June 1968
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QST

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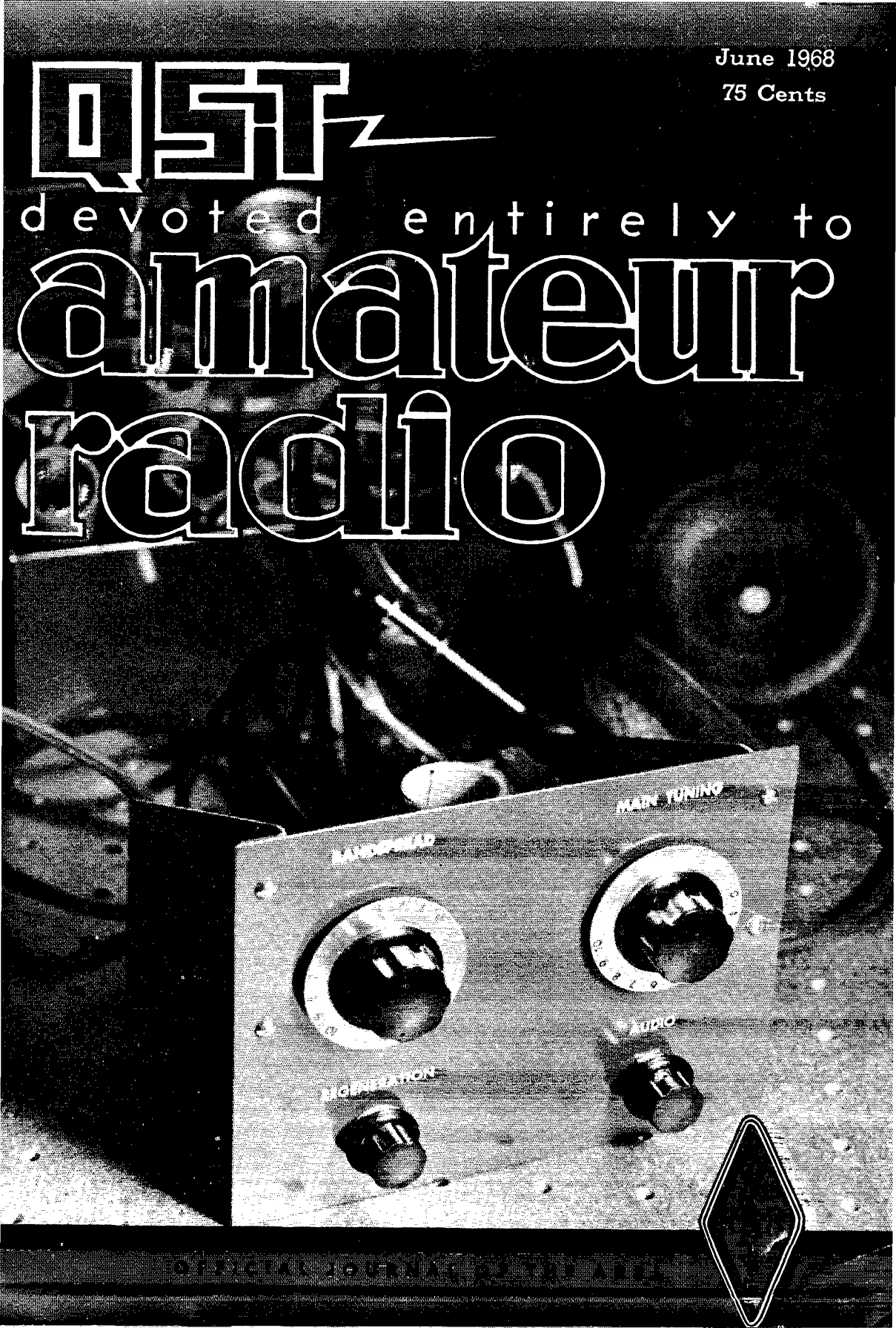
amateur radio



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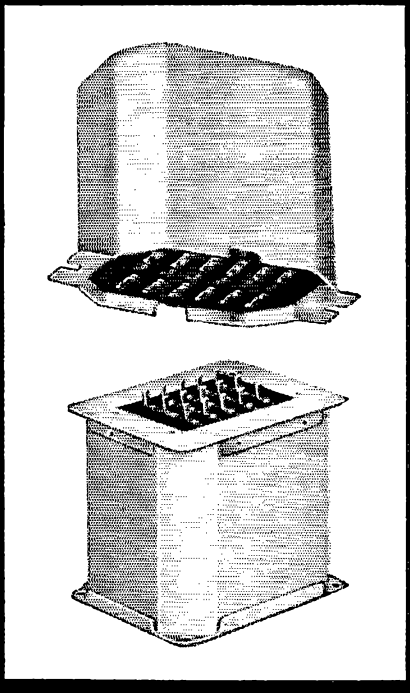

10 reasons to buy Hallicrafters' new SR-400 Cyclone

FEATURE	Hallicrafters SR-400	Collins* KWM-2	Drake* TR-4
Power Input	SSB=400 watts CW=360 watts	SSB=175 watts CW=160 watts	SSB=300 watts CW=260 watts
Accessory "dual receive" VFO available	**Yes**	No	No
Noise Blanker	**Yes**	$135.00 Accessory	No
Receiver Incremental Tuning	**Yes**	No	No
Built-in notch Filter	**Yes**	No	No
Sharp CW Filter	**Yes** 200 cycles	No	No
Sensitivity	.3 uv for 10 db S/N	.5 uv for 10 db S/N	.5 uv for 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.

hallicrafters

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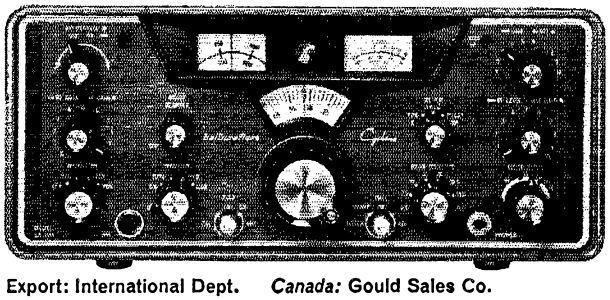
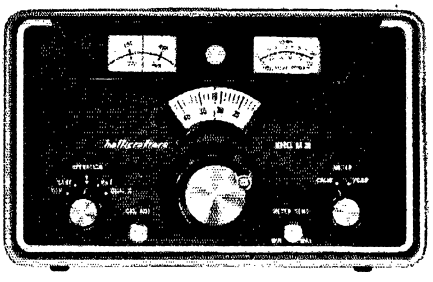
Rolling Meadows, Illinois 60008
A Subsidiary of Northrop Corporation

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 you are on the air—anywhere—with a Collins quality kilowatt system.

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INDEXED BY Applied Science and Technology Index. Library of Congress Catalog Card No.: 21-9421

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.

QST

JUNE 1968

VOLUME LII NUMBER 6

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

—CONTENTS—

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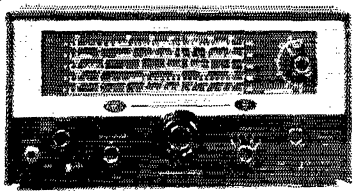
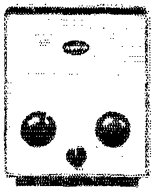


MODEL R-5 ALLWAVE RECEIVER

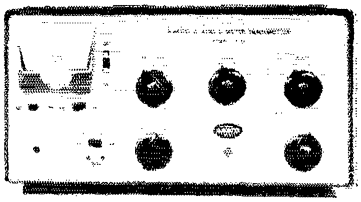
An exceptionally fine receiver for the short wave listener and beginning amateur operator. Fully transistorized—solid state. Covers .54 through 54.0 Mc in five continuous bands. Includes standard broadcast band, all foreign broadcast bands, all amateur bands from 160 through 6 meters, all 27 Mc CB Channels, all 2-way radio frequencies from 30 to 50 Mc including many police and fire departments. Controls include Variable Beat Frequency Oscillator, Noise Limiter, Bandspread. Compare with tube-type units costing as much!

Kit $64.95
Wired and tested 79.95



VFO-621

VFO for 6, 2 and 1 1/4 meters. Transistorized oscillator plus built-in zener diode regulated power supply gives highest stability. Ideal match for TX-62 and other VHF transmitters.
Wired and tested $59.95



TX-62 TRANSMITTER

In response to the demand for an inexpensive, compact VHF transmitter, Ameco has brought out its 2 and 6 meter transmitter. There's no other transmitter like it on the market. 75 watts input, phone and CW. Built-in solid state power supply. Broadbanded circuits make tuning easy. Uses inexpensive crystals or external VFO.
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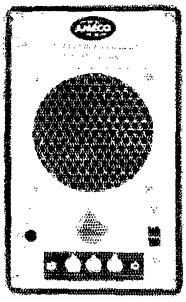

MODEL OM

CODE PRACTICE OSCILLATOR AND MONITOR

A combination code practice oscillator and CW Monitor. (No connection to transmitter required.) Transistorized. Has built-in speaker, tone control and headphone jack.
Model OMK, Kit (less batteries) ..... $ 9.95
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Similar unit, but without CW RF Monitor feature.
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Receivers, transmitters, VFO, Pre-amplifiers, converters, code practice oscillators, code records, theory and license books.

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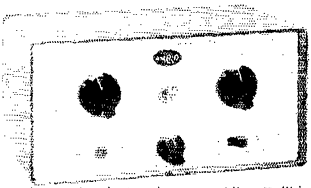

MODEL PT

Low noise, high gain preamplifier. Built-in power supply. Interconnecting cables included. Station power control center—one switch controls everything. Automatic changeover, transmit to receive. Feeds and mutes second receiver.
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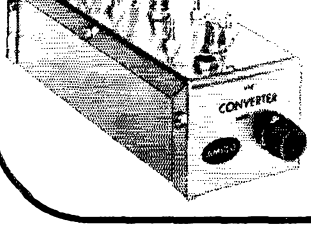

Deluxe line of Ameco VHF Converters uses three RCA Nuvistors to obtain an extremely low noise figure and high gain. A gain control is included to reduce the gain if necessary. These converters do NOT become obsolete when the receiver is changed.

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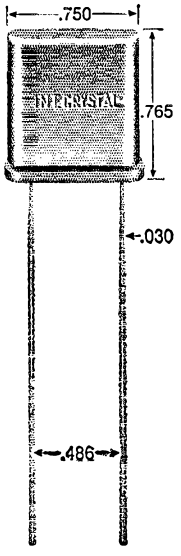

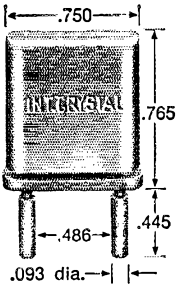

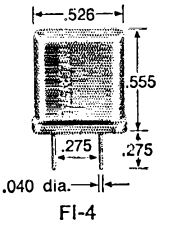

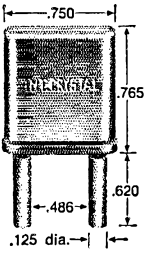

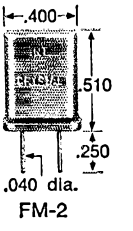

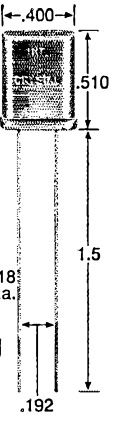

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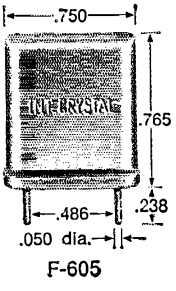

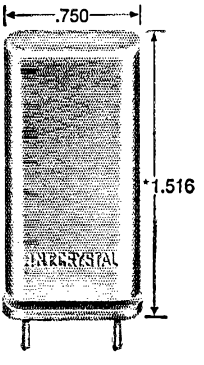

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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

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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734 West Foster Avenue, State College, Pa. 16801
Vice Director: Harry A. McConaghy W3EPC
8708 Fenway Dr. Potomac, Bethesda, Md. 20034

Central Division

PHILLIP E. HALLER W9HPG
6000 S. Tripp Ave., Chicago, Ill. 60629
Vice-Director: Edmond A. Metzger W9PRN
1520 South Fourth St., Springfield, Illinois 62703

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Box 226A R.R. 1, South St. Paul, Minn. 55075
Vice-Director: John M. Maus . . . . . WØMBD
Oakdale Addition, St. Cloud, Minn. 56301

Delta Division

PHILIP P. SPENCER W5LDH/W5LXX
575 Amethyst St., New Orleans, La. 70124
Vice-Director: Max Arnold W4WHN
612 Hogan Road, Nashville, Tenn. 37220

Great Lakes Division

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359 Bonham Rd., Cincinnati, Ohio 45215
Vice-Director: Charles C. Miller W8JSU
4872 Talvin Drive, Columbus, Ohio 43227

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HARRY J. DANNALS W2TUK
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Vice-Director: Stan Zak K2BJO
13 Jennifer Lane, Port Chester, New York 10573

Midwest Division

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2110 Goblin's Gully Dr., S.E., Cedar Rapids, Iowa 52403
Vice-Director: Ralph V. Anderson . . . . . KØNL
528 Montana Ave., Holton, Kansas 66436

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ROBERT YORK CHAPMAN W1QV
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Vice-Director: Bigelow Green W1EAE
11 Law's Brook Rd., South Acton, Mass. 01771

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Vice-Director: L. Phil Wicker W4ACY
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Vice-Director: Albert L. Hamel K4SJH
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Vice-Director: Thomas J. Cunningham W6PIF
1105 East Acacia Ave., El Segundo, Calif. 90245

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P.O. Box 1656, Corpus Christi, Texas 78403
Vice-Director: Ray K. Bryan W5UYQ
2117 S.W. 61st Terrace, Oklahoma City, Okla. 73159

"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. Dannals, 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.

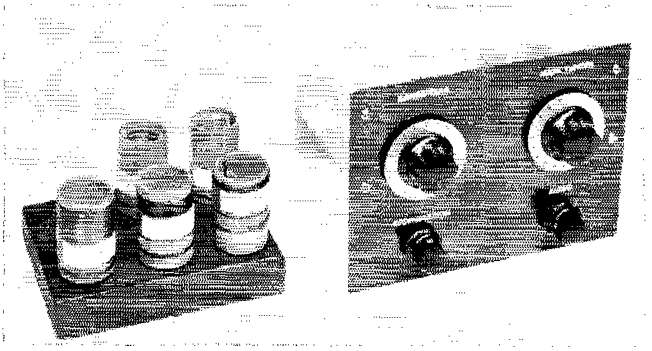
The program of assistance to amateur groups in other countries will be expanded, with emphasis on a club-to-club liaison for mutual exchange of information and knowledge.

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.[1] 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_1, 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 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.

* Assistant Technical Editor, *QST*.

[1] *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.

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

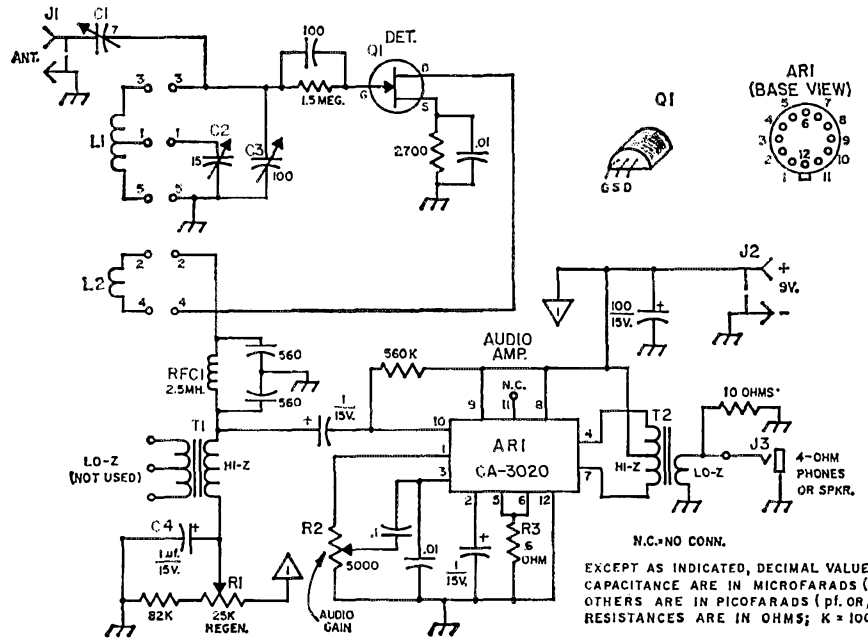


Fig. 1—Schematic of the GCR-2. Tapped-coil arrangement shown for L_1 is used on the 40-, 20-, and 10/15-meter coils. Pin 1 connects directly to pin 3 of the coil form (inside the coil form by means of a jumper wire) for broadcast-band, 160- and 80-meter operation. There is no coil tap on these three bands. Fixed capacitors are disk ceramic. Polarized capacitors are electrolytic and are in μf. Fixed resistors are ½-watt carbon.

AR_1—RCA CA-3020 integrated circuit.
C_1—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).
C_2—15-pf. miniature variable (Millen 20015).
C_3—100-pf. miniature variable (Millen 20100).
J_1, J_2—Phono jack.
J_3—Two-conductor phone jack (Switchcraft type 11 suitable).
L_1, L_2—See Table I.
Q_1—Motorola MPF-105 FET (MPF-102 or MPF-106 also suitable).
R_1—25,000-ohm linear-taper carbon control.
R_2—5000-ohm audio-taper carbon control.
R_3—See text.
RFC_1—2.5-mh. choke (Millen 34300-2500 or equivalent).
T_1—Any small transistor driver transformer with one winding of 10,000-ohms or greater. (low-impedance winding not used) Argonne AR-153 or similar.
T_2—Output transformer, primary 125 ohms c.t. 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 AR_1, the IC audio amplifier. RFC_1 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 AR_1 and impairing its performance. The primary of T_1 is used as an audio choke, for coupling the a.f. signal to the following stage. C_4 is used to bypass the noise heard in the phones when R_1 is adjusted — an annoying scratching sound which is audible when the regeneration control is advanced or retarded.

R_2 functions as an audio gain control and is adjusted for the desired headphone or loudspeaker level. R_3 is a bias resistor for AR_1 and can be obtained by placing two 1.2-ohm ½-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 R_3.

Transformer T_2 matches the output impedance of AR_1 (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 J_3 to provide a constant load for AR_1 should the operator forget to plug in the speaker or phones when the set is turned on. Such a condition could destroy AR_1. Also, the resistor provides a mismatch safety factor when high-impedance phones are plugged directly into J_3, 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 J_3. The 4-ohm winding of the outboard transformer should plug into J_3 if this method is used.

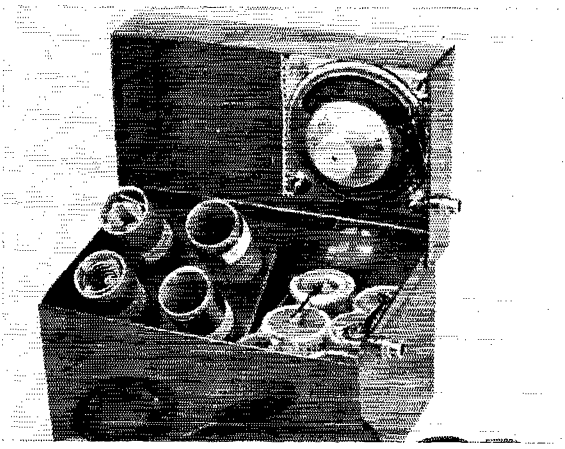
Range (Mc.)	L_1	L_2	*Tap*
0.8–1.6	175 turns No. 36 enam. wire, close-wound.	25 turns No. 36 enam. close-wound 1/16 inch under L_1.	None
1.6–3.0	65 turns No. 30 enam. wire, close-wound.	6 turns No. 30 enam. wire, close-wound 1/16 inch under L_1.	None
2.3–5.0	36 turns No. 30 enam. wire, close-wound.	3.5 turns No. 30 enam. wire, close-wound 1/4 inch under L_1.	None.
4.5–9.5	18 turns No. 20 enam. wire, close-wound.	2 1/4 turns No. 20 enam. wire, close-wound 1/4 inch under L_1.	9 turns
8.0–19	18 turns No. 18 bare wire, 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 1/2 turns No. 20 enam. wire, close-wound on outside of form, 1/8 inch under ground end of L_1.	9 turns
16–30	8 1/2 turns No. 18 bare wire, 5/8-inch dia., 1 inch long. (8 1/2 turns of B&W 3006 Miniductor stock, Air Dux 508T, or Polycoils 1734.	2 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.

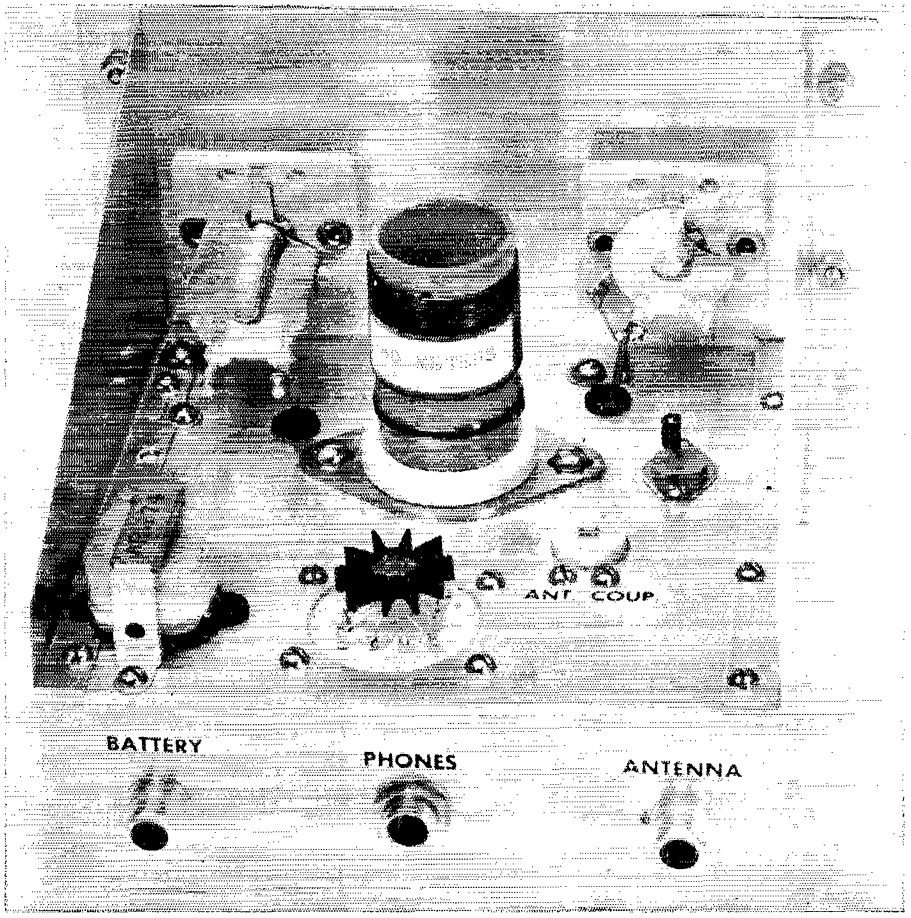
Six size-D flashlight cells, series connected, provide the 9 volts that operate the receiver. Smaller flashlight cells can be used, but will not last as long as the size-D pack. Under no circumstances should the builder use a small 9-volt transistor battery, as the receiver drain will deplete it in a 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 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 1/2 × 4 1/2 × 5 inches. A Bud CB-1629 open-end chassis can be used as a substitute (1 1/2 by 4 7/8 by 5 3/4 inches) if the builder wishes. The panel is 4 1/2 inches high and 5 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 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.

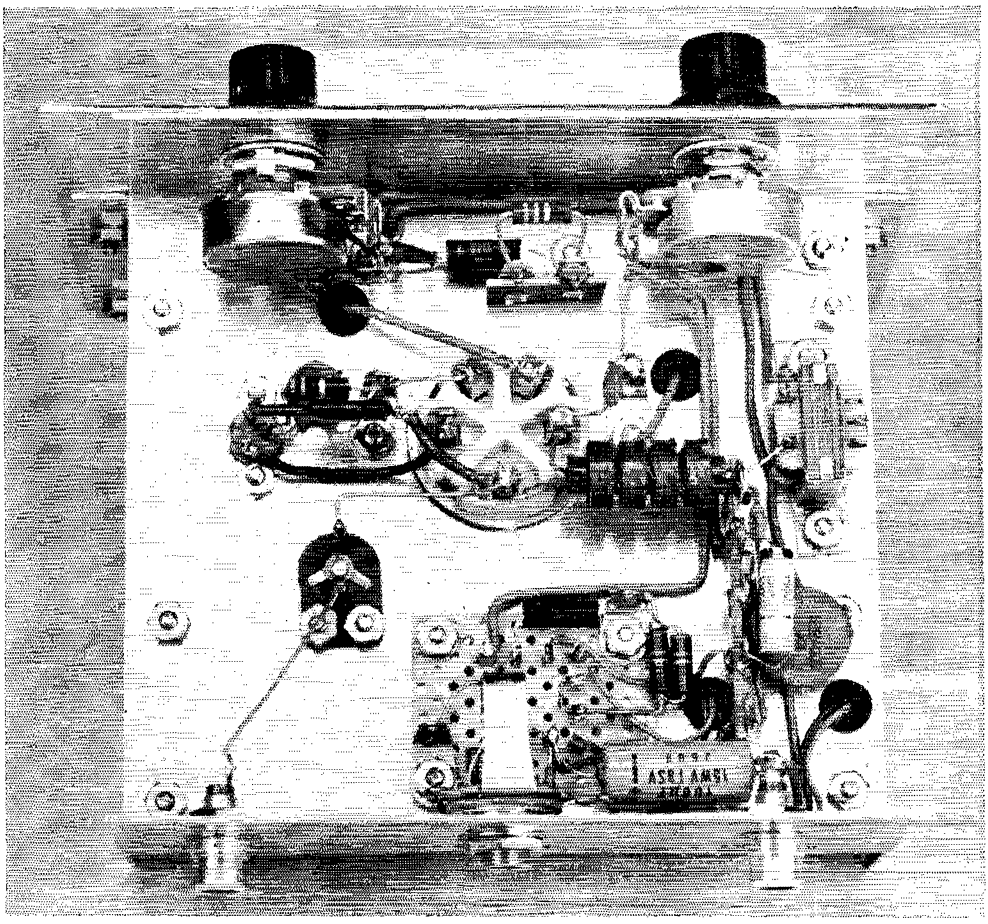
Side brackets were added after the receiver was built because of an annoying signal shift caused by mechanical instability when tuning the 20-, 15-, and 10-meter bands. The brackets make tuning much easier on the higher bands.

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 1¼ by 1½-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 1⅛-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,[2] which are 1⅝ 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 (Miniductor) 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,

[2] 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

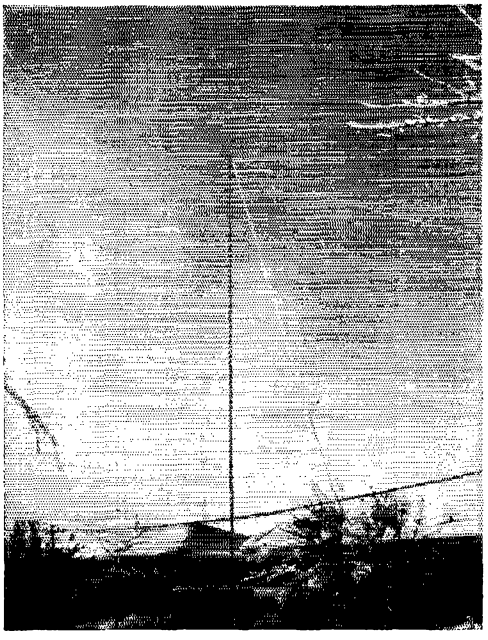
It's that time of year again when portable operation is a delight. Here is a full-sized low-frequency antenna that you can put up in the field or at home without any help.

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.

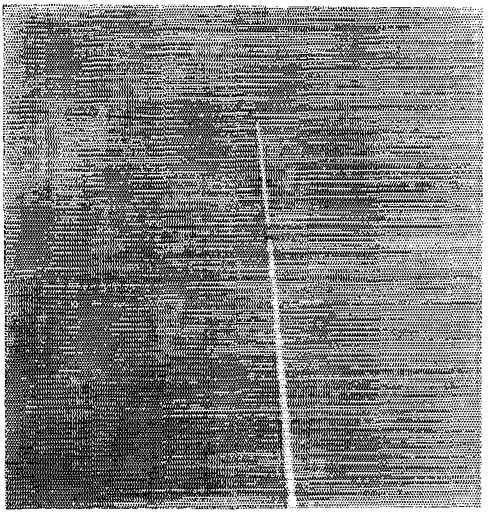
The popular inverted V suggests itself as an answer to these requirements. It can be constructed so that it guys itself, minimizing the inevitable exasperating tangle of rope and wire, and it requires only one mast. Like all dipoles, the inverted V can be fed at the center with low-impedance line, and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

* 2252 Joyce Street, Burlington, Ontario, Canada.



