional 200 kHz segments anywhere between 3.4 and 30.2 mHz without disturbing ham band segments.

**MODE:** Selectable USB, LSB, CW or AM.

**FREQUENCY STABILITY:** Less than 100 Hertz per hour after 5 minute warm-up.

**BACKLASH:** Not more than 25 Hertz.

**VISUAL DIAL ACCURACY:**  $\pm 200$  Hz on all bands.

**SENSITIVITY:** Better than 0.5 microvolts for 10 db signal-plus-noise-to-noise ratio SSB/CW mode with 2.1 kHz filter.

**SELECTIVITY:** SSB-2.1 kHz mechanical filter, 2:1 shape factor.

**HARMONIC AND SPURIOUS RESPONSE:** Image rejection better than -50 db. Internal spurious signals below 1.0 microvolt equivalent signal on all amateur bands.

**A. G. C.:** Selectable time constants: Slow and Fast. Attack time, less than .5 milliseconds.

**"S" METER:** Approximately 50 microvolts for S-9 to 60 db over S-9.

**NOISE LIMITER:** Self adjusting, series type.

**REJECTION TUNING:** Provides up to 40 db rejection of unwanted heterodynes and carriers.

**AUDIO OUTPUT LEVEL:** Better than 1.5 watts with less than 10% distortion.

**AUDIO OUTPUTS:** Speaker 3.2 ohms. Headphones 500 ohms.

**CALIBRATOR:** 100 kHz Crystal.

**ANTENNA INPUT:** 50-75 ohms, unbalanced.

**AMBIENT TEMPERATURE:** 0 degrees C. to +50 degrees C.

**TRANSCIVE OPERATION:** Provided.

**TRANSISTOR AND DIODE COMPLEMENT:** 26 silicon transistors, 13 diodes and 2 Zener regulator diodes.

**POWER REQUIREMENTS:** 117/234 Volt AC 50/60 Hertz. Power Consumption, 19 watts. 12-15 Volt DC Negative ground only. Current Drain (12 Volt Supply) 460 mA with external speaker at rated output; 75 mA with headset.

**SIZE:** 6.8" H x 15.8" W x 14" D.

**WEIGHT:** 21 pounds.

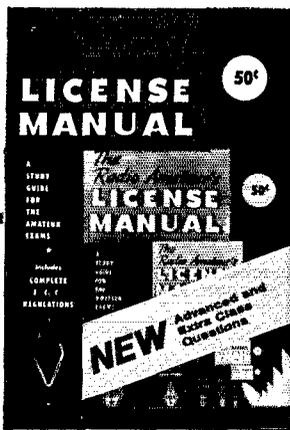
Quite an impressive list! But there's more! See your Hammarlund distributor now—He can give you the rest of the story. And—if you still feel that specs should be taken with a grain of salt, we'll send you one free—and throw in the shaker.

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Newington, Conn. 06111

## Correspondence From Members

(Continued from page 88)

used properly), hi-fi, and miscellany, but they have no room in a ham magazine.

I feel that the American Radio Relay League presents itself in such a way that it shows that you have John Q. Hamm's good at heart, and *not* the fattening of your wallets or egos. I feel, every time I read *QST*, or any other ARRL publication, that it was written with the individual ham in mind, no matter what his interests. I admire the League for not being extreme in anything — except being extremely devoted to the good of amateur radio.

After reading the pro and con letters in *QST* for over three years, then reading your editorials, explanations, and the FCC's own version of the incentive licensing proposal, I now *know* that the League is traveling down the right road. I personally know some hams who quit when you decided to promote incentive licensing. One is now no longer a ham, except in name. He lost interest in ham radio, just as he lost touch with it. The other is still doing OK, and I know for a fact that he tries to lay hands on a *QST* every month. It only goes to show that the quitters who growl from the sidelines just might be growling at themselves for quitting.

I currently hold a General Class license, and was not straining at the bit to make that long jump up to the Extra Class ticket. Then it seemed that incentive licensing, as explained in *QST*, would at least take a little of the sting out of such a jump, I began to take a look at the Extra Class section of the *License Manual*. In a previous *QST*, I found out for the first time that the FCC is going to throw in an Advanced Class "stepping stone", which will not only make the climb to Extra a bit less painful, but much more inviting. You can bet that I'm going to keep a little money stashed away for the new *License Manual*, and really get going after a higher grade license. Thanks to who? The League of course. Without your support, the FCC might not have adopted incentive licensing, or worse, it might have followed the advice of the dissenters and made amateur radio a disaster area similar to the 11 meter Citizens Band.

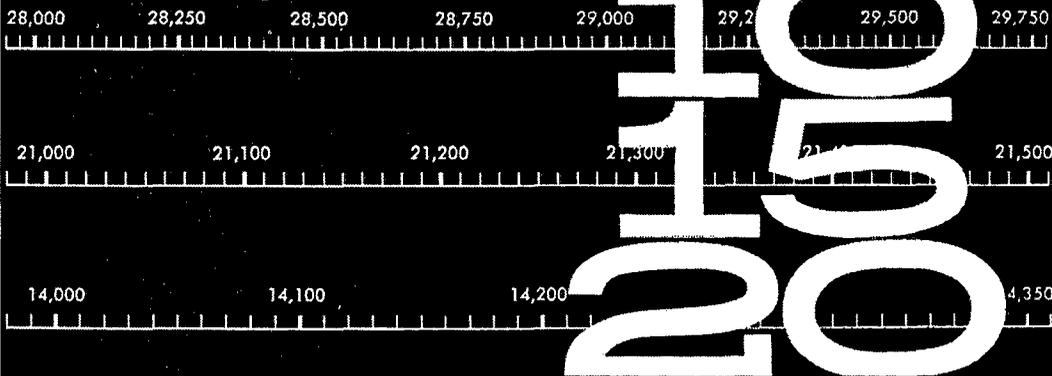
Judging by the length of my letter, I'm pretty sure that you can tell I'm no "R FB RST 589 TNX 73 SK" style ham. I feel ham radio was made to be used, and used well. I feel confident that the League will always fight to keep our fraternity in action, and will always strive to uphold and improve amateur radio, and the radio amateur. Thank you for your hard work, and keen insight. I'm proud to have a League lapel pin on my coat. — Curt Holsoapple, W4SVRM, Lansing, Michigan.

### SOME STILL BUILD

☞ I want to tell you of my success in building the f.e.t. converter which appeared in Sept. 1967 *QST*.

I built mine on a piece of sheet metal instead of using printed board and used transistor sockets for the f.e.t. (so I could also use them in a 6-meter version). I used iron core coils salvaged from old TV tuner and with judicious use of grid dipper and small ceramic condenser (also TV salvage). I had no trouble in getting all tuned up. I used sections of i.f. coil cores as ferrite chokes and also salvaged resistors and condensers. I did not build the osc. chain as I take injection from a home brewed transmitting converter. The converter works very well; I'm hearing things I never heard before and

# NEW | **Cubical Quads** by *Mosley*



## Four NEW Two-Element QUADS

### SINGLE BAND QUADS

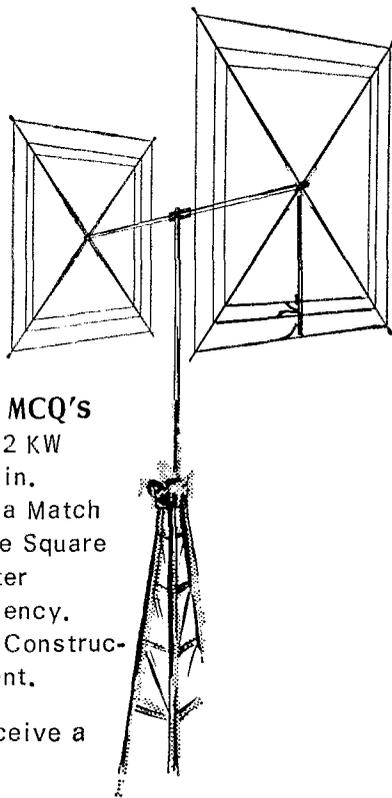
Model MCQ-10 for 10 meters

Model MCQ-15 for 15 meters

Model MCQ-20 for 20 meters

### TRI-BAND QUAD

Model MCQ-3B for 10, 15 & 20 meters



Designed and Engineered for Superior DX, the new **MCQ's** (Mosley Cubical Quads) are rated to 1 KW AM and 2 KW P.E.P. SSB. Maximum Front-to-Back and Forward Gain. A Single 52 ohm Line feeds the Quads via a Gamma Match resulting in a low SWR over the full bandwidth. The Square Configuration of the **MCQ** Series guarantees better performance by providing optimum electrical efficiency. The Durable, Lightweight, Weatherproof Aluminum Construction yields a lifetime of maintenance-free enjoyment.

For detailed brochure, Write Dept. 169 . . . and receive a **FREE** 1968/69 Mosley Antenna Catalog.

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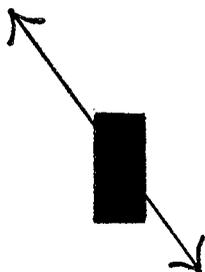


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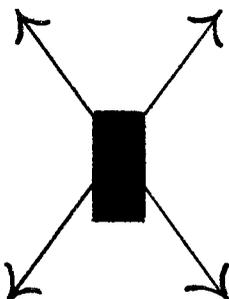
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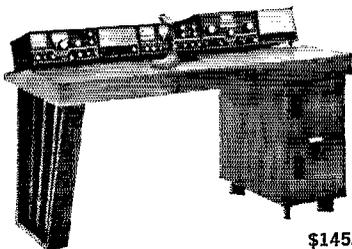
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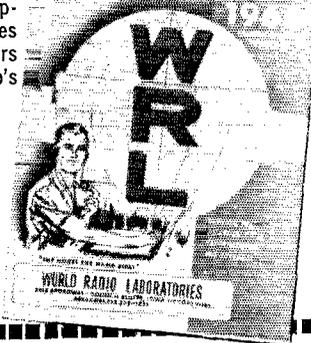
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that little pocket of 220 activity remains in New York, New Jersey, Connecticut and Massachusetts. MIT's W1MX in Cambridge, Mass. is quite active, as are W1s OOP, YWQ, GAN and QXX.

430 and 1215 MHz. reports were scarce this reporting period — guess everyone was building for the coming summer tropo. K3CFA, Pennsylvania, has completed a 432 array of twenty four 5-element Yagis and is at work on a kw. final. K9AQP/1 at Groton, Mass. has a 2C39 putting 10 watts into either a 16-element collinear or 18-element Yagi of the W1HDQ design. He is also building a final, a 4CX250B. WA5IOD/1 is another 432 station now active at Groton with a 2C39 and 11-element Yagi. At Ottawa, Ontario VE3BDX runs 20 watts into a 13-element Yagi and desires schedules. He is also on 1296 with 6 watts output and a 32-element extended-expanded collinear, and is building a 2C39 ring amplifier. Schedules are also welcomed on 1296. VE2HW has completed half of his 128-element extended collinear for 1296.

K2UYH in Northern New Jersey says at least a dozen 1296 stations are active in that area, but apparently the 1296 activity has been at the expense of 432. Al is keeping several schedules on 432 and 1296 and wants more. He also would like schedules for the June contest on 220 through 2300 MHz.

QST

### Novice Roundup

(Continued from page 58)

#### SOUTHWESTERN DIVISION

*Arizona*  
WN7JSP 36,500-485-73-40  
WN7ILE 33,345-498-65-40  
WN7ITE 11,092-188-59-23  
WN7HTZ 7250-145-50-14  
WN7DUX 1992-73-24-25

*San Diego*  
WN6VIE 2368- 64-37-15

*Santa Barbara*  
WN6WKC 7426-143-47-22  
WN6YEU 4223-103-41-17  
WN6YWF 561- 33-17- 2

#### WEST GULF DIVISION

*Los Angeles*  
WN6WGO 13,250-285-50-28  
WN6ZEB 12,096-216-56-33  
WN6VOK 11,395-205-53-40  
WN6VVF 9984-177-52-15  
WN6VUS 7140-125-51-15  
WN6WNO 5375-110-43-26  
WN6WKM 3145- 85-37-10  
WN6YWR 2590- 70-37- 9  
WN6WKJ 920- 30-25- 5  
WN6VXN 240- 24-20- 4  
WN6ZFP 375- 25-15- 9

*Northern Texas*  
WN5TJU 8500-170-50-27  
WN5TSM 3415-165-51-23  
WN5SIO 7854-154-51-22  
WN5TSI 3510- 90-39-11

*Oklahoma*  
WN5RWU 27,202-396-67-35  
WN5TWM 195- 15-13-12

*Orange*  
WN6ZXN 18,900-300-63-38  
WN6ZEC 290- 14-10- 4  
WN6YUS 225- 25- 9- 9

*Southern Texas*  
WN5TSF 21,440-320-67-35  
WN5RQU 8750-175-50-14  
WN5RUU 1- 1- 1- 4

#### Non-Novice States

K1QFD 9456, W1AW (W1ARR, opr.) 13,050, W1DAL 9541, W1ET (W1CRT, opr.) 270, W1FNFQ 1197, W1IHES 7344, W1HXH 1560, W1IOB 3731, W1IUL 782, K2EJU/5 6407, W2HAE 2820, W2ABY 3456, W2BHU 637, WA2CAL 232, WA2CZQ 3264, WA2PXB 795, WA2ZEW/1 588, WB2IVP 1428, WB2UVB 2025, WB2VAZ 2418, WB2VBQ 1680, WB2VAD 8052, WB2YCX 1404, WB2YJS 2130, WB2YVP 1820, WB2ZCJ 5945, WB2ZXR 770, K3YBW 672, W3CRF 450, W3CSL (W3HQK, opr.) 187, W3YC (W3AGOV, opr.) 400, W3AFI 972, W3AYW 1008, W3ADNH 6300, W3DSD 15,600, W3ADYW 10,584, W3AEE 759, W3AENR 4961, W3AEXX 5842, W3AFFR 2407, W3AFRL 576, W3FTY 6380, W3GHI 320, W3GLP 1189, W3GUI 4389, W3GYM 250, W3HAIU 1176, W3HQH 132, W3HWV 5904, W3IHD 1800, W3JGS 464, K4ADT 5616, K4BAL 2576, K4GMR/4 7697, K4NOV 2496, W4DR 7200, W4LE 490, W4KFC 8910, W4RNL 12,744, W4YOK 2368, W4ZZV 264, W4EPM 1701, W4OFS 6570, W4PAE 255, W4PRF 4, WB4BGL 800, WB4DVR 1890, WB4EKI 785, WB4EMF 1160, WB4FAY 3434, WB4FDK 430, K5DYL 2310, K5KDG 11,770, W5JFB 2044, W5QNY 6030, W5HIQY 1904, W5AQA 2730, W5RWP 2210, W5TOS 9344, K6BXI 450, W6FEW 3430, W6LS (W6DD, opr.) 589, W6VUS 16, W6TCG 1560, W6UCC 263, W6UHF 4141, W6GUA 36, W6UQZ 3219, WB6VFL/1 720, W7BNV 273, W7EWC 648, W7EYN 420, W7FBL/7 5328, W7GLC 96, W7HRE 504, W7ITZ 35, W7JCB 2233, K8SWS 468, W8QXQ 3816, W8RHF (multiopr.) 406, W8PRA 2039,

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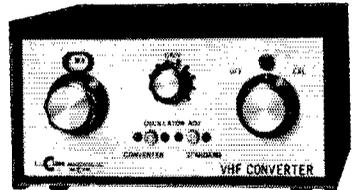
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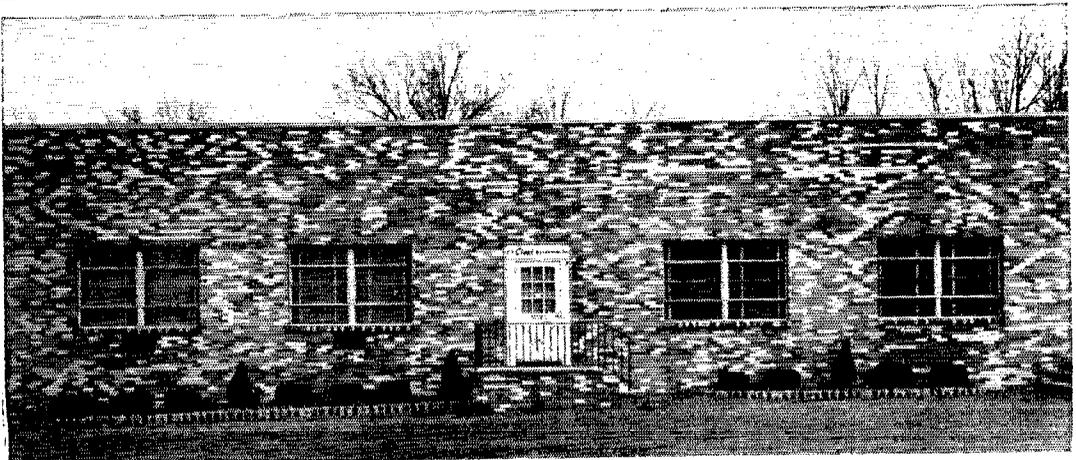
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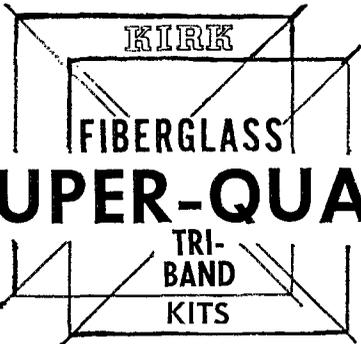
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**V.H.F. Yagis**

(Continued from page 53)

operation near 432 Mc. The lower, at B, is a broader-band array developed originally for British u.h.f. TV reception, and shown here in its amateur-band version. If you were going to transmit high-fidelity amateur TV, you'd probably want this model. The narrow-band model uses spacing essentially the same as that developed by W2NLY and W6QKI in their classic work with long Yagis.<sup>7</sup> Twelve directors are used in an array 109 inches long. Only slightly-graduated spacing is employed in the other, which has 16 directors and a 103-inch boom. Directors in 2-A are 11 1/4 inches long throughout, while those in 2-B are 10 3/8 inches.

The reflector in A simulates a nonresonant screen, with 4 rods 19 inches long, spaced 5 inches apart in a vertical plane, a quarter-wavelength in back of the folded-dipole driven element. The driven element and reflector in B are reminiscent of the "skeleton slot" that is so popular in Britain, where these antennas came from, but it is not quite the same thing. As may be seen from the sketch, the element is in the form of a closed loop, fed at the midpoint of the vertical sides by horizontal rods coming in to the center.

According to the designer, there is radiation from all three horizontal members. Current flow in the vertical portions is equal, but opposite in phase, so radiation is cancelled, as in a transmission line. The upper and lower portions of the loop are bent forward, so that (again, according to the designer) all portions are in phase, and fully energize the directors. The reflector is a similar loop, but closed at the center, and flat in a vertical plane.

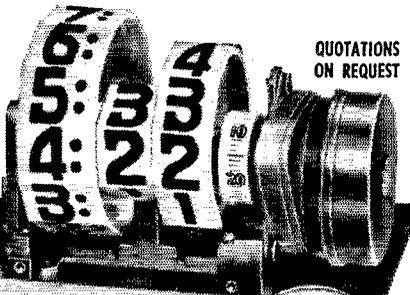
Though wide frequency response is not claimed for 2A, it does cover more frequency spread either side of 432 than do Yagis of similar gain made with small-diameter elements and parasitic reflectors. This is of little importance to most 432-Mc. operators, since even 432 to 436 Mc. is a narrow band, in percentage, easily covered with narrow-band designs. The array of 2B is claimed to cover the entire 420 to 450 Mc. band easily, a statement we are unable to dispute, as a stable power source capable of this much frequency spread is not among our possessions. Both arrays show gain at 432 Mc. that is comparable with other well-designed Yagis of similar boom length.<sup>8</sup>

**QST**

<sup>7</sup> "Long Long Yagis," Kmosko and Johnson, January, 1956, QST, p. 19.

<sup>8</sup> Radio Amateur's V.h.f. Manual, Edition 1, Fig. 8-4.

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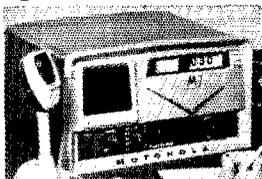
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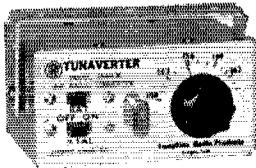
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**Those Higher-Class License  
Examinations**

(Continued from page 69)

Answers to license quiz: Q1 — A; Q2 — E; Q3 — D; Q4 — B; Q5 — D; Q6 — C.

Incidentally, we flunked on one of our own questions last month. The vital blocking capacitor was omitted from the amplifier diagram on page 148 of the May issue. It should go between the plate choke and the junction of the tank coil and tuning capacitor. Our thanks to the several sharp-eyed readers who told us about it.

**Novice in Wonderland**

(Continued from page 35)

(Pause, then Refined Male Voice — no pun intended)

*RMV:* Hyde here, Logario says you need some help on transformer oil. What's the problem?

*Me:* Well, I need to find out what the difference is between regular and inhibited.

*RMV:* That's no problem . . . the inhibited has higher ASPE specs. Its dielectric can handle up to 36 thousand volts without arcing, and it has outstanding heat dissipation characteristics.

*Me:* Oh, I see. I guess either one would serve my purposes . . . (pause)

*RMV:* What is your specific application, and how much do you need?

*Me:* It's for use in an amateur radio dummy antenna, and I'll need about a gallon.

(Long period of silence . . .)

*Me:* Hello! Have I been cut off?

*RMV:* (breaking up): We generally sell in tank carload lots, although sometimes we'll go as small as a truckload of 55-gallon drums. One gallon?

(Long pause on my end of the line. Then)

*Me:* (very small voice) Oh.

*RMV:* All things considered, I think the only thing for us to do is to draw off a one gallon sample, and supply it to you gratis, courtesy of the Company. That sound OK to you?

*Me:* Thanks a lot! Be down to get it this afternoon.

All of which shows (1) nothing ventured, nothing gained; (2) landline telephone, too, can serve the amateur radio operation well; (3) where ignorance is bliss, 'tis folly to be wise; and, finally, (4) oil's well that ends well. QST

**YL News and Views**

(Continued from page 87)

But we all hope to see every one of you there June 13 through June 15, 1968. Won't happen again for four years you know.

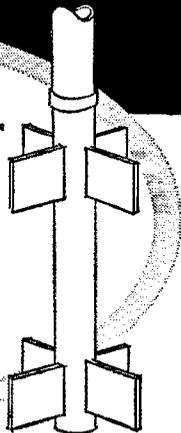
**GAYLARK Public Service Project**

The Houston Post, put it this way: "The GAY-LARKS are not all twitter and faldorol." And these busy active gals certainly aren't. They set up a message booth at a shopping center to demonstrate that amateur radio is dedicated to public service. The 7.290 Mhz Traffic Net held a special Saturday

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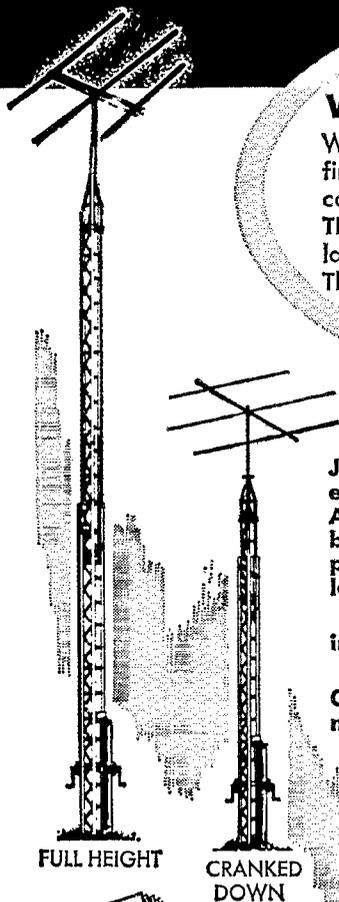
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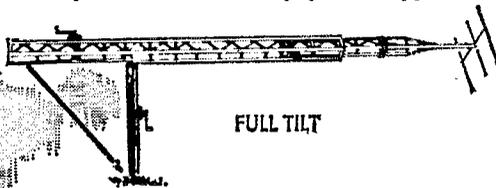
Standard models from 40 to 150 feet and commercial installations to 1,000 feet.

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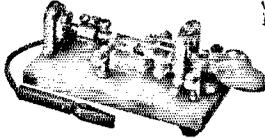


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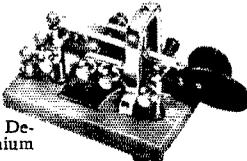


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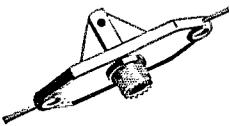
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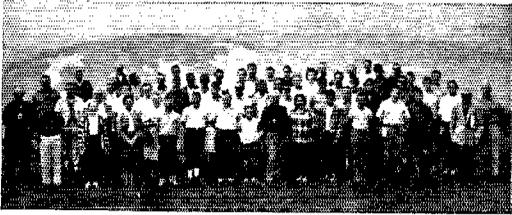
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Camp opens on August 3rd and closes August 17th.

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| NAME.....                                                                                  |    |
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session to clear the traffic they had, and it was addressed all over the United States as well as 23 messages into Viet Nam, where that word from the home folks is so very welcome.

There were three operating stations at the message booth on 40, 15, and 2 meters, relaying the traffic into the long haul circuit as it was received at the booth. When they weren't taking and relaying messages to demonstrate the service, these gals were distributing ARRL literature to interested people, and telling them about the public service we "hams" perform.

The GAYLARKS who participated in this project were: Deanna Mercurio, WA5KRI; Ann Beadel, WA5GLM; Audrey Beyer, K5PFF; Mary Ann Leveridge, K5VZB; Alverda Look, K5MIZ; Margaret Pearle, K5MNO; Phyllis Riblet W5CXM; Grace Tracy K5YTT; and Lillian Smith WA5NUR. (ex KZ5TT).

**The GCR-2 Receiver**

(Continued from page 15)

cut for the frequency range to be tuned — to  $J_1$  and plug a pair of headphones into  $J_3$ . Next, connect the 9-volt battery pack to  $J_2$ . Turn  $R_1$  toward maximum resistance until a "plop" is heard in the phones. This will indicate that  $Q_1$  is going into regeneration. Tune  $C_3$  until a c.w. signal is heard, then adjust  $R_2$  for the desired listening volume. By varying the setting of the regeneration control,  $R_1$ , the pitch of the c.w. note can be changed. Also, the setting of  $R_1$  will have a marked effect on the sensitivity of the receiver. The best setting for s.s.b. and c.w. reception is that which just permits  $Q_1$  to go into regeneration. On very strong c.w. or s.s.b. signals it may be necessary to advance the setting of  $R_1$  and make the detector oscillate slightly harder in order to get the required amount of beat-frequency signal. For a.m. reception  $R_1$  should be adjusted to the point where regeneration just ceases. Changing the setting of  $R_1$  will cause some shift in frequency, necessitating readjustment of the bandwidth control. This interaction is normal with circuits of this kind.

By experimenting with the settings of  $C_1$ , a point should be found where a good compromise can be reached between suitable sensitivity and smooth regeneration. Its setting will depend upon the length of the antenna used, and the operating frequency. Generally, the longer the antenna the smaller will be the capacitance value at  $C_1$ . If the builder does not have a doublet antenna available, an end-fed 50- or 100-foot length of wire will provide good results. An earth ground should be attached to the GCR-2 chassis for best results when short antennas are used.

The no-signal current drain of the receiver is approximately 25 ma. when fresh batteries are used. At high volume levels the circuit will draw as much as 250 ma. in the presence of strong signals. A bonus feature results from the use of this kind of power supply: the unwary beginner need not worry about shock hazards. Nine volts of d.c. are scarcely enough to cause anyone to dance up and down with discomfort should he stick his fingers into the power supply!

# No, we're not lazy! It's just that "Popular Electronics" (Dec. 1967) tells the DX-150 story so well.

## Reprinted Without Editing

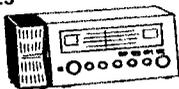
"What may be the first really noteworthy advancement in communications receivers is wrapped up in the new Radio Shack imported DX-150. Featuring continuous coverage from the top of the AM broadcast band (535 kHz) to the bottom of the 10-meter band (30 MHz), the DX-150 is a single-conversion superhet with a tuned r.f. stage, two i.f. stages, full-wave product detector for SSB/CW reception — and it's 100% solid state. Selling at \$119.95, the DX-150 has the flexibility of a communications receiver that a ham or SWL is used to buying for \$175-plus. To rattle off a few more "features": there is a front panel antenna trimmer, fast or slow a.v.c. attack, a cleverly concealed built-in monitor speaker, plenty of calibrated bandspread, and noise limiting in both the i.f. and audio stages. Because of the solid state circuitry, the usual warm-up drift expected with a tube-type receiver is virtually absent here. And, although the DX-150 is primarily a base station receiver with a 117-volt a.c. power connection, it can be operated from an outboard d.c. power supply consisting of only 8 D-cells. Radio Shack claims that the receiver will operate for 100 hours — continuously — using only the d.c. supply. Ideal for Field Day and emergency work! The proof of the pudding so far as any communications receiver is concerned is how well it works "on the air".

At POPULAR ELECTRONICS, the DX-150 was hooked up to a 125-foot long-wire antenna and tuned across the AM broadcast band. Needless to say, the S-meter was pinned on just about every single channel, and the audio quality with Radio Shack's voice-selective speaker (extra, \$7.95) was crystal-clear. Tuning the band between 1.55 and 4.5 MHz, your reviewer got a chance to appreciate the comfortable handling on SSB reception. Going a little higher (4.5-13.0 MHz), the 25- and 31-meter bands were "alive" and signals appeared to leap out of the air — possibly due to the very quiet background of the DX-150. While quietness is usually regarded as a lack of sensitivity, that wasn't the case with the DX-150. On the top band (13-30 MHz), the sensitivity still seemed high; and on the CB frequencies, the DX-150 could hold its own against a dual-conversion receiver built just for CB work. Summary: Radio Shack has the Model DX-150 in most of its 160 retail outlets. Take a look at it, and get the "feel" of this unusual receiver."