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



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

Assembly

As shown in Fig. 1, the antenna support consists of three 10-foot sections of 1¼-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.

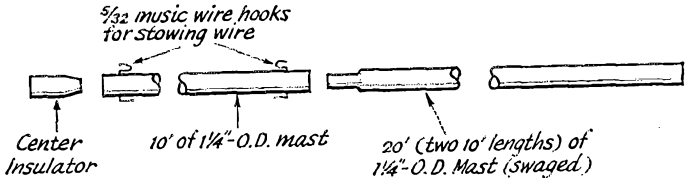
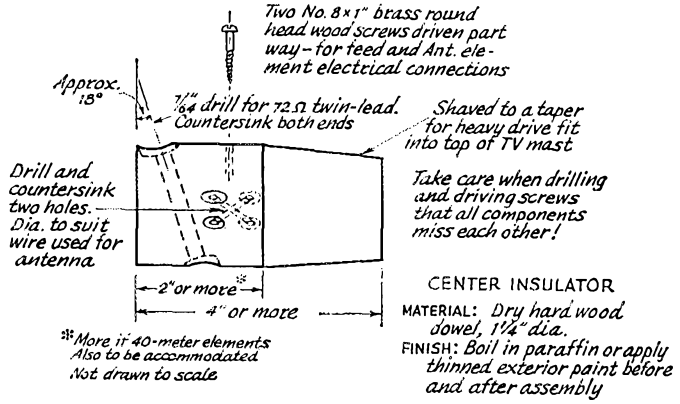


Fig. 1—The makings of the inverted-V center support.

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



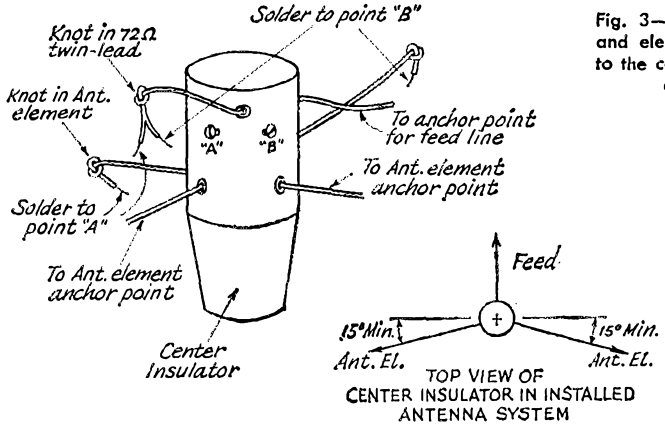


Fig. 3—Details of how the feed line and element wires should be attached to the center insulator, and a top view of the installed insulator.

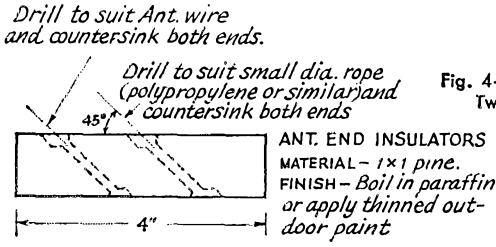
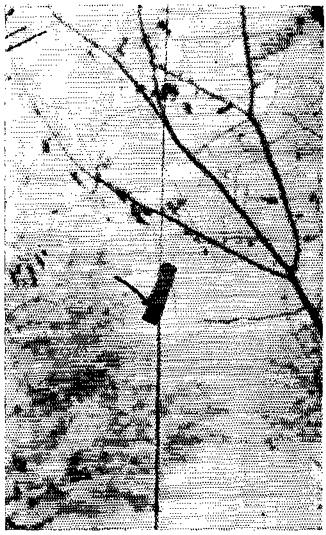


Fig. 4—A sketch of one of the wooden end insulators. Two insulators are required for each dipole used.



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.[1]

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, 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.[2] 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).

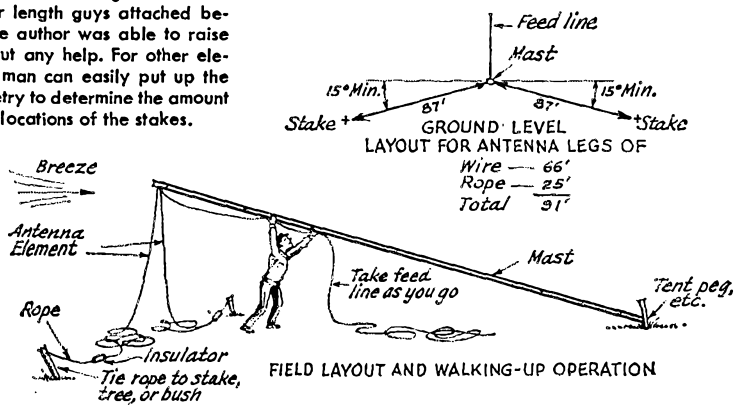
If help is available, it won't be necessary to install stakes or measure guys prior to putting up the antenna. Have the helpers pay out each half of the antenna element and keep slack out of the wire as the mast goes up. Station the men about 45 degrees off the line of the mast as it lies on the ground, 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*)

[1] 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.

[2] 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.

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.



An Automatic Band Scanner/Transmitter Monitor

Putting the Inexpensive Oscilloscope to Work

BY R. F. LATTER,* W2YFM

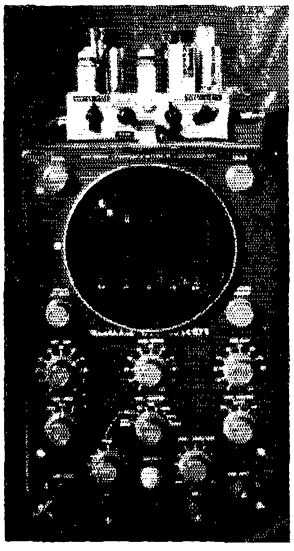
A DESIRE to use an existing oscilloscope to increase the effectiveness of the author's station, rather than to let the oscilloscope gather dust as a seldom used test instrument, resulted in the unit shown in the photographs. The gadget enables the oscilloscope to alternately display two patterns, one 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 6U8A 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 electron beam as it sweeps across the face 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

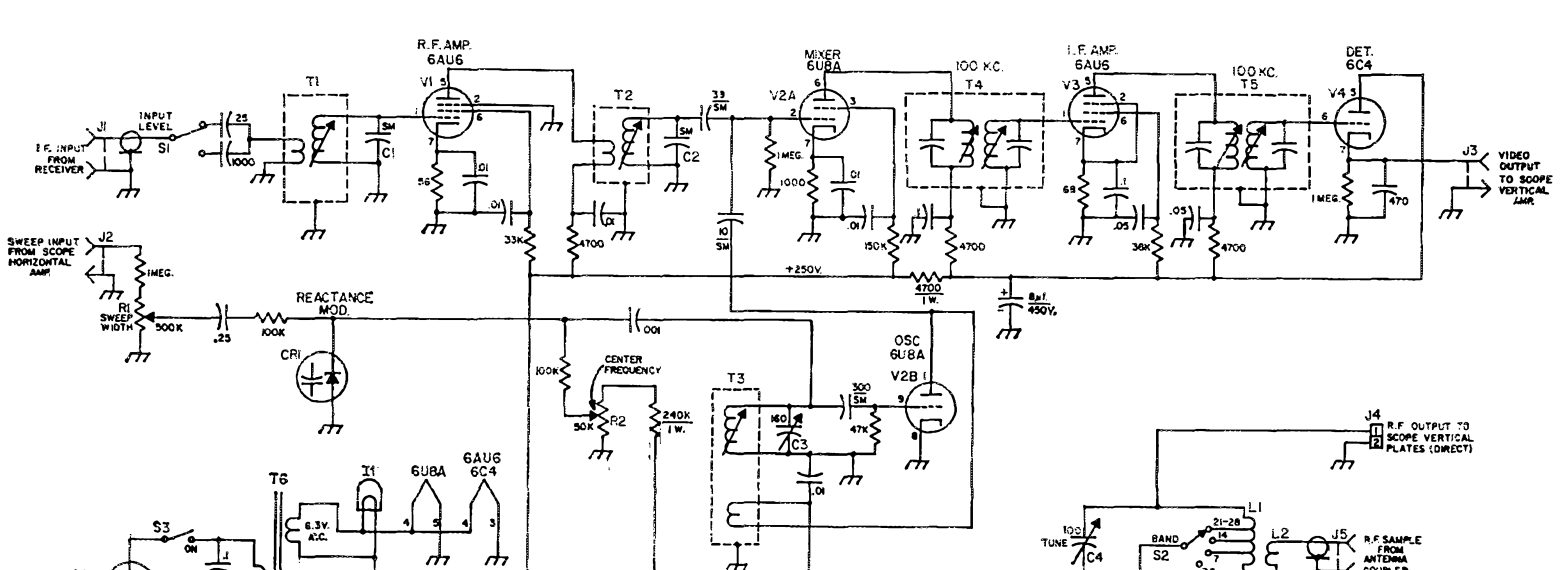


Fig. 1—Schematic diagram of the band scanner/transmitter monitor. Capacitors with polarity indicated are electrolytic, fixed capacitors are ceramic except those marked SM (silver mica). Unless otherwise specified, fixed resistors are ½-watt composition.

C_1, C_2—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_3—10-160-pf. mica padder (Miller 160-D).
C_4—100-pf. variable (Hammarlund HF-100 or equivalent).
CR_1—Voltage-variable capacitor (Motorola MV838).*
CR_2, CR_3—Silicon, 800 p.i.v., 750 ma.
J_1, J_5—Coaxial chassis receptacle (SO-239).
J_2, J_3—Phono jack.
J_4—Two-terminal connector (Cinch-Jones 2-140 or equivalent).
L_1—54 turns No. 24, ¾-inch diam., 32 turns per inch, tapped at 4, 9 and 25 turns from J_4 end (B&W 3012 or equivalent).
L_2—2 turns insulated hookup wire over ground end of L_1.
R_1—500,000-ohm linear-taper control with switch.
R_2—50,000-ohm linear-taper control.
S_1—S.p.s.t. slide switch.
S_2—Phenolic rotary, 1 section, 1 pole, 5 positions, 4 positions used (Centralab PA-1003 or equivalent).
S_3—S.p.s.t. switch (part of R_1 assembly).
T_1—BC band antenna coil (Miller A-320-A).*
T_2—BC band r.f. coil (Miller A-320-RF).*
T_3—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_4, T_5—100-kc. i.f. transformer (Miller 1709 or 1710).*
T_6—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.

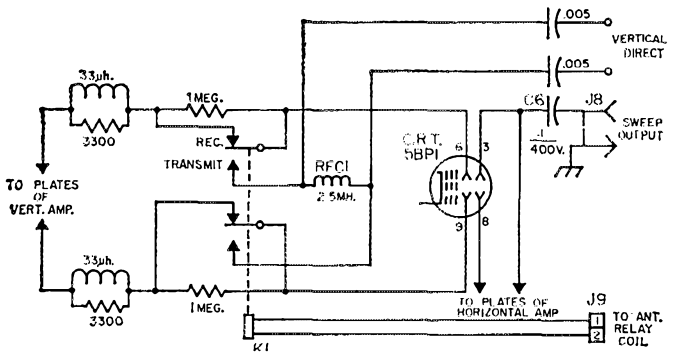


Fig. 2—Circuit showing modifications to the Heathkit OM-2 oscilloscope. The VERTICAL DIRECT slide switch (not shown) on the back of the scope has been replaced by K_1, and the parts with component designators added. Capacitance values are in microfarads (μf.); resistances are in ohms. Resistors are ½-watt composition.

C_6—0.1-μf. 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.[1] 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}.

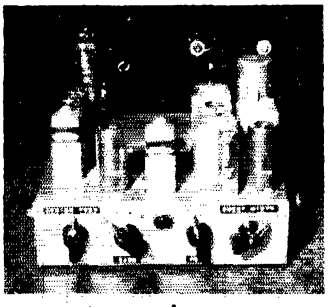
An 0D3 voltage regulator is used to stabilize the voltage applied to the oscillator and the varactor-diode reactance modulator.

Parts Layout and Construction

The unit is built on a 7 × 7 × 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-μf. blocking capacitor.

Oscilloscope Modifications

Modifications to the Heathkit OM-2 oscilloscope are detailed in Fig. 2.[3] 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 connectors, J_8 and J_9, a 2.5-mh. r.f. choke, RFC_1, and a 0.1-μf. 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 × 7 × 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.

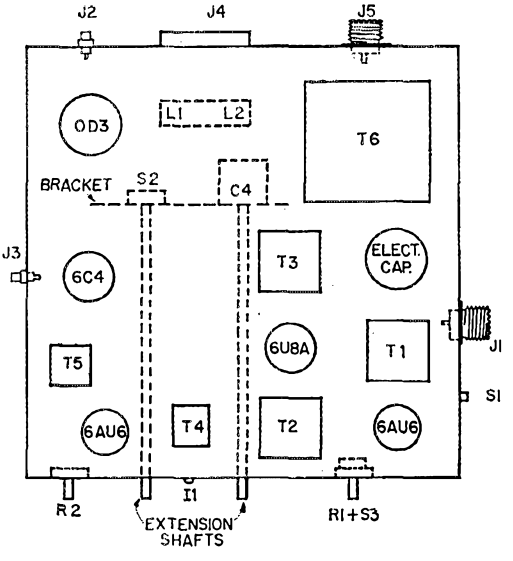


Fig. 3—Top view of the chassis showing where the major components are mounted. Dotted lines indicate parts that are located on the underside of the chassis.

[1] *Motorola Semiconductor Data Book*, 2nd Edition, pp. 12-21, 16-99.
[2] Brady, "Select Varactors for Voltage Tuning," *Electronic Design 12*, p. 72, June 7, 1967.
[3] Many other types of oscilloscopes can be similarly modified.

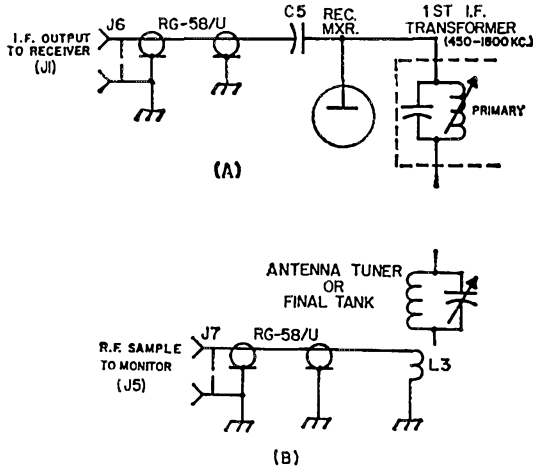


Fig. 4—Modifications to the receiver (A) and antenna tuner or transmitter (B).

C_5—5-pf. disc ceramic.
J_6, J_7—Coaxial chassis receptacle (SO-239).
L_3—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_1, 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_{2B}, 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_2) 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.

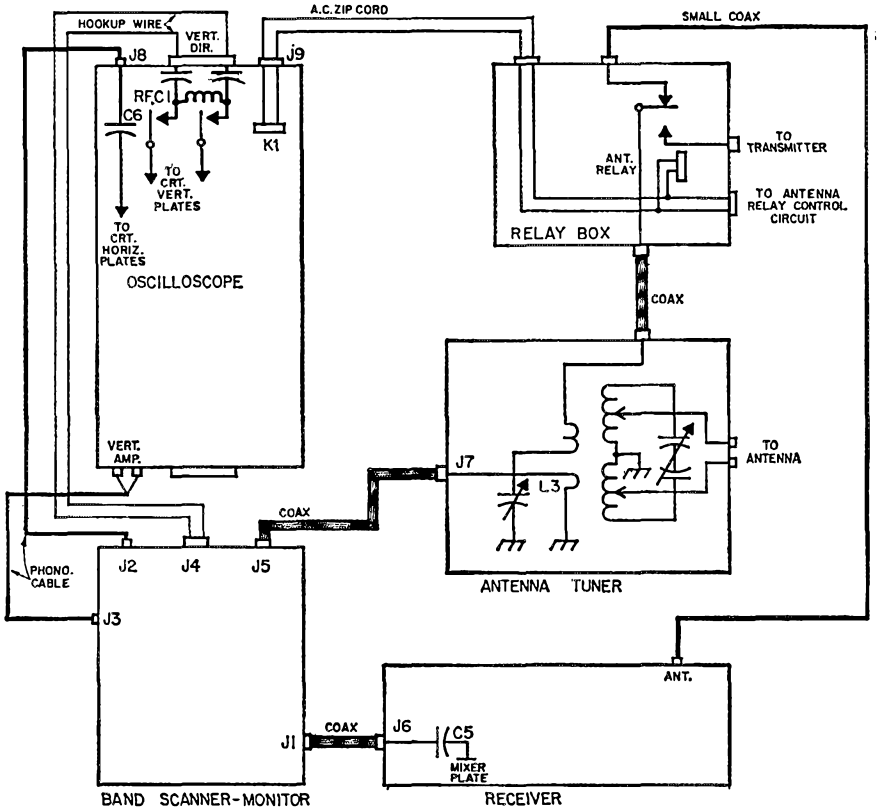


Fig. 5—Diagram showing how the band scanner/monitor is integrated with several other pieces of equipment in a ham station. In setups where an antenna tuner is not used, L_3 should be coupled to the output coil in the transmitter.

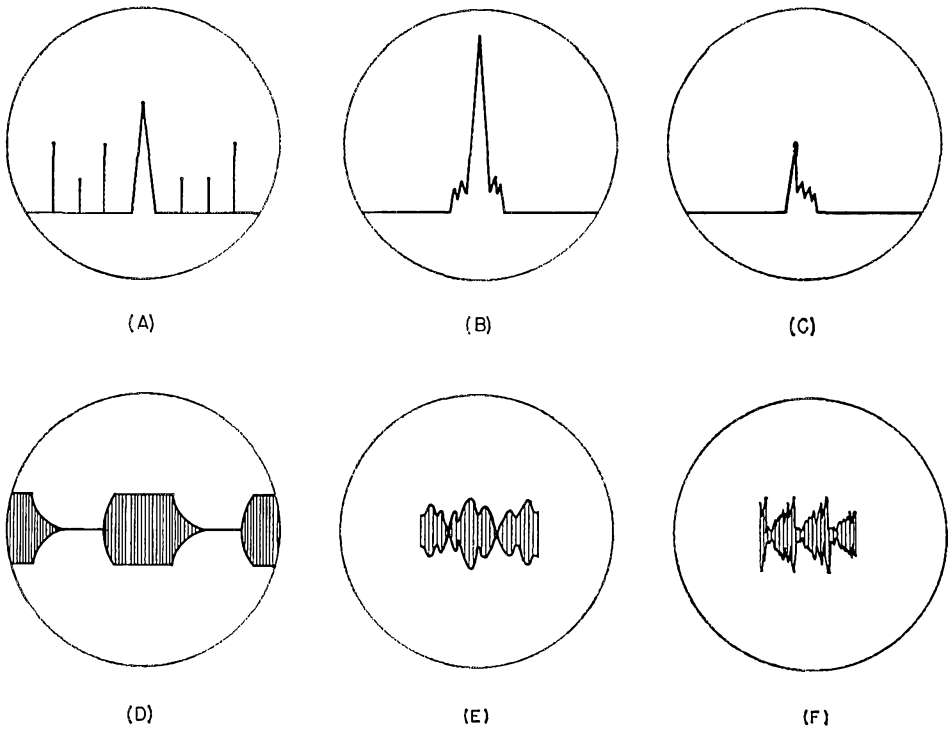


Fig. 6—Some typical band-scanner displays (A, B and C) and some typical transmitter-monitor waveforms (D, E and F). A—Constant carrier with some noise pulses on either side. B—Double-sideband a.m. C—S.s.b., suppressed carrier. D—C.w. wave envelope. E—A.m. wave envelope. F—S.s.b. wave envelope.

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 characteristicsof 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"[4] 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,[5,6,7] and the encouragement received from local amateurs to write this article. QST

[4] 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.

[5] Priebe, "Build Your Own Panoramic Adapter," *QST*, September, 1954.

[6] Hutton, "The Pan Scope," *CQ*, February, 1960.

[7] Ehrlich, "The Lazy Man's Panoramic Adapter," *QST*, November, 1954.

A JFET QRP Rig For 40 Meters

BY KEN M. DOOLITTLE,* W2SMR

EVER 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.[1]

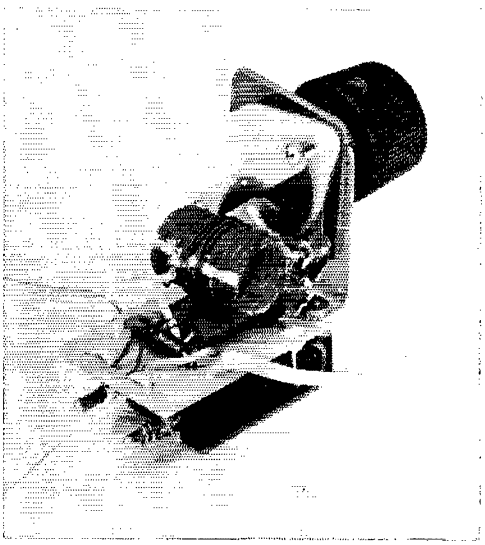
Construction

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 5/16-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 1/16-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 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



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.

* Box 553, Newark Valley, New York 13811.

[1] 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.

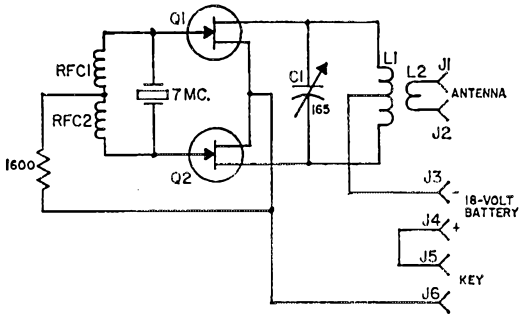


Fig. 1—Circuit diagram of the 7-Mc. transmitter. Capacitance is in pf.; resistance is in ohms; resistor is ½-watt composition.
BT_1—Two 9-volt batteries in series (Eveready 216 for portable or intermittent use; Burgess M6 for home operation).
C_1—165-pf. miniature variable (modified Radio Shack 272-1431 365-pf. unit; see text).
J_1-J_6, inc.—Alligator clip.
L_1—36 turns No. 26 insulated wire, tapped at center, ½-inch diameter, close wound.
L_2—4 turns No. 26 insulated wire over center of L_1.
Q_1, Q_2—MPF106 JFET (Motorola).
RFC_1, RFC_2—250 μh. 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-μh. r.f. chokes were used in the rig, if you have the space, any chokes in the 250-μh. 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, 65½ 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 C_1 in the transmitter and C_2 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 C_1 for best keying and C_2 for maximum antenna power. The rig keys well if an active crystal is used.

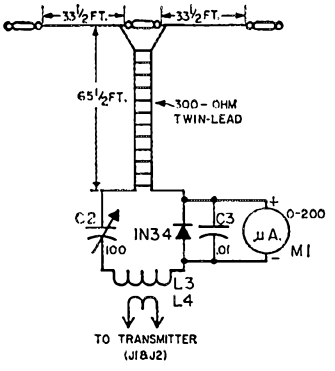


Fig. 2—Suggested antenna system for use with the QRP rig. The feed line should be an even multiple of a quarter wavelength for use with the series-tuned coupler shown.
C_2—100-pf. variable.
C_3—0.01-μf. disk ceramic.
L_3—20 turns No. 14 insulated wire, 3-inch diameter, close wound.
L_4—4 turns No. 14 insulated wire over center of L_3.
M_1—0-200 microammeter, or v.o.m. with similar range.

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

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.

At 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 (⅛ 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:

[1] S. Butterworth, "The High-Frequency Resistance of Toroidal Coils," *Exp. Wireless and Wireless Eng.*, Vol. 6, p. 13, January 1929.

[2] G. Reber, "Optimum Design of Toroidal Inductances," *Proc. I.R.E.*, Vol. 23, p. 1056, September 1935.

[3] F. Terman, *Radio Engineers Handbook*, 1943 (McGraw-Hill Book Co., Inc.).

[4] G. Palmer, "High Ferrites for Frequencies From 2 to 200 MHz.," *Proceedings 1959 Electronic Components Conference*, Philadelphia.

[5] Remis, Bady, Sands, "Planar Ferrites for Permeability Tuning in the Very High Frequency Region," *Proceedings 1966 Electronics Components Conference*, Washington, D. C.

[6] *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).

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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.

How To Do A Good Soldering Job

Some Tips On an Important Subject

BY LEWIS G. MCCOY,* W1ICP

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.

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.

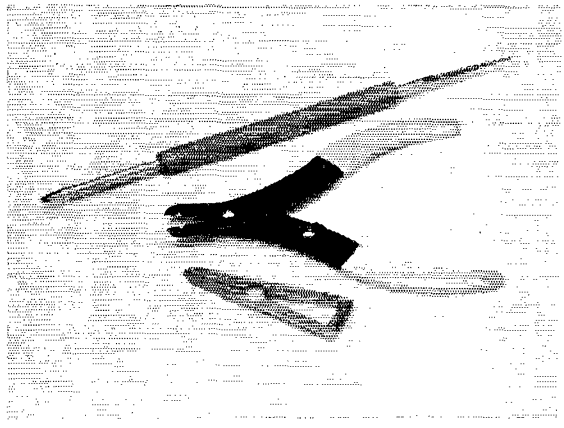
The Solder

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.

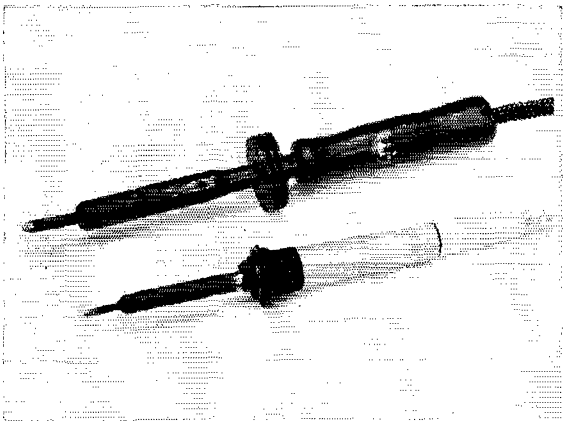
Which Soldering Iron?

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.

* Novice Editor



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

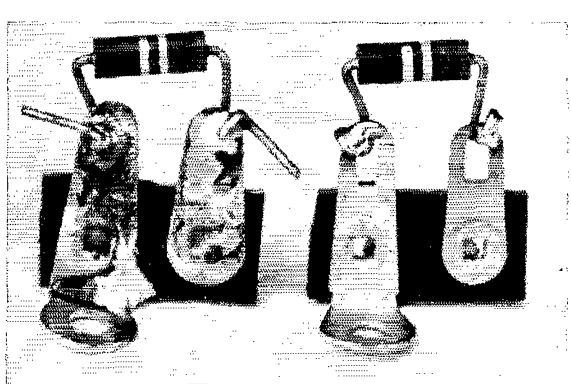
Before getting into the actual techniques of soldering, let's say something about the care of your iron. For the tip of the iron to conduct heat from the iron to the work, it is necessary for the tip to have a thin coating of solder — not dirty or oxidized solder, but a bright, shiny surface. A new iron 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 retinned. 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.

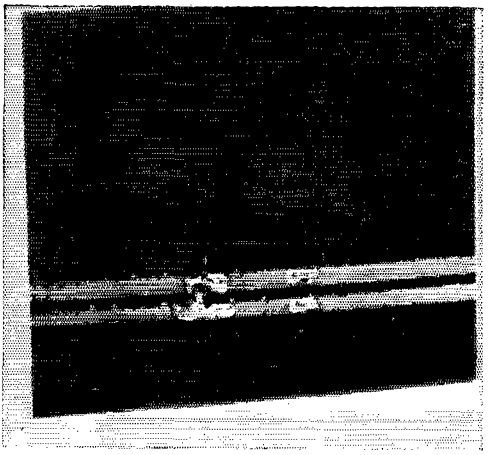
The process of soldering is quite simple. The tip of the iron is applied to the connection and the connection allowed to heat up to the point where the solder flows around the connection. Where many amateurs make a mistake is by applying solder to the iron and not the connection. It is very important 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.