### CUSTOM ACCESSORIES



12 VDC Power Set



Matching Speaker



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Thousands of hams and swl's have discovered that Radio Shack's Realistic DX-150 is truly the "break-through" full coverage receiver of 1968. It's the 100% solid state receiver that *banishes forever* tube failure, tube heat, tube drift, and — thanks to its built-in 117V/12V supply — your dependence upon AC current when power fails or on field day. The brilliant DX-150 is NOW IN STOCK in every one of Radio Shack's over 200 stores.

### CAVEAT EMPTOR

Since DX-150 is certain to be the world's most imitated communications product, we advise our readers that "solid state" on a receiver is not necessarily indicative of selectivity, sensitivity and "feel." The DX-150 is built to \$200-\$300 performance specifications; its modest \$119.95 price tag simply designates the extent to which we have sacrificed traditional markup to establish REALISTIC as a quality line! P.S. — DX-150 is a hefty 14 lbs., with a 12¼" dial, extruded 11-control front panel, and 14¼x8¼x6½" in size. It's just the picture that's little! Our no money down policy makes the pain little, too!

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- FREE 1968 Catalog     Matching Speaker, 20-1500, \$7.95  
 Receiver, 20-150,     12 VDC Power Set, 20-1501, \$7.95  
\$119.95

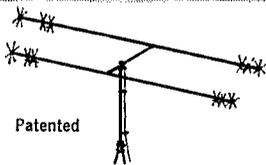
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| SWR at Resonance | 1.5 to 1.0 max.   |

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## Amateur Radio Public Service Corps

(Continued from page 63)

TCC roster: Eastern Area (W3EML, Dir.) — W1s BJG EFW EOB NJM, W2s FR GKZ, K2RYH, W4s BLV UWA, W7s OYE RKK UHZ, W3s EML NEM, K3MVO, W4s NLC UQZM, K4KNP, W8s AHZ CHT UM, K8KMQ, W4s OCG ZGC, Central Area (W0LCK, Dir.) — W4OGG, K4s BSS DZM, W44WVT, WB4AIN, W5KRX, W9s CXY DND DYG JUK VAY, W0s INH LCK, K0s ABM YBD, W40s DOU MLE, Pacific Area (W7DZX, Dir.) — W6s BGF EOT HC IPW TYM VNQ VZT, K6LRN, W46s BRG LFA ROF, W60s HVA RSY, W7s AAF/6 KZ ZB ZIW, WA7CLF.

**Other Net Reports.** Listing in this column is open to any traffic or public service net not part of NTS, conducting a minimum of one session per week with coverage, both nominally and in regular practice, transcending section boundaries. Following are March reports received:

| Net                  | Sessions | Check-ins | Traffic |
|----------------------|----------|-----------|---------|
| Mike Farad           | 57       | 479       | 272     |
| No. American SSB     | 26       | 759       | 773     |
| New England Teenage  | 31       | 374       | 143     |
| 7290 Traffic         | 44       | 2221      | 819     |
| 20 Meter SSB         | 21       | 503       | 3268    |
| Mission Trail        | —        | 1694      | 163     |
| QTC Traffic          | 21       | 347       | 275     |
| Clearing House       | 29       | 414       | 264     |
| Eastern Area Traffic | 30       | 313       | 257     |
| Hit & Bounce         | 31       | 376       | 339     |
| 75 Meter ISSB        | 31       | 1222      | 520     |

QST

## 80 Meter Inverted V for Field Day

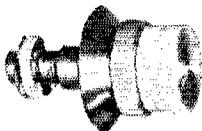
(Continued from page 18)

With the rear guy (feed line) in your hand, move quickly and smoothly past top dead center and promptly and firmly apply back tension on the antenna element. Once the feed line is snubbed, you can easily correct the mast for lean by lifting the base and putting it where it suits you. If you are fortunate enough to have three helpers, there is no problem at all. Give the third man the feed line, station him as far away as possible from the mast and antenna element, and have him take up the slack as the mast goes up.

Base support can be little or nothing. The mast, which is now permanently erected in my back yard, rests directly on the grass. It was moved a couple of inches during each mowing operation, and no apparent harm came to the lawn.

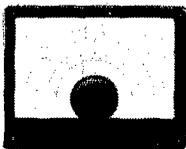
Lowering the antenna is brutal but quick. Release the back guy (feed line) and let the whole system fall. If the ground is reasonably flat, this will be OK. But if the ground is very rough, the pipe may take a set as it strikes the ground. Under such conditions, it would be better to use helpers to reverse the erecting procedure.

The antenna has been left up for a period of several months, during which there have been many autumn storms and a severe ice storm. It has shown no signs of distress, and it has performed normally when wet or loaded with ice. The small size of the inverted V's parts has led to little wind and ice loading and is probably the main reason for the antenna's durability. QST



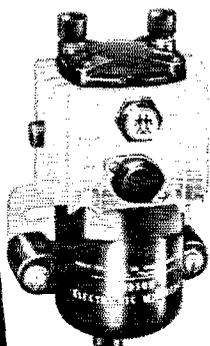
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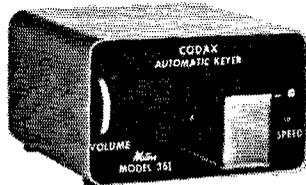
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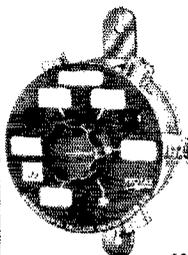
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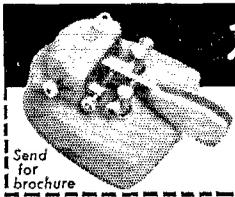
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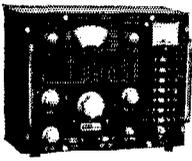
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**Interference and the V.H.F. Mountain Topper**

(Continued from page 35)

This just might save embarrassment and inconvenience for all concerned. It is not beyond the realm of possibility that interference in these circumstances would be brought to public attention through the news media. Let's face it; amateur radio can do without *this* kind of publicity!

You might think that I have painted a rather dark picture for the v.h.f. mountain-topper, but this is not the case. Mountain expeditions are great for the participants, and they help to make life more interesting for the v.h.f. stay-at-homes. In many areas they are the life of our v.h.f. contests. But too often we head for the hills without taking any precautions, and leave ourselves vulnerable to interference problems that could mar our day or weekend. A little time spent investigating the interference possibilities of the location selected will certainly be worthwhile. Consider the following suggestions:

Take the best receivers available; with effective noise limiters and adjustable selectivity. Leave the bloopers at home.

Use transmitters that have been proven free of harmonics and other spurious radiations.

Take along coaxial or strip-line filters for each band you plan to use. An i.f. noise blanker may be good, too.

Use antennas that are matched for coaxial feed.

Provide extra feedlines and power cable, so that you can set up as far as possible from troublesome permanent installations.

Contact FAA personnel beforehand, should you plan operation near one of their unmanned installations. Advise the technician at any manned facility, and ask for an on-the-air check, if possible.

Do not expect to use facilities of mountain stations without prior permission from the chief engineer, and/or technician on duty.

Avoid CATV facilities, even with the best equipment.

Anticipate possible birdies; you may not be able to eliminate all sources of interference to your reception.

Operation from sites inaccessible by road is great fun, and there are many such places left that are remote from the problems we've been discussing. With lightweight transistor rigs you can hike to many trouble-free sites.

Last, but far from least, while operating from your choice v.h.f. location, remember that your signal will probably be the strongest on the band, over a very large area. Use a little common on-the-air courtesy with your fellow hams. Good luck — and happy mountain-topping this summer!

**SWITCH TO SAFETY!**



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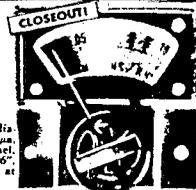


- 4-2N3563 NPN, 600MC, 200MW .....\$1
- 4-2N3643 NPN, 250MC, 350MW .....\$1
- 3-B-5000 SW, 3Amp, PNP .....\$1
- 4-2N4313 PNP 600MC, 200MW .....\$1
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- 3-2N4265, 400HFE, NPN, 350MC .....\$1

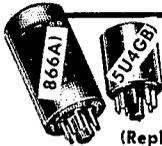
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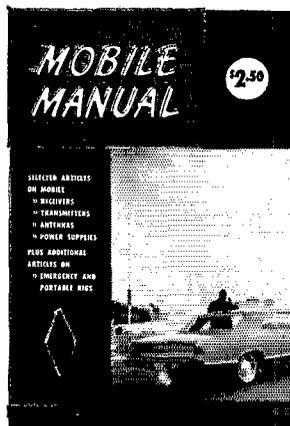
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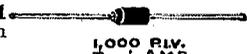
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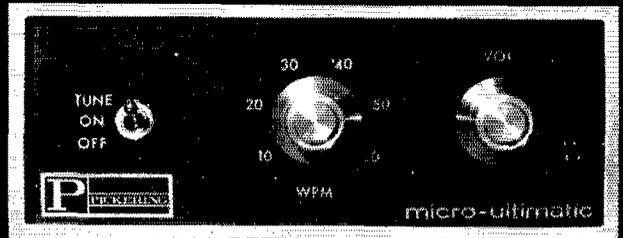
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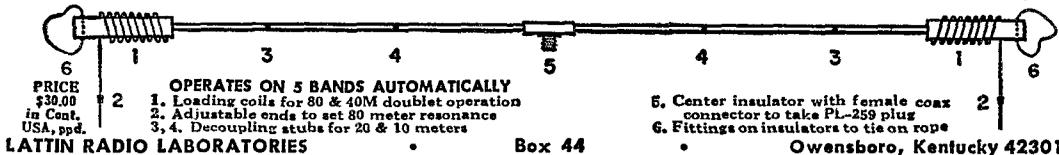
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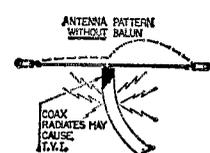
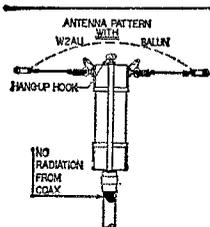
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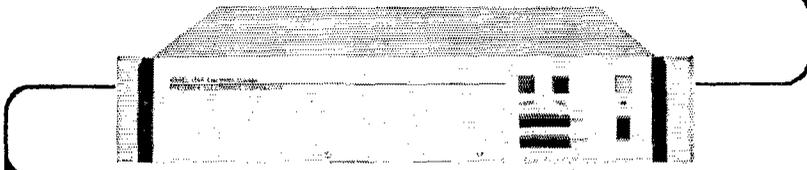
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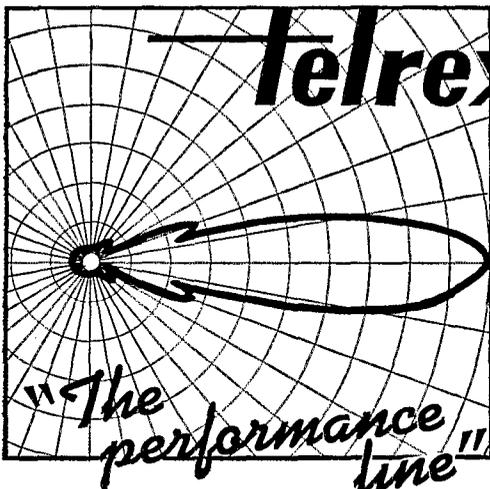
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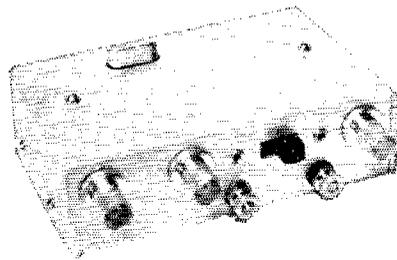
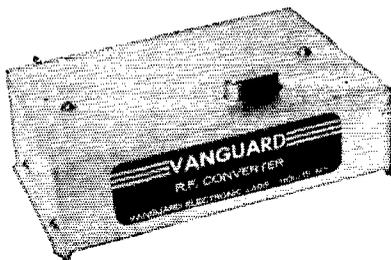
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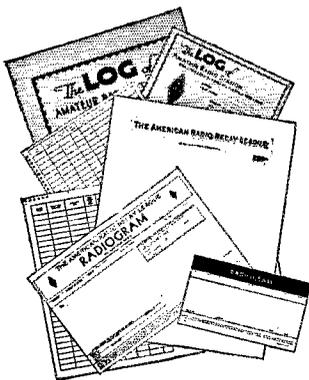
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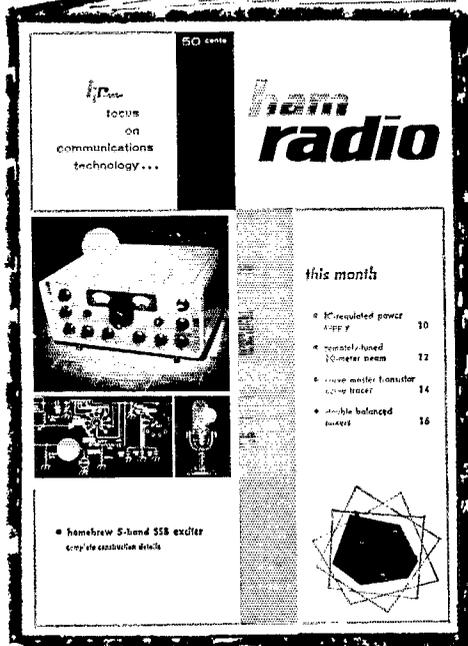
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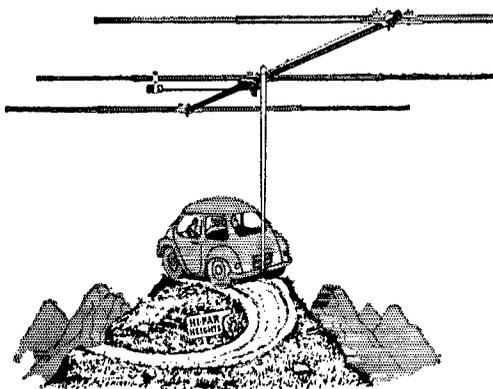
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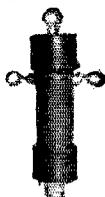
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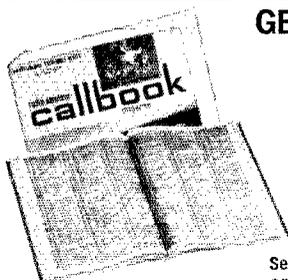
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# HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraphs (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 non-commercial 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 zip code, 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 every signature and address be printed plainly on one side of copy only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.

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

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

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

AMERICA'S FINEST PERSONALIZED MADE-TO-ORDER SAMPLES 25¢. DeLuxe, 35¢. Religious 25¢ (Refunded). Sackers, W8DED, P.O. Box 218, Holland, Michigan 49423.

OSLS "Brownie" W3CJ1, 3111 Lehigh, Allentown, Penna. 18103. Samples 10¢. Catalog 25¢.