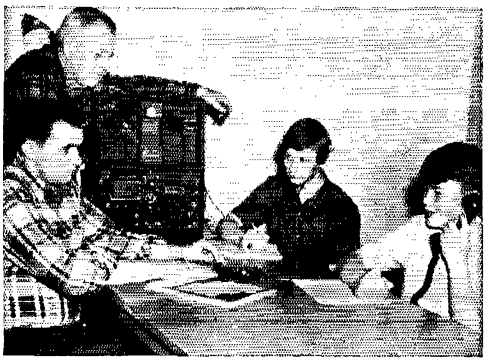
In Summary

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

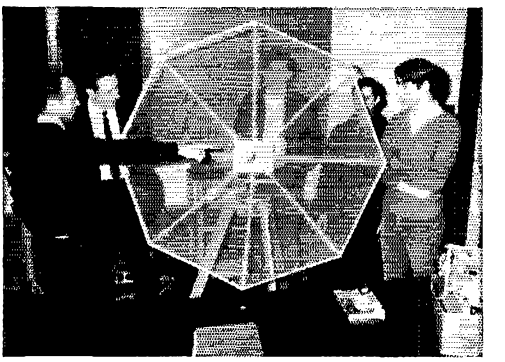
1) Always use rosin-core solder, never acid-core.
2) Keep the tip of the iron clean and tinned.
3) Any leads or terminals should be clean.
4) Apply the solder to the work, not the iron.
5) Never use more solder than necessary.
6) Always use a heat-sink on small components.

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,* W1HDQ

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.[1] 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.[2] we first used a wood boom. When optimum element lengths and spacings were obtained, we duplicated the array with a boom of ¾-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.

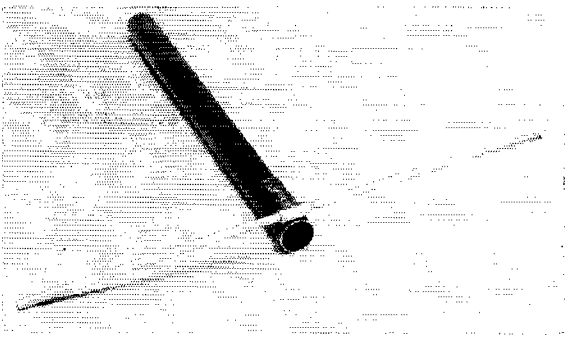


Fig. 1—Model showing a mounting method for elements in an array for 220 Mc. or higher frequencies. Riveting is done with the "Pop Rivetool," now generally available in hardware stores. A drop of epoxy cement on the element before assembly will keep the mounting tight indefinitely.

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 innacurate 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 W1QVF, who made this model. We built a riveted version of the 11-element 432-Mc. Yagi. Somewhat to our surprize, 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

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

[1] "V.h.f. Antenna Facts and Fallacies," January, February and March, 1964, *QST*.

[2] "Yagi Arrays for 432 Mc.," April, 1966, *QST*, p. 19.

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.[3]

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 1/8th 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 1/8th 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 "broadbanded" 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.[4]

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

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

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[5] 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,[6] 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-

[3] "Building Your Own Arrays for 50 and 144 Mc.," October, 1966, *QST*, p. 33.

[4] *Radio Amateur's V.h.f. Manual*, Edition 1, Fig. 8-18D.

[5] "Technical Topics," — "Some Observations with V.h.f. Folded Dipoles," April, 1965, *QST*.

[6] "More Ideas for 50-Mc. Portable Arrays," October, 1967, *QST*, p. 15.

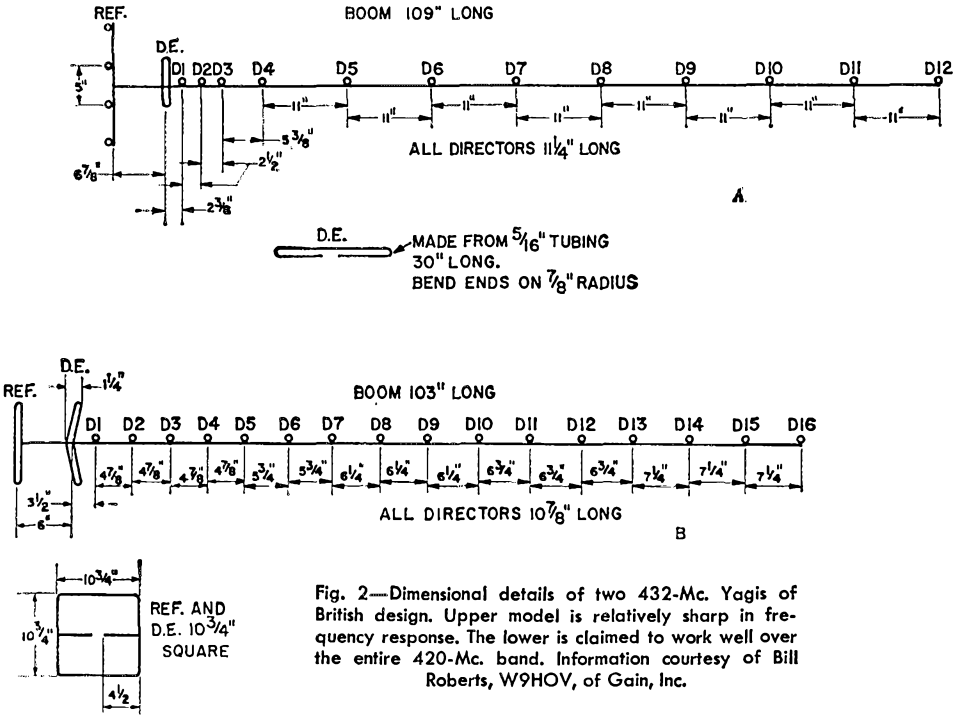


Fig. 2—Dimensional details of two 432-Mc. Yagis of British design. Upper model is relatively sharp in frequency response. The lower is claimed to work well over the entire 420-Mc. band. Information courtesy of Bill Roberts, W9HOV, of Gain, Inc.

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 1¼-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 186*)

Interference and the V.H.F. Mountain-Topper

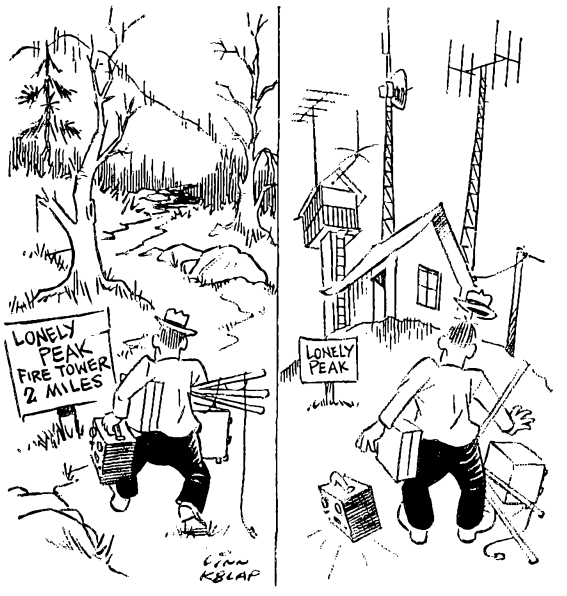
How To Get Along with "Big Brother"

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

DURING 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.

* Box 72, RFD 2, Bristol, Tenn. 36720.



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).

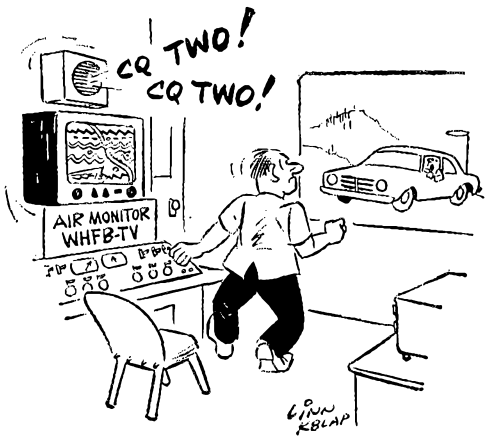
Surveillance Radar.

With the exception of most radar installations, these facilities are not manned except during maintainance 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 maintainance 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, parasitics 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[1] 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!

[1] Tilton, "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

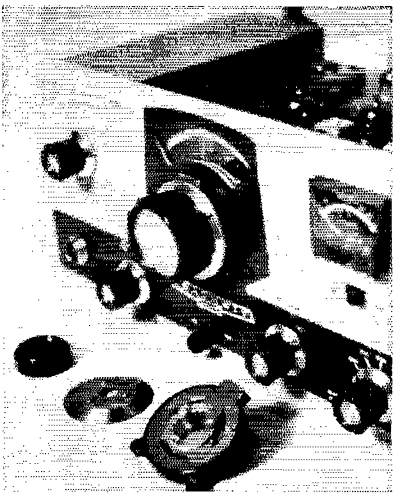
There is just one good word of advice about trying to operate near a community antenna television system (CATV) — *don't*! These cable systems have pickup stations on hills or mountains near the communities they serve. The TV signals are picked up by high-gain antennas, then amplified many times and fed through coaxial cable and more distribution amplifiers, into the homes of the community. Such facilities are not manned, except for brief maintainance 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 ¼-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 ¼-inch shaft, approximately ⅜ 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-μf. 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.

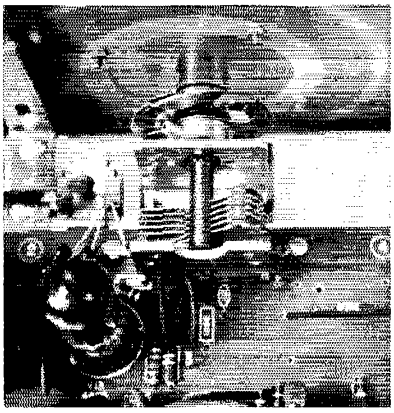
3) Unsolder connections, remove four mounting screws, and lift out the v.f.o. tuning capacitor. Loosen the setscrew and slip the plastic dial off the shaft.

4) Using a hacksaw, carefully cut the shaft of this capacitor, leaving only 5/16 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 remounting the v.f.o. capacitor ⅝ 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 ⅛ 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.



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.

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 ¼-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 ¾ to ⅞ inch, depending upon the size of the coupling selected.)

11) Slide the new vernier dial on the end of the ¼-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 ¼-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

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

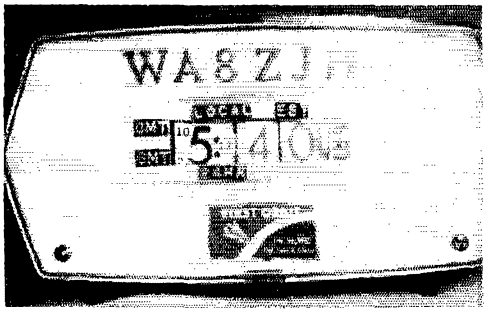


Fig. 1—By modifying a 12-hour digital clock as described in the text and shown above, you can read 24-hour GMT and 24-hour local time without any calculating.

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 ⅛ 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 KEYER"

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.[1] I accomplished this by adding a J-K flip-flop as shown in Fig. 2. The additional circuitry was mounted on a 2¾ × ¾-inch circuit board inside a 3 × 4 × 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*

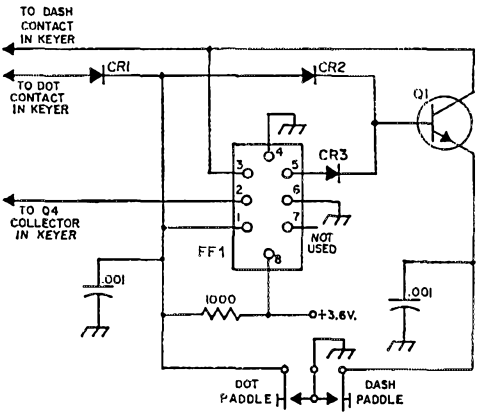


Fig. 2—Iambimatic adapter for "Micro-TO Keyer." Resistance is in ohms; resistor is ½ watt. Capacitors are ceramic; capacitances are in microfarads (μf.)

CR_1, CR_2, CR_3—Germanium diodes (1N64 suitable).
FF_1—J-K flip-flop (Fairchild μL923).
Q_1—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-

[1] Gensler, "The 'Iambimatic' Concept," *QST*, Jan., 1967.

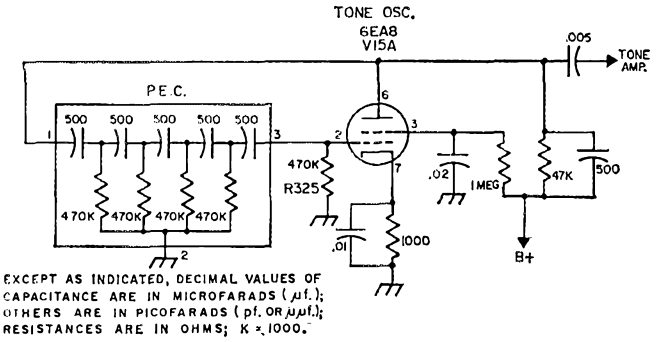


Fig. 3—Schematic diagram of the c.w. monitor in the Heath SB-101. By increasing the value of R_{325}, the user can lower the pitch of the oscillator. The P.E.C. is discussed in the text. Resistors are ½ watt.

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

In 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*

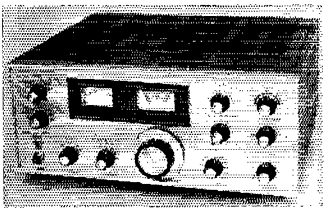
CLEANING HINT

For 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.

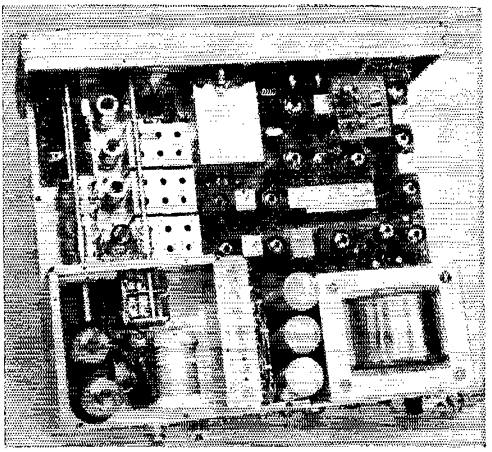
The Yaesu FT-DX-400 Transceiver



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.



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.

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

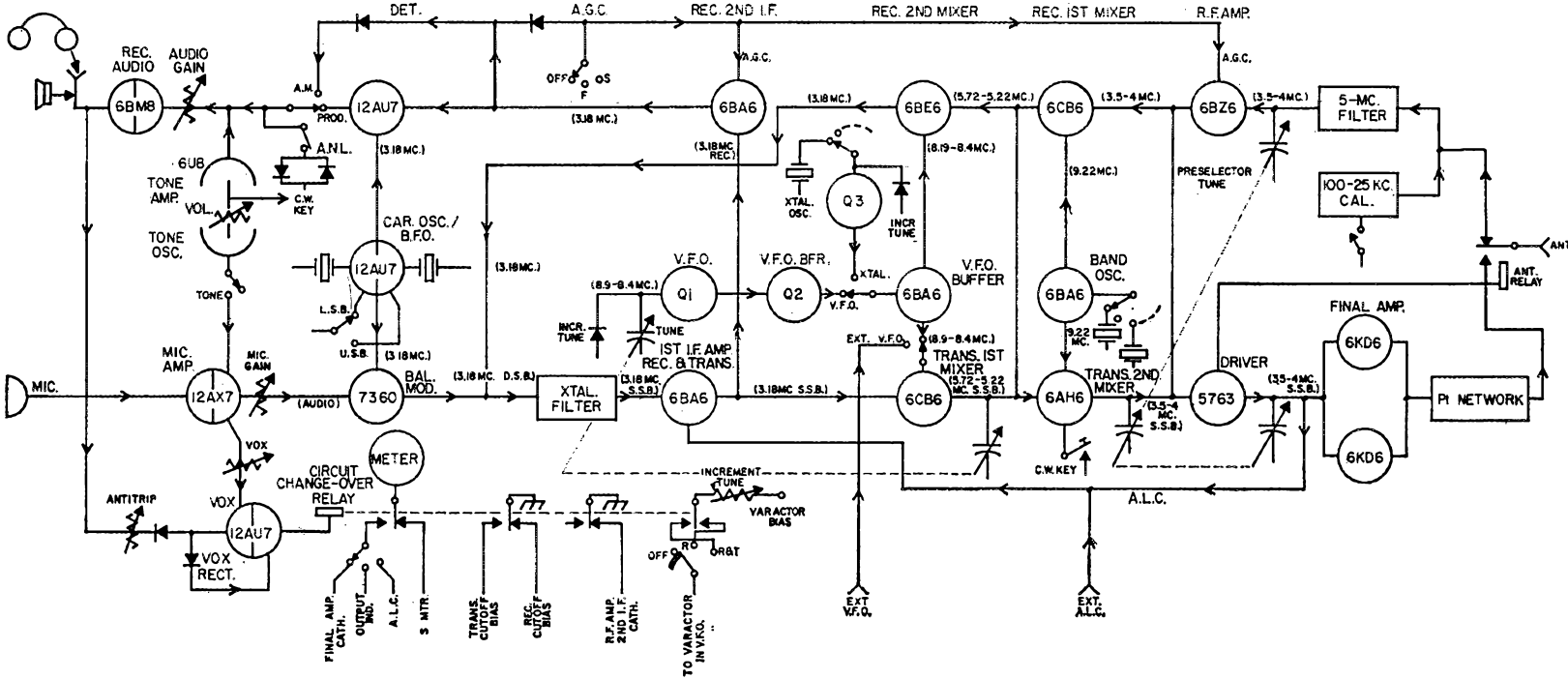


Fig. 1—Block diagram of the FT-DX-400.

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 (6BM8) 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

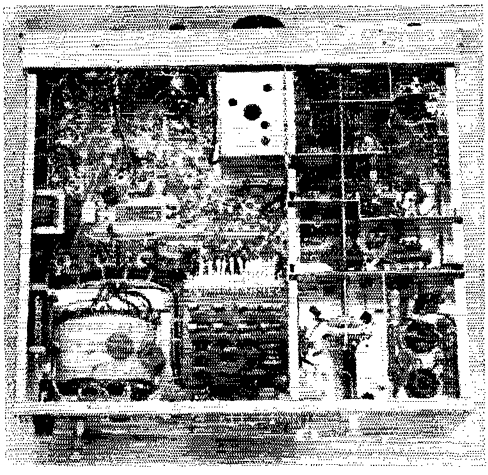
Separate relays are used for switching the antenna and switching circuitry. The circuit relay opens the cathode circuits of the receiving r.f. and second i.f. amplifiers on transmit; shifts cutoff bias from the driver and both transmitting mixers on receive, to the two receiving mixers on transmit; shifts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



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.

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.

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 0C3A 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-kc. 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*)

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 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.)

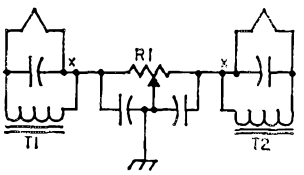


Fig. 1—Arrangement for balancing plate dissipation in two tube amplifiers having tubes which operate with visible color in the plates. T_1 and T_2 are separate filament transformers having ratings appropriate for the tubes used. Capacitors can be 0.005- or 0.01-μ, disk ceramic. See text for discussion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

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, Logootee, Indiana 47553.*

SEMI-AUTOMATIC KEY ADJUSTMENT

Technical Editor, *QST:*

After reading over VE2AQG'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 — ½ 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. 02633.*

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 Lousiville Kenvention C.W. Contest would be useful to many clubs and individuals alike. The advantage of such a unit is that output

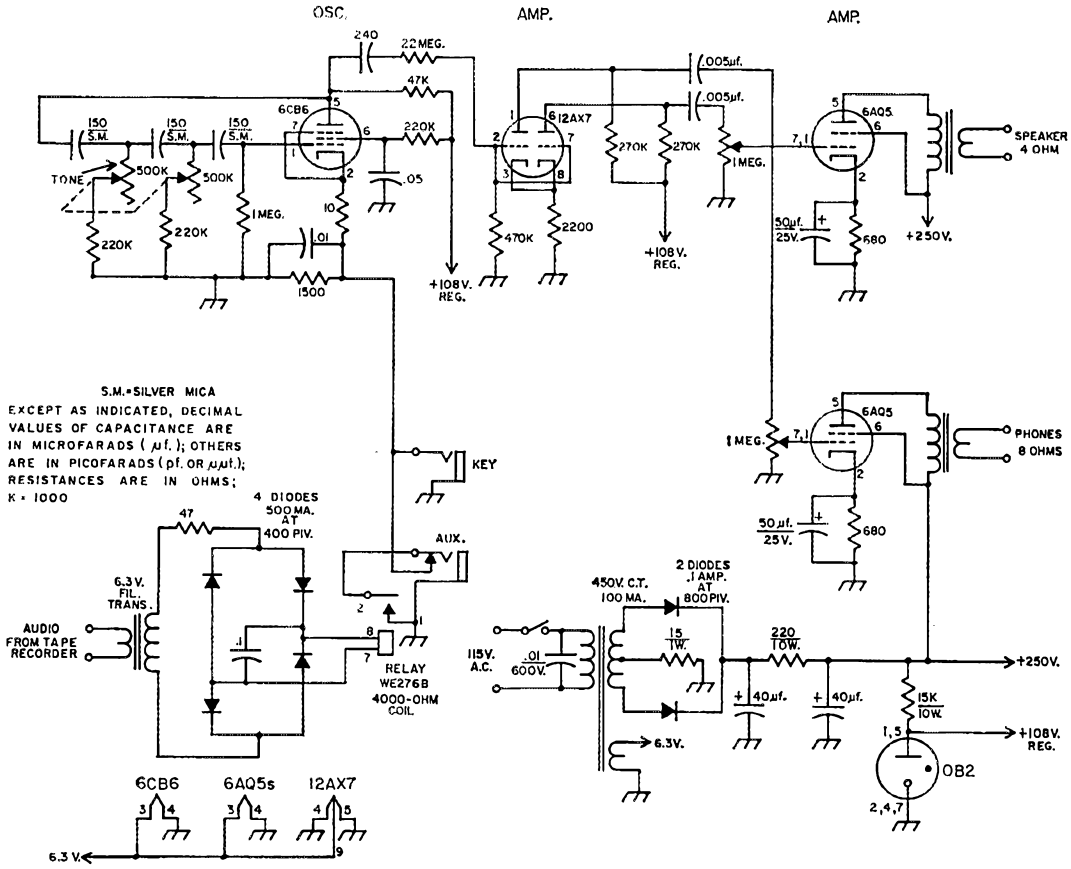


Fig. 2—Circuit for constant-tone reproduction of code from tape recordings run at various speeds. Except as indicated, resistors are ½ watt. Electrolytic capacitors have polarity indicated; other fixed capacitors may be any available type except those marked "SM" (silver mica).

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 outboard 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 × 9½ × 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 screwdriver-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, WAØIQN, P.O. Box 1664, Boulder, Colorado 80301.* QST

Snowmobile Mobile

WINTER MOBILE OPERATION --VE3 STYLE

VE3ETO and VE3BSB (with mike in hand) operating snowmobile

BY READ C. EASTON * W5PSY/VE3

Over 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-doos 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

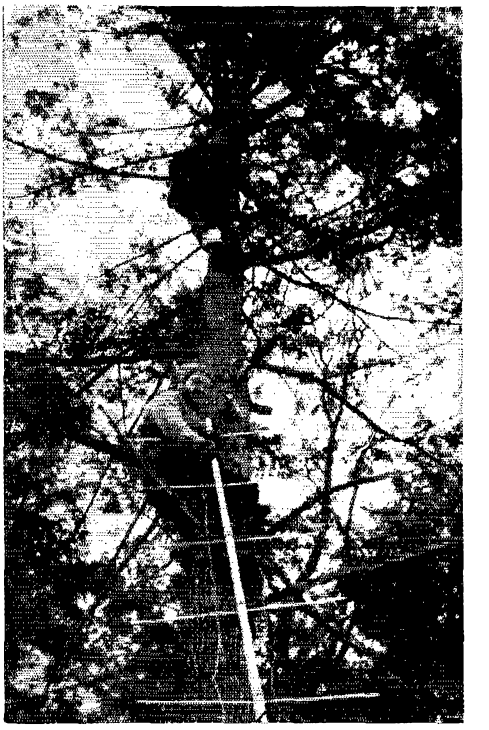
*9 Roche Place, Ottawa 14, Ontario, Canada.

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.

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



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

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.

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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,

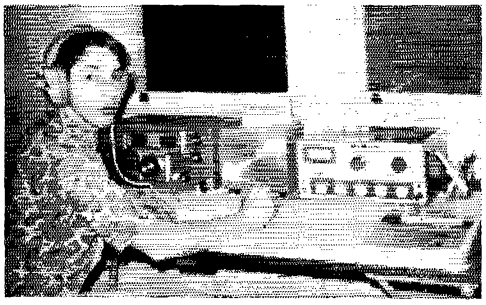
Great." —*WN6YMW*

Results, 1968 Novice Roundup

For 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 WN7IIE 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?)

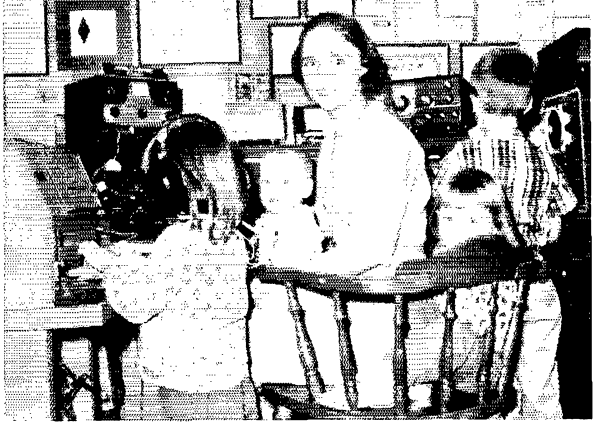
Many entrants commented that the NR ought to be shortened to ten days or so; others felt that the RST ought to be included in the contest exchange. How about letting us know how *you* feel about making such changes. And CU next February! — *W1ARR*



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." — **WN2CXL.** "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!" — **WNØSQD.** "Lots of fun on all bands." — **WNØTCN.** "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." — **WN8YOQ.** "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." — **WNØRGR.** "The most fun event I have witnessed so far in my hobby, especially with two other hams within two blocks of my station." — **WNØSBP.** "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." — **WNØSQG.** "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 conTEST!" — **WN1IXJ.** "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." — **WN1IIH.** "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.** "*Grr-r-r-rent* contest!" — **WN4HRA.** "Worked three JAs during the contest." — **WN5TQP.** "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." — **WN4HOI/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?" — **WN6WNQ.** "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

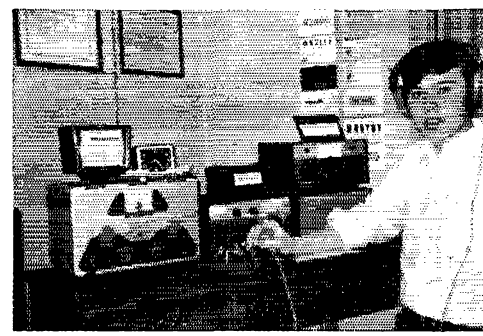
Call	*Section*	*Score*	*Bands Used*	*Transmitter*	*Receiver*	*Antenna(s)*
WN9UOP	Wis.	39,262	80, 40, 15	Heath DX-40	Drake R-4	Dipole (80), trap vertical (40, 15)
WN7ISP	Ariz.	36,500	80, 40, 15	Globe Scout (80), 6GK6-6DQ5 (40, 15)	Collins 75A-1	Vertical (80, 40), 2-el beam (15)
WN7IIE	Ariz.	33,345	40, 15	Adventurer	Halli-crafters	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)
WN8YMF	W. Va.	23,760	80, 40, 15	Johnson Viking Challenger	Halli. S-85	Dipole cut for 40
WNØRPI	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

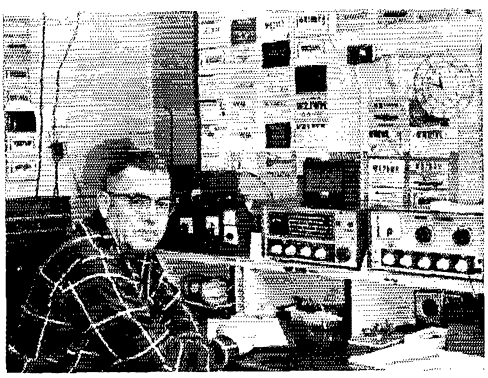
comments about band conditions, though: 15 — great; 40 — got their *QSTs* late; 80 — *what* contest?????" — **WN5TSM.** "Thoroughly enjoyed the NR even though I may run out of QSL cards confirming R.I." — **K1QFD.** "Enjoyed a somewhat rarer status up here in N.H., as my home is in Mass." — **WA1CRT,** 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!" — **WA3IID.** "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." — **WB4EKI.** "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 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." — **WA7IRE.** "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." — **WA0PPK.** "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." — **WA0NMA.** "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.**

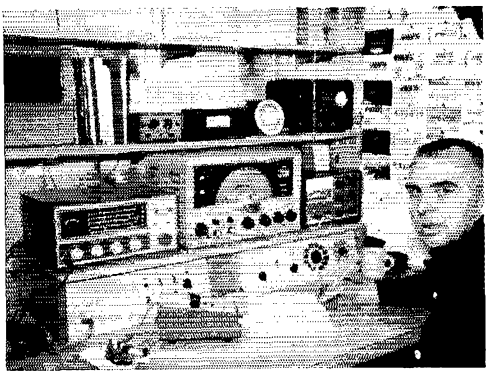
DIVISION LEADERS

Atlantic	WN2CPQ	New England	WN1IIVL
Central	WN9UOP	Northwestern	WN7IYZ
Dakota	WN0RPI	Pacific	WN6YBX
Delta	WN5TAF	Roanoke	WN8YMF
Great Lakes	WN8YOQ	Rocky Mt.	WN5TQP
Hudson	WN2DRJ	Southeastern	WN4FQK
Midwest	WN0RMA	Southwestern	WN7ISP
West Gulf	WN5RWU		

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:* WN3HXJ 1890-70-27-7 or total score 1890, different stations worked 70, sections worked 27, total operating time 7 hours.

ATLANTIC DIVISION

Delaware

WN3HXJ 1890- 70-27- 7

Eastern Pennsylvania

WN3INW 15,675-270-55-39
WN3HOM 12,084-228-53-34
WN3IXF 10,285-172-55-40
WN3HMK 9000-200-45-22
WN3JCJ 7840-225-32-34
WN3IIA 7693-157-49-30
WN3IPG 6390-142-45-35
WN3IRF 4725-169-25-40
WN3JAF 4070-110-37-35
WN3ILL 3450-100-30-34
WN3JAE 2924- 86-34-18
WN3HEU 1798- 58-31-17
WN3IMG 1326- 51-26- 7
WN3JEL 1296- 54-24-28
WN3HOM/3 1247- 43-29- 6
WN3IOA 564- 32-12- 9

Maryland-D.C.

WN3JAB 12,348-181-63-38
WN3IYS 5610-150-34-37
WN3IJA 4250-125-34-25
WN3JCH 3848-104-37-18
WN3HXG 3224-109-26-15
WN3IUY 12- 4- 3- 9

Southern New Jersey

WN2BVW 19,557-369-53-24
WN2CXL 13,462-244-53-37
WN2DBB 6764-168-38-27
WN2BZB 4928-112-44-14
W2PU (WN5ROC, opr.) 1188- 44-27-20

Western New York

WN2CPQ 21,835-377-55-40
WN2VQG 9360-180-52-19
WN2AWX 5016-104-44-12
WN2CAL 1950- 60-26- 8
WN2BSG 290- 29-10-10
WN2BRI 176- 16-11- 6

Western Pennsylvania

WN3HUN 18,924-317-57-29
WN3BQL 14,396-244-59-31
WN3JEM 13,724-277-47-33
WN3JBN 1200- 50-24-12
WN3IZH 192- 14- 8- 6
WN3JGO 184- 13- 8-12

CENTRAL DIVISION

Illinois

WN9UZH 28,644-434-66-38
WN9WAU 21,266-343-62-29
WN9UXR 20,790-310-63-38
WN9UQS 19,328-282-64-37
WN9WEC 17,342-279-58-40
WN9USL 13,737-241-57-32
WN9USR 10,089-177-57-18
WN9WAS 6096-127-48-34
WN9VOX 5460-120-42-22
WN9VVU 5110-146-35- –
WN9UYV 3560- 89-40-16
WN9UOT 3192- 84-38- –
WN9VFO 2886- 74-39- 9
WN9UIG 1800- 60-30- 9
WN9VGX 154- 14-11- 4
WN9WPD 130- 13-10- 5

Indiana

WN9VJB 8208-142-54-37
WN9VYJ 4860-135-36-22
WN9VDP 4600-100-40-17
WN9UEO 4200- 90-42-40
WN9WIK 3168-132-24-12
WN9VZD 2816- 88-32-20
WN9VHA 2408- 71-28-13
WN9WDB 2310- 77-30-11
WN9UIR 440- 22-20-16

Wisconsin

WN9UOP 39,262-576-67-39
WN9VHV 8194- 64-31-15
WN9WDP 1909- 83-23-17
WN9UW8 1534- 59-26-10
WN9WBQ 507- 39-13- –

DAKOTA DIVISION

Minnesota

WNØRPI 22,196-358-62-35
WNØTAE 14,280-223-60-25
WNØSEN 4620-100-42-14
WNØSCH 2240- 80-28-11
WNØTHC 2205- 63-35-19
WNØRXC 384- 24-16-12

North Dakota

WNØSQD 6350-127-50-34

South Dakota

WNØTHG 6072-123-44-38
WNØTCN 6030-119-45-17
WNØSJK 1920-64-30-17

DELTA DIVISION

Arkansas

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

Louisiana

WN5SBJ 6600-150-44- –
WN5TTH 2233- 77-29-11

Mississippi

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

Tennessee

WN4HOK 16,320-257-60-24
WN4GNR 11,792-248-44-28
WN4FZP 10,120-169-55-22
WN4HNB 8800-176-50-33
WN4HLI 7350-137-50-38
WN4GTI 6300-135-42-28
WN4HPY 5421-139-39-30
WN4GSS 4620-105-44-15
WN4HMA 1595- 55-29-11
WN4HLH 731- 43-17-12
WN4HSS 306- 18-17- 3

GREAT LAKES DIVISION

Kentucky

WN4HF 17,568-273-61-40
WN4HUS 7344-144-51-39
WN4ILP 3672-102-36-39

Michigan

WN8YOQ 30,114-458-63-37
WN8YVY 8850-162-50-26
WN8WLK 6118-161-38-35
WN8YIR 6028-117-44-20
WN8YRH 5735-140-37- –
WN8YHP 2100-100-21- –
WN8ZJM 1020- 51-20-13
WN8ZIS 54- 9- 6- 2
WN8YHO (WN8s WCZ YHO) 4563-117-39-15

Ohio

WN8WGX 19,965-343-55-36
WN8ZNC 16,302-286-57-35
WN8YKE 15,444-282-52-36
WN8YOW 13,833-261-53-40
WN8ZBA 11,592-207-56-25
WN8YFH 11,220-200-51-25
WN8YWI 11,205-234-45-23
WN8YHN 10,175-185-55-35
WN8ZBJ 9880-180-52- –
WN8WYO 8418-183-46-26
WN8WQN 8400-153-50-24
WN8ZNO 6847-167-41-30
WN8YXH 6068-164-37-40
WN8YXE 1914-126-39-26
WN8YXI 1890- 63-30-10
WN8WHR 1587- 69-23-28
WN8YTH 648- 26-18- –
WN8WBV 490- 34-10- 5
WN8WCR 99- 18- 3-13

HUDSON DIVISION

Eastern New York

WN2DTN 13,080-218-60-40
WN2BND 10,710-223-45- –
WN2CDE 5754-122-42-30
WN2ASW 4420-120-34-16
WN2DTL 2812- 76-37-14
WN2CRW 1560- 63-20- 7
WN2BQE 522- 29-18- 9
WN2DUS 45- 5- 3- 1
WN2BQF 42- 7- 6- 4

N. Y. C.-L. I.

WN2COL 12,238-191-58-31
WN2CEM 7334-183-38-40
WN2DFD 4633-113-41-11
WN2AYF 2325- 75-31-10
WN2BSQ 1404- 44-26-13
WN2DSF 1400- 70-20-12
WN2BSP 1150- 40-23-14
WN2AVX 56- 8- 7- 1

Northern New Jersey

WN2DRJ	17,360-300-56-38
WN2DNY	13,144-248-53-40
WN2DVN	11,475-225-51-24
WN2CWX	10,971-207-53-25
WN2BPZ	10,290-190-49-34
WN2APG	5474-141-34- 9
WN2DZU	5328-148-36-36
WN2CKU	5240-121-40-24
WN2CJT	2835-105-27-13
WN2CUR	1829- 59-31-12
WN2CTN	1368- 72-19- –
WN2DXW	1180- 49-20-28
WN2CZP	1040- 40-26-11
WN2CEW	646- 34-19-14
WN2BUP	156- 28-12-10
WN2CWV	140- 22-20- 5

MIDWEST DIVISION

Iowa

WN0RXQ	3240- 81-40-34
WN0RGR	1998- 74-27-19
WN0RJZ	1512- 56-27-17
WN0RXR	1215- 45-27-19

Kansas

WN0SXB	6612-142-41-27
WN0THQ	5412-123-44-27

Missouri

WN0RMA	10,324-178-58-31
WN0SBP	8313-153-51-31
WN0RTO	7056-147-48-30
WN0SKP	4522-104-38-12
WN0TLT	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

WN1HVL	20,496-321-61-38
WN1IQJ	16,856-288-56-40
WN1JAD	14,734-268-53-35
WN1HUN	12,180-200-58-23
WN1IWD	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	18,900-300-63-36
WN1DP	9888-208-48-24
WN1ISH	6930-155-42-25
WN1IVA	3420- 85-36-23
W1KBN (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
WN1IUU	1456- 56-26- –
WN1IGG/1	368- 23-16- 5

New Hampshire

WN1IIH	2958- 87-29-20

Rhode Island

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

Vermont

WN1HUQ	5220-106-45- –
WN1HRM	697- 41-17- 6

Western Massachusetts

WN1HYT	13,974-274-51-25
WN1IPZ, 1	13,530-236-55-37
WN1IZS	7350-140-49-18
WN1JCT	5371-131-41-17
WN1IJI	3947-127-31-27
WN6WKN/1	2016- 69-24- 8

NORTHWESTERN DIVISION

Oregon

WN7IOK	304- 38- 8-33

Washington

WN7IYZ	592- 37-16- 6

PACIFIC DIVISION

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	12,096-201-56-37
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	12,980-236-55-40
WN6ZFA	4004-91-44-16
WN6YAY	592-37-16-10
WN6YAY,6	36-6-6-2

San Joaquin Valley

WN6YBX	18,618-321-58-34
WN6ZIP	10,070-175-53-40
WN6YMK	8427-149-53-15
WN6YXB	3136-112-28-19
WN6WGR	2409- 58-33-15
WN6ZBX	1748- 76-23-21

Santa Clara Valley

WN6YQY	16,695-265-63-19
WN6YIY	3432- 78-39-19

ROANOKE DIVISION

North Carolina

WN4GXW	5704-124-16-37
WN4IMW	2002- 72-26-35
WN4FGC	1701- 66-21-14
WN4HKO	374- 22-17-21

South Carolina

WN4GQA	12,687-219-53-32
WN4FUV	6684-126-49-25
WN8ZQN/4	4158- 99-42-27

Virginia

WN4GRN	29,150-305-62-39
WN4FQR	17,640-315-56-34
WN4HRA	8120-217-35-26
WN4FSV	2320- 80-29- 9
WN4HYO	9- 3- 3- 3

West Virginia

WN8YMF	23,760-432-55-40
WN8YWK	15,336-284-54-39

ROCKY MOUNTAIN DIVISION

Colorado

WN0RMQ	8052-168-44-38
WN0SUD	3255- 85-31-18
WN0RY8	1269- 47-27-20
WN0SJB	300- 15-12- 7
WN0SQA	32- 8- 4- 8

New Mexico

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

SOUTHEASTERN DIVISION

Alabama

WN4HVD	1080- 45-24- –

Canal Zone

KZ5THN	30- 6- 5- 3

Eastern Florida

WN4FQK	12,265-213-55-24
WN4GQZ	9024-192-47-39
WN4FSG	7050-141-50-30
WN4HQX	2970- 99-33-15
WN4FSF	2139- 49-31- 8
WN4HZS	1410- 47-30- 8
WN4FQK,4	480- 22-15- 4

Georgia

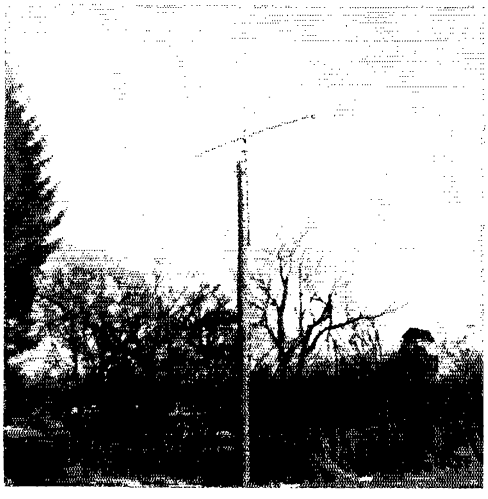
WN4HOL,4	6272-118-49-20
WN4HVO	5989-127-47-12
WN4HLC	3564- 99-36- –
WN4IEJ	836- 38-22-11

West Indies

WN9VPX/KP4	4400-110-40-25

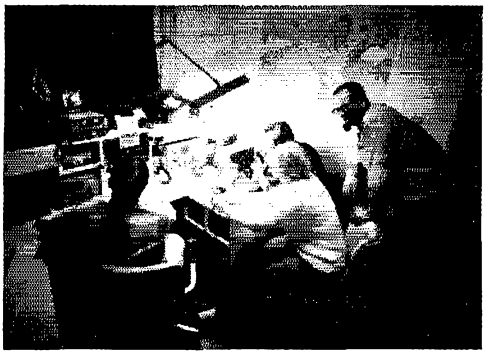
(*Continued on page 154*)

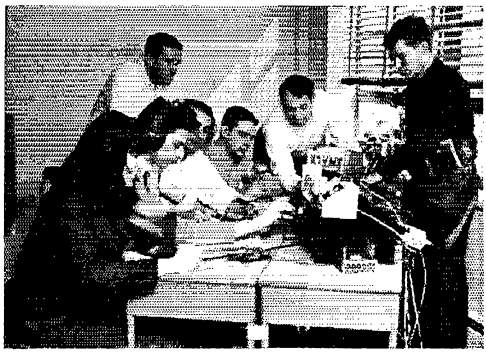
A close section race adds plenty of excitement to the NR. In Rhode Island, **WN1IJB** edged neighbor WN1IJC by a scant 600 points and made the 5th-highest score in New England. Besides the Cushcraft 15-meter beam, Mark used a vertical mounted atop the house.



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

REPORTED BY BOB HILL,* W1ARR





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.

THERE 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 W1HDQ 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 **W3MFY** 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 W3MFY 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, WN8YYV, 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

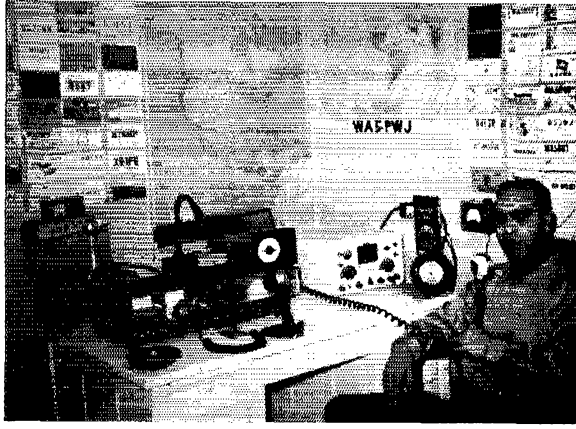
"Conditions very good on 6 and terrible on 2. Just about every type of propagation present on 6 except *F2*, which came a week before. Six-meter activity in Quebec is picking up by leaps and bounds. I will be on 2 and 432 s.s.b. for the June contest, and please tell the stations in the States to turn 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." — **VO1DZ.** "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." — **VE1AKA.** "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.** "Eighty QSOs during the 4-hour band opening did a lot for my score. Glad to give a Wyoming contact to so many happy fellows." — **K6QPH/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." — **WAØPHZ/Ø.** "My first contest as a single operator and found it a nice experience. The six-meter band was open, which allowed many section contacts." — **WØINK.** "Condx 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." — **W4TBQ.** "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 SCV. 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.** "Unfortunate 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 continental 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 blew (no spare), rotator froze, and after these were corrected, poor band condx. Old Man Murphy rang in the New Year!" — **W1DZA.** "Thank goodness for K2HLA!" — **WN1IQJ.** "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." — **WAØJYK.** "TVI cut down on operating time but did work the *Es* opening." — **WAØOVM.** "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*
Mt. Airy V.H.F. Radio Club (Pa.)	742,811	95	W3MFY
Rochester V.H.F. Group (N.Y.)	253,185	122	W2UTH
South Jersey Radio Association	233,631	45	W2REB
Albany Amateur Radio Association (N. Y.)	96,162	56	K2CBA
Mobile Sixers Radio Club (Pa.)	82,299	27	W3IZU
Hampden County Radio Assn. (Mass.)	42,796	30	K1ANF
Dayton Amateur Radio Assn. (Ohio)	35,848	20	W8KKF
Talcott Mountain U.H.F. Society (Conn.)	35,759	14	K1HTV
Six Meter Club of Chicago	34,029	16	K9ENZ
Rock Creek Amateur Radio Assn. (Md.)	30,980	24	W3HB
Germantown Radio Club (Pa.)	30,104	8	WA3HGW
1200 Radio Club (Mass.)	21,793	13	K1CHY
Alexandria Radio Club (Va.)	20,196	9	K4SUM
Southern California V.H.F. Radio Club	19,729	8	WA6WKF
Ranconas Valley Amateur Radio Assn. (N. J.)	15,934	5	WB2LZW
Vienna Wireless Society (Va.)	13,458	11	K4YCH
Villanova University Amateur Radio Club (Pa.)	12,836	3	WA3HGX/3
Hartford County Amateur Radio Assn. (Conn.)	12,537	9	W1HDQ
Springfield Amateur Radio Club (Ohio)	11,814	9	K8DEO
Dutchess County V.H.F. Society (N. Y.)	11,760	3	.....
East Coast V.H.F. Society (N. J.)	11,240	5	K2OJD
Six Meter Club of Dallas	10,376	5	WA5PWJ
Central Michigan Amateur Radio Club	9310	5	K8WEX
Greater Pittsburgh V.H.F. Society	8260	8	WA3ISY
Mid-Hudson V.H.F. Society (N. Y.)	6888	3	K2BGU
Skokie Six Meter Indians (Ill.)	6371	8	WA9PIY
Lake Success Radio Club (N. Y.)	5708	4	W2TUK
Argonne Amateur Radio Club (Ill.)	5140	9	K9HPW
York Radio Club (Ill.)	4976	3	WA9NRI
Fulton Amateur Radio Club (N. Y.)	4258	9	WA2SOO
Mid-Island Radio Club (N. Y.)	3340	3	W2SEU
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 Techs can copy code, because I heard beautiful sigs. Stations in EPa led the pack, with K3IPM 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-watter 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?" — **WA8TYF.** "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." — **WA8EOW.** "Where was everybody?" — **WA8UDE.** "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." — **WA8RQJ.** "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." — **WA5SER.** "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 deadest 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 WN 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

W3CGV 9296-166-18-ABCD
K3URP 1856- 58- 6-A
K3OBU 1800- 50- 8-B
K3FFD 364- 13- 4-A

Eastern Pennsylvania

W3MFY 52,910-715-27-ABCD
WA3CAG 38,480-520-27-ABC
K3IPM/3 34,304-536-22-ABCD
W3LHF 24,246-449-17-ABC
W3CL 20,800-416-15-ABC
W3KKN 19,338-440-12-ABC
W3HFY 18,496-272-24-ABCD
K3IUV 16,016-364-12-ABCD
WA3CQO 15,180-345-12-ABC
K3JJZ 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
W5NFD/3 11,077-293- 9-AB
K3GQJ 11,020-290- 9-ABC
W3SAO 10,812-318- 7-ABC
W3CCX 10,744-316- 7-ABC
W3CJU 10,744-316- 7-ABCD
W3MVF 10,374-273- 9-ABC
K3ZPN 10,225-205-15-A
K3ACR 9042-206-12-A
K3HSS 8976-281- 6-ABC
K3KTY 8896-278- 6-AB
K3EOD 8240-258- 6-AB
K3KVS 8194-241- 7-ABC
WA3HIT 7700-275- 4-AB
K3IGX/3 7581-200- 9-A
K3AQH 7560-210- 8-AB
K3BOY 7500-250- 5-AB
K3NMN 7480-220- 7-AB
WA3HGX/3 7232-226- 6-A
WA3AXV 7140-210- 7-ABD
W3ETB 6984-194- 8-A
W3CXU 6840-171-10-AB
WA3IMT 6810-227- 5-AB
W3FGQ 6750-225- 5-AB
K3QMK 6307-186- 7-AB
W3BBC 6290-185- 7-AB
WA3IVY 6290-185- 7-AB
WA3ADN 6132-219- 4-AB
WA3EHD 5850-195- 5-A
W3AJF 5820-194- 5-ABD
K3ZPQ 5792-181- 6-AB
K3TEF 5740-205- 4-AB
W3HKZ 5328-148- 8-ABCD
K3LNV 5312-166- 6-A
K3MXM 5200-200- 3-AB
WA3CND 5096-182- 4-A
W3QXV 5085-170- 5-A
K3WEU 5070-169- 5-A
K3YPL 5070-169- 5-A
WA3HGW 4860-162- 5-AB
WA3FAA 4844-173- 4-AB
WA3BTE 4760-140- 7-AB
WA3ERQ 4758-183- 3-AB
K3ATL 4640-119-10-A
K3QGQ 4500-150- 5-A
K3EPB 4452-159- 4-AB
K3OBY 4290-165- 3-ABC
W3ELI 4290-165- 3-AB
WA3EMQ 4260-142- 5-AB
WA3HET 4020-134- 5-A
K3KUB 3825-128- 5-AB
WA3GNL 3796-146- 3-A
K3TPM 3648-114- 6-B
W3KXH 3456-144- 2-A
K3AFT 3416-123- 4-A
K3VEQ 3354-129- 3-ABC
K3HNP 3328-104- 6-A
K3UZO 3220-115- 1-AB
W3ZRR 3180-132- 2-AB
WA3BRV 3068-118- 3-AB
K3CIV 3024-126- 2-AB
W3IXL 3024-126- 2-AB
K3FYX 2865- 98- 5-AB
W3WIJ 2600-100- 3-A
W3GS 2240- 80- 4-A
K3GFG 2232- 93- 2-A
WA3EYJ 2112- 88- 2-B
K3AA 1960- 70- 4-A
W3HYO 1960- 70- 4-B
K3IYA 1876- 67- 4-A
K3HWZ 1872- 78- 2-A
K3ZLL 1608- 67- 2-A
W3HAB/3 1558- 41- 9-AB
W3PST/3 1482- 57- 3-AB
K3EHQ 1428- 51- 4-AB
K3ZKO 1404- 54- 3-AB
K3ZMS 1400- 50- 4-
WA3BGM 1344- 48- 4-A
WA3EIO 1344- 48- 4-A
K3IFH 1320- 55- 2-A
K3ALK 1272- 53- 2-A
K3DLS 1272- 53- 2-ABC
WA3GNV 1248- 52- 2-B
W3HKZ/3 1170- 45- 3-A
K3DAQ 1032- 44- 2-A
K3GAY 1022- 37- 4-AB
WA3EKM 884- 34- 3-A
WA3IOK (WA3EKM, opr.) 854- 33- 3-A
WA2AMB/3 720- 30- 2-A
W3GXB 576- 24- 2-C
K3GFG/3 480- 20- 2-A
K3GZT 442- 17- 3-A
K3YDZ 432- 18- 2-A
WA3BKP 420- 15- 4-A
WA3FOF 360- 15- 2-B
W3IHT 330- 15- 1-A
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 oprs.) 10,438-307- 7-AB
W3GEW (K3NDA, W3GEW) 10,064-296- 7-AB
W3CLQ (K3DLS, W3CLQ) 7657-202- 9-AB
K3WGK (K3s WGJ WGK) 6732-187- 8-ABC

K3WGJ (K3s WGJ WGK) 6324-186- 7-ABC
K3WEB/3 (8 oprs.) 3120- 78-10-AB
W3N8I (W3s N8I QA8) 3104- 97- 6-ABC
W3QA8 (W3s N8I QA8) 2720- 85- 6-ABC
WA3GFZ (K3WJB, WA3GFZ) 2424-101- 2-A
WA3HVR (WA3s ADK FWL HVR) 2400-100- 2-A
W3DYL (W3DYL, WA3EVU) 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 2628- 76- 8-B
K3FPE 2520- 90- 4-AB
WA3ILO 2002- 77- 3-AB
W3MNE 1980- 55- 8-B
W3CPM 1612- 62- 3-B
W3PIH 1586- 61- 3-B
WA3EOQ/3 1586- 61- 3-B
W3MHB 1534- 59- 3-B
W3PZK 1392- 58- 2-AB
K3LFN 1200- 50- 2-AB
W3MSR 1176- 42- 4-B
W3YAG 1128- 47- 2-B
WA3BMM 1104- 46- 2-AB
W3KUH 1066- 41- 3-B
W3BNL 858- 33- 3-B
W3CER 780- 33- 2-B
W3AIR 748- 22- 7-BD
K3RWY 720- 30- 2-AB
W3KMV 720- 30- 2-B
K3BEG 648- 27- 2-B
K3LZX 600- 25- 2-A
K3GMB 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 HBS) 10,856-236-13-AB

W3PGA (6 oprs.) 6510-155-11-ABD
K3ERM/3 (K3s ARN OPB UHY) 4074- 97-11-ABD
WA3GDB (WA3s GDB GLP) 2835- 95- 5-AB

Southern New Jersey

W2EIF 25,926-448-19-ABCD
W2REH 24,696-344-26-AB
WB2MTU 22,572-513-12-AB
WA2EMB 18,225-339-17-ABD
W2AXU 16,128-224-26-AC
W2BV 11,250-225-15-B
K2BPX 10,440-261-10-AB
W2OQN 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
WB2BMJ 6672-209- 6-AB
WB2YEH 6570-219- 5-AB
WB2OAD 5550-111-15-A
WB2LWZ 5440-170- 6-A
W2BLV 5150-103-15-B
WB2BZK 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
WA2QZQ 4020-132- 5-A
WB2CEX 3480- 87-10-A
WB2PZF 3302-127- 3-A
WA2AOC 3198-123- 3-AB
K2QIJ 3120-120- 3-AB
WA2EIY 2898- 69-11-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.