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

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

OSLS—SMS. Samples 10¢. Malgo Press, Box 373, M.O., Toledo, Ohio 43601.

DELUXE OSLS 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.

OSL, SWL, cards that are different. Quality Card stock. Samples 10¢. Home Print, 2416 Elm Ave., Hamilton, Ohio 45015.

CREATIVE OSLS Cards, Personal attention. Imaginative new designs. Send 25¢. Receive catalog, samples, and 50¢ refund coupon. Wilkins Printing, Box 787-1, Atascadero, Calif. 93422.

RUBBER STAMPS \$1.15 includes tax and postage. Clints' Radio, W2UD0, 32 Cumberland Ave., Verona, N.J. 07044.

OSLS, finest V.I.R.'s. OMs samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

OSLS Professional, neat. 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio 43935.

3-D OSLS cards, recognized leader among raised designs. Compliments aplenty! Prize collector's item. Samples 25¢ (refunded). 3-D OSLS Co., Monson, Mass. 01037.

OSLS, SWLS, WPE. Samples 15¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz. 85017.

OSLS, samples, 20¢. Fred Leyden, WINZJ, 454 Proctor Ave., Revere, Massachusetts 02151.

OSLS 300 for \$4.35, samples 10¢. W9SKR, George Vesely, Rte. #100 Wilson Road, Inglede, Ill. 60041.

OSLS 3-color glossy 100, \$4.50. Rutgers Vari-Typing Service, Free samples. Thomas St., Riegel Ridge, Milford, N.J. 08848.

OSLS's. Free samples, attractive designs. Fast return. W7I1Z.

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

ORIGINAL EZ-IN double holders display 20 cards each in plastic, 3 for \$1.00 or 10 for \$3.00 prepaid and guaranteed. Free sample to Dealers or Clubs. Tepacbo, John, K4NMT, Box 1981, Gallatin, Tenn. 37066.

OSLS; 3-color glossy; 200, \$6.99 postpaid. Samples, 10¢. Gates Print, 317 11th Avenue, Juniata, Altoona, Penna. 16601.

QUALITY OSLS; Samples 25¢ (refundable). R. A. Larson Press, Box 45, Fairport, N. J. 14450.

OSLS's. Free samples, attractive designs. Fast return. W7I1Z Press, Box 2387, Eugene, Ore. 97402.

OSLS. Kromtech glossy 2 & 3 colors, attractive, distinctive, different. Choice of colors 100-\$3.00 up. Samples 15¢. Agent for Call-D-Cals. K2VOB Press, 240 West Kinney St., Newark, New Jersey 07103.

OSLS by KIFF, \$2.00 for 100. Others at reasonable prices. Samples 25¢ deductible. KIFF OSLS, Box 33, Melrose Highlands, Mass. 03177.

OSLS. Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, WA4FJE/W3COP, 905 Fernald, Edgewater, Fla. 32032.

EXCLUSIVE OSLS. Picture, custom, standard. Over 250 styles available. Samples dime. KINZC Press, 335 Walpole St., Dept. C, Norwood, Massachusetts 02062.

RAISED Lettering OSLS, Ace Printing, 6801 Clark Ave., Cleveland, Ohio 44102.

OSLS by Jansen, K2HVN, samples 25¢. 860 Atlantic St., Lindenhurst, New York 11757.

OSLS cards. Finest quality. Economical prices. Fast service. Free samples. Little Print Shop, Drawer 9848, Austin, Texas 78757.

OSLS. Neat, different 10¢. Filmcrafters, P.O. Box 304, Martins Ferry, Ohio 43935.

OSLS. 100, \$1.25 and up, postpaid. Samples, dime. Holland, R3, Box 649, Duluth, Minnesota 55803.

OSL Free samples! CBM Printers, 5161 N. Hopkins, Milwaukee, Wis. 53209.

EXECUTIVE Stationery. Impressive personalized ham letterhead. Inexpensive. K3GWD Press, RR2, Wampum, Penna. 16157.

RUBBER STAMPS. Return mail delivery, postpaid. Basic price, \$1.00 first line, 50¢ each additional line. Request type style chart. Fulton Rubber Stamps, Route 216-A, Fulton, Maryland 20759.

YOUR Call engraved on white plastic with black letters, or reverse. Choice lapel bar or tie-clip. \$1.45. Also 1 1/2" x 6" wall signs \$2.95. W2DF, Gorbey, Box 213, Faringsdale, L.I., N.Y. 11735.

WANTED: Military, commercial, surplus, airborne, ground, transmitters, receivers, test-sets, specially Collins Airborne. We pay cash, and freight. Ritco Electronics, Box 156-Q567, Annandale, Va. Phone: 703-560-5480 collect.

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

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

CANADIANS: Ranger 1, \$115.00; HO-145, \$135.00, plus shipping costs. Both good. H. Walker, VE7XX, Box 880, Hope, B.C., Canada.

HAMFEST: Annual SRRC Hamfest, June 2. Same place as last year. See May Hamfest calendar in QST for details or write G. E. Smith, W9QLZ/W9MKS, RFD #1, Box 171, Olesby, Illinois 61348.

HAMFESTERS Radio Club, Chicago, Illinois, proudly announces its 34th Annual Midwestern Hamfest, Sunday, August 11th, at Santa Fe Park, 91st and Wolf Road near Chicago. The Hamfest features manufacturer and distributor exhibits, swappers row, awards and a variety of activities for all. Clowns and games for the children, activities for the YXL while you enjoy amateur radio with friends and acquaintances. The Hamfest, clowns, "Illinois Amateur Radio Week August 3 thru 11th" by proclamation of Governor Otto Kerfer. For information and tickets write to Charles Borkowski, WA9TWA, 1851 W. 21st St., Chicago, Illinois 60608.

LOUISVILLE Ham Convention, Saturday, August 31 at the Executive Inn, featuring Dealers and Manufacturers; Technical Forums; contests, fashions for the ladies. 648 South Fourth St. 40202.

INVITATION: New York Radio Club invites New York Area hams and SWLS to its regular monthly meetings the second Monday of each month, thru June 1968 at the Hotel George Washington, Lexington Ave. and 23rd Street at 8 P.M., W2ATI, New York Radio Club.

BREAKFAST Club Hamfest July 20 and 21, Palmyra, Illinois. Errol Workman, K9CIL.

A.W.A. Historical Radio Meet for old time amateur and commercial operators, historians and collectors. Smithsonian, Washington, D.C. Oct. 5th. Write to W2OY, Lincoln Candall, A.W., Treas., for details.

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

THE Wood County Amateur Radio Club Announces its 4th annual Ham-A-Rama Sunday July 7th at the Fairgrounds Bowling Green, Ohio. Write W8PSK, 324 South Grove St., Bowling Green, Ohio 43402 for details.

PRE-WORLD WAR 1 operators will find many of their old buddies are members of the Old Old Timers Club. We welcome all applicants whose first wireless contact was more than 40 years ago but give special consideration to those pre-World War 1 Pioneers, including Charter Membership. Write to W5VA, Secretary of the Old Old Timers Club, P. O. Box 840, Corpus Christi, Texas 78403.

WELCOME To Maritime Mobile service net. 14317 Khz, Jaily 2130Z, Amateur Radio's service to the Fleet. Vic Barry, RDC USS Corry, DD817 FPO, N.Y., N.Y. 0950.

TRADE ARRL 1968 Handbook for one of 10 old Handbooks not in WAAA historical library. Need govt. Amateur Callbooks 1922 through 1926, early wireless magazines and catalogs. Wayne Nelson, Concord, N.C. 28025.

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

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

TUBES Wanted. All types higher prices paid. Write or phone Ceko Communications, 120 West 18th St., N.Y., 11, N.Y. Tel: 242-7359.

MANUALS for surplus electronics. List 15¢ S. Consalvo, 4905 Roanoke Drive, Washington, D.C. 20021.

HAM'S Spanish-English manual \$3.00 Ppd., Gabriel, K4BZY, 1329 N.E. 4th Ave., Fort Lauderdale, Florida 33304.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Grand Electronics, 64 Grand Place, Kearny, New Jersey 07032.

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

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.

JOYSTICK Variable frequency antenna systems solve space problems. Available immediately. SWL Guide, 218-S Gifford, Syracuse, N.Y. 13202.

CASH Paid for your unused Tubes and good Ham and Commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, N.Y., N.Y. 10012. Tel: (212) Walker 5-7003.

GOODIES, Cash for Teletypewriters, parts. List. Typetronics, Box 8873, Ft. Lauderdale, Fla. 33312.

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, ARN, GRM, etc. Best offer paid. 22 years of fair dealing. Ted Dames Co., 308 Hickory St., Arlington, New Jersey 07032.

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

INTERESTING Sample copy free. Write: "The Ham Trader," Sycamore, Illinois 60178.

WANTED: For personal collection: Learning the Radiotelegraph Code, Edition 4; How to Become a Radio Amateur, Edition 9; The Radio Amateur's License Manual, Edition 2, 11, 12. WICUT, 18 Mohawk Dr., Unionville, Conn. 06085.

RTTY gear for sale. List issued monthly, 88 or 44 Mhz toroids, five for \$1.50 postpaid, Elliott Buchanan & Assoc., Inc. Buck, W6PVC, 1057 Mandana Blvd., Oakland, Calif. 94610.

WE'RE Trying to complete our collection of Callbooks at Headquarters. Anyone have extra copies of Government Callbooks 122-1925 and 122-1925 and 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 Grand Electronics, 64 Grand Place, Kearny, New Jersey 07032.

WANTED: Model #28 Teletype equipment R-388, R-390A. Cash or trade for new amateur equipment. Altronics-Howard Co., Box 19, Boston, Mass. 02101.

EICO 720, 722, 730 modulator, Lafayette HA-350, manuals, mint condx, \$215.00. Tel: 212-776-2821, Mike Lehrman, 226-06 88 Ave., Queens Village, L.I., N.Y. 11427.

SELL: CO, OST, Handbooks, old radio magazines, any quantity. Buy old radio gear and publications. Erv Rasmussen, 164 Lowell, Redwood City, Calif. 94062.

NOVICE Crystals: 40-15M, \$1.33, 80M, \$1.83. Free list. Nat Stinnette, Umatilla, Fla. 32784.

TOROIDs, 88 mh uncased, 5/\$2.50. Postpaid, Humphrey, WA6FKN, Box 34, Dixon, Calif.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

SAVE. On all makes of new and used equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts, 617-598-2530 for the gear u want at the prices u want to pay.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, WBRP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan 48104, Tel. NOrmandy 8-8262.

RTTY Channel filters, octal mounted, 2125/2975, \$5.95 pair. Special filters for T1/L-2, SASE for information, 88 Mh. toroids, uncased, 5 for \$2.50. Herman Zachry, WA6JGI, 2322 Seby Ave., Los Angeles, Calif. 90034.

TR-4, \$480.00; AC-4, \$83.00; DC-3, \$123.00; R-4-B, \$360.00; T-4-XB, \$360.00; M-4-A, \$17.50; RV-4, \$83.00; L-4B, \$580.00; W-4, \$43.00; factory-sealed boxes, fully guaranteed. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C. 27404. Tel: 919-299-8767.

1000 PIV 1.5 amp. epoxy diodes, includes by-pass capacitors and resistor, 10 for \$3.75 ppd U.S.A. Fully guaranteed. East Coast Electronics, 123 St. Boniface Road, Cheektowaga, N.Y. 14225.

ESTATE Liquidation. SSAE brings list quality equipment. Paradd Engineering, 284 Route 10, Dover, N.J. 07801.

HQ-110 receiver, \$135.00; Johnson converter 6-2 meter, \$35.00; Seneca VHF-1 transmitter, \$95; Heathkit scope Model OM-3, \$35.00; Eico modulator, driver model 730, \$45.00. Howard Roberts, 635 Jayne Blvd., Terryville, L.I., N.Y. 11776.

COLLINS S/Line including 30-S-1, \$1600. Johnson Viking Kilowatt, \$600.00, with Ranger driver, \$700.00; HQ-180 with speaker, \$150.00. Or will trade for land in Florida. James H. Hayes, K4RIZ, 102 Leesville St., North Charleston, S.C.

RADIO Parts and equipment. Stamp for complete list. W6ME, Rte 1, Box 666B, Arroyo Grande, Calif. 93420.

TOOBES—Tranzesters: New, unused, 6146B, \$4.00; 6CW4, \$1.60; 81A, \$4.80; 417, \$17.50; 6146A, \$2.25. Free catalog. Vambar Distributors, P.O. Box 912, Paramus, N.J. 07652.

GE Used Two-Way FM equip, SASE for list, 75A4, \$425.00; SB-150, transceiver, AC and DC ps, \$350. OSTs 1957 through 1967, W2EQV, 25 Gladwish Road, Delmar, N.Y. 12054.

WANTED Grebe CR18, Keith Olson, W7FS, Star Rte. 1, Box 398, Belfair, Wash. 98528.

PROP Pitch rotors, excellent, small 10:000:1. \$45.00. John Link, 1081 Aron St., Cooca, Fla. 32922.

HISTORICAL Rare documents. Large number of QSTs from 1923 on to swap for Colin B. Kennedy longwave receiver. John Broolley, 719 41st, Los Alamitos, New Mexico 87544.

HALLICRAFTERS HT-44 less supply and SX-101A, both in like-new condx and A-1 shape. Any reasonable offer accepted. K9DOO, W. J. Dres, Box 273, Palos Heights, Ill. 60463.

A Business of your own. An industry leader shows you how to set up into the Sound and Intercommunications business on your own. Send today for a free brochure to: Action! Systems Company, 34 Cambridge Street, Meriden, Connecticut 06450.

FOR Sale: NC-300 with speaker and converter cabinet 6M Parks conv., \$150.00; G-76 with 12VDC supply, \$120.00; Globe 30K A, \$120.00; SCR522 with supply, \$30.00. K7UNA, Rte. 1, Box 200-B, Quincy, Washington 98848.

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. Plot showers, fireplaces, light housekeeping, children golf. Lake shore camp sites. Literature. At. Q. Livingstone, W2QPN, 12-01 Ellis Ave., Fair Lawn, N.J. 07410.

CLEAN KWM-2, Collins modified to meet most recent specs, \$825. WA9LNS, 414 3rd Ave., Rock Falls, Illinois 61071.

TWO Thirty watt Novice transmitters, including manuals, cost over \$100 each, including assembly. Must sell fast. \$80.00 each. John Schmitz, 11208 Whisperwood Lane, Rockville, Maryland 20852.

JOHNSON Ranger II, factory wired, unmodified. Will guarantee excellent condx: \$175.00. K1YYC, 14 Tonetta Circle, E. Norwalk, Conn. 06855.

SX-99, vy gud condx. Asking \$70.00. Woody Hill, WB6ZCD, 2612 Westhaven, Anaheim, Calif. 92804.

HEATHKIT Station for sale! All in excellent condition. The following units are available: SB-300, complete with all filters, \$265.00; SB-400 modified to transceiver with either LMO, \$285; HO-10 Monitor scope, \$45.00; HO-13 panoramic scope, \$45.00.