DIVISION LEADERS

Single Operator		*Multiopcrator*
W3MFY	Atlantic	W2PAU
K9QKB	Central	K9DZK
KØDTA	Dakota	.....
WA5NOB	Delta	.....
K8DOC	Great Lakes	K8MMM
WA2PBN	Hudson	W2JKI
W9ECV/Ø	Midwest	WAØJYK
K1MRI	New England	WA1IOX
W6PUZ/7	Northwestern	K7UYX
WB6UYG	Pacific	W6YEP/6
K4SUM	Roanoke	WA4LTS
K7UFQ	Rocky Mt.	WAØPHZ/Ø
K4WHW	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
K2IEO 1008- 42- 2-B
K2BG 984- 41- 3-B
W2LZA 962- 37- 3-BC
WA2DIN 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 210- 10- 2-A
W2HBE 88- 8- 1-B
K2QIJ/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
WB2YCZ (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-B
WA2KWS (WA2s KWS OAA) 4288-134- 6-AB

Western New York

W2UTH 15,624-252-21-ABD
K2ISP 11,388-219-16-AB
K2YCO 10,464-218-14-ABD
W2FDI 5652-157- 8-AB
WA2THS/2 5566-121-13-AB

W2MPM 4830-161- 5-AB
W2ALL 4755-159- 5-AB
WA2TEY 4140-138- 5-AB
W2VVG 3978-153- 3-AB
W2QY 3960-165- 2-AB
W2ADN 3822-147- 3-AB
W2BOC 3640- 91-10-A
WA2KND 3432-143- 2-ABD
K2BBJ 3380-130- 3-AB
W2CNS/2 3336-139- 2-ABD
WA2YPT 3264-136- 2-AB
WA2ZNC 3264-136- 2-AB
K2JA 3192-133- 2-AB
K2WW 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
WB2NFY 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
W2RIS 2424-101- 2-AB
K2CEH 2340- 65- 8-BD
WB2LZM 2332-106- 1-AB
WB2ZFS 2244-102- 1-AB
WB2QXB 2200-100- 1-AB
K2JJT 2136- 89- 2-A
W2DNS 2136- 88- 2-A
WB2MDC 2134- 97- 1-AB
WB2FDZ 2064- 86- 2-A
K2LZF 2040- 85- 2-A
WA2KMI 2016- 84- 2-A
WA2IYZ 2002- 91- 1-A
WB2MCP 2002- 91- 1-AB
WA2ALW 1920- 80- 2-AB
WA2TJS 1914- 87- 1-A
K2GMZ 1892- 86- 1-AB
K2YMM 1848- 77- 2-AB
WA2GIA 1830- 61- 5-A
WA2CJL 1800- 75- 2-A

WA2UFV 1760- 80- 1-AB
W2BPE 1742- 67- 3-B
WB2INN 1738- 79 1-AB
WB2SNA 1738- 79- 1-A
WB2KWZ 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
WA2AQW 1386- 63- 1-A
K2UOA 1364- 62- 1-A
WB2DCC 1342- 61- 1-A
K2SQI 1320- 60- 1-A
WB2KUY 1320- 55- 2-B
WB2FAN 1298- 59- 1-A
WB2NXL 1298- 59- 1-A
WB2HJN 1276- 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
WA2FOG 1067- 50- 1-A
WB2SMD 1056- 48- 1-B
WA2UGE 1034- 47- 1-A
K2DHA 990- 45- 1-B
WA2JMR 968- 44- 1-A
WB2ZEA/2 968- 44- 1-B
WB2RXS 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
WA2AII 836- 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

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
WA2YEK 682- 31- 1-A
K2ZNC 660- 30- 1-A
W2WWO 616- 28- 1-B
WA9LQG/2 594- 27- 1-B
WB2FPT 594- 27- 1-B
WB2QGL 572- 26- 1-A
WB2GQB 561- 26- 1-A
K2UBA 550- 25- 1-A
WA2GVH 528- 24- 1-AB
WB2LJG 506- 23- 1-A
K2KWK 462- 21- 1-A
K2UPC 462- 21- 1-A
WA2ZXU 440- 20- 1-AB
WB2LTN 440- 20- 1-AB
WB2YWI 440- 20- 1-AB
K2ZFV 396- 18- 1-AB
WA2QRT 396- 18- 1-AB
WB2ZDP 360- 15- 2-A
WN2BFH* 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
WB2QFI 176- 8- 1-A
WB2SER 132- 6- 1-A
WN2BSG 110- 5- 1-B
W2OW (15 oprs.) 6250-125-15-AB
K2ERQ (12 oprs.) 4000-100-10-AB
W2TRS/2 (W2TRS, WA2YGG) 3208- 92- 2-AB
WB2VPY (13 oprs.) 1736- 62- 4-A

Western Pennsylvania

W3KWH 23,445-261-35-AB
WA3ISY 3040- 80- 9-AB
WA3BAK (W3BWU, opr.) 1802- 53- 7-AB
K3FGQ 1008- 36- 4-AB
W3DJM 784- 28- 4-A
K3WNZ 520- 20- 3-A
K3TTP 420- 15- 4-AB
K3QBI 374- 17- 1-A
K3FIW 312- 13- 2-A
K3HKK (K3s AKR CXZ RBH) 12,654-171-27-ABD

CENTRAL DIVISION

Illinois

K9QKB 9240-220-11-ABC
K9RVG 6800-200- 7-B
WA9JKT 5775-193- 5-AB
WA9FGK 5256-146- 8-ABC
W9NW 5120-160- 6-B
W9VWY 5120-160- 6-B
WN9UHB* 5120-160- 6-B
WA9RNQ 5088-159- 6-B
K9T8Q 4956-177- 4-B
WA9OZC 4896-153- 6-B
WA9TMC 4800-150- 6-AB
W9IPO/9 4480-160- 4-B
WA9SOC 4160-160- 3-AB
K9ENZ 4147-160- 3-AB
WA9ENM 3960-110- 8-AB
WA9NVB 3696-132- 4-AB
K9ZWU 3562-137- 3-ABC
WA9HIR 3510-117- 5-B
W9JGV 3424-107- 6-B
K9ZWV 3380-130- 3-ABC
WA9SHV 3380-130- 3-AB
K9FHP/9 3008- 94- 6-A
WA9FXH 2996-107- 4-B
W9YYF 2924- 86- 7-B
K9ECZ/9 2912-104- 4-B
K9ONA (WA9IRZ, opr.) 2912-112- 3-AB
WA9NRI 2912-112- 3-B
WA9FIH 2860-110- 3-AB
WN9WHJ 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
W9DJZ 2240- 80- 4-A
WA9RSH 2208- 92- 2-B
K9HPW 2160- 90- 2-B
WN9TZI 2136- 89- 2-B
K9SCE 1952- 61- 6-A
K9YJQ 1920- 80- 2-AB
W9EHU 1920- 80- 2-B
WA9CUK 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
K9VUR 1428- 51- 4-B
W9ETK 1428- 51- 4-AB
WA9MSZ 1428- 51- 4-B
K9BDJ 1394- 41- 7-AB
WA9VXO 1378- 53- 3-B
W9RPH 1352- 52- 2-AB
K9TUN 1326- 51- 3-B
WA9VKX 1326- 51- 3-B
WA9EEG 1320- 55- 2-AB
WA9QOI 1272- 53- 2-B
K9SYA 1248- 52- 2-A
K9VKF 1248- 52- 2-B
WA9NPF 1248- 52- 2-AB
W9CVX 1200- 50- 2-B
K9DKI 1128- 47- 2-A
WA9IWU 1100- 50- 1-AB
K9OOG 960- 40- 2-B
W9QVE 946- 43- 1-B
W9ZSQ 946- 43- 1-A
WA9KQD 912- 38- 2-AB
K9FBL 902- 41- 1-AB
K9YHB (WA9EJD, opr.) 902- 41- 1-A
K9AWV 896- 32- 4-B
WA9SDT 864- 36- 2-AB
W9TOY 840- 35- 2-B
WA9QHI 748- 34- 1-AB
W9YOW 660- 30- 1-A
WA9BMC 660- 30- 1-A
WA9SVF/9 650- 25- 3-B
WA9KIO 649- 30- 1-AB
WA9RIF 638- 29- 1-B
W9CEJ 624- 26- 2-B
WA9KJX 600- 25- 2-B
W9BOD 480- 20- 2-A
W9GWT 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
W9ZEW 176- 8- 1-AB
WA9SKJ 88- 4- 1-A
WA9GVF 66- 3- 1-AB
WA9FIH/9 44- 2- 1-A
K9MFE (4 oprs.) 6800-200- 7-AB
WA9JYR (G3PAC, W8PSO) 6244-223- 4-AB
W9MCG (W9s MCG RVG) 5408-169- 6-ABC
WA9QZE (WA9s QZE TCW) 2756-108- 3-B
WA9QAD (WA9s QAD UJQ) 2328- 97- 2-B

Indiana

W9HTF 3304-118- 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
WA9UAQ 756- 32- 2-B
K9LSB 480- 16- 5-A
K9QCB 448- 16- 4-ABCD
WN9UNK 336- 14- 2-B
K9JTZ 312- 12- 3-A
K9DZK (K9DZK, WA9FAF) 26,520-342-29-AB
W9BZN/9 (9 oprs.) 2478- 59-11-AB

Wisconsin

W9IYQ 3984- 83-14-AB
WA9HNJ 3654- 63-19-A
W9YT (K9OXY, opr.) 2375- 48-15-A
WA9RTH 2054- 79- 3-AB
WA9POV 484- 22- 1-AB
WA9ULK 374- 17- 1-A
WA9MCC 242- 11- 1-B
WA9EZU 55- 5- 1-A
K9IFF (6 oprs.) 11,492-169-24-AB

DAKOTA DIVISION

Minnesota

K9DTA 4100- 82-15-AB
KH6FKB/9 351- 14- 3-A
WA9CJU (6 oprs.) 1929- 84-21-AB

South Dakota

K9GJX 150- 5- 5-A

DELTA DIVISION

Arkansas

WA5NOB 4216- 6 -24-A

Louisiana

WA5SER 180- 6- 5-A

Mississippi

K5TYP (WA8QNR, opr.) 1173- 27-13-A

Tennessee

W4WQZ 2162- 47-13-AB
WB4ASA 1760- 40- 12-A
WB4EKI 264- 11- 2-A

GREAT LAKES DIVISION

Michigan

WA8ABT 3100- 78-20-AB
WA8RQJ 2610- 73- 8-B
WA8VHG 2460- 82- 5-B
K8LZF 1976- 52- 9-B
W8CVQ 1680- 70- 2-AB
WA8HAA 1540- 55- 4-AB
WA8TSY 1472- 46- 6-A
WA8PST 1368- 57- 2-AB
WA8UDE 1014- 39- 3-AB
K8WEX 960- 40- 2-AB
K8MWA 952- 34- 4-AB
WA8QBG 864- 36- 2-A
WA8SWV 864- 36- 2-B
WA8EOW 702- 27- 4A
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
WA8USU 22- 1- 1-B
W8BQD (4 oprs.) 7000-140-15-AB

Ohio

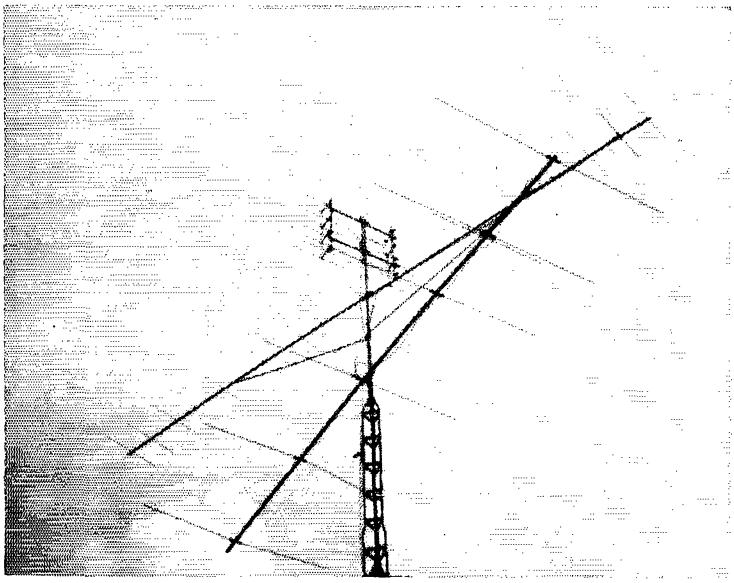
K8DOC 9972-139-26-A
W8KKF 7296-192- 9-AB
W8MOW 6048-168- 8-AB
WA8HPY 4023- 76-17-A
W8NEE 3780-105- 8-AB
WA8REM 3458- 91- 9-AB
K8OWB 3276-126- 3-AB
W8JRN 3248-102- 6-AB
K8DEO 3060- 85- 8-ABD
WA8STX 3030-101- 5-A
K8TVT 2940-105- 4-B
WA8TYF 2755- 73- 9-AB
K8MHJ 2128- 76- 4-AB
K8HRR 2112- 66- 6-AB
WA8AUO 2100- 70- 5-A
WA8BOB 2080- 80- 3-AB
K8GDV 1778- 64- 4-AB
WA8HVK 1632- 68- 2-B
WN8YYV* 1200- 50- 2-B
W8WAU 1196- 46- 3-B
WA8IKN 1152- 48- 2-AB
K8VAK 1056- 48- 1-AB
W8DPW 1056- 44- 2-AB
WA8LYM 988- 37- 2-B
WA8CZF 984- 41- 2-AB
WA8RUO 936- 36- 3-B
WA8WJW 884- 34- 3-A
K8IIS 864- 36- 2-B
K8ADI 858- 33- 3-AB
W8RLY 792- 33- 2-B
W8MCW 682- 31- 1-B
WA8UYM 616- 28- 1-B
WA8FZS 552- 23- 2-B
WA8IHC 528- 24- 1-A
W8INQ 520- 20- 3-A
W8BK 494- 19- 3-A
W8KSE 468- 18- 3-AB
WA8MTS 396- 18- 1-A
K8CQA 390- 15- 3-B
WA8RCN 320- 16- 1-A
W8TDY 308- 14- 1-
W8HQX 242- 11- 1-B
WA8ZMP 198- 9- 1-B
WA8YCJ 165- 8- 1-A
WA8WKQ 110- 5- 1-A
WA8GQQ 44- 2- 1-AB
K8MMM (6 oprs.) 26,606-284-37-A
W8CCI (9 oprs.) 19,902-321-21-AB
WA8PLZ 19,114-253-28-AB
W8ZOF (W8ZOF, WA8HUB) 4978-131- 9-AB
WA8BNW (W8GVQ, WA8BNW) 1794- 69- 3-AB
WA8HNY (4 oprs.) 1740- 58- 5

HUDSON DIVISION

Eastern New York

K2CBA 6372-118-17-ABCD
K2BGU 5616-117-14-AB
WB2VQK 5559-164- 7-B
WB2OIM 4646-101-13-A
WB2RBG 4080-128- 6-AB
WB2VLM 2700- 90- 5-AB
WA2JWO 2492- 89- 4-AB
WA2DTE 2490- 83- 5-AB
WA2WSY 2464- 88- 4-AB
WB2MHH 2408- 86- 4-AB
WA1GFG/2 1860- 62- 5-AB
W2DSK 1794- 69- 3-AB
K2UAR/2 1680- 61- 4-AB
W2CTH 1596- 57- 4-AB
WA2MCP 1456- 52- 4-AB
WA2GUU 1404- 54- 3-AB
WA2GGD 1378- 53- 3-AB
WB2BPS 1372- 49- 4-AB
WB2PZL 1260- 45- 4-AB
WB2UEW 1232- 44- 4-AB
WA2KUL 1152- 36- 6-B
WB2OGN 1080- 45- 2-A
WB2WWZ 1036- 37- 4-AB
WB2ICI 1014- 39- 3-AB
K2ARO 986- 29- 7-B
W2CDQ 936- 36- 3-AB
W2LP 884- 26- 7-B
K2ACB 858- 33- 3-AB
K2AXX 840- 30- 4-AB
K2KTJ 840- 35- 2-AB
WA2GXM 836- 38- 1-AB

WMass Novice **WN1HHN** adding another one to the log. Walt 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-K1IGY, 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
K2UKE 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
W2FEN 650- 25- 3-B
W2HCS (K2ACB, opr.) 624- 24- 3-AB
W2YPN/2 576- 24- 2-AB
WB2QVX 572- 26- 1-AB
WA1GDA/2 528- 24- 1-AB
WA2JIK/2 528- 24- 1-AB
WB2BDG/2 528- 24- 1-AB
W2CJS 484- 22- 1-AB
K7TAZ/2 (K2UAR, opr.) 462- 21- 1-AB
WA1FPS/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/2 220- 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
W2AEE (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
W2SEU 1824- 57- 6-ABCD
WA2OVG 1800- 60- 5-A
WB2YYV 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 286- 13- 1-B
W2GFF 252- 9- 4-B
WB2PGR 22- 1- 1-B
K2VMR (8 oprs.) 26,588-391-24-AB
WA2CVS (WA2BCY, WB2WOI) 7412-218- 7-AB
WA2PNF (WA2s KIK PNF) 3296-103- 6-AB

Northern New Jersey

WA2PBN 21,200-265-30-A
K2OJD 7920-165-14-AB
W2AQT 4840-121-10-
WA2BLB 4032-126- 6-B
K3AFW/2 3488-109- 6-B
W2CVW 2265- 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.) 12,280-309-10-AB
WB2TGT (4 oprs.) 10,836-258-11-AB
WB2KKO/2 (11 oprs.) 10,428-237-12-AB
K2DEL (4 oprs.) 8670-255- 7-AB
WB2UAQ/2 3104- 97- 6-B
WN2AFI (WN2s AFI BJW) 2490- 83- 5-B
K1TZD 240- 10- 2-B
W1DZA 168- 7- 2-
K1OXU 144- 6- 2-A
WA1FJF 44- 2- 1-A
WA1IOX (K1TZD, WA1s CYT IOX) 6279-137-13-AB
W1AW (W1ARR, WA1FVJ)** 2380- 85- 4-AB
WN1IZR (WN1s ISD IZR) 1846- 71- 3-B

Eastern Massachusetts

WA1ACD 7332-141-16-A
W1IMM/1 4160-130- 6-A
K1CHY 3690-123- 5-ABC
WA1GGB 3520-110- 6-AB
W1EUJ 3434-101- 7-AB
W1QIB 3060- 90- 7-AB
K1KNI 2720- 80- 7-A
W1RSR 2592- 81- 6-AB
WA1FCD 2288- 72- 6-AB
WA1GVH 1984- 62- 6-A
W1AGN 1920- 60- 6-A
WA1EIH/1 1376- 43- 6-A
WA1DYU 1260- 42- 5-AB
WA1HON 1110- 37- 5-AB
K1QYY 896- 32- 4-A
K1CQX 780- 26- 5-A
WA1GSP 598- 23- 4-A
W1JSM 504- 18- 4-B
WA1BLS 476- 17- 4-A
W1CTR 442- 17- 3-B
K1DUZ 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
W1MIX (4 oprs.) 4800-150- 6-AB
W1KN 4048-127- 6-A
W1IPJ (W1s BXI CHF) 2278- 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

WØPFP 3944- 58-24-A
WAØOVM 1740- 30-19-A

Kansas

W9ECV/Ø 12,690-138-37-A
WØIPB/Ø 1900- 50- 9-AB
WØSPF 396- 18- 1-AB
WAØJYK (7 oprs.) 9520-136-25-AB

Missouri

KØTLM 3822- 74-16-A
WØDSW 1728- 72- 2-AB

Nebraska

WAØMRH 7067- 96-27-A
K2PCG/Ø 2688- 42-22-A
WØUJK 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 5000-125-10-AB
WA1GIS 4046-119- 7-ABD
WA1CWG 3808-112- 7-ABE
K1YON 3610- 95- 9-ABCDE
W1MEH 3300- 75-12-AB
K1TZD/1 3200- 80-10-AB
W1VTU 2550- 51-15-B
WN1HUE* 2496- 78- 6-B
WA1IUO 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
WN1ISV 980- 35- 4-B
WA1IYJ 912- 38- 2-A
W1RNT 598- 23- 3-ABD
K1KKK 552- 23- 2-B
K1PCC 544- 16- 7-B
K1JFN/1 528- 22- 2-A
K1SXF 480- 20- 2-B
WA1EHK 468- 18- 3-AB
W1VLK 456- 19- 2-A
W1YCP 432- 18- 2-B
WA1GNG 432- 18- 2-A
W1IMV/1 420- 15- 4-A
W1QVF 264- 11- 2-ABD
W1LVQ** 260- 10- 3-A

New Hampshire

W1JJO 4692-138- 7-ABC
W1ALE 720- 24- 5-ABC

Rhode Island

W1EYH (K1LPL, opr.) 11,160-180-21-A
W1POP 4242-102-11-AB

Vermont

K1GYT 3834- 71-17-AB
W1EXZ 120- 5- 2-AB

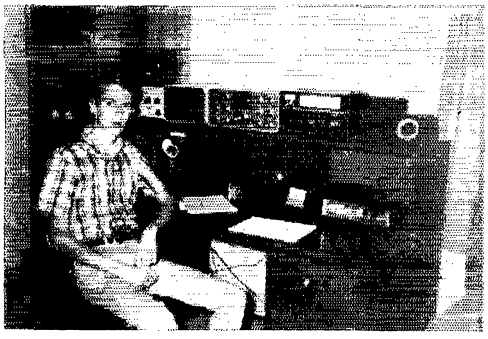
Western Massachusetts

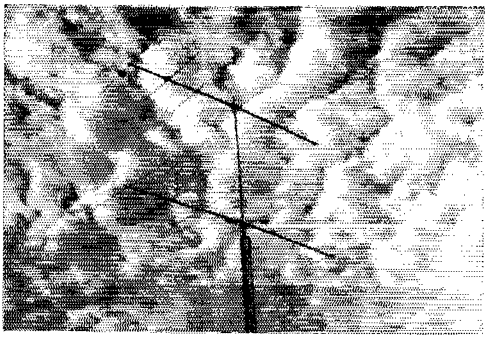
K1ANF 7358-141-16-AB
WA1ECR 3978-117- 7-AB
W1STR 3800-100- 9-AB
K1ULZ 2784- 87- 6-AB
K1PYX 2728- 62-12-A
W1UPH 2632- 94- 4-AB
K1DGQ 2548- 91- 4-AB
WN1HHN* 2460- 82- 5-B
K1NJC 1800- 60- 5-AB
W1ALL 1768- 68- 3-AB
W1NY 1586- 61- 3-AB
W1QWJ 1540- 55- 4-BD
WN1IEK 1456- 56- 3-B
W1IC 1196- 46- 3-AB
K1DYL 1176- 42- 4-AB
K1PMK 1066- 41- 3-B
K1LDT 1056- 44- 2-B
W1UCB 1056- 44- 2-AB
W1VNH 1020- 34- 5-B
K1RPB 952- 28- 7-AB
W1JWV 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
K1LMY 650- 50- 3-AB
K1YXX 648- 27- 2-B
W1UWX 624- 26- 2-AB
WA1EHO 572- 22- 3-A
W1MNG 552- 23- 2-AB
W1KUL 528- 22- 2-B
W1IKR 504- 21- 2-B
W1UPF 480- 20- 2-AB
W1MDM 392- 14- 4-AB
W5NWG/1 384- 16- 2-B
WA1IUI 144- 6- 2-B
K1FUA 88- 4- 1-B
W1YK (K1FJM, WA2VFN) 3400-100- 7-AB
WA1FJW (WA1s FJW HIX) 1800- 45-10-A
WB2MOQ/1 (K1NKR, WB2MOX) 22- 1- 1-B

NORTHWESTERN DIVISION

Oregon

K7ZFG 1248- 52- 2-AB
WA7ECY 960- 40- 2-AB
W7TYR 624- 26- 2-AB
WA7FNZ 576- 24- 2-A
WA7HGD 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 oprs.)
319- 15- 1-AB

Washington

W6PUZ/7
1520- 41- 9-A

PACIFIC DIVISION

Sacramento Valley

WB6NTL
1938- 51- 9-A
W6TEE 1188- 50- 2-AB
WB6UEO/6 (WB6UVH, opr.) 1050- 35- 5-AB
W6NIW 840- 30- 4-B
WA6CXB
572- 22- 3-B
K6IKV 240- 10- 2-B

San Joaquin Valley

WB6UYG
3480- 60-19-AB
K6UJG 504- 14- 8-A
W6YEP/6 (K6GSS, W6YEP, WB6HIL)
3990- 95-11-AB

Santa Clara Valley

WB6WLE/6 (WB6s RGR WLE)
264- 11- 2-AB

ROANOKE DIVISION

North Carolina

K4HGK 3120- 60-16-A

South Carolina

WA4LTS (5 oprs.)
12,792-164-29-ABD

Virginia

K4SUM
9240-154-20-ABD
K4YCH 5508-102-17-A
W4TBQ 3026- 89- 7-AB
WB4HAJ
2184- 84- 3-A
WB4EIY
2132- 82- 3-AB
WB4FQR
2100- 75- 4-A
W4KVI 1760- 55- 6-B
W4YKH 1584- 66- 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
K4QPH 528- 22- 2-B
K4YCG 480- 20- 2-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

WØINK 1932- 42-13-AB
WAØMJR 512- 19- 6-AB
WØWYX 96- 4- 2-B
WAØPHZ/Ø (7 oprs.)
8062-141-19-ABD

New Mexico

W5IXR 828- 23- 8-AB
K5EFW 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
WB4EHR 456- 19- 2-A

Georgia

WB4FMJ/4 (7 oprs.)
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
K6BPC (W6FNE, 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

WA5KPU
3990- 68-20-
K5RDQ 504- 21- 2-B
WA5RNL 264- 11- 2-B

CANADIAN DIVISION

Maritime

VE1PL 640- 20- 6-AB
VE1AKA 220- 10- 1-B
VO1DZ 112- 4- 4-AB

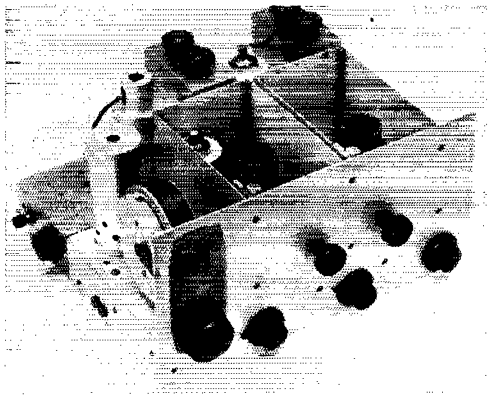
Ontario

VE3ASO 6072-132-13-B
VE3EZC
6050-121-15-BD
VE3CUA
2875- 63-13-AB
VE3ERQ
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
VE3DWQ
432- 18- 2-
VE3FOE 408- 17- 2-B
VE3CUJ 264- 12- 1-B
VE3HR 240- 12- 1-B
VE3DAY 88- 4- 1-B

Quebec

VE2SH
5244-114-13-ABD
VE2BU 1708- 61- 4-
VE2HW
1316- 47- 4-ABDE
VE2BMQ
960- 32- 5-ABD
VE2BMH 576- 24- 2-AB
VE2BGJ 532- 19- 4-
VE2ALE 408- 17- 2-B
VE2DFO (VE2s BQJ DFO DGB)
3168- 66-14-AB

Check logs: W1HAX, K2PBP, W2HF, WA2DNJ, WB2YUK, W4ISS, W5LHD, WA7DSS, W8YHX, WA8ALO, WA8UIV, 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,* W1NJM

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*,[1] 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.

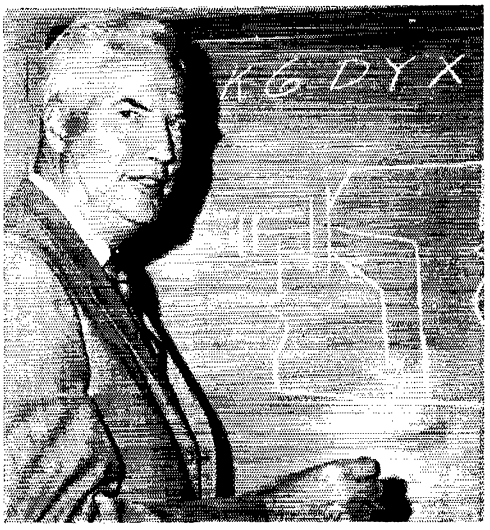
This isn't the same thing as giving up. If a thing is desirable enough and beneficial enough, there has to be a way to do it. The thing to do is keep on worrying the problem until some kind of a solution presents itself.

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. — *W1NJM.*

*Communications Manager

[1] 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 WØQFC, RO for Adama County, Colo., on 147.3 kc. to assist in the search for a missing child. At 1730 MST, WAØBDF/mobile left for Thornton and joined WAØPXF and WØGIL in the search. The child was found at 1825 MST. Several mobiles from Denver were also on the way to assist. — *WØLRN.*

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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.*

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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.*

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On Mar. 21, K3OLG 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, K3OLG 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.*

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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, WØVPG 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 WØVPG 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.*

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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.*

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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. KØOAL, 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 KØODF and SEC KØOAL activated the AREC Net. Weather reports were received and disseminated to all interested parties, along with road reports. The tow truck dispatched to rescue KØOAL's car became stuck within 400 feet of the marooned vehicle, and KØPTK went the rest of the distance on foot. En route, he noticed a number of other marooned vehicles which were still occupied. He put KØOAL mobile into operation, contacted KØOAL and advised him of the circumstances. Meanwhile, the tow truck had returned to town and advised KØOAL they could not reach his car. KØOAL then advised the Road Department of the additional stranded motorists, and a decision was made to attempt to plow to that point. KØOAL then advised KØOAL/mobile (KØPTK) who brought this good news to the other stranded motorists. After plowing, KØPTK got KØOAL's car moving and drove into town, advising KØOAL on the way that some of the other cars would need a tow truck. KØOAL then phoned the tow service and a truck was dispatched. Had not KØOAL 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. — *KØOAL, SEC, Nebraska.*

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

Feb. 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 W6BOI, 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. 18, 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.

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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.*

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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.*

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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.*

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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	97.8
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[1]	2083	11143		5.6	
TCC Eastern	124[2]	813			
TCC Central	93[2]	644			
TCC Pacific	124[2]	902			
Summary	2898	25039	EAN	7.8	—
Record	3031	33737	1.420	14.2	—

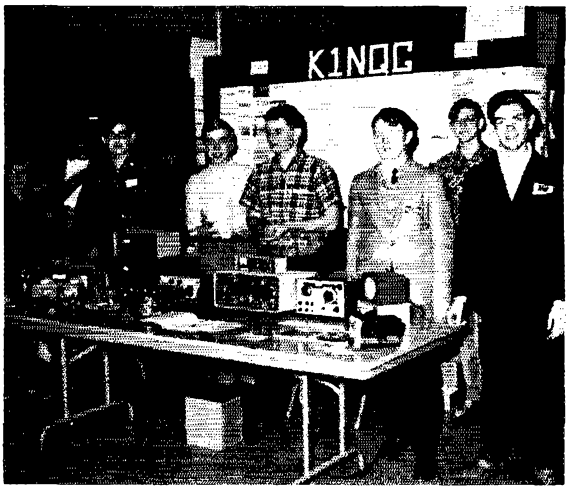
[1] Section and local nets reporting (66): QMN (Mich); SWRN, BEN, WSN, WSBN (Wis.); MDDS (Md.-Del.-D.C.); RPQ (Que.); MEPN (Md.); TN, Tenn. SSB; Mo. Teen, MNN; NTTN (Tex.); KTN, KYN, Ky. Rebel, Falls City; EPA, PTTN, PFN, EPA EP&T, EPA VHF (Pa.); GN, W. Fla. Phone, Volusia Emerg., FMTN (Fla.); NJN, NJEPTN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

[2] 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 as Sat. NCS on CAN. W7BQ and W7EM are new calls for K7JHA and W7LQE respectively. PAN certificates 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. W4SHJ issued 4RN certificates to K4KNP, K4YSN, WA4CFN and WA4ZLK. RN5 switched to 7095 kc. for its early session. RN6 certificates to K6KOL and WA6SCE. W6ECP 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 downtrend since December's probable all-time high. W9QLW, 9RN manager, asks "Does anybody know what time it is?" WØLGG 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 2345Z; 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 EFW EDB, *W2s* FR GKZ, K2RYH, WA2UWA, *WB2s* 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, WØLCX, who reports W9JUK and K4BSS will be absent for a while; TCC-C certificates were issued to WB4AIN, W9DND, WØINH and WAØDOU. TCC-P reports nine missed functions in March, mostly through no fault of the PAN functionaries.

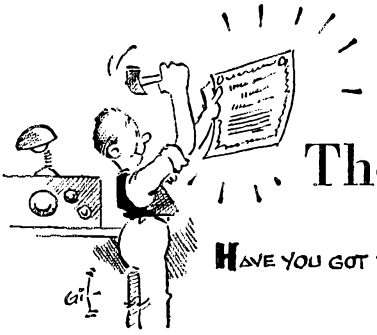


These members of the Fidelity Amateur Radio Club of Cranston, R.I., set up this exhibit station at the Midland Mall Shopping Center, Warwick, R.I., during the Christmas season last year. Left to right behind the counter are WA1HUM, WA1FGB, WA1BOP, WA1EEJ, WA1GND and WN1HTH.

March reports:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	124	95.1	2199	813
Central	93	95.6	1304	644
Pacific	124	92.7	1809	902
Summary	341	94.4	5312	2359

(Continued on page 142)



Those Higher-Class License Examinations

In Six Parts — Part IV

Radiotelephony

THE 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,

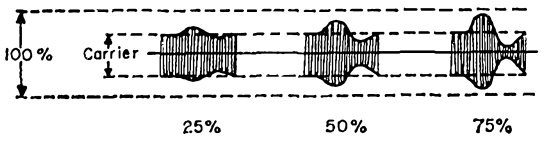
$$P_s = \frac{P_c}{2} \times m^2$$

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

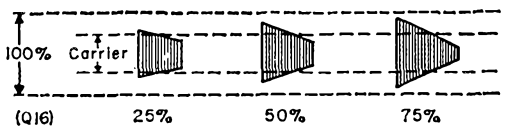
waveform, but is not equal to $P_c/2$ at 100% modulation.

(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.



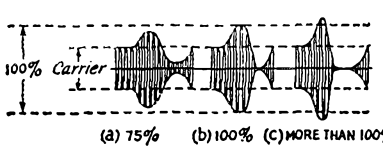
SINUSOIDAL MODULATION ENVELOPE



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).



(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 Δf is the carrier-frequency deviation and f_m is the modulating frequency.

For a given value of deviation, Δf, 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.

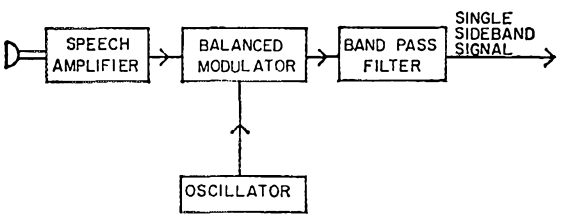
The essential stages for generating a single-sideband signal by the filter method are shown in the accompanying block diagram. The oscillator supplies a "carrier" frequency to the balanced modulator, where the audio and r.f. signals are combined to produce an amplitude-modulated signal. Because of the 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?

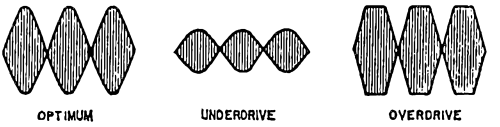
One method uses an oscilloscope to display the modulated r.f. pattern. Since the worst non-linearity usually is at the peak of the modulation envelope, where overdriving is likely to occur, an indication of proper adjustment can be obtained by observing the modulation-envelope peaks with voice input. 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 "bow-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_2, 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 9002.5 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,* WN6BRE

TRANSFORMER 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.

(Continued on page 138)

* 833 Oxford, Berkeley, Cal. 94707.

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 E. Barr, Chief, Safety and Special Radio Services Bureau*

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*.

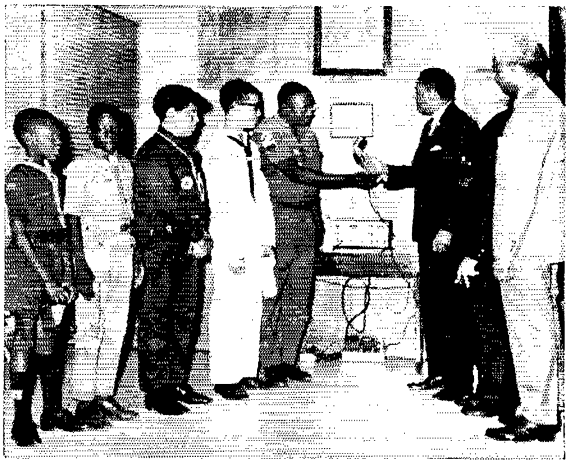
Effective July 1, therefore, Section 97.61 (b) is amended to read as follows:

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

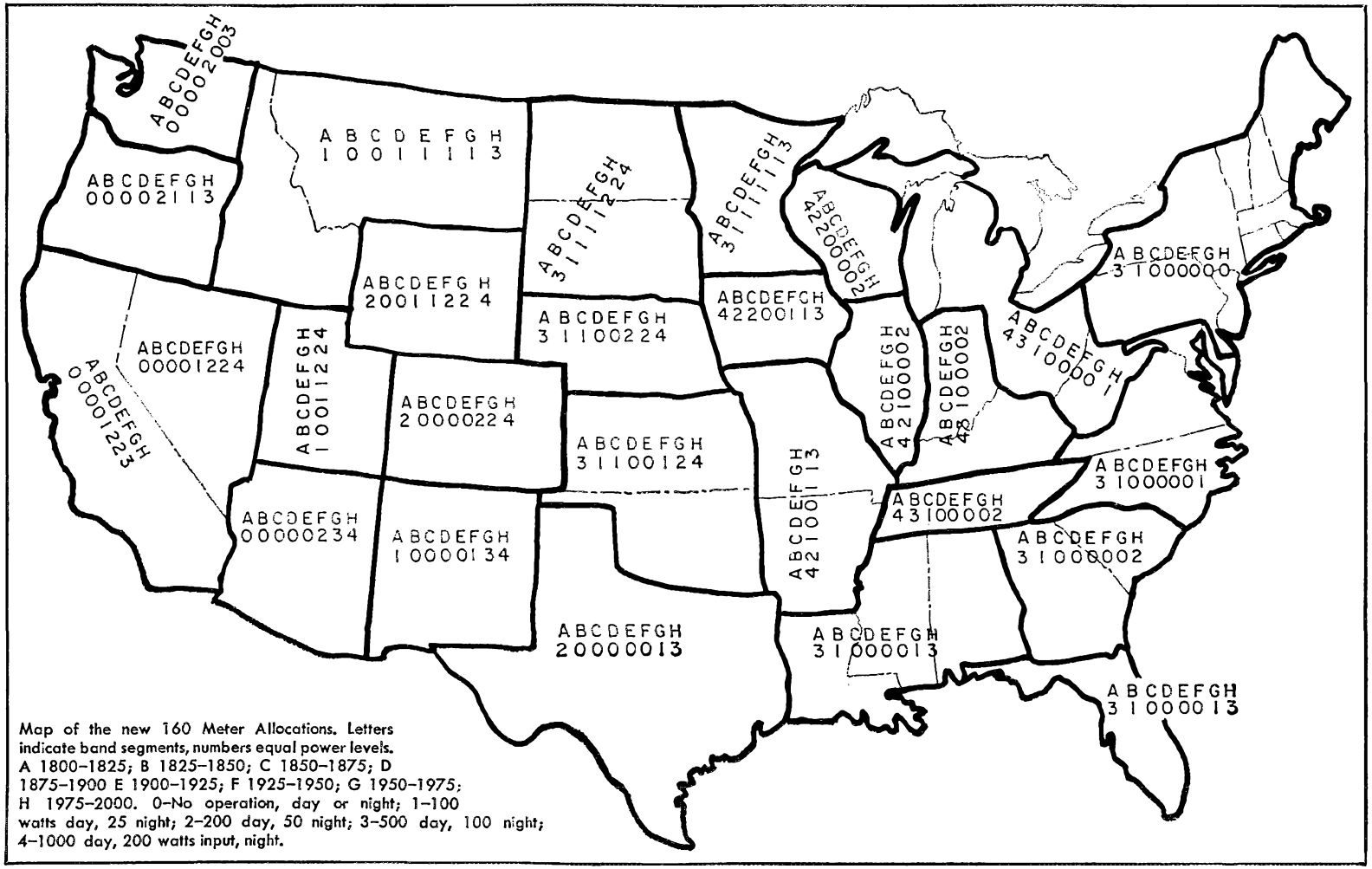
(1) Use of this band is on a shared basis with the Loran-A system of radionavigation. The Amateur Service may use the sections of the band 1800–2000 kc/s which are not required for Loran-A in accordance with subparagraph (3) of this paragraph. The use of these frequencies by the Amateur Service shall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



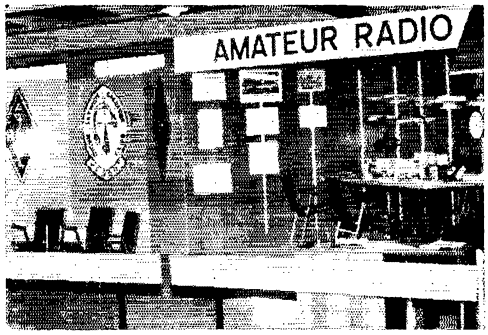
Boy Scout Executive Samuel King, center, receives radio equipment from Francisco Corneiro, Attorney General of the U.S. Virgin Islands while Governor Ralph M. Paiewonsky and Government Secretary Cyril King (far right) looks on. The equipment will be used under the call KV4FL to train Scouts. (Photo by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



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	1800–1825 kc.	1825–1850 kc.	1850–1875 kc.	1875–1900 kc.	1900–1925 kc.	1925–1950 kc.	1950–1975 kc.	1975–2000 kc.
	Day/Night	*Day/Night*	*Day/Night*	*Day/Night*	*Day/Night*	*Day/Night*	*Day/Night*	*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 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, Enderbury, Howland	100/25	0	0	100/25	100/25	0	0	100/25
Guam, Johnson, 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

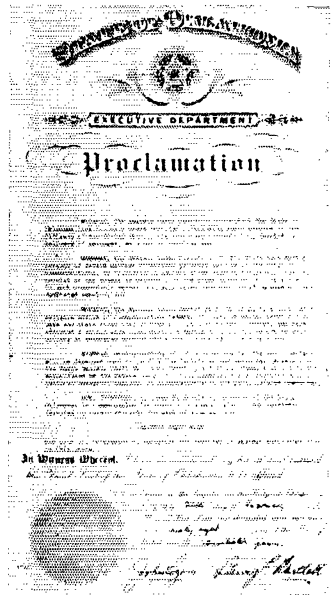
In the amendments to Section 97.7 which resulted from the incentive licensing matter, Docket 15928, some confusion was caused when the Extra Class phone segments 3800–3825 and 21,250–21,275 kc. were omitted from the listing of privileges effective November 22, 1969. By an Errata released April 16, 1968, 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 3800–3825 kc/s 7000–7025 kc/s 14000–14025 kc/s 21000–21025 kc/s 21250–21275 kc/s	Amateur Extra Only	November 22, 1968
3500–3550 kc/s **3800–3825 kc/s** 7000–7050 kc/s 14000–14050 kc/s 21000–21050 kc/s **21250–21275 kc/s**	Amateur Extra Only	November 22, 1969
3825–3850 kc/s 7200–7225 kc/s 14200–14235 kc/s 21275–21300 kc/s 50–50.1 Mc/s	Amateur Extra and Advanced	November 22, 1968
3825–3900 kc/s 7200–7250 kc/s 14200–14275 kc/s 21275–21350 kc/s 50–50.25 Mc/s	Amateur Extra and Advanced	November 22, 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.


EXECUTIVE DEPARTMENT

Proclamation

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!). Ham 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 perpetual 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 to 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 submits 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	W1IJO	W3HH	K3ZMQ	W5DV	W5MKW	W6ZM	W6LCF
W1DW	W1IZY	W3IE	W3LWQ	W5EL	W5JFS	W6ZN	W6NRV
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	WA2EKY	W3LX	W1ILN	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	W2ETY	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	W8FFK
W2LX	W2DQT	W4FS	WB4BXO	W6MV	W6NAO	**W9AO**	W9CQN
W2MB	W2JKH	W4GA	WA4YKL	W6NS	W6ZJD	W9AT	W9OUP
W2MK	W2SSG	W4KD	W4HY	W6ON	W6DZQ	W9BC	K9TSK
W2MT	W2KGN	W4KE	W4GXU	W6OR	K6QNI	W9BG	W9RBI
W2MU	W2VJO	W4KO	K4OBM	W6PT	K6ENX	W9BY	W9JUX
W2NE	K9CUV	W4LE	W4EPA	W6QC	W6MUB	W9CI	W9CSZ
W2NF	W2GCV	W4MG	K4MJJ	W6SE	W6ECP	W9CK	W9IEV
W2NG	WA2DYO	W4NM	K4UYY	W6SI	W6MIW	W9CL	W9JIP
W2NI	W2GFH	W4OB	W2CPE	W6SO	W6DLF	W9CM	W9UIT
W2OC	W2MXJ	W4OE	W1CXO	W6SV	W6KWQ	**WØAS**	WØGTU
W2OH	W2SDZ	W4OX	W2HZA	W6TA	WA6EYP	WØBU	WØWHM
W2OL	K2AAI	W4PE	W4ERT	W6VB	W6BJU	WØCA	WØIIC
W2OM	WA2KQN	W4QQ	W4RMH	W6VD	W6QNJ	WØCM	WØJYW
W2ON	W2AEC	W4RB	K4SMO	W6VG	W6CBE	WØDX	WØNWX
W3BF	W3HJK	W4UM	W4YEA	W6VK	W6PLS	WØEA	WØMIQ
W3CO	K3NTK	W4UX	W4DGC	W6VR	W6NXY	WØGH	WØHDD
W3CV	W3ZAO	W4YD	K4COQ	W6YG	WA6PMX	WØGS	WØTPK
W3FC	W3LML	**W5BG**	W5HUA	W6YO	W4VOF	KH6AD	KH6GEW
W3FE	K3EKO	W5CR	W5KWI	W6ZG	W6NBX		

Ham'n'Gravy

BY CONNIE EVANS*
(XYL of W9TØC)

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 ½ of the cost.

"Take it back."

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

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! QST

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

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. 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*

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, WAØJFC, 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 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 KØAHD, WØMUX or WØJUY.

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, $1.50, 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 6:00 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, K8IHV, 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 3-4 — 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, Dominca, Guadeloupe, Antigua, Barbuda, St. Kitts, Nevis Monsserrat, 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 VP8s go to RSGB in Great Britain. W, K, VE and VO stations only may send foreign cards for which no bureau is listed to ARRL. See "How's DX?" for QSL information on specific stations.

For service on incoming foreign cards, see list of domestic bureaus in most *QST*s, under "ARRL QSL Bureau." **Bold face listings indicate corrections or additions.**

Aden: Amateur Radio Club, Signal Squadron, RAF Khormaksar, B.F.P.O. 69, London, England
Algeria: G. Deville, 7X2RW, 21 Blvd. Victor Hugo, Alger
Angola: L.A.R.A., P.O. Box 484, Luanda
Antarctia: KC4AA cards go to the Office of Antarctic Programs, National Science Foundation, Washington 25, D. C. KC4US cards go to K1NAP, COMCBLANT, USN, CBCEN, Davisville, E. Greenwich, R. I.
Argentina: R.C.A., Carlos Calvo 1424, Buenos Aires, BA
Austral/Antarctic French Lands: via Malagasy Republic
Australia: **VK1, VK2 QSL Bureau, WIA Box 1734, GPO Sydney, N.S.W.; VK3 QSL Bureau 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, VKØ, 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
Bahrein: (All MP4) Ian Cable, MP4BBW, P.O. Box 425, Awali
Barbados: Amateur Radio Society of Barbados, Highgate Signal Station, Flagstaff Road, St. Michael
Belgium: U.B.A., Postbox 634, Brussels 1
Bermuda: R.S.B., P.O. Box 275, Hamilton
Bolivia: R.C.B., Casilla 2111, La Paz
Brazil: L.A.B.R.E. Caixa Postal 2353, Rio de Janeiro
British Guinana: 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 Island: Radio Club de Cabo Verde, CR4AA Praia, Sao Tiago
Ceylon: 4S7WP, P.O. Box 907, Colombo
Chagos: via Mauritius
Chile: Radio Club de Chile, P.O. Box 13630, Santiago
Colbomia: L.C.R.A., P.O. Box 584, Bogota
Congo: (TN8) QSL Bureau, P.O. Box 2239, Brazzaville
Congo: (9Q5) U.C.A.R. QSL Bureau, B.P. 3748, Elisabethville
Cook Island: ZK1 QSL Bureau, % Radio Station Rarotonga, Rarotonga
Costa Rica: Radio Club of Costa Rica, Box 2412 San Jose
Cuba: ANRAC QSL Bureau, P.O. Box 6996, Havana
Cyprus: C.A.R.S. QSL Bureau, P.O. Box 216, Famagusta
Czechoslovakia: C.A.V., Box 69, Prague 1
Denmark: E.D.R. QSL Bureau, OZ6IIS, 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. 96263 All other BV stations: QSL Bureau, C.R.A., Box 2007, Keelung, Taiwan, Rap. of China
France: Taiwan, Rap. 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: GA.R.S. QSL Bureau, P.O. Box 3773, Accra
Gibraltar: RAF Amateur Radio Club, New Camp, RAF
Great Britain: (and British Empire): R.S.G.B. QSL Bureau, G2MI, Bromley, Kent
Greece: Gorge Zarafis, P.O. Box 564, Athens
Greece (SVØs 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, Agana, USPO 96910
Guantanamo Bay: Guantanamo Amateur Radio Club, Box 55, FPO, New York, N. Y. 09593
Guatemala: C.R.A.G., P.O. Box 115, Guatemala City
Haiti: Radio Club d'Haiti, Box 943, Port-au-Prince
Honduras: Jacobo Zelaya, Jr., HR1JZ, Bo. Buenos Aires, 13 Calle 505, Tegucigalpa, D. C.
Hong Kong: Hong Kong Amateur Radio Transmitting Society, P.O. Box 541
Hungary: H.S.R.L., P.O. Box 214, Budapest 5
Iceland: Islenzkir Radio Amateur, Box 1058, Revkiavik
India: A.R.S.I. QSL Bureau, P.O. Box 534, New Delhi 1
Iran: Amateur Radio Soc. of Iran, APO, New York, N. Y. 09205
Ireland: I.R.T.S. QSL Bureau, 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: (HL9) HL QSL Bureau, Signal Section, USFK/EUSA, APO, San Francisco, Calif. 96301
Kuwait: Alhalf Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf
Laos: Houmphanh Saignasith, 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, Laurenco 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 Ireland: via Great Britain
Northern Rhodesia: see Zambia
Norway: N.R.R.L., P.O. Box 21, Refstad, Oslo 5
Nyasaland: see Malawi
Okinawa: O.A.R.C., APO, San Francisco, Calif. 96331
East Pakistan: Mohd, AP5CP, Tiger Amateur Radio Club Dacca Signals, Dacca 6
West Pakistan: Ahmed Ebrahim, AP2AD, P.O. Box 65, Lahore
Panama, Republic of: L.P.R.A., **P.O. Box 9A-175 Panama 9-A,**
Papua: VK9 QSL Officer, P.O. Box 204, Port Moresby (or via Australia)
Paraguay: R.C.P., P.O. Box 512, Asuncion
Peru: R.C.P. Box 538, Lima
Philippine Islands: P.A.R.A. QSL Bureau, P.O. Box 4083, Manila
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 Britian
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 Toboga: 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.R.J., 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.

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, WA6AFP, 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 WØJIH 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 ¾ 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 outout 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 WØJIH 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. Chanslor, 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.

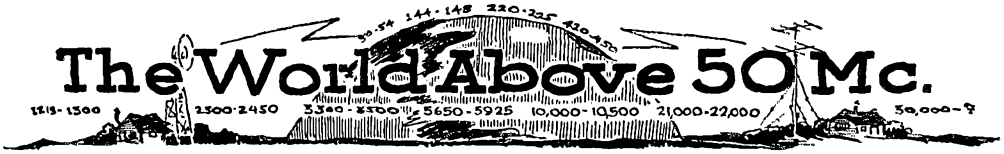
One of the many features of amateur radio, and one which I thoroughly enjoy, is being of service. I consider it a privilege to be licensed and in turn feel that any contribution I can make to be of help to others is the least I can do in return.

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, it's 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. WØKEI will speak on u.h.f. amplifier design and will undoubtedly display several that he has constructed, KØRZU's topic will be matching antennas and transmission lines, and WØIPE will present a program on antennas. K5WXZ, well known in 2-meter circles for his noise blanker designs, will speak on that subject. W1HDQ is also scheduled on the program, and WØEYE 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 stations and XE1PY, 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.

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

2-METER STANDINGS

W1JSM	33	8	1398	W5UKQ	29	8	1150
W1AZK	33	8	1384	W5HFV	27	10	1285
K1ABR	32	8	1374	K5TQP	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				
K1JIX	18	6	800	K7NIL	24	5	1290
K1RJH	16	6	675	K7ICW	16	4	1246
W2AZL	35	8	1380	WA8VHG	12	6	415
K2HLA	32	8	1300	K9SGD	42	9	1300
K2YCO	20	7	750	WA8DOT	40	9	1200
WB2FXB	20	6	915	W9AAG	37	9	1200
K2DNR	19	8	1010	W9YYF	32	8	1050
WA2PMW	19	6	1000				
W2CRS	19	6	710	WØBFB	45	10	1350
				WØDQY	41	9	1300
W3GKP	32	8	1108	KØMQS	41	9	1150
W3KWH	26	8	1335	WØLFE	36	9	1040
W3BDP	22	7	1100	WØEYE	34	8	1380
K3OBU	21	7	930				
K3CFA	21	6	950	F8DO	1	1	5100
W3HB	17	6	677				
				OH1NL	1	1	5850
K4IXC	36	8	1403				
K4EJQ	36	8	1125	VE2HW	11	5	800
W4FJ	33	8	1080	VE3AIB	29	8	1340
K4QIF	29	8	1150	VE3EZC	27	8	1150
				VE3ABO	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 milleage of best DX. Revised May, 1968

220- and 420 MHz. STANDINGS

220 MHz.				K4EJQ	8	4	500
K1JIX	11	4	600	K4QIF	8	4	435
K1BFA	7	3	225	W4FJ	7	4	300
K2CBA	16	5	660	W5AJG	7	3	1010
K2DNR	6	3	175				
K2YCO	3	2	225				
K3IUV	10	4	310	K7ICW	4	2	225
W5AJG	3	2	1050	W8RQI	10	6	425
VE3AIB	7	4	450	K8REG	8	4	300
420 MHz.							
K1JIX	10	4	385	W9AAG	12	4	600
K1BFA	6	2	250	WA9NKT	9	3	400
K2CBA	11	5	3000	WØDRL	10	4	565
K2YCO	8	6	550				
K2UYH	9	4	350	VE2HW	2	2	350
				VE3EZC	6	4	510
W3RUE	13	6	585	VE3AIB	5	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.

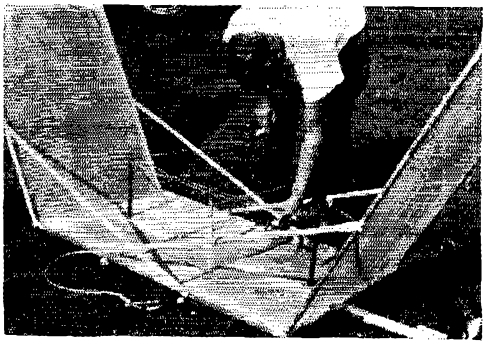
WØEYE, who had earlier announced beacon transmissions on several bands, lost his antennas to high winds just before the tests were to have started. However, Don has the 50.015 signal beamed east between 0200 and 0400 and 1300 and 1400 GMT daily. See the November, 1967 column for further details on the 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 K4QIF snagged number 29 from Virginia when he and W5ORH, Oklahoma, worked. On the 21st, WØEYE 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.

KØMQS 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 Roig, CO3NR; LaGunas 19; LaHabana, Cuba. His location is about 50 miles from Havana.



It is a somewhat unusual antenna that W9YOI, Chicago, has built. The 432 MHz. Moulin trough is ten feet high and 3½-feet wide, mounted for horizontal polorization, and built of angle iron and steel plaster screening. Keeping it on his 40-foot tower must be no small trick. *(K9AHK Photo)*

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

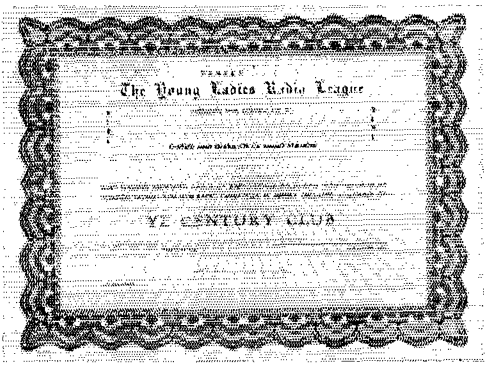
100 YLs

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.

Onie Woodward, W1ZEN. YLRL custodian of the YL Century Club certificate.



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, W4HLF, W5JCY, WA6AOE, W6BIS, W6YZV, W7KOI, W8NAN, and KØGIC.

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 then 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*

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, Marleboro, Massachusetts, 01752.

Barbara Buford, WA7IPA

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, WA7IPA.

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 WAØYL, or KØYL, listen on 7.250 s.s.b., 14.265 s.s.b. Tangle Net at 1800 GMT Thursday and find out. KØZSQ, and KØDCW will be in charge of the station. WØHEP 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, KØEPE, 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 Caribous 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 Brrack 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 codehounds 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 awayyYY . . .