The following equipment is also offered for sale: Apollo 700 linear amplifier for six meter service, \$180.00; GDB Model TR-44 rotator with 250 ft. of cable, \$55.00; RG-11A coaxial cable, 250 ft., used, \$15.00; RG-8A polyfoam cable, 250 ft., used, \$15.00. Alan Davis, WA2URT, Jericho-East Norwich Road, Syosset, N.Y. 11791. Tel: a.c. 316-WA1-6188.

SELL: QST: June 1935, June 1936, Dec. 1940, July 1953 through July 1956 and September 1956; CO: 25 issues, May 1953 thru Nov. 1955 and 1954 (33rd Edition). License Manual. Best offer, plus shipping takes all. G. Rome, 8119 Delridge SW, Seattle, Wash. 98108.

SELL: SX-101A, in exlnt condx, \$225.00 or partial trade on 5-hand transceiver, David Shafter, K3NXX/3, Box 533, C-MU, Pittsburgh, Penna. 15213.

COLLINS 75A-4, Ser. No. 3703, with 3-kc. and 500 cycle filters. One owner. Very little used. Perfect condition. \$450.00. WOLPB, 900 South Fairview Ave., St. Paul, Minn. 55116. Tel: 612-698-2559.

FOR Sale: Heath 300 and 400, \$475.00 for both; Collins 30L-1, \$375.00; Heath Ham-Scan HO-13, \$45.00; HRO-5 table model p/s, N/S. All coils 50 k.c.—30 meg, \$135.00. W2AOM, 1235 East 40th St., Brooklyn, N.Y. 11210. Tel: Bus: 596-5917. Home: 338-4644.

TWT'S Unused—tested, available in ranges from 0.5 to 12.4 GHz. Joe Deal, K2R0K, 67 South Pearl Street, Bridgeton, N.J. 08302. Tel: (609)-451-0251.

TEKTRONIX "scope plug-in," "L"-type, 30 Mc., 5 millivolts/cm, \$70.00. Collins filters, 2,1 and 4 kc. for 75A-4, \$20.00. Unused \$100.00. A5500, \$50.00. Very low rise time amp. for 2, APA-2, See 73, June 1966, \$35.00. Good 15 key board, 7.00. Want: 530-540 series Tektronix; 2 meter FM equipment; Bird 43 plug-ins; Nems-Clarke receivers and front ends; Boonton FM generator; PRD 219L and 219H heads. Cash, K4GYO, 430 Island Beach Boulevard, Merritt Island, Florida 32952.

FOR Sale: SB-200 linear, \$250; HT-44 with power supply, \$295; SX-117, \$250; DX-60, \$50; Grid Dip meter, \$30; Cesco SWR meter, \$12. All are in mint condx. Call or write Michael Theodorou, 16 Fane Court, Brooklyn, N.Y. 11229. Tel: TW-1-3714 after 5 PM.

HAM-TV, closed circuit TV camera, \$125.00; Hitachi 7735A Vidicon, \$15.00. Toshiba 7038 Vidicon, \$10. Stan Nazimek, WB2GRF, 506 Mt. Prospect Ave., Clifton, N.J. 07012.

HEATH HW-22 Transceiver, with mobile power unit: \$110. W5BSU, 74112.

116 Copies OST, ten year run, 1951 thru 1960, with Index: \$25.00. F.o.b. W0CAW, 1840 So. Milwaukee St., Denver, Colo.

DRAKE T4X, \$290. Heath checked, DeLuxe general coverage receiver GR54, \$55; Heath HD-20, 100 Kc. calibrator, \$10.00; Heath VTVM, 1MW13 with 309 W-R probe and 336W V.V. probe. All Heath factory assembled, \$5.00. Heath V.T.V.M. IM11, \$22.00. Ed O'Brien, W21W, 86-10 34 Ave., Jackson Hts., L.I., N.Y. 11372.

WANTED: Old 3" oscilloscope, in any condx. Will trade Jensen X-20 walnut thin-line speaker system, Billy K. Hart, 32 Best Drive, Saraland, Alabama 36571.

CHRISTIAN Ham Fellowship now being organized for licensed amateurs for the purpose of Christian fellowship and for distributing gospel tracts among amateurs. Christian Ham Callbook, \$1.00 donation. Free details. Write Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Michigan 49423.

HEATH SB-300 receiver with three filters, SB-401 transmitter with all crystals; SB200 linear. All very sud condx. Only \$650.00. Drake MN4 Matchbox, \$55.00. Eico 460 "scope, like new, \$80.00. Phil Schwabler, W9GCG, 4536 N. 50 St., Milwaukee, Wisconsin 53218.

SALE: Heathkit SB-10 \$45.00 Hammarlund LLO receiver, \$160.00. W3IHF, 31 North Grant St., Waynesboro, Penna. 17268.

**DRAKE TR-4, MS-4, AC-4** in mint condx. Vietnam bound. Will sell for \$500.00, KH6FRO/6, 303 Fairmont, Oranese, Calif 92668 Tel: 714-332-0222

**SALE:** S-108, \$59; Mosley CM-1, \$85; DSB-100, \$45; UM-modulator, \$5; AC-459 \$38; Heath Twozer, \$35; HQ-150, \$115; HQ-140, \$95; Wanted: NC-45, W3NCX, 1005 Wyoming, Aldentown, Penna. 18103.

**SWAN 350** Mobile rig, complete with Electro-Voice mike, field strength meter and bumper mounting. Waters whip antenna, with 10M and 80M Automatch coils. Used very little. Price, \$350.00. Stanton L. Burgess, W4EFT, 2 Lake Haven Park, Dune-din, Florida 33528.

**6-Meter transceiver 1967** Hallicrafters SR-46A W/mobile kit, Squalo, like new condx. \$145.00. W1QML, Tel: (617)-922-4819.

**SELL Locally:** Globe Chief deluxe xmt, Globe VFO V-10, Globe modulator SM-90; Astatic mic JT-30. All in xclnt cond for \$100. WA2JZU, 18 Elm Road, Pompton Plains, N.J. 07444. Tel: 853-3804.

**COMPLETE** station priced to sell: 75S-3C, 312B-4, 32S-3, 516F-2, late Henry 2K kilowatt Matchbox with indicator, complete 70 foot tower, with Ham-M rotor, Mosley TA-36; all gear in like-new condition. For details write or phone Mel Marsley, 2242 Stevens Avenue, Kalamazoo, Mich. 49001. Phone: 3428838. Area code 616.

**SELL 4 v. power supply.** Heath FV1, military clock 24 hrs. Some variable condensers. All for \$5.00. Frank Rodio, K2TBZ, 243 Senator St., Brooklyn, N.Y. 11220.

**NEW, immaculate Drake 2-Cs, \$230; Ranger I, clean, \$95; DB-20 Preselector, \$20. WA8KME, Gary Kaser, 314 Birch Lane, Paw Paw, Mich. 49079.**

**QSTS** For sale: 1924-1949, run complete. Make offer. W8INB, 9 Valley View, Vienna, West Va., 26101.

**CENTRAL Electronics 100V, \$385.00, F.o.b. Louisville.** Excellent condx, manual, spare 6550's. Original crate. WA4ZIR, 7902 Tip Top Lane, Louisville, Ky. 40219.

**RTTY Model 15 and 14 TRFX** with TD and power supply mounted on portable stand, beautiful, mint condx. Cash and carry: \$150.00, 133 Morlynn Ave., Bryn Mawr, Penna. 19010. Tel: PH-LA-5-8849.

**WRITE, Phone** or visit us for the best deal on new or reconditioned Collins, Drake, Swan, National, Galaxy, Conset, Hallicrafters, Hammarlund, He-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, Mo. 64730.

**NC-200/AC supply, 10D/PTT, 12AVO, \$300.** Package only. G. Arroyo, Tel: (212)-942-3633. One Bogardus Place, New York City 10040.

**COLLINS 32V-2** for sale locally, \$150.00. Walt, W7VI, 5049-37th Ave., N.E., Seattle, Wash. 98105.

**YAESU FT-DX-400** Transceiver for sale. W8AO, 2912 River-view Boulevard, Silver Lake, Ohio 44224.

**VACATIONERS:** Free use of my antennas for back-home OSOs. Gerald Osburn, W9ARW, Tentel Campground, Peyton, Colorado, Near Colorado Springs, 80831.

**COLLINS 75A-4** (Stankus modification): 3 filters, 3, 6, 12 kc., Ser. No. 5577, \$435.00; Swan 500 117X, \$375.00; Hallicrafters HA-2 HA-6 power supply, \$300. Irving Haimowitz, WB2HZH, 153-18 58th Ave., Flushing, L.I., N.Y. 11355. Tel: (212)-TV6-1344.

**WANTED:** New England Radio Counselor to teach and operate W1MYM, Maine Senior Boys Camp. Minimum 19, General Class, plus one year college. Write: Camp Androscoggin, Wayne, Maine.

**SSBA 250 Kc/S Collins** mechanical filter very much needed. TF3ST, Box 354, Reykjavik, Iceland.

**RME 6900** receiver with speaker, in gud condx. Will ship. \$110.00. Albert Schwartzberg, 2233 Marrye Street, Alexandria, La. 71301.

**WANTED:** 32S-1, 32S-3, or HT-44 transmitter with AC supply. Must be reasonable, mint, with manuals. WA6JWK/4, 2304 N. Florida St., Arlington, Va. 22207.

**SBE-33**, with mike, in A-1 condx; \$200. L. J. Sams, WA7ASC, West 2816 Olympic, Spokane, Washington 99208.

**SELL 32S3 and 516F2,** Telrex TC-99 Tribander. Heath HO-10 scope, NC-125. Write for details. K4CST, 1340 NW 190 St., Miami, Fla. 33169.

**SX-25 w/speaker; Harvey-Wells** Bandmaster TBS-50D (2 thru 160) homebrew power. NCX-3 w/homebrew power supply. Apache TX w/S-10. Best offer any or all. A Jacobs for WA0LUP Estate, P.O. Box 214, Kiowa, Kans. 67070.

**HALLICRAFTERS HT-32A** transmitter, \$250. SX-101A receiver, \$150. Both are in perfect condition with manuals. You pay shipping. Also accessories: Cesco SWR Bridge, \$15; Astatic D-104 mike, \$20. Lo-pass filter, \$5.00; antenna relay, etc. Rick Cales, WB6VSO, 5117 Hallmark, Riverside, Calif. 92505.

**CESCO SWR Bridge, \$15; Astatic D-104** mike, \$20. Lo-pass filter, \$5.00; antenna relay, etc. Rick Cales, WB6VSO, 5117 Hallmark, Riverside, Calif. 92505.

**COLLINS Station,** complete 32S-3, 75S-3, 30S-1, 312B-4, 516F-2, spare new 4-CX1000A. All for \$1600. In addition, two Rohin foldover steel towers 65 feet and 55 feet. Telrex 15-20 meter beam. Hy-Gain 2-element 40- and 3-element ten. Two Ham-M rotators. Make offer. You take down and take away. Sry, will not ship anything. W9YSM.

**DAH-DITTER** Keyer. Integrated circuit electronic keyer. Fully self-completing on both Dit and Dah with automatic spacing. Built-in AC power supply, Reed relay output, with side-tone monitor and speaker. Completely assembled and tested. Only \$24.95. Desks in stock. Send your order to: M & M Electronics, 6835 Sunnybrook, NE, Atlanta, Georgia 30328.

**R-392/URR** recvr, in excnt condx. Complete, \$525.00 firm price. H. Brock, 2226 East 28th St., Brooklyn, N.Y. 11229

**WANTED:** Little 20-meter c.w. rig or transceiver. WA2UDY, 112 Carlson Parkway, Cedar Grove, N.J. 07009.

**SELL:** Hammarlund HX-50 xmt, Drake 2B with 2BQ speaker Q-multiplier. Like new condx. \$190.00 each. Thomas J. Reid, WA2LHH, 2557D Shallowford Road, N.E., Atlanta, Ga. 30329.

**TRADE 2000** PEP linear parts for six meter transceiver. W3KG, McShaffrey, 4 Knox Ave., Monessen, Penna. 15062.

**GALAXY V, Mk II,** power supply, speaker, console; Shure microphone. Like-new condition. Hardly used, \$359.00. Phil Gluckman, WB6SSA, 19790 Merricbrook Drive, Saratosa, California 95070.

**PRINTED Circuit** Board. Single or double-sided, 9 x 12; 754; 6 x 9, 404; 4 1/2 x 6, 206; 3 x 4 1/2, 154. Minimum order, \$1.00. Sry, no c.o.d.'s. Star Sales Company, 404 West 38, Wilmington, Delaware 19802.

**FOR SALE:** HT-33-A, \$295, SB-300 with AM filter, \$200. SB-401 with all Xals, \$250, 75A4 #5362 (0.5, 3, 1 filters), immaculate, \$495. F500B-3 (5114), \$35, UTC LS-103, \$15. Transformer, 115/1300 @ 3.0 amps, \$25, 115/6.3 or 7.5 @ 21 amps, \$7. New Tronics transceiver 1g1, new (cost \$39.95), \$20, 351D-2, new \$85, used \$65. Collins SM-1, \$25, 3-400-Z, new, \$28. Heath IP-32, \$35, Henry 2K-2, new Jan 68, \$57. Wanted: KWM-2A, manufactured within past year. Also 30S-1, needing work, \$450-\$500. James Craig, 29 Sherburne Avenue, Portsmouth, N. H. 03801

**HEATH Sixer (HW29A)** 6-12 volt power supply, Saturn 6 antenna. Best offer. Jim Overheul, K8YZP/8, K-107 Cornell, Ypsilanti, Mich. 48197. Tel: (313)-483-9562.

**COLLINS KWM-1** with noise blander and 516F-1 AC supply, \$270. Collins mobile mount, \$25. Dan Marien, 5904 Grove St., Edina, Minn. 55436.

**METERS** At giveaway prices. Send for listing. Also 4CX250B tubes unused, \$10.00 each; Jennings ICSXF vacuum variable capacitor, unused, \$10.00, Carborundum 250-watt dummy load, unused, \$8.00, SWR Bridge, \$3.00. Want: Swan 410, Drake 1A, 2A, 2B, Samkotsky, W2YSE, 201 Eastern Pkwy., Brooklyn, New York 11238.

**TWENTY-Meter** antenna system. Vesto HPX-100 tower, Telrex 20M-546 beam and A2675RIS rotor. \$1800 F.o.b. Alamogordo, New Mex. Write for details. Gary L. Grothen, W5OPL WOOMH, 710 Arnold, Alamogordo, New Mexico 88310.

**SELL:** Hallicrafters, HT-37, like new. Fitted for RTTY. Just plug in the key board, \$200. One owner only. Will take \$100 and used TTL converter. Ed Sowers, WA8AUZ, 1548 Sunside Dr., Akron, Ohio 44321.

**COLLINS 32S3-B** ser. No. 15066. Certified check for \$375.00 plus collect shipment. R. P. Dutton, 4336 Irvin Simmons Dr., Dallas, Texas 75229.

**SALE:** 75A3 with 3.1 filter and G-E #B for SSB with 75A-3 in F.M. position. Collins speaker in cabinet with HT-37 with w-11. Make A.L.C. HT-41 spare 709AS. Mint condx. Must pick-up. Cash only, \$600.00. Phone 201-262-0943. 188B Powell Dr., New Milford, N.J. 07646.

**NC-303**, in mint condx; \$210.00; prop pitch motor, \$25.00; 4-250As, \$12.00; 4-125As, \$8.00; 805's, \$2.00; 810's, \$2.00; 2E24's, \$2.00; 24G's, \$2.00; 866As, \$1.00; 4E27, \$3.00; 829 and socket, \$4.00; Heath VF-1, \$7.00; 250 watt multitap modulation xfrm, \$10.00; 500 watt multitap modulation xfrm, \$18.00; 5G selvsys \$10.00 pair, xfrm sv 100 amps, \$8.00; 10 VCT 10 amps, \$4.00; Johnson 5S mmfd/section, 250 spacing, \$5.00; 5 ft. Part-Metal enclosed cabinet with dolly, \$25.00; dynamotor 12 VDC inrut 440 VDC output, \$3.00; 2-element 20 meter beam, \$12.00. F.o.b. James Buck, WB6BYZ, 13222 Loretta Drive, Santa Ana, Calif. 92705.

**SCHEMATICS** For T-61/AXT-2 transmitter. CRV-59AAE camera. CRV-60ABK monitor. Instruction manuals for following scopes. Type 241 Dumont, Hughes memo scope type 104. Jerry, K0REK, 13312 Inverness Rd., Hopkins, Minn. 55343.

**WANTED:** Link Two-Way radio Model 9600 test meter. Appearance not important. L. Hughes, W1ACW, 21 Turner, Presque Isle, Maine 04769.

**SALE:** Brand new Drake SW-4A late model receiver with broadcast band, matching speaker, loop antenna manual, 1000 watt card. Bought new from Henry Radio, February, 1968, \$330.00. Sorry, no trades. Write offer to Bob Randall, W0RNR, Ashland, Kansas 67831. Box 672.

**FOR Sale:** Like new Collins: 75S3B recvr, 32S-3 xmt and power supply; 30L-1 linear; 312B station control and SM-2 microphone. 10 additional crystals for out band operation. Package: \$1400. J. K. Richardson, 408 Trimble, Palestine, Texas 75801. Collins 2-C and 2-CO, like new, in original cartons, \$195.00; Drake 75A-3 with 3.1 choke, filter, plug-in product detector and crystal BFO. In perf. condx, no scratches, \$240.00. Johnson Vibrokey and 2.5 unit VFO and Etico modulator, \$125.00. F. Levine, WA2OEH, 139-10 Cronston Avenue, Rockaway Park, New York 11694.

**HAVE** the following for sale: TA-33 antenna with 40-meter conversion kit. Never used, \$75.00. William Coleman, 17 Madison Ave., Ossining, N.Y. 10562.

**3-Element Triband** Hy-Gain TH3MK2, local delivery, \$60.00; CDR rotor TR44; \$44.00 with 100 feet of control cable. HA-1 T-20 keyer with Vibrokey bug, \$65.00. W9HHA, John Dwyer, 2285 Holly Court, Northbrook, Illinois 60062. Tel: CR-2-2443.

**SELL:** SR-150 with A.C. supply. WA1DLM, Warren Hall, 209, RPI, Troy, N.Y. 12181.

**HAVE** VFO power supply and Heath VFI, also military 24-hr. clock. Will trade for what have you around the shack. Frank Rodio, 243 Senator St., Brooklyn, N.Y. 11220.

**\$72As, 10000 PIV, 5A peak, 1.25 A continuous.** New surplus, \$5.00. WA0NOP, Dwight Hunter, Forestburg, South Dakota 57338.

**FM New 2-meter** ITT 30-watt output, desk top AC Base, less Mic, \$129.50; Mobile small front mount transistor powered with mic cable mounting hardware, \$87.50. Used 450-Motorola T44 18-watt with control head and cable, \$29.50. The Western Communications Co., 4130 Cochran St., Santa Susana, Calif. 93063.

FOR Sale: Pre-1930 Atwater Kent floor model radio, in working condx, excnt cabinet. First best offer. Mrs. Bill Wilson, 62 Somersd Road, Norwood, N.J. 07468. Tel: (201)-768-6304.

ELECTRONIC components for less. Write for free catalog. EDL, Wescom Electronics, 1491 Overlook Dr., Alliance, Ohio 44601.

SELL: Two Dow-Key relays, \$5.00 each. Both: \$8.00. K0AHO, 45 Green Meadow Park, Clear Lake, Iowa 50428.

REBUILDING Antenna? Write Ham Hardware Headquarters. Best QVS Stainless Steel, brass, screws, bolts (1/2" to 6"), nuts, washers, eye-bolts, rods, clamps. Bargain packets 25¢ to \$10. Postpaid. Stamp for lists. W3BLR, Strassner, 29716 Briarbank, Southfield, Mich. 48075.

MUST Sell: Hammarlund used 30 hours HQ-180XE receiver. (Cost \$499.00) for \$250. HX-50A exciter. Cost \$399. For \$200. HX-1 linear cost, \$375. For \$187. All perfect, in cartons. W3WK, 3579 Milburn, Baldwin, N.Y. 11510.

NOVICES: HQ-129X, with Heathkit Q-multiplier; Johnson Viking Challenger with crystals, key, and mike. All for \$150.00. Glenn Gustavson, K1MCH, 20 Livingstone Lane, Waltham, Mass. 02154.

DX-100B, \$120.00; SX-101, \$150.00. Both \$250.00. Very clean, with manuals. DK-60GZC, 115 v., ant. relay, \$15.00. G. Black, K8VAS, 563 Center Ave., Essexville, Michigan 48732.

COLLINS 75A-4, ser. No. 5799; 6 Kc (w 3.1 Kc filters, manual, excellent condx. \$450.00. HT-44 with p.s., manual: \$225.00. Pick-up deal only, sry. W2BOYA. Tel: (212)-359-0271.

SWAP: AN/TRC-1 equipment (R-19/TRC-1 and T-14/TRC-1) for VHF equipment. Berkley Ruiz, WA4SKF, 210 West New Street, Winder, Ga. 30680.

FOR Sale or trade: Globe V-10 VFO, almost new, \$25.00 or will trade for ham gear or test equipment. Les, W2BDWR.

COLLINS KWM-2 and AC power supply. In perf. condx; \$725.00. W4BGC, John Breece, McComb, Ohio 45858. Tel: (419)-293-3500.

WANTED: Buy or borrow manual for Harvey-Wells TBS-50 transmitter. W4UEB, Joe Wright, 317 Marshall St., Hampton, Va. 23369.

COLLINS 32S-1, 75S-1, a.c. supply. In excnt condx; \$625.00. Also two beautiful linears, Fr 4-1000's and pr. 4-400's. Write for details or call c.a. 313-647-8249. Robert Day, K8TAH, 325 Keswick, Bloomfield Hills, Michigan 48013.

SELL: Twoer transceiver Heath with crystals. Best offer. K0AXY, St. Joseph's Hill Infirmary, Eureka, Missouri 63025.

SELL: Hallcrafters SX-117, R-48 speaker; Johnson Navigator transmitter; Heath HW-32, HP-25, PIT microphone; Hallcrafters HA-1 keyer; Vibro-Key; Telex MRB-30 headset, new; Model 18, p.s. table; snare keyboard and type basket; Esco W2JAV type T.U. All units are in excnt condx with manuals. Best offer. Donald Porter, W2BQKD, 230 Merritt Dr., Oradell, New Jersey 07649.

TA-33 Triband beam, \$65.00. No salt air or smog corrosion. Silicone treated traps. Will ship. W6DSX, P.O. Box 201, Paradise, Calif. 95969.

HT-32 SSB transmitter. Excellent rig, but need something more compact. \$200. Kevin Snapp, W4MCK, 12308 Sierra Grande N.E., Albuquerque, New Mexico 87112.

SELL: Heath Marauder SSB xmtr, HX-10, \$150.00. W2PBZ. Tel: 201-768-2891.

HT37 xmtr, \$195.00; SX-111 revr, \$110.00. In gud condx. Manuals Walter Bennett, W9KUA, 4464 Glenway St., Wauwatosa, Wis. 53225.

ATTENTION Michigan, Ohio, Indiana, Illinois DXERS: Complete 20 meter antenna setup, including 144 foot tower with guys, 2" mast, loudspeaker rotator and indicator. Bearings, 175 feet 1" O.D. Lo-Loss coaxial cable, 550 feet Neoprene jacketed 4 wire rotator cable, and 6 elements on 46 foot boom Telrex 20 meter beam. Used but in excellent condition, \$1,000. Also two 2 Kw 90-135 volt 60 cycle input 17 volt output constant voltage transformers, \$100 each. Anderson, W4GUC, Apt. 505, 390 North Florida Highway, Deerfield Beach, Florida 33441.

HAMMARLUND HX50-A. Must sell, getting married. Joe Babcock, W4SGPA, 295 W. Prospect Ave., Pittsburgh, Penna. 15305.

HEATHKIT GR-64, general coverage receiver, excellent condition, \$35.00. Martin Dwyer, 239 W. 21st St., Chester, Penna. 19013.

SB-400, \$225; SB-300 with c.w. filter, and SB-600, \$200.00. P.O. Providence, R.I. Ronald Simonton, K1GMW, 48 Tryon Ave., Rumford, R.I. 02916.

FOR Sale: SX-99, in excnt condx, \$80.00. David Holm, W2BWSU, 71 Delaware Ave., Metuchen, N.J. 08840. Tel: 201-549-9015.

SELL Swan 350, a.c. power supply, MARS SW-10, 14AVO, Heathkit Cantenna. All for \$325.00. Les J. Delworth, W6BRDW, 5089 Delmonaco Drive, Santa Barbara, Calif. 93105.

SELL: HT-37, \$180.00; Drake 2B, 2BQ, 2AC, \$170.00. Both are in mint condx. Manuals, Steve Press, W2KRV/1, 134 Lexington St., Woburn, Mass. 01801. Tel: 935-5055.

SPORTS-CAR Fans: Road & Track, Car & Driver, 250 early issues. Will swap for test equipment, other gear? Walt Schwartz, W0LOJ, 4138 Wentworth Ave., Minneapolis, Minn. 55409.

TRADE: SX-111 and DX-100 together only. Want 2 1/4 x 3/4 or larger high quality photo-enlarger. Super 8 mm movie camera and projector, Transceiver, or cash. W9EFV, 419 S. Oakwood, Anrola, Indiana 46703.

COLLINS KWM-2 with 516F-2, \$750.00. Latest model 75SB with improved circuitry and shield over filters, used only as demonstrator \$600. Earlier model 75SB3, \$500.00; 32S3 latest model, \$650.00; 75A-4, clean, \$400.00. Drake T4X with AC-4 supply, \$375.00; 2B, \$150.00; Factory authorized Collins service center. Sorry, no trades on above items. Douglas Electronics, W5GEL, Bob, 1118 South Staples, Corpus Christi, Texas 78404.

HEATH HG-10 VFO, in mint condition. Will sell or trade for Hico modulator or VFO. WB2UWN. Tel: (212)-653-2697.

HA-350 and DX-60A, for sale, \$90.00 and \$40.00 respectively. Used about 8 months. W4SRWT, Mark Morrow, Route 4, Box 53, San Benito, Texas 78586.

HALLCRAFTERS HT-32A, \$250.00; Hammarlund HC-10, \$50.00; Harvey-Wells "Z-Match", \$50.00; Eimac 3-400Z, new, \$25.00; Chimney SK-406, \$5.00; Stancor P-6433, new, \$8.00. National HRO-60T, xtal calibr, Select-O-Ject SOJ coils A/B/C/D/AC, \$200. Ed Terrien, W0LO1, 29 Friendship Lane, Colorado Springs, Colo. 80904.

DRAKE TR-3, AC-3, and DC-3 power supplies. Mobile mount, body mount, 75 and 40 meter Hell-whip antennas. All like-new condx; \$550.00 package price. Will deliver within 50 mile radius Chicago or F.o.b. Joliet, Illinois. Earl E. Luckhart, W9YWX, 123 Roy St., New Lenox, Ill. 60451. Tel: ca. 815-485-6368.

HALLCRAFTERS SR-150, AC, DC, mobile mount. All are in excellent condx. \$435.00. Dennis Russell, 4103 Highcrest, Rockford, Ill. 61107.

HAM, over 18, to instruct at a children's camp in the Pocono Mountains in Penna. Own equipment required. Please explain type equipment and further qualifications to Pocono Highland Camps, 6528 Castor Avenue, Philadelphia, Penna. 19149.

TOROIDS, 88 and 44 mhv. Center tapped, unused, 5/81-50 ppd. RTTY page printer paper, \$5.50/case. New Heath DX-50A, \$55.00. Tecraft Criterion 6-meter converter, \$30.00; Apeco photo-copier with paper and chemicals (trade?) \$40.00. T163A regenerative repeater \$20. Polar relays, \$3.00; sockets \$1.25 postpaid. Wanted: tower, K500, RTTY gear, rotator, stamp for list. Van, W2LPT, 302Z Passaic, Stirling, N.J. 07980.

MERCURY wetted reed relays ideal for solid state electronic key 2 amp, contacts, 1000 ohm, 3 mil coil, \$4.45 postpaid. Delaware Electronic Supply Co., 220 West 4 St., Wilmington, Delaware 19801.

FOR Sale: Complete station in excellent condition. HT-44 xmtr, w/matching supply, \$320.00; SX-117 receiver, \$215.00; TH-3 beam, TR-44 rotator, and 25-foot Rohm tower, Larry Kraus, 147 Croydon Road, Yonkers, N.Y. Tel: (914)-779-4741.

SX-111, T-150, tape-recorder, extras, no scratches, Like new condx. \$200. R. Zears, 927 Chambers, Ottawa, Ill. 61350.

PROPELLER Pitch Motor, unused, with transformer converted, \$30.00. One piece 34 feet Duraluminum 3 inch tubing, \$35.00; T150 modified, with manuals. Best offer. W9-3E, 4061 North Drive, Ft. Wayne, Ind. 46805.

HALLCRAFTERS SR-150 matching P/S. All new tubes, in mint condx. \$295.00. Local pick-up deal preferred. Fair Lawn, N.J. Tel: (201)-797-9652. W2NWX.

GALAXY V, a.c. supply, remote VFO and speaker, \$350.00. Tom Porter, 230-22nd St., S.W., Birmingham, Ala. 35211. Tel: 781-1810.

PRICED For quick sale: HT-44 with power supply, \$220.00; Drake 2B, 2BQ, 2AC, all 10 mtr xtals, \$180.00. Both for \$390.00. Both in mint condx. You pay shipping. W48LYF, Steve Maki, 29809 Stockton, Farmington, Michigan 48024. Phone: (313)-474-1266.

61 FT. Vesto tower, with standing platform and safety rails. Telrex 4-element trap beam model TBS-416, Ham-M rotator, control box cables, 100 ft. VHF helium filled line, coaxial lead-in cable, \$1100 value for \$200. You take it down and cash & carry it away. Can be seen at 382 Fulton Street, at Radiator Shop. Call CH-9-0923. Albert J. Bertolisi, W2ALT, 33903.