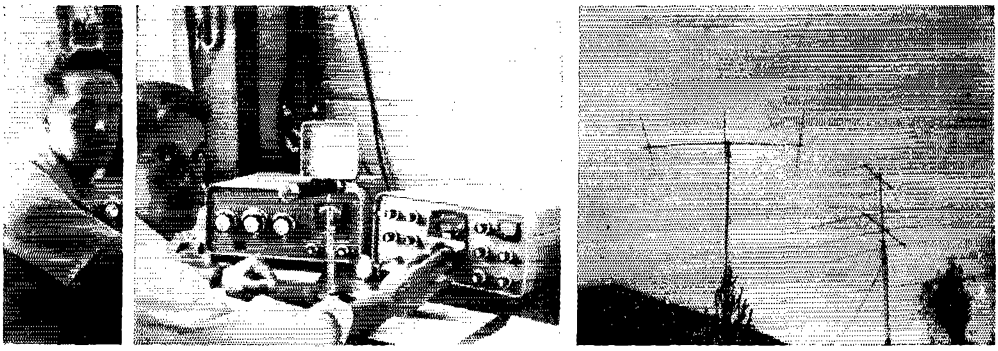
75 phone, though warm-weather atmospherics move in up our way, still may turn up CE6EZ, CN8AW, CR4BC, CTs 1LN 1MQ 2AA 2AP, scads of Gs and DJ/DK/DLs, EA3JE, EP2GI, ET3s FMA USA, F3RT, FP8CY, GW8AX, HBs 9HT 9LL, HC1TH, HI8LC, HK3RQ, HP1JC, HV3SJ, JW2BH, K4RSH/KG4, KP4AST, KZ5s ML MV, LA2PH/mm, MP4TAH, OA8V, OD5EJ, OK1XN, OYs 4OV 7ML 7S, PZ1CF, SM4GZ, SP6AAT, TAs 1HA 2BK, TF5TP, TI2s NA WR, UAs 2KAW 9KLW, UD6BR, six VO1s, VPs 5AA 7NS, VS6DO, W1FZJ/KP4, YUs 2HDE 3CTN, YVs 4HN 5AXU 5BBW 5BTS, ZB2s A AP BM, ZDs 3F 8NK, 4A1AC, 4U1ITU, 4X4s CW MR RW WN, 5W1AT, 5Z4s KL LG, 7X0AH, 8R1G, 8Z4AB, 9J2BC, 9M2s DW and NF, mostly sideband ers between 3700 and 3800 kc.

40 phone, described by Ws 3DWG 8YGR, WB2UVD and s.w.l. P. Kilroy with help from the clubs newshawks, offers CN8AW, CRs 4BC 6EI, CT1LN, some DJ/DK/DL and G chaps, DUs 3FL 9AO, EAs 3JE 8BQ 8EZ, EL2AJ, EP2GI, ET3FMA, GW8AX, HKBD, 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 1BH 0WL, TA2BK, TI2s JIC NA, UAs 2KAW (78) 2, 9FC 9KDL, UB5KAW, VKs 2FU (90) 5, 3ZL, VPs 1PV (225) 12-13, 2AC 2SC 9BY 9DL, VR2DK, VS6DO, YNs 1BCD 3KM, ten YVs including 7DF and 9AA, ZB2AP, ZC4s CN RB, oodles of ZL and ZS friends, 4A1s CCW HT SD 2, 4X4s IX VO, 5W1AT, 5Z4AA, 8P6BH, 8R1G 8, 9Y4s AR GL LA VT and that magnificent multibander, 7X0AH.

15 phone is *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 S9 QRM barriers," write Ted and Ernie. "Wyoming and North Dakota were our most difficult States."

(335) 11, CEs 3BK 6EZ 9AT 1, ØAE (255) 14, CN8s BB ML (305) 11, CB, COs 5PP 8RA, CPs 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, EI3AK, ELs 2A 2AL 2NH 2V 2Y (220) 18, 9A, EP2s DA DW, ET3s FMA (268) 23, RB (340), REL 21, USA 22, FB8WW, FG7s XM XT, FO8s BS BV, FP8CS 17, FR7ZD 4, G6ZY/CN, GC3s DVC 19, MLR 19, HBØAG 16, HCs 1MF 1MX 1WJ 8FN (300) 23, HIs 3AGS 8LAL 15, HKs 5AOA 6F17PU ØAI ØBKW ØBKX (260) 21, HL9s KA KD KI TY (310) 2, HP1s PC RC, HR1s CAS KAS (340) 15, taboo HSs 1CB (259) 17, 3DR (298) 16, 3RF, HV3SJ (290) 19, IS1s EP (350) 14, PEM PPB, IT1s ATK JR, JAs 1DWN 1EDZ 2AAY 3COX 3FDA 3HVC 3MV, JH1s BED UJ (300) 10, JWs 2BII 14, 6GL, Ks 8NHW/XV5 ØILI/KG6, KAs 2KK 5, 5MC (345) 10, 7AB, KC4s USB (365) 23, USM (340) 2, USP, KGs 4AM (442) 16, 6AAY (310) 9, 6ALY 6SK 6IG, KJ6CD, KL7BUW, 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, LAØAD (190) 3, LU2OF, LX1AE, LZs 1KSA 2KKZ (305) 17, MP4s MAY (355) 9, MBB MBC (312) 16-17, OAs 4AY 4CL 4WG 6BU (312), ØENP, OD5s EJ (248) 16, ER, OEs 3GSA 3RE (270) 14, 5XEB, OY5S (300) 13, PJs 2AQ (390) 16, 2CQ 3CD 5BC (340) 22, PYs 4BLH 9HL (200) 23, SPs 5AKG (322) 17, 6AAT, SVs 1DL ØWI ØWII ØWL 18, ØWM ØWP 18, ØWQ, TA1BN, TF2s WJZ WKM (300) 21, WKR WKV, TGs 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 BQ (290) 7-8, BX, UAs 2KBD 2WJ 9BE 9DT (345) 2, ØIH (250) 23, ØSK, UB5s FG WF 15, KAW, UD6s BR CC 5, UF6FE (298) 9, UH8AE, UJ8KAA 5, UL7BF 5, UQ2s AN 12-13, IQ, VKs 9GN 21, 9LR (388) 10, 9WD 9XI ØJW 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 6DO 9MB, VU2s BK CQ DKZ KX (190) 7-8, VR6TC (355) 0, VQ9L, XW8AX 15, YAIs HD ZC, YJ8BW, YN1s FR GLB (366) 13, RBF, YO5LC, YSs 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 mitful of ZLs, ZSs 3JJ 3YF 9L, ZPs 5BR 5KA 5KN 6CW, 4As 1CK 23, 1YG 3, 3DE, 4U1ITU, 4X4s CW KM VB, 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, 6Y5GB (185) 18, 7P8AR 21, 7Q7EC, 7Xs 2AH (260) 19, ØAH 10-11, ØVP ØWW, 8P6s AY CC CE (280), 8R1s C G (350) 21, S (373) 21, 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 AJ CM CR DP (414) 20, SK (265) 20, TT, 9V1OI, 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 4YOK 5QGZ 8YGR 9LNQ, K4TWJ, WAs 1CYT 1DJG 5PUQ 8SLW, WB2UVD, KG6IC, KH6BZF, KP4DBJ and tuner Kilroy awaiting multicolored wallpaper from such as CEs 3RC 17, 3TV 3UQ ØAE (622), CN8s FV (655) 19, MZ, COs 2HQ 2JC 2JL 5PP (420) 18, 7HQ, CPs 5CC 17, 6FK (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, DU1FH 0, EAs 8FO ØAH (635) 16, EI4BB (525) 19, ELs 2AL 2E 2Y 8I (552) 13, 8J, EPs 2AM 2BQ 2GI 3AM, ET3s FMA (645) 16, REL USA, FG7s TH XL XV, FO8BV (610) 3, G3UHR/VO2 19, GC2FMV 13, GD3RFK (680) 15, HBØs AG (577) 17, LL (502) 16, HCs 1PC 1WF 17, 2OA 5EJ (628) 14, 5KA 8FN (55) 16, HGØKRD, HIs 3AGS 8MMN 8XMT (571) 15, HKs 1BHP 3CI 3RQ, HL9s KA 23, TS O, HP1s GU LM, HRs 1JMF 4DHS, banned HS1s CB (552) 8, DR (621) 10, HV3SJ, HZ1AB, IT1JR (570) 15, JA9BSQ, K1IFS/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) 0, 6SM (610) 23-0, KH6s BI (590) 20, BZF (570) 21, EQA (510) 22, SP (670) 23, KL7s AHB ALZ (527) 22, FPR (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 (620) 1, KZ5s JJ WH (900) 21, LUs 2ECC (570), 3DJV 5DJZ 6BM 8DB 16-17, LX1RM, LZ1s AM (570) 15-16, UF, MP4s BIA (610) 13, BEU (560) 12, BFJ 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 13, EJ 16, EP 9, OHs 2BEM 5BA 5TS, OX3WX, PJ3CC (563) 19, many PYs including 9AI (570) 18, PZ1s BK BX (688) 22, CE, SVs 1AA 1AE 1AN ØWII (735) 13-14, ØWL (640) 16, ØWU, TA1s IB TV, TGs 8IA 9EP (595) 18, 9JN 9RN 9US 9XX (581) 19, TIs 2JIC (612) 2, 2LA (590) 18, 8CAB, TJ1AG, TN8AA, TU2BQ (602) 15, UAs 1BFA 1KAB 13, 2ACS 14, 3AAS 3ACF 3APB 3APK 3DRG 3KFM 3KHD 3MPE 3MRH 3NUE 3PJG 6RWB 6SW 13-14, 9KBW 9MDM 9TE ØKJJ, UB5s APK BZS DJI FGC GFT GPU GWC 14, KPU, UC2KBB, UD6CR (620) 11, UF6CR, UH8s AE (610) 12, AWE, UJ8KAJ, UL7FR, UN1KDI, UO5s KAT OT TI, UP2s OV VPW, UQ2s AN 15, ASO LR, UT5s KHT OV VP, UVs 3AAJ 3AAM 3ABA 3ABW 3AEB 3AGA 9PP, UWs 1KAK 1KAT 3KFO 3LZ 6AU ØSX, UY5s HB HI (415) 10, VKs 6CF 6KL (604) 12, 6MK 6NM 7AIR 8AG 8KK 8NO (600) 22, 8UG 9DH (598) 10-11, 9XO, VO1DW, VPs 1PV (600) 16, 2AC 2GSM 2MF (552) 16, 2MK (600) 17, 2VM 7NO 8HZ 8JT (600) 18, 9DL 9FU 9GB (510) 18, 9GP 9L 9WB (635) 15, VQs 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, YA1AD, YN1GLB 16, YO2II, YJ8BW, YS1XEE (555), YU3NEQ, piles of YV fellers, ZB2BC 18, ZC4s MO (620) 14, RB, ZDs 3E 5R 7DI (715) 13, 8LMR (736) 22, 8NK 15, 8RK (642) 14, ZEs 1CX (630) 19, 2JA 15, 2KL 3JU 8JY, ZF1GC, ZLs 1HW (520) 23, 1TU (599) 12, 2JK 22, 3FM (481) 20, 3GN, ZPs 5JB 9AC (446) 20, ZSs 3HT 3HX (560) 16, 9L (663) 15 and other South Africans, 4As 1AE 1DO 1GJR (548), 2WG 3DE, 4U1ITU (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 ØWW 15, 8P6s AH BR BU CA CC (600) 17, 9G1s KM (612) 16, SV, 9H1s BA BB, 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, EB (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.

Later on we'll review the c.w. action of (10) Ws 1AYK 1VAH 3HMR 4YOK 5QGZ 8YGR, Ks 1FKW 3CUI, WAs 1CYT 1DJG 1FHU 5PIF 5PPZ 8MCQ 9QBM, 11ER; (15) Ws 1AYK 1DAL 1VAH 3HMR 4YOK 7BE 8IBX 8YGR 9LNQ ØCVZ, Ks 1FKW 2UPD 5MHG 5YUR, WAs 1CJE 1CYT 1DJG 1FHU 3DSD 4YOK 5MIN 5PUQ 7BE 8PVN 8VRB ØRVR, WB2s FPG SSK, WNs 1ION 1ISH 4GRN 4GSS 4GTI 4HF 8YHN, 11ER; (40) Ws 1DAL 1VAH 3HNK 4YOK 7VE 8YGR, Ks 5MHG 9UIY, WAs 1CYT 1DJG 1FHU 3DSD 5MBC 5PUQ 8MCQ 8PVN, WBs 2PPG 6UBC, WNs 3INI 4GSS 4GTI 4HF; (80) Ws 1DAL 1VAH 1SWX 4YOK, WAs 1CYT 1FHU 1GXE 8MCQ, WNs 1ION 4HF; (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! W1BB reports the east coast gang grabbing ZC4RB and 5Z4LE 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 VKØIA of Macquarie will be forwarded as soon as I get clear," assures VK7ZKJ, also busy with VKØCR's confirmational matters. Ill health and a change in address (see list) further complicate Greg's efforts. "Unlike VKØMI, Dave requests that his VKØCR 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 K8WXV.

ASIA — AP2AR undertook an AP5CP QSL hunt in KØEZH'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-VS9AJH 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.e. plus International Reply Coupon, from each petitioner . . . . . ZC4GM (G3MCY) writes, "My QSLing has always been 100 per cent. Now that W2CTN is looking after it, exchange will be even more efficient." . . . . . *DX News-Sheet* notes that 1967's 4W1G QSLd via HB9MQ, the 1964 version via HB9NL . . . . . 9M2PO helped WB2CGW dig up the ex-9M6MG address in the list to follow. "A note to Ian met with immediate response and QSL."

AFRICA — "Again please stress that U.S. postage is not usable in Canada," requests VE4SK, new QSL aide to 6W8DY as of this March first. Skip also assists DL5YL, ON8XE, TF3EA and VP1SB . . . . . "I was QSL manager for ZD8JES from December 26, 1966, until December of '67 when he transferred to Guam," observes WA4UHK. "Haven't heard from Jack since then, and I still need his logs for last November and December." . . . . . The widow of W7MLL tells W4VON 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 EL2D . . . . . WØDAK credits 9L1TL with the Attractive QSL of the Month.

EUROPE — SKs 2AZ 3AK 4AV 5AA 6AB 6AG 7AX ØAI and ØAL 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 OY7MIL says there is no OY1Z . . . . . WB6UJO, 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 CEØAE, 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 HC5s EJ and KA has started via VE1ASJ, also from Cuenca for cards coming direct." . . . . . WB6SSO has no QSL managerial arrangements with CEØs or 5U7s. TI8ABL keeps Steve quite busy enough.

HEREABOUTS — For especially quick QSL response "How's" correspondents Ws 1AYK 1DAL 1DTY 1SWX 8YGR ØDAK, Ks 2UPD 9IFB, WAs 2HIU 5IIPV 5MIN 5PUQ 8SLW, WNs 1ION and 8YHN nominate the following colleagues as your "QSLers of the Month": CE2DI, CO6RM, CR6KB, DL1OV, EAØTU, EI7BK, Fs 5ID 8TC, FG7XX, Gs 2NN 3PUM, GD3AIM, HC1TH, HL9KA, Hs ER LLZ, JA1HHM, KC4USM, KG6SA, KH6EDY, LX1CF, OA7BI, OEs HZ 5ANL, PAØPN, PJ5MJ, SM5CAK, UC2WP, VK6RU, VP9GA, VQs 8CBN 8CC 9JW, VR4TC, VU2s KV LN VZ, YA3TNC, ZL4HZ, ZS6VJ, 5W1AT, 7XØs AH WW, 8P6BU, 9L1TL and 9U5BB, as well as QSL tenders Ws 2CTN 4ZXI 6BCT 8UTQ ØQKC, WA9AEA, WB2NZU and W3TNC's OM. Any fast ones we missed? . . . . . *Help!* W9LNQ awaits word on JT2AD, and WA8SLW wonders about HBØAG, KX6FN, OHØAA and 4M4A. Any 'alp? . . . . . K9UIY 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 mailsack 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
CE4LQ, Casilla 52, San Fernando, Chile
CT2AS, Box 183, 1605th CAMS, APO, New York, N. Y., 09406
ELs II 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 VE2NV)
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 287, Fort-de-France, Martinique
G3SMO, J. Holmes, 99 Coneygrey Spinney, Flintham, Newark, Notts., England
G3XEM/HZ, P. Booth, Airwork Svc., Box 2142, Jeddah, Saudi Arabia

HC8BY, Box 289, Quito, Ecuador
HL9US (via K3UWQ; see text)
Is 4RUI 8CLC, *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
TI2JH, P.O. Box 2259, San Jose, Costa Rica
TJ1AQ, J. Bernal, B.P. 5209, Douala, Cameroon
VE2ASL/LX (via REF or VE2NV)
VE3CUS/VP2K (via VE3ODX)
VK9KS, Box 530, Rabaul, T.N.G.
VK9RJ, 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/KH6 (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. Ingram, 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 AB WS, P.O. Box 277, Bilma, Niger
6W8DY (via VE4SK; see text)
ex-9M6MG, S/C I. Body, GRSF, RAF Chivenor, Barnstable, N. Devon, England
ex-AP5CP (see text)
EA0AFG (to HB9AFG)
G3XIO (to VE5JS)
GB2OHE (via G3PUO)
GB3BSE (via G3IRM)
ex-HA1R (to K9IFB)
HB0SJ (to HB9SJ)
HC8RS (via SM5EAC)
I9RB/4U (to I1RB)
IT7GAI (to IT1GAI)
JW2AP (via NRRL)
JW2BH (via LA5YJ)
KM6DE (via KM6BI)
PJ5MM (to K9GCE)
PX1KT (to F1KT)
SK2AZ (via SM2BHX)
SK4AV (via SM4CLU)
TI8ABL (via WB6SSO)
VK9GN (see text)
VP2VO (via VE3ACD)
VS5RCS (via 9M2NF)
ex-VS9AJH (to G3SMO)
XE0GLD (to K7GLD)
YN1RMP (via W9GZZ)
ZC4GM (via W2CTN)
ZC4JU (via RSGB)
ex-ZD8JES (see text)
ZD8Z (via W6CUF)
3A2CL (via 3A2CN)
3A2EK (to DL2WB)
4A4A (see text)
4W1G (see text)
4W1RC (to HB9RC)
4X8AC (to 4X4AC)
4Z4AG (via WB4FJO)
5N2AAU (via WA9UFV)
9K2BV (see text)
9L2SL (to 9L1SL)
9Y4AT (to KV4AM)

Our geographical benefactors this trip: **Ws** 1AYK 1CW 1DAL 1SWX 2VOZ 4YOK 6BIL 9LNQ, **Ks** 2UPD 8EKG 9UIY, **WAs** 1FHU 4UHK 5PPZ 8SLW 8VRB, **WB**2CGW, **KH6**BZF, P. Kilroy, T. Gricco, Canadian DX Association *Long Skip* (VE3DLC), Columbus Amateur Radio Association *CARAscope* (W8ZCQ), DARC's *DX-MB* (DL3RK), *DX News-Sheet* (G. Watts, 62 Belmore Rd., Norwich, Nor.72.T, England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (W4BRB), International Short Wave League *Monitor* (A. Miller, 62 Warward Ln., Selly Oak, Birmingham, 20, England), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y., 12020), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025; attn. K6CQF), Southern California DX Club *Bulletin* (WA6GLD), Utah DX Association *Bulletin* (W7LEB) and VERON'S *DXpress* (PA0s FX LOU TO VDV WWP). Well done, sirs.

Whence:

ASIA — Taiwan DX soloist BV2A tells W6BIL he hunts U. S. 'fours on 20 c.w. to clinch WAS. Chin formerly signed AC3YW, C3YW and XU6A as far back as 1930 . _ . _ . _ WA1FHU learns that 4X1VO-G5AAD will close shop by fall for return to W6DLX . _ . _ . _ ARSI's VU2CZ announces this year's VU2/4S7 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 K8WXV at KG6IC. (Hooray for 160!) "K5AMT dropped in to help work on our 1350-ft. tower." W1DTY adds, "Don is setting up classes for several Iwo Jima people interested in getting ham tickets." . _ . _ . _ KA7AB, due back in the States this summer, had to corner W1DTY '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 certifications based on QSOs with Japanese call areas, prefectures and cities, respectively . _ . _ . _ "Always delighted to contact 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-mter c.w. and sideband." . _ . _ . _ AP2AR tells KØEZH 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 SVØWPP." . _ . _ . _ 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 2200 GMT or so, 28,733 kc." W6BHY is on the scene, too, signing ZD8Z until his own ZD8Z or other call comes through . _ . _ . _ WA9UFV says 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 sideband near 14,200 kc. at 1000–1200 GMT or so. (Photo from WA5EFL of Arkansas DX Association via W1CW)

June 1968

KG6IC is very big on 10 and 15 meters thanks to the efforts of K8WXV. Traffic skeds for the Iwo Jima service gang preclude much DX chasing but Don heeds 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 output 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.

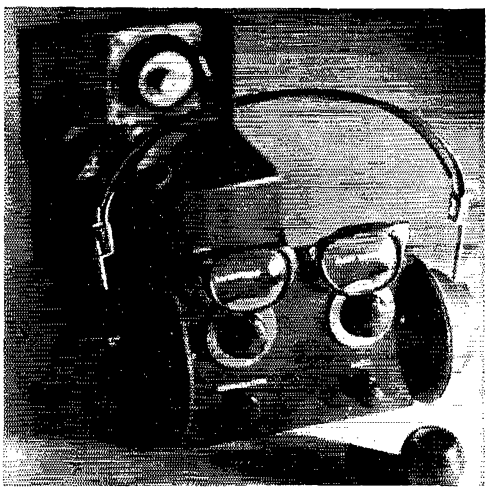
OCEANIA — VR6TC and spouse were guests of W6HS before returning to Pitcairn from their extensive U. S. tour. "Tom and Betty kept skeds with home from here," remarks Mert, "and now we have Tuesday s.s.b. contacts at 0600 GMT on 14,225 kc." . . . . "Was off ship for several months awaiting our fourth harmonic," comments W6HUQ/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-HA48A). "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: DU1DBT 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 WN1ION'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 St. Mark Day festivities . . . . VE2ASL sometimes puts his SB-101 to work on 10, 15 and 20 meters as VE2ASL/LX and FØFS . . . . WA1FHU finds former HA1KSA operator Fred now banging away at HA5KFZ. K9IFB (ex-HA1R) 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 1.8 Mc. in the ARRL DX Contest," writes GC3IEW (G3IEW) to W1CW, "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 WØGTA (ex-EP2BK-9V1LP) behind the key at LAØAD . . . . PX1CW was the handiwork of EA2s CW and DV.

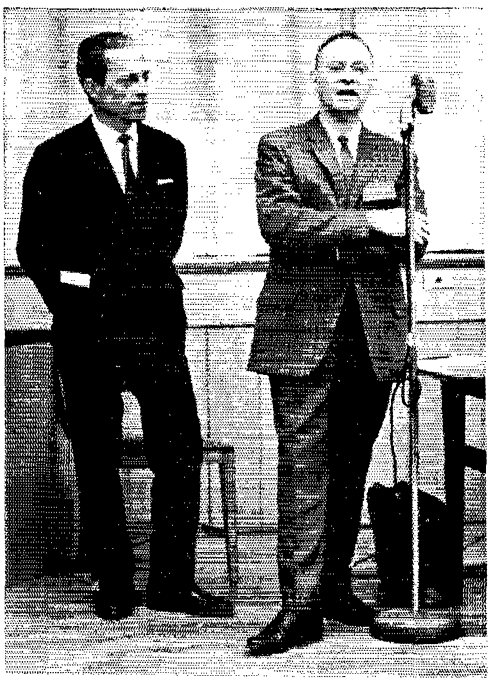
HEREABOUTS — Circle September 14th on your shack calendars, group, the date announced by W9 Central Division DX Century Club 1968 chairman W9EWC for the annual W9-DXCC conclave near Chicago. The usual power-packed program is a-buildin' . . . . Furious s.s.b. contest work and loads of fun are reported by K9GCE as PJ5MM and FS7TJ. FG7TI promises W8IBX other St. Martin maneuvers to come . . . . W9CA 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-WA9NHZ) 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 ZIA 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-kc. 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 kc., 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 . . . . VP8IE 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 *CARAscope*, 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

"DXCC²" 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.

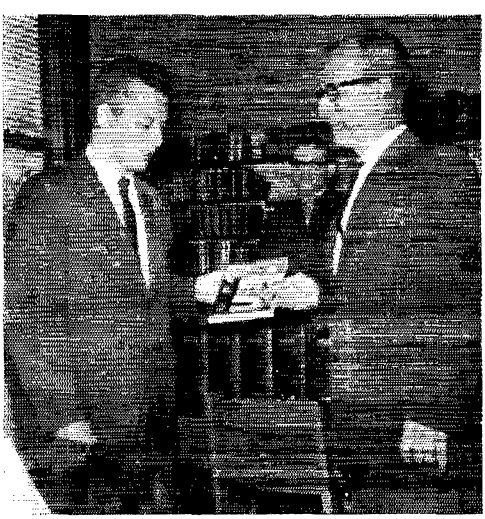
Strays



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, W1NJM, Communications Manager
ELLEN WHITE, W1YYM, Deputy Comms. Mgr.
Administration: LILLIAN M. SALTER, W1ZJE
Contests: ROBERT HILL, W1ARR
DXCC: ROBERT L. WHITE, W1CW
Training Aids: GERALD PINARD

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* can look up the original Field Day announcement[1] in which nowhere is emergency preparedness or public service mentioned. "The real object," the announcement states, "is to test 'portables.'" The second announcement[2] 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?

[1] June, 1933, *QST*, p. 15.
[2] June, 1934, *QST*, p. 8.