SELL Or swap: Field Day unit, Hol-Gar CE-55AC/WK8, skid-mount 5 KW, 120V/240V, 60 Hz, 1 or 3 Ph. Used, vy gud shape. F.o.b. Minneapolis, Kansas. Best offer over \$350.00. Trade for lab test equipment, military gear, late model color TV or ???, Rod Hoeg, K0E0H, 1304-1 E. Chestnut, Garden City, Kansas 67846.

HEATH DX-100, in excnt condx, with Heath antenna load mod, and silicon HV rectifier, \$100. W1TF, Elmer Turner, Box 87, Melrose Village, N.H. 03850.

TRADE Globe-King 400-B and VFO for gud stereo recorder, or \$120. More bargains! Send stamp. Metzler, R.1, Box 39, Manhlm, Penna. 17545.

SELL: Collins 62S-1, #11604, immaculate condx, \$595. J. W. Wagner, W8AHB, 3890 Tubbs, Ann Arbor, Michigan 48103.

SWAN-350, like-new condx, less power supply, \$230.00 firm. W5NNV, 482 Highland, Richardson, Texas 75080.

NATIONAL NC-303, \$150; Apache, \$100. Arthur Malatzky, W2BWF/1, 83-19 141 St., Jamaica, L.I., N.Y. 11435. Tel: (212)-V19-7568.

DX-40 xmtr, \$40.00; S-85 revr with built-in 100 kc, xtal calibr. \$75; Heathkit Q-multiplier, \$5.00. All are in excnt condx es working FB. Will sell as package: \$100. John Hastings, 827 Nims, Wichita, Kansas 67203.

WANTED: Repairable SB-33 or SB-34. Eico 753, Natl. HFS, Miniprods B-24, Tiny Tor power plant, Gardiner code-sender Type J, Lennart Larsson, Vulcanusgatan 8, Stockholm Va., Sweden.

DX-60, \$50.00; HR-10, \$40.00. Both are in excnt condx. W4DQA, W. N. Giles, 128 Manor St., Roanoke, Va. 24019.

SELL: Drake 2-A, matching speaker, xtal calibrator. In excnt condx, \$125.00. Chuck Lynch, Jr., 1900 Forest Drive, Camden, S.C. 29020.

FOR Sale: Heath DX-100, \$85.00 and Heath HR-10, \$50.00. Both are in excnt condx. Fred, W4HKV, 92 Leonard Road, Hamden, Conn. 06514.

NEW Swan 500C with 117XC, \$488. Unopened factory-sealed cartons, with warranty. Two available. W4HKO, Don Payne, Box 525, Springfield, Tennessee 37172. Phone (nights only) (615)-384-5643.

SALE: Drake 2B receiver, \$160.00; Heath HX-10 Marauder transmitter, \$180.00. Take both and receive free D-104 microphone. Ameco CN-50 converter, \$30.00. Heath Twoer, \$25.00 (\$30 w/microphone and xtals). Heath HO-10 monitor, \$25.00. Heath Seneca VFH-1, \$95.00. Ship REA collect. Austin Wade, 108 San Marco, Rapid City, S.D. 57701.

TA-33 beam and Ham-M rotor on 66 ft. Rohn #25 tower, 40 ft. crank-up and tilt-over tower with TR-44 rotor, plus 3-bed room, 1 and 1/2 bath OTH with large ham shack. One block from large lake with excellent fishing and water-ski shows at adjacent Cypress Gardens, \$18,950. Financing available. K4IIF, Box 205, Winter Haven, Fla. 33880.

MINT Viking Valiant, D-104 Astatic microphone, Ameco LN-2 low-pass filter, \$145.00; free Vibroplex, coaxial cables, connectors, extras if picked up. Vibroplex alone \$11. SASE. WB2UZ, 101 Aldrich Ave, Binghamton, N.Y. 13903.

PREPARE For new FCC exams! You need Post-Check. Multiple choice questions, explained answers, IBM sheets for self-testing. Same form as FCC exams. General Class, \$3.25; Advanced Class, \$3.50; Extra Class, \$3.75. 295 to 300 questions or diagrams in each. Each complete for a specific exam. Basic questions duplicated if they apply. Third class postage prepaid. Add 26¢ per copy for first class mail; 54¢ for air mail. Send check or money order to Post-Check, P.O. Box 3564, Urbana Station, Des Moines, Iowa 50322.

SELL: Swan S50 (latest), A.C. supply, crystal calibrator, selectable sidebands, \$325.00. WA1CHL, East Shore Drive, Burlington, Conn. 06082.

SELL: HQ-129X revr, \$89.00; Knight T-60, \$27.00. WB2SBA. Tel: c.e. (616)-269-9818.

CLEGG Zeus, excellent, \$320.00. Best offer or will trade on Drake T-4X and 2-105 mike. Also need carrying case for SB-33. KB1ZW. Tel: (614)-322-5341.

APACHE Transmitter, in excellent condx, and SX-111 receiver both #250. W8CCN, Tom H. Haymond, Rte. 7, Box 472, Fairmont, West Virginia 26554.

TRADE HW-12A for HW-32A. Also want Swan 240 or 350. Jon Buhler, 5219 South Angela, Memphis, Tenn. 38117.

SELL: Vibroplex Vibro-Keyer for electronic key. Never used. \$17. Postpaid. S. B. Lee, WA9MPU, Box 127, Lacon, Illinois 6150.

NCX-3 without power supply for sale: \$150.00. W0GEP, 907 Deandell Ave., St. Louis, Mo. 63135.

DRAKE TR-4, pwr. supply and spkr. \$500; RA4, \$325.00; Heathkit SB-200, \$200.00. All very clean. K3FPY, Rick Feld, Cedarbrook Hill #1221, Wyncote, Penna. 19095.

SELL: 755-3, SSB and AM filters, \$350; DX-20 and Dow-Key relay, some crystals, \$25.00. Both good condition. WBAGN, 1100 E. Main St., Visalia, Calif. 93277.

SALE: HRO-50T1, A, B, C, D, E and F coils, speaker, manual, \$165.00. Will ship prepaid. Cashier's check, postal money-order only for remittance. Clyde Lee, K4OOW, 925 Bluesprings Drive, Pensacola, Fla. 32505.

CLEANING House: KWM-2, \$750; NCL-2000, \$375. Homebrew 4-811 A linear, \$100; Seneca, \$150; NC-173, \$75. 2M and 4M converters \$10. Power supply and converter selector \$8. \$15. Donald Greenbaum, WB2DND, 20 Sunnyfield Terrace, Neptune, N.J. 07753.

NCX-5 with NCX-A pls. 1 1/2 years old. Paid \$795. Will sell for \$495. GSB-101 linear with four new 811As, \$150. All equipment is in absolute mint condx. Write for details. All inquiries answered. Please help pay for college. Tom Bergan, K9DVZ, 1506 Woodmont Drive, South Bend, Indiana 46614.

RECEIVER, Hallicrafters 101 Mark III and speaker; xmr Halcrafters HT-37, D-105 mike, new Vibroplex, like new, straight key, new; Mosley vertical for 40, 20, 15 and 10 meters; trap, new; headphones; callbooks, foreign and local, 1968 issue. Dow-Key changeover relay; SWR Bridge. All instruction books. Extra tubes, co-ax cable. All in perfect condx. Package deal: \$350 buys a complete station. W21ZW.

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SPRING Sale savings! New Swan-500C, \$520 (117XK free); Swan 350C, \$420 (free 117X); Swan Mark II, \$530. Galaxy V Mark III, new, 520 watts PEP, in stock, \$420.00. One-half price on AC-500 with every Mark III. National 200, \$359 (free a.c. supply); new Ham-M, \$95.00; Galaxy TA-33, \$99.00; CL-33, \$109; MP-33, \$83.00; RG-8/U special, \$9/100 ft. w/purchase of beam. Hy-Gain TH6DX, \$125; TH3 Mark II, \$95. 18Ht. \$125. 204BA, \$90. Astatic GD-104, \$26.00. Gonset GSB-201 (new), \$269.00. Galaxy 2000B, \$430. SB-34, \$349.00. Watch for the opening of our Los Angeles store. Send SASE for the best price. Evansville Amateur Radio Supply, 1629 S. Kentucky Ave., Evansville, Indiana (closed on Thursdays).

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FOR Sale: NC-303 revr in mint condx, and 10 meter 120 W. AM xmr with 4 power supplies, Air cooled. Package deal, \$275.00. Bob Fleishhauer, W4GNW, Box 88, Rt. 3, Moncks Corner, S.C. 29461.

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DRAKE 2B with calibrator, \$125.00. Heath HX-20 with homebrew supply, \$55.00. Both in good condx. Send certified check and I will ship collect. R. Rasmussen, W6GXX, 129 Club Drive, San Carlos, Calif. 94070.

WHIPPANY Labs "Li'l Lulu" 6-meter xmr. Never used. First certified check or m.o. for \$100 takes it. R. Harting, WA2TEW, 300 Parsippany Road, Apt. 19F, Parsippany, N.J. 07054.

HEATHKIT DX-60, \$60.00; HG-10 VFO, \$30.00; National NC-155 receiver, \$75.00. Excellent. Novice rig. Hal Kusner, WB2PHW, 21 Charles Court, Fair Haven, N.J. 07701.

3000 V @ 3mf brand new GE Pyronal oil capacitors, \$3.00 each. Can mail. 2-lb. each shipping weight. FOB P. Wandell, RD #1, Unadilla, New York 13849.

SELL: 10 meter Johnson Messenger 1 transceiver, 6 VDC or 110 VAC. Good condition, \$45.00 REA prepaid. Dave Melone, W0VYT, 5022 38th Place, Des Moines, Iowa 50310.

MOHAWK Receiver, good condx, with instructions, \$100. WIECH, Gary Foskett, 1 Marlon Place, Cromwell, Conn. 06416.

SELLING IT-12 Heathkit Signal Tracer, \$15.00; 6 meter Halo, \$3.00; Hallicrafters SX-140 amateur receiver 10-6 meters, \$75.00; Nordmende stereo AM, FM, SW radio, \$50.00; Lafayette C. B. H. E. 90 transceiver, \$15 as is. You pay shipping. WB2JMD. Tel: ES-2-7927 (please call after 7 PM). S. 2790 86th St., Brooklyn, N.Y. 11223.

SELL: All are in excellent condition: Collins 51J3 with cabinet and speaker, \$40.00; HRO-500 with speaker, \$90; SB-34, \$275.00; P & H 1A1000 1 KW linear, \$75; P & H 1000PS transistorized 12VDC/5's, \$75; Hallicrafters SX-104, 30-50 Mc., \$40.00; BC-342N receiver, \$65.00; Tapetone converters, 201 6-meter \$325.00, XC-144 2 meter, \$40; TC-220 mc \$40.00; custom 417A 6-meter, \$40.00. Antennas at 1/2 price. Telex 20-meter, \$266, 6 meter 1136SR, 6 meter 309, 4 meter 2148, 2 meter \$129. Hy-Tower 18HT. Send for list. SWR Bridges, coaxial switches, relays, filters, etc. Frank Grosso, K2MLB, P.O. Box 4, West Orange, N.J. 07052. Tel: 201-731-5064 (evenings).

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WANTED: HW-100, SB-100, SB-200, SB-300, SB-400. Passed my exam and will pay cash for complete rig. Quote lowest price in your first letter. C. J. Scribner, 23 Magnolia Dr., Mary Esther, Fla. 32569.

SELLING DX-60 with VFO, \$90.00; Seneca, \$90.00; HQ-170, \$145.00; Hallicrafters SX-100, \$100.00. All in good condx. Write or call David G. Steffens, 656 Cascade Road, Cincinnati, Ohio 45240. Phone: (513)-825-8333.

"HOSS TRADER" Ed Moory has a limited supply of new equipment with factory warranty for cash: One to a customer, plus! New Swan 500 in factory sealed carton, regular price \$495.00. Cash price \$369. Hy-34, regular price \$449.00. Cash price, \$349.00; New NCX-200 and matching supply, regular price \$434.00. Cash price \$329.00; BTI LK-2000, \$659. Displayed TR-4, \$449.00; T4-XB, \$359.00; New Mosley Classic-33 beam and demo Ham-M rotor, \$198.00; special Rohn 50 ft. fold-over tower, prepaid \$188.00; Drake L-4 linear, \$499.00; New FTDX-400 transceiver, regular price \$399.95. Cash price, \$469.00. Used equipment: TR-4, \$399.00; T4XB, \$329.00; 2-A, \$129.00; TR-3, \$349.00; Swan 250, \$209.00; Swan 500-C, \$389.00; HT-37, \$169; Ham-M rotor, \$89.00. Ed Moory Wholesale Radio Co., P.O. Box 506, DeWitt, Arkansas 72042. Tel: 946-2820.

FOR Sale: Lafayette HA-460, built in c.w. and 3 element beam. In perfect condition, \$110.00. Heath AT-1, \$10; 10 and 11 meter transceiver, \$35. HA-90 VFO, \$13; 6 meter halo, \$8, and Explorer, \$8. Lee, WA2ACP, 722 Carlisle Road, Jericho, L.I., N.Y. 11753. Tel: (516)-931-9922.

CLAU5 Amateur Radio Shop offers highest trades on Galaxy, Hallicrafters, Hammarlund, National Swan, Hy-Gain, Mosley, GOR, E-Z-Way, Spalding and Rohn products. We pay all shipping. Claus Amateur Radio Shop, 104 Wetzel Road, Pittsburgh, Penna. 15209.

SACRIFICE: R4A, \$325.00; Eico keyer with Vibroplex, \$50.00. Both are two months old. Have bills. Invader 2000 mint condx. New PL175As, 3B28s, 6146s. Extras, \$425.00. TA-31 coax, \$17.50. Greenbaum, 2568 Laconia Ave., Bronx, N.Y. 10469. Tel: (212)-881-3054.

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EARLY OSTs, 1921 through 1932 (some years in run incomplete). Also Radio News, 1920-1932. Radio Craft, 1930-1936. Radio World 1929-1932. What's your offer for part or all? Detailed list on request. Clifford C. May, R. 1, Vanderbilt, Michigan 49795.

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HT-33A with MK II screen modification, \$250.00 or you make offer. You ship shipping. Need money for college. WA5INL, David McElroy, 5375 Fannett Road, Beaumont, Texas 77708.

TR-3, AC-3 creampuff condition, seldom used, never mobile. Best offer above \$395. Gigantic junk-box list for stamped envelope. John Bradley, Troy Towers, Bloomfield, N.J. 07003.

18AVO ant. \$25.00. W2HI, 161 Evans St., New Hyde Park, N.Y. 11040. Fone 516-FL4-3122.

SELL: HT-37, \$220; HO-170, \$180; 18AVO, \$30. Will ship REA collect. Tom Ward, WA8RNA, RFD 4, Hillsboro, Ohio 45133.

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WANTED: Tubes, all types, write or phone Bill Salerno, W2ONV, 243 Harrison Avenue, Garfield, N.J., Tel: Garfield Area code (201)-773-3320.

SELL: Drake 2B receiver with matching speaker/O-mult. Clean, \$190.000. DX-100. Updated with LP filter, \$125.00. Others. List available. K9QYA, Bob Behee, 8224 N. Ivy St., Brown Deer, Wis. 53223.

SELLING: Closed circuit TV camera, 7038 and 19 lens. Perfect \$175.00. W2AU Balun: TA-31 Senior. Best offer. WB20OK, 1129 Astor Avenue, Bronx, N.Y. 10469.

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HEATH SB-110A prof. construction 1967 with power supply and manual: \$350.00; Cov 6 beam antenna, \$15.00; Hallicrafters HA-6 transmitter, power supply and manual, like brand new, \$25.00; Clegg Interceptor with interceptor allband, \$325.00. HO-180C mint, \$375.00. Ted Valpey, WIATP, P.O. Box 87, Mellen Street, Holliston, Mass. 01746.

SALE: Three editions, ARRL Handbook. First Edition 1926 (gud condx), Sixth Edition 1930 (gud condx), and Ninth Edition 1932 (very gud condx). Best offer. K3ANT, 332 South Ave., Jim Thorpe, Penna. 18229.

4-400 6-meter linear with all supplies; in 1 ft. rack; legal limit on c.w., 2 m. SSB. Guaranteed OK. For \$150.00 or your best offer Clark Still, K4BMG, Box R1632, Emory University, Atlanta, Ga. 30322.

HO-170, \$165.00; Valiant, \$130.00; Matchbox with SWR, \$65.00; Thor VI, complete, \$160.00. List available. WAZVHW, 18 Hillcrest Terrace, Linden, N.J. 07036. Tel: (201)-486-6917.

FOR Sale: HT-37 SSB xmtr, \$250.00; HO-120 AC receiver, \$275.00; Eico 720 xmtr, factory-wired, with 5 crystals, \$75.00. Saturn 6 6-meter mobile antenna, mast and matching transformer, \$10.00. All equipment in excellent condition. Call or write Mr. Adler, 2 Garden Road, Scarsdale, N.Y. 10583.

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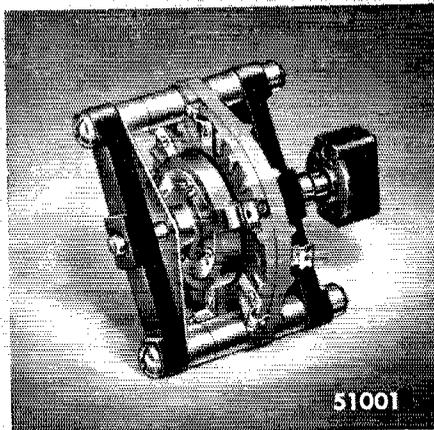
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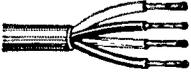


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...easy to use packaged lengths.



### Antenna Rotor Cables

Sturdy, flexible, plastic insulated cable for rotor applications. Color coded. Chrome, vinyl plastic jacket resists sun and aging.



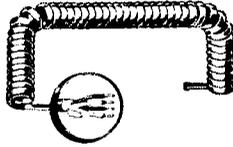
### Power Supply Cables

Excellent mechanical and electrical characteristics for long service life. Special jacket offers maximum resistance to abrasion and ozone. Use as power supply cords and interconnecting cables. Ideal for remote control circuits, special press-to-talk microphone circuits, and other applications.



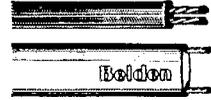
### Shielded Hook-Up and Grid Wire

Provide most effective TVI suppression. Vinyl insulated with tinned copper braid shield. Available from 24 AWG to 12 AWG.



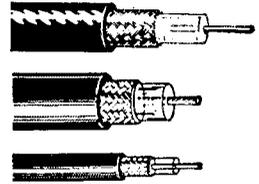
### Coiled Microphone Cable

Provides low impedance for mobile microphone applications. Neoprene jacket remains flexible at low temperatures. Available with or without shielded conductors.



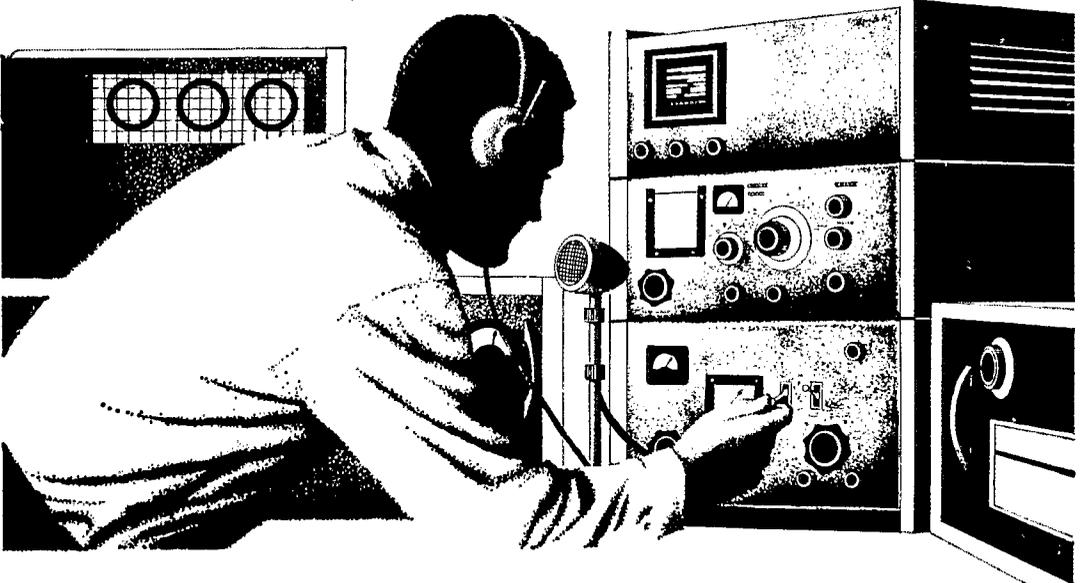
### Ham Transmission Lines— Parallel Type

Uniform quality control provides uniform impedance. Brown polyethylene for best weather resistance and lowest losses.



### Ham Transmission Lines— RG/U Type

Designed for lowest losses, longer service life, and maximum dependability. Cables are essentially flat with no peaks in attenuation to reduce signal on either high or low frequencies.



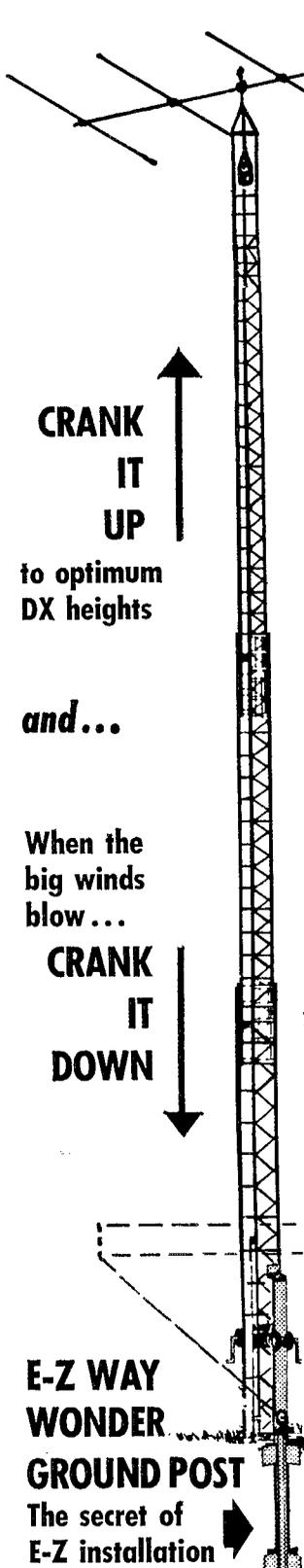
**FOR FULL INFORMATION CONTACT YOUR BELDEN ELECTRONIC DISTRIBUTOR**

The Belden line gives you maximum efficiency with lowest losses under all conditions of operation. There's a Belden wire or cable to meet every ham transmitting and receiving need. Shown here is only a small portion of this complete line.



4-7-6A

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73 *Bil Harrison* W2AVA

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to optimum DX heights

and...

When the big winds blow...

**CRANK IT DOWN**

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| HD   | 32 to 52 Ft.    | 28.8       | 571.50   |
| STD  | 30 to 51 Ft.    | 12.0       | 438.00   |
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\*Antenna sq. ft. for 50 MPH winds, full up; 100 MPH when down.  
†Three section; others two.

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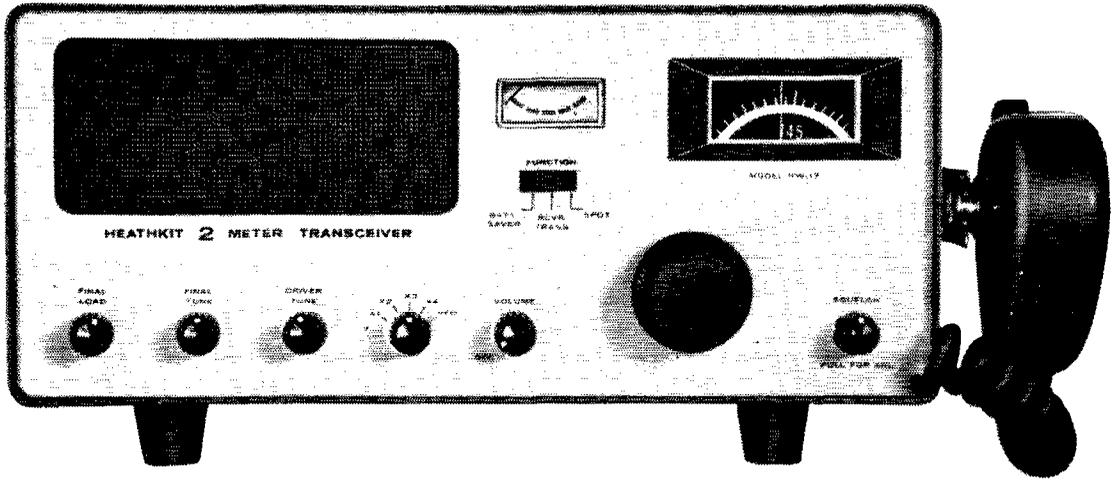
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Another new Heathkit transceiver . . . this time it's a solid-state 2-Meter AM job that's just right for local ragchewing, NETS, DX, as well as CAP, MARS, and Coast Guard Auxiliary use . . . reasonable power output, sensitive receiver, easy-to-use features, and a low price tag.

The Heathkit HW-17 in detail. It's really a separate receiver and transmitter in one compact, versatile package (the only common circuitry are the power supply and the audio output/modulator). Frequency coverage is 143.2 to 148.2 MHz. The solid-state dual conversion, superheterodyne receiver with a pre-built, pre-aligned FET tuner has a lighted dial with 100 kHz calibration, automatic noise limiter, squelch, and 1  $\mu$ V sensitivity. Selectivity is 27 kHz at 6 dB down, a figure that's consistent with band occupancy and easy receiver tuning. The front panel meter indicates received signal strength and relative power output. A 3-position switch on the front panel has a "Spot" position for finding the transmit frequency on the tuning dial, a Receive/Transmit position, and a Battery-Saver position that comes in handy during those long periods of monitoring while mobile (the receiver draws only 8 watts during this time). A 3" x 5" speaker is built in.

On the transmitting end is a hybrid circuit including transistors and tubes with an 18 to 20 watt power input and an AM power output of 8 to 10 watts. Modulation is automatically limited to less than 100%. A front panel selector switch chooses any of four crystal frequencies or an external VFO (the Heathkit HG-10B VFO at \$37.95 is perfect for this job).

Front panel controls include Final Load, Final Tune, Crystal-VFO switch, Main Tuning, Squelch with ANL switch, Battery Saver-Receiving/Transmit-Spot switch; rear panel has S-meter Adjust, Head-phone jack, Power socket, VFO power socket, VFO input, and Antenna connector (50-72 ohms, unbalanced).

The 15 transistor, 18 diode, 3 tube circuit is powered by a built-in 120/240 VAC supply. Circuit board construction averages 20 hours. It's all housed in a low-profile Heath gray-green aluminum cabinet measuring 14 $\frac{1}{8}$ " W x 6 $\frac{1}{8}$ " H x 8 $\frac{1}{2}$ " D with everything in place. A ceramic PTT mic. and a gimbal bracket for mobile mounting are included.

Move up to 2 meter 'phone operation this new low cost way with the Heathkit HW-17.

Kit HW-17, 2M Transceiver, 17 lbs. . . . . \$129.95  
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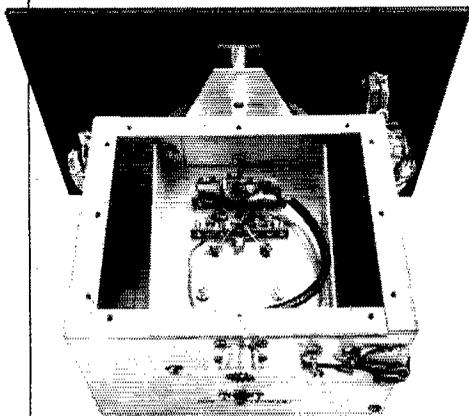


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# Solid-State Projects for the shack

## Build this high stability VFO

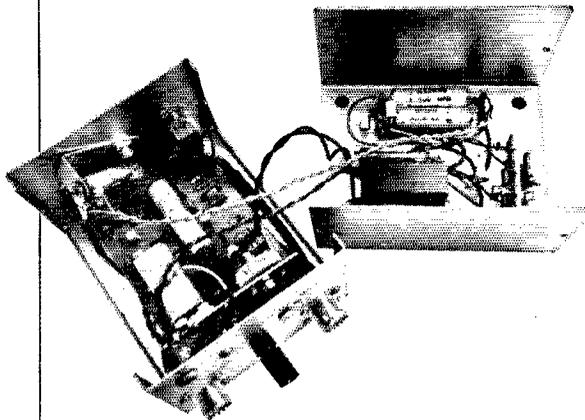


Here's an almost drift-free VFO built around the RCA-3N128 MOS/FET for flexible operation. After just 30 seconds warm-up, it tests out at less than 30 cycles drift in a two hour period.

Look in *The Radio Amateur's Handbook*, 1968 edition or write to RCA, Commercial Engineering, Section F37-SD, Harrison, N. J. 07029 for full design details, including parts list, schematic, and building tips.

*All listed RCA devices are available from your  
RCA Industrial Semiconductor Distributor*

## Build this VFO calibrator



If you're interested in MARS and have just a "ham-bands-only" receiver, this may be your answer to VFO calibration outside normal bands. It uses two RCA-1N3193 rectifiers; two 1N34A signal diodes; one RCA-2N2614 and seven RCA-2N3241A transistors—provides calibrating beats at 100 kHz points as well as 50, 33, 25 and 20 kHz. Handy, too, for calibrating test equipment.

Look in August 1967 QST or write RCA, Commercial Engineering, Section F37-SD, Harrison, New Jersey 07029 for August 1967 "Ham Tips." RCA Electronic Components, Harrison, New Jersey.

# RCA