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

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

June	July	August
2 **LO Time** (League Officials only)	3-5 FEARL DX Field Day	2 **Qualifying Run, W6OWP**
8-9 **VHF QSO Party** (p. 57, May *QST*).	7 **LO Time** (League Officials only)	4 **LO Time** (League Officials only)
8-10 New York State QSO Party (p. 108, May *QST*).	11 **Qualifying Run, W6OWP**	10-11 WAEDX (c.w.)
13 **Qualifying Run, W1AW**	12 **Qualifying Run, W1AW**	17 **Qualifying Run, W1AW**
14 **Qualifying Run, W6OWP**	13-15 **CD Party** (c.w.)*	17-18 Indiana QSO Party
15-21 Rhode Island Amateur Week (p.107, this issue).	20-21 Independence of Colombia contest	Sept. 7-8 **VHF QSO Party**
18-20 Rhode Island QSO Party (p. 120, May *QST*).	20-22 **CD Party** (phone)*	14 **FMT**
22-23 **Field Day** (p. 58, May *QST*).	* League Officials and Communications Dept. Appointees only.	Oct. 12-14 **CD Party** (phone)
		19-21 **CD Party** (c.w.)
		Nov. 9-11 **SS** (phone)
		16-18 **SS** (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 W1AW. 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. — *W1NJM.*

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, K2DGI, 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 questionnaries 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.
Radioas, 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 umpire'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/ Million*	*Non-Observers*	*Parts/ Million*
W1BGW W4CMP		W2PVG W3PYW	
K4HDX W4JUI		W4CTT W5QMI	
W5FMO W6GQA		WB6AAL W6BXX	
K6KA	(0 to .4)	K6ITS W6KEV W6KT	
W2AIQ	1.0	WA6ZOY 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/VE 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
W6A.....322/346
W7GUV....322/344
W8EWS....322/345
LU6DJX...321/344
W1HX.....321/340
W5ABY....321/337
W8JBI....321/339
W8KIA....321/344
HB9J.....320/343
HB9MQ....320/336
K6ENX....320/336
OE1ER....320/341
ON4DM....320/338
VE2NV....320/336
W1CLX....320/342
W1GKK....320/344
W2AGW....320/343
W2JT.....320/338
W2WZ.....320/342
W4GXB....320/340
W4ML.....320/339
W4OM.....320/341
W4VPD....320/336
W6WWQ....320/336
W7AC.....320/343
W8BF.....320/340
W8MPW....320/337
W8PQQ....320/336
W8UAS....320/340
W9NDA....320/343
W9YFV....320/343
W0DU.....320/341
W0QVZ....320/340
DL3LI....319/334
G4MJ.....319/335
G8KS.....319/336
LU4DMG...319/334
PA0FX....319/338
VK3KB....319/341
W1JYH....319/341
W1MV.....319/335
W2BXA....319/342
W2CTO....319/338
W2NUT....319/334
W2SUG....319/335
W2TP.....319/327
W3GAU....319/341
W5PQA....319/336
W5UX.....319/333
W6BZE....319/338
W6GYV....319/336
W6RKP....319/332
W8DAW....319/342
W8JIN....319/343
W0ELA....319/341
W0SYK....319/336
CE3AG....318/341
DL1IN....318/333
DL3RK....318/334
K2OEA....318/333
K4TJL....318/326
K6EC.....318/331
K6EVR....318/334
VE3CFG...318/331
W1BAN....318/330
W1BIH....318/341
W2BQM....318/330
W2HO.....318/333
W2LAX....318/334
W2OKM....318/335
W2SSC....318/333
W2YTH....318/335
W2ZX.....318/336
W3KT.....318/341
W3WGH....318/332
W4LRN....318/329
W4OPM....318/332
W4PLL....318/332
W4TM.....318/339
W5MMK....318/338
W6CUQ....318/342
W6EPZ....318/338
W6GPB....318/338
W6NJU....318/331
W7PHO....318/335
DL6EN....317/331
DL7BA....317/333
IT1TAI...317/332
K2DCA....317/333
K2LWR....317/329
K4LNM....317/330
LA7Y.....317/338
W1BIL....317/333
W1FZ.....317/335
W2BOK....317/333
W2FZY....317/329
W2HTI....317/332
W2PCJ....317/333
W2RGV....317/332
W2SAW....317/333
W2ZGB....317/332
W3ECR....317/333
W4AIT....317/339
W4BJ.....317/328
W5CKY....317/335
W5KC.....317/339
W5QK.....317/327
W6ID.....317/335
W6KZL....317/332
W6LDD....317/337
W6OSU....317/328
W7ENW....317/340
W7GBW....317/340
W8IRN....317/334
W8NGO....317/333
W9HUZ....317/336
W9SFR....317/330
W0NLY....317/332
W0QGI....317/332
ZL1HY....317/340
G2BOZ....316/333
G2BVN....316/333
K4AIM....316/329
K4TWF....316/321
K6LGF....316/327
K6VVA....316/324
K7GCM....316/323
W1CKA....316/325
W2CR.....316/332
W2FXN....316/329
W2JVU....316/336
W2QHH....316/336
W2SHC....316/330
W2TQC....316/334
WA2ELS...316/320
WA2IZS...316/332
W3LMO....316/328
W4AAU....316/334
W4BYU....316/333
W4DQS....316/322
W4LVV....316/335
W4MR.....316/335
W5AFX....316/340
W5KBU....316/333
W5LGG....316/335
W5UKK....316/329
W6KEV....316/337
W6KUT....316/335
W6TZD....316/336
W6WX.....316/323
W6YY.....316/335
WA6EYP...316/329
W7CMO....316/326
W7CNM....316/334
W8BRA....316/338
W8DMD....316/337
W8PHZ....316/330
W8ZCO....316/329
W9AMU....316/332
W9LNM....316/338
W0AIH....316/330
W0PGI....316/331
4X4DK....316/333
DL9OH....315/325
G2PI.....315/337
G3HDA....315/326
K2BZT....315/331
W1FH.....315/340
W2DXX....315/320
W2FXA....315/327
W2LV.....315/333
W2RDD....315/328
W2WMG....315/325
W3CGS....315/333
W3LMA....315/336
W3NKM....315/331
W4AVY....315/326
W4LYV....315/334
W5DLG....315/335
W6LN.....315/334
W6UOV....315/328
W7AQB....315/328
W7UMJ....315/322
W8HGW....315/339
W8ONA....315/330
W9DWQ....315/327
W9GIL....315/331
W9RCJ....315/326
W0BMQ....315/327
W0MLY....315/330
W0PNQ....315/336
DJ1BZ....314/331
DJ2BW....314/330
DL1KB....314/332
G3HCT....314/324
HB9TL....314/329
I1AMU....314/332
K3UPG....314/337
K8LSG....314/324
K9ECE....314/322
VK4QM....314/336
W1HZ.....314/331
W1ZW.....314/330
W2AYJ....314/332
W2CYS....314/335
W2LPE....314/334
W2MES....314/321
W2MJ.....314/325
WA2OJD...314/327
W6FOZ....314/332
W8QJR....314/330
W8WZ.....314/335
W0BFB....314/331
GI3IVJ...313/327
DL7AA....313/334
JA1BK....313/320
K2SHZ....313/324
K4ICK....313/324
K4RPK....313/321
K8IKB....313/323
K8ONV....313/321
VE7ZM....313/336
W1CBZ....313/327
W1ME.....313/335
W2DOD....313/330
W2EXH....313/318
W2UVE....313/330
WA2RAU...313/313
W3AFM....313/322
W3GRS....313/324
W3JNN....313/336
W3RNQ....313/330
W4NJF....313/315
W5CE.....313/328
W5IGJ....313/330
W50GS....313/328
W6HOC....313/325
W8KPI....313/330
W8LKH....313/332
W9WYB....313/327
W9YSX....313/329
YV5AB....313/331

Radiotelephone

W3RIS....321/345
W8GZ.....321/343
W2ZX.....320/338
W8BF.....320/340
ON4DM....319/337
W2BXA....319/340
W6AM.....319/342
W7PHO....319/336
W8PQQ....319/335
LU4DMG...318/333
W2JT.....318/331
W6GVM....318/338
W0JYW....318/334
G3FKM....317/330
PY4TK....317/333
VK5MS....317/336
W2TP.....317/322
G8KS.....316/329
K4TJL....316/324
W6BAF....316/325
W6RKP....316/324
W6YY.....316/335
W9WHM....316/331
DL1IN....315/329
DL3LL....315/330
K4AIM....315/328
K8RTW....315/323
W1BAN....315/326
W1JFG....315/329
W2HTI....315/329
W2PTE....315/331
W4PDL....315/324
W8HGW....315/336
W9NDA....315/334
4X4DK....315/332
5Z4ERR...315/336
DJ2YI....314/328
HB9TL....314/328
OE1ME....314/326
TI2HP....314/335
W2VCZ....314/322
W0QVZ....314/328
DL6EN....313/325
DL9OH....313/323
I1AMU....313/331
W1ONK....313/328
W2RGV....313/326
W3JNN....313/333
W3WGH....313/321
W4ANE....313/327
W8MPW....313/321
W8QJR....313/329
W9JJF....313/329
YV5AB....313/331
K1IXG....312/318
VK3AHO...312/322
W1FH.....312/333
W1LLF....312/324
W2BQM....312/324
W2OKM....312/327
WA2RAU...312/312

The following nominating form is suggested. (Signers should be sure to give city, street address and zip code to facilitate checking membership.)

Communications Manager, ARRL [Place and date]
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the.....
.....ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this Section for the next two-year-term of office.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

—*George Hart, W1NJM, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
Santa Barbara	June 10, 1968	Cecil D. Hinson	Aug. 10, 1966
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, 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	JA1GHH....123	WA3ATX....110	W7CRT....105	DJ3VI....101	K5YUR....100
G2FA....226	K2EUR....120	WB4CGY....110	W9USP....105	G2FAS....101	SM5BTX....100
VE3CTX....222	WA3ELE....119	W6JKR....110	SP1BHX....104	K8QVG....101	VE3DTQ....100
W5HJ....210	OH3UQ....115	VE2DCW....109	WA9AUM....104	WA1DXI....101	W1SBM....100
W8CWY....193	W0BUL....114	WB2QJB....109	K2BUI....103	WA6VJD....101	WB2JBJ....100
XE1AZ....146	OH6NH....113	JA1ERB....107	LA4AF....102	W7LVH....101	WA3EJK....100
DJ4VP....144	JA3BIP....112	DJ9AL....106	W5WZ....102	WA9QAM....101	WA5PUQ....100
WA9VFR....137	WB2DWR....112	WA0OTE....106	WA8DOY....102	HA5BY....100	WB6SCQ....100
DJ5CQ....129	ZD8HAL....112	G3RJX....105	WA0KQQ....102	K4DSN....100	W9IBX....100
W8MIKE....128	PY2OU....110	K4RSM....105	YO5LD....102	K5U8U....100	W9TGN....100
OK2BIF....127					

Radiotelephone

W7GBW....270	JA1JAN....142	W7QON....111	W0BUL....108	WA0JCP....102	K2BUI....100
G2TA....204	F5RV....139	K0YIP....110	W6WLH....107	WA0OTE....102	WA4QHN....100
WA3ENZ....178	W5HJ....133	YO3JU....110	K4HUO....103	OE8AY....101	WA7FGA....100
VE6AQL....173	VP8IE....122	WA0MQM....109	K0RTH....103	W3NQV....101	WA8TOY....100
W7MVC....169	WA5REU....118	G3TUF....108	LA8RI....102	W7GHB....101	W9PWQ....100
W4RJL....150	HA5FE....111	W7PJY....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.

320	W7BA	ZL1AJU	WA4FDR	W2HC	VE4SA	SM7DQK	W3EAI	K4VZI
W6KUT	YV5BOA		W7YEX	WB2NYM	VQ8AD	SM7VX	W3FNV	K9UG
W6SQP	ZL3IS	**240**	WA8HFN	W4JFW	WB2CGW	VS6AJ	W5KFN	VE3CKW
W7BTH		K0JPL	W0FLK	W4RJL	W4RJC	W1YPH	W6EJJ	W1DAY
W8KBT	**280**	W5RU	YV5BNR	W6ABJ	W5DWB	WB2OLN	W7GGO	W1HTE
W9KXK	DJ0KQ	W6USG		W6BJU	W7VSM	W3IXJ	W8QXQ	WA1CJE
	DL1HH	W7AZG	**200**	W6JWD	WA7BOA	W9QWM	W9KYK	W2EGI
310	K4CEB	**220**	DL1MD	WA6OJU	WA8OVC	WA9NHQ		WB2QJI
W3INH	W8ILC	K4RSY	EI5F	W9ABM	WA9JDT			W3DHG
W6FZJ		K5LNN	K1GUD	W9NNC		**140**	**120**	W4RXT
	260	SM0MC	OK2BCI	W0MVG	**160**	K9IHG	DL6CL/W2	WA4BNI
300	W2JSX	VE7BW	VE3FKL		JA1JAN	W1AA	HC1TH	WB6MVK
K4EZ	W6KNH	VP7NA	VE6AQL	**180**	OZ3PO	W2LFL	JA8KB	WA9DJO
W1QJR	W0TW	W4WHF	WA1ERM	HB9RX	SM7BEM	WA2TIF	K2JFE	WA9LMY

Radiotelephone

330	W4NJF	W9TKD	**220**	PY1JR	YV5CIL	W1OKG	**140**	**120**
G3DO	YV5AIP		VE3CTX	PY2AQQ		W2OEH	DL1MD	K1HBM
		260	W3EVW	PY2ASO	**180**	WB2VZW	HK5ACI	K2CPR
320	**300**	G3AAE	W4ELB	SM0MC	I1GIZ	WA4FDR	PY2DSC	W1DAY
W4OM	K6ERV	HK5AOH	W6CCB	W4WHF	WB2CGW	W5OLG	VE5FO	W2BHK
W8PQA	W7QPK	W1JWX	WA8HFN	W6ABJ	W7VSM	W6ZBS	W1AA	WB6MVK
	W9DWQ	W6FZJ	W9KXK	WA6OHH	YU6CB	WB6RMZ	W2ESC	W8WRP
310		W7BTH	W0SFU	W8ICC		W9OPD	W3OJW	WA6OAH
G3HDA	**280**			W9WYB	**160**	6Y5DW	W8GKM	VE4BJ
WA2IZS	WA4W1P	**240**	**200**	XE2WH	K8GQG	9Q5FV	XE1AZ	YA5RG
W3DJZ	W6EUF	W6KNH	OE1PC		VS6AJ			
W4FPS	W6KUT	YV5ANQ						

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.

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. QST

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 0400 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION!* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example!* In converting, 0130 GMT June 13 becomes 2130 EDST 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 QST.
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.

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[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]
0020–0100[4]	.....	.....	3.555[6]	14.1	14.1	7.08[6]	14.1
0100	.....	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]
0105–0130[4]	.....	145.6	3.945	145.6	50.7	1.82	21.41
0130	**Code Practice Daily[1] 15–35 w.p.m. TThSat., 5–25 w.p.m. MWFSun.**						
0230–0300[4]	.....	.....	3.555	7.08	1.805	7.08	3.555
0300	RTTY-OBS[3]	.....	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]
0310–0330[4]	.....	.....	3.625	14.095	3.625	14.095	3.625
0330	Phone-OBS[2]	.....	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]
0335–0400[4]	.....	.....	7.255	3.945	7.255	3.945	7.255
0400	CW-OBS[1]	.....	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]
0420–0500[4]	.....	.....	3.555[6]	7.08	3.945	7.08[6]	3.555
1700–1800	.....	21/28[5]	21/28[5]	21/28[5]	21/28[5]	21/28[5]	.....
1900–2000	.....	14.28	7.255	14.28	7.255	14.28	.....
2000–2100	.....	14.1	14.28	14.095	21/28[5]	7.08	.....
2200–2300	.....	21/28[5]	21.075[6]	21/28	7.255	14.28	.....
2300	.....	.....	.....	RTTY-OBS[3,7]	.....	.....	.....
2330	**Code Practice Daily 10, 13 and 15 w.p.m.**						

[1] 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.
[2] Phone OBS (bulletins) on 1.82, 3.945, 7.255, 14.28, 21.41, 50.7 and 145.6 Mc.
[3] RTTY OBS (bulletins) on 3.625, 7.045, 14.095 and 21.095 Mc. 170/850 cycle shift optional in RTTY general operation.
[4] Starting time approximate. Operating period follows conclusion of bulletin or code practice.
[5] Operation will be on one of the following frequencies: 21.075, 21.1, 21.41, 28.08 or 28.7 Mc.
[6] W1AW will listen in the novice segments for Novices on band indicated before looking for other contacts.
[7] Bulletin sent with 170-cycle shift, repeated with 850-cycle shift.
Maintenance Staff: W1QIS W1WPR. * All times/days in GMT, general operating frequencies are approximate.

Station Activities

ATLANTIC DIVISION

DELAWARE—SCM, John L. Penrod, K3NYG—RM: W3EEB. PAM: W3DKX. A new traffic monitoring net has been established tor 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 OO 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; DTMN reports QNI 37, QTC 2; DSMN reports QNI 48. Traffic: W3EEB 103, W3DKX 19, WA3DUM 12, K3NYG 5, WA3GSM 2, WA3HWC ?.

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, QTC473; PTTN, QTC 340; EOAEP&TN, QNI 700, QTC 279; EPA V.H.F., QNI 322, QTC 365. OO reports were received from W3BFF, W3KEK, K3MYS, K3RDT, K3HNP, W3FGQ and W3NNC; OBS reports from WA3AFI, K3WEU, K3BHU, K3RDM, WA3HGX, WA3EEC, W3CBH; OVS reports from WA3BIV, WA3CQO, W3CL, WA3BJQ, W3ZRR, WA3HGX, WA3HIT, WA3EEC, W3FGQ. New Officers Dept.: Penn State ARC—WA3BSV, pres.; WA3CFU, vice-pres.; WA3GSH, secy.-treas.; K3DSQ, station director; K3PBL, asst. station director; K3KQY, WB2OEM, K3QXV, executive board. Reading ARC—K3IIJ, pres.; K3PSX, vice-pres.; W3UQC, secy.; K3MGO, treas. Villanova ARC—WA3HGX, pres.; K3ZUN, vice-pres.; K3RDM, secy.; WA8OFA, 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, WA3JKH, 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 Tfc. 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, W3CID 200, WA3ATQ 197, WA3AJT 178, WA3AIZ 169, K3YVG 135, WA3GLI 98, WA3AOJ 95, WA3AFI 87, WA3EXW 87, WA3CKA 85, W3FPC 85, WA3EMO 84, WA3EEC 81, WA3FCP 68, WA3IDK 66, WA3FPM 63, W3CBH 52, W3NNL 50, K3KKO 49, W3HK 46, K3WAJ 46, WA3CND 45, WA3EIO 43, W3KKJ 37, WA3GAT 34, W3VAP 31, K3MDG 29, WA3HGX 25, K3BHU 24, WA3HVR 23, K3FOB 21, WA3EXB 20, W3JKX 16, K3KTH 16, K3RUA 15, WA3HDI 14, K3SLG 14, WA3AES 13, K3PSO 13, WA3EMO 12, W3IVS 12, W3BUR 11, WN3JCJ 11, K3WEU 11, W3RLT 10, W3RV 10, W3OY 8, WA3AIB 6, WA3IOB 6, W3CL 4, K3NSN 4, K3HNP 3, W3PVY 3, W3BFF 2, WA3BJQ 2, WA3IAZ 2, W3OML 2, WA3BIV 1, W3EU 1, W3FAF 1, WA3GUL 1, WA3HIT 1, W3ID 1, WA3JED 1, WN3JLF 1, W3KEK 1, K3NPC 1, K3RDM 1, K3RDT 1, W3YPF 1, W3ZRR 1.

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

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI Ave.*	*Mgr.*
MDD	3643	0000Z	Daily	31	241	12.8	K3OAE, RM
MDDS	3643	0130Z	Daily	31	45	5.6	W3CBG, RM
MEPN	3920	2200Z	M-W-F				K3NCM, PAM
		1700Z	S-S				
MDCN	3920	2200Z	T-T-S-S	18	75	12.8	K3GZK
AREC	3920	2100Z	Su	5	0	8.0	W3LDD, SEC

• 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.

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. W3CDQ 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 WA3BMM. 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/VS6/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 108, W3ADO 96, W3ATQ 88, K3JYZ 71, W3PRC 52, K3ZLE 41, WA3JBY 33, WA3CCN 30, W3LDD 26, WA3ERL 22, K3ORW 18, W3FA 17, WA3FRL 16, WA3CBC 15, WN3IYS 14, K3LFN 14, WA3GDG 10, WA3BMM 6, W3BWT 2.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—Asst. SCM: Charles E. Travers, W2YPZ. SEC: W2FK. RMs: WA2KIP, WA2BLV. PAM and NJPN Net Mgr.: W2ZI. 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: WB2FJE 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/ARPSC. WB2JBE is moving to Barnegate, N.J., in June. W2SJI, K2PI and W2FK are moving to Florida. W2ZVW 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, WB2UVB 185, WA2KIP 172, W2YPZ 139, WA2ABY 117, W2ZI 108, W2ORS 100, WB2BGH 99, WA2BLV 42, WB2VMQ 30, W2CKF 22, K2SOL 18, WB2VEJ 14, W2BLM 11, WB2SFX 11, WA2KAP 10, W2FK 9, K2JJC 6, WB2APX 5, K2MBW 5, K2SHE 5, W2IU 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 3510.5 and 3993 kc. at 0900 Sun. and 3510 kc. at 1930 Wed., TCPN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT. 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., WB21UM secy.; South Towns ARS, WB2YNR, pres. WA1IUY/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, WB2GAL 134, W2RUF 118, W2HYM 110, WB2SMD 106, W2LYG 79, W2FEB 62, WB2YUT 61, W2RQF 39, K2JBX 34, K2DNN 33, K2OFV 25, W2FCG 23, K3IMI 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: W3KPJ. PAM: K3VPI (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. W3KPJ is now SEC and a very capable replacement for K3KMO. The Nittany ARC held its annual inauguration banquet with W3LNW as guest speaker. W3YA gave the club the latest news from ARRL prior to W3LNW'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 WA3HNM. Ex-WN3INX is now WA3INX with a General Class license. *Spark Gap* reports that K3MMO still is telephone relaying into Guantanamo 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 Mobileers 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 msesages, 424 QNS plus 12 visitors during Mar. Traffic: WA3BLE 507, W3NEM 218, WA3HLI 198, W3KUN 156, WA3IPU 143, W3LOS 121, WA3AKH 109, W3BLZ 93, K3SOH 87, K3HKK (W2KAT/3, K3AHT ops) 73, WA3GQJ 72, WA3EPQ 56, K3PYS 46, K3SJN 40, K3HCT 35, K3RZE 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*
IEN	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
Ill. PON	3915 kc.	1615 CST	Mon.-Fri.	
Ill. PON	3915 kc.	1645 CST	Mon.-Fri.	468
Ill. PON	3915 kc.	0830 CST	Sun.	
TNT PON	145.5 Mc.	0200Z	MWF	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 WN9WZX, WN9WZY, WN9WZZ and WN9WPJ. 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. WN9VLK 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 OBSs and WA9SDT, WA9TCW and WA9QZE as OVSs. Mr. Fritz Franke, well-known engineer of Hallicrafters, spoke at the Apr. 3 meeting of the Chicago Area Teleprinters Society. WN9VOK passed the General Class exam. K9RAS's XYL is now WN9YFH. K9UFK, 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. K9UFK and K9WMP 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, WA9PPA 100, W9DOQ 94, WA9OTD 62, K9BTE 51. WA9RCQ 48, W9HOT 46, W9KFQ 32, WA9QVU 24, W9CWH 22, W9PRN 22, WA9SFB 15, WA9SPA 13, K9TXJ 13, K9HSK 11, W9IDY 9, WA9POZ 8, K9WMP 7, W9LNQ 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: M. Roberta Kroulik, K9IVG. SEC: W9JUK.

Nets	*Freq.*	*Time*	*Tfc.*	*Mgr.*
IFN	3910	1330Z Daily 2300Z M-F	223	K9IVG
ISN	3910	0000Z M-F 2300 Sat.-Sun. 2130Z M-F	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. W9ILU 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. W9FII, 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, WA9YJB, also has code and theory classes. Randolph County ARC's new officers are WA9GKF, pres.; WA9MBT, vice-pres.; WA9QDD, secy.; W9VJX, treas. The Kekionga 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 W9HPG, 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, K9VHY 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, W9HRY 209, WA9LTI/WA9MTY 184, WA9LGQ 87, WA9BGI 71. K9CRS 60, K9STN 60, W9BUQ 57, K9RWQ 55, W9JUK 40, K9EFY 37, WA9BHG 33, K9CBY 33, WA9KOH 33, K9VHY 31, W9YYX 30, WA9IPS 29, W9FWH 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, WA9ABI 2, K9ATV 2. (Feb.) W9QLW 150, W9JUK 127, W9QUH 66.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9NGT. RMs: W9DND, K9KSA and W9CBE. PAMs: W9NRP, WA9QKP, WA9QNI, K9DBR and WA9IZK.

Net	*Freq.*	*Time*	*Days*	*QNI*	*QSP*	*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 WA9VNJ, W9IHW and WA9QHP for WSBN; WA9WKJ and WA9VNJ for BEN; WA9BBL. WA9OFF, K9LJM, WA9PKM, WA9SVF, W9NUC, K9YTS, WN9-VCK, WA9SZH, WA9DXW, K9WMA, W9FX and WA9-IZK for SW2RN. New appointments: W9CBE, K9KSA and W9DND as RMs, K9DBR and WA9IZK as V.H.F. PAMs; W9ESJ as OPS. Renewed appointments: WA9-OFF as OVS, 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. WN9WMW received his license at age 11. W9UIT received the new call, W9CM. 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.) W9AOW 684, W9DND 199, W9ESJ 162, K9CPM 142, W9DYG 141, WA9QKP 130, W9BCH 79, W9DXV 73, K9KSA 72, W9ODD 69, K9FHI 67, W9AYK 59, WA9VNJ 58, W9KRO 44, WA9OMO 44, K9TBY 40, W9CBE 36, W9IHW 34, W9NRP 34, WA9PKM 24, K9JPS 23, WA9LRW 23, K9GSC 15, W9RTP 13, WA9NPB 11, W9IQW 5, K9FYM 4, K9QKU 4, WA9OFF 2. (Feb.) K9JPS 25.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke, Jr., WØ-TCK—SEC: WAØIEF. RMs: KØORK, WAØEPX. PAMs: WAØMMV, WAØHRM. MSN meets daily on 3685 kc. at 2330Z. MJN meets Tue.-Sun. on 3685 kc. at 0000Z. Noon MSPN meets Mon.-Sat. on 3945 kc. at 1705Z Sun. and holidays at 1400Z. Evening MSPN meets daily on 3945 kc. at 2315Z. KØCNC received an OPS appointment. EC appointments renewed: WØAZR Mower Co., WAØDFT Nicollet Co., KØICG Blue Earth Co., WØLW Wilkin Co., KØSXP Beltrami Co. Other appointment renewals: WAØHRM, KØICG and WØ-TCK as OPSs; WØTIV as OO. KØCNC recently built an 800-watt grounded-grid linear using a pair of 813s. He also assembled a Heath SB-301 receiver. WAØEZQ and WAØPZY 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 WAØRRJ, WAØQVN, WAØRQO, WAØTUU and WAØNAX. WAØIYM and WØTCK 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 e.d. headquarters. Waseca Co. also is busy equipping a semi-truck and trailer with communications gear. WAØJKT received the BPL award for March traffic. Traffic: WAØIAW 306, KØCNC 148, WAØJKT 134, WAØOEJ 95, KØZRD 92, KØORK 86, WAØMMV 79, WAØLVK 52, WØUMX 45, WØISJ 43, WAØEPX 39, KØFLT 39, WAØHRM 39, KØZBI 39, WØTCK 35, WØHEN 25, WAØIYM 23, WØKNR 22, KØSNC 20, KØPIZ 18, KØDEF 17, WØBUC 16, WØ-SZJ 15, WAØDFT 13, WAØDOT 13, WØEQO 11, WØ-ATO 10, WØKLG 9, WAØJPR 8, WAØEZQ 3, WAØSSN 1.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. OBS: KØSPH. PAM: WØ-CAQ. RM: WAØELO. WAØDQX/7 keeps in touch on 20 meters with the Grand Forks gang. WNØRFG now is General Class. KØOVE received a birthday present of a Heath Compact. WØMQA is back and will be on when the antennas get up. WAØPPK recently received No. 7180 from the YL International S.S.B. Net. WAØOVW lost some antennas in the recent sleet storm. WAØOAT came up from Bismarck for the State Basket Ball Tournament. New Novice calls from the Valley Jr. High Radio Club are WNØTYA, WNØTXY and WNØ-TXZ. A new class has been started for Novices as well as work on the General. WØDM 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 WAØMSJ, WAØOVT, WAØHDA, WØDXC and WØBF on the air. WØBF has been giving exams for Novices and Conditional Class licenses and acts as NCS for the C.W. Net. His son, WNØRQY, soon will have an antenna on the SAE House at U.N.D. WØHDD will be WØGH. WØFVX 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. WØBIH is home from the hospital.

NDRACES Net	Sess. 22	Check-ins 814	Tfc. 77	KØSPH, WØEFJ, WØCAQ WØGFE, WØHJU, KØPZK
NDCW Net	" 14	QNI	52	Tfc. 39 WAØELO, WAØHUD, WØBF
YL WX Net	" 20	Check-ins 459	Tfc. 18	WAØGRX, WAØMND
ND PON	" 10	" "	216	Tfc. 17 WAØHUD, KØPZK

Traffic: WAØELO 143, WAØHUD 126, KØSPH 22, WØ-BF 17, W9QNI/Ø 14, KØPZK 11, WØDM 10, WAØJPT 7, WAØTBR 6, WØDXC 4.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW —SEC: WAØCPX. PAM: WAØCWW. RM: WØIPF. New calls: WAØSKJ, Vermillion; WNØTXG, Brookings. KØKXR 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: KØKXR as ORS, WAØLLG, WAØPNB, WAØRIQ, WAØCWW, WAØCPX, KØKXR, WAØCWX as OPSs; KØKXR, WAØPNB, WØSCT as OBSs. Net reports: Early session Phone Net, QNI 361, QTC 22, 52 informals; late session, QNI 1150, QTC 65, 124 informals. NJQ 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 *Keyclix*, published by RM WØIPF, reports increased interested in SDN. Traffic: WØZWL 564, WAØPNB 84, WØSCT 68, WAØRIQ 36, KØVYY 28, WØIPF 20, WØBQS 16.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: WA5IIS. PAM: WA5PPD. RM: W5NND. The EC appointment of K5ABE has been endorsed for another year. W5SMS reports a new father-son Novice team in Camden: WN5ULA-WN5TVF. 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. W5OBD 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	WA5EVU
LaPON	3870	Sun.	1300	W5KC
La RTTY	3612.5	Sat.	0100	W5GHP

W5CEZ urgently needs coverage in Shreveport, Nachitoches, 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 Winnsboro 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. K5WOD reports that the Springfield ARC has four new Novice members. W5MBC is bugged by business activities. W5BV again is more active on 3900 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 FET 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 e.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 3900 mobile throughout the trip. Traffic: W5CEZ 134, W5GHP 132, W5MBC 102, W5MXQ 96, WA5LQZ 78, W5KRX 75, WA5KQN 15, WA5OHH 14, WA5NYY 10, K5ANS 5, WA5LGO 4, K5OKR 4, W5PM 4, WA5OJG 2.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. Please note the new frequency of the Miss. Sideband Net: 3947 kc. daily at 1815 CST. Net control stations are WA5WMQ, WA5OKI, W5LEA, W5BW, WA5PTE, WA5KEY, WA5OHQ and WA5MPQ. WN5SIM 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. WN5UMQ is a new Novice in Olive Branch and WN5TMC 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 K3SFC, pres.; WA4UPE, vice-pres.; WA8WNK, secy.; K3RFC, materials officer; OE2HLL, librarian; K2DEM, 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 28, 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)			W4OGG
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, WA4AJB 15, WB4HYY 15, WA4CGK 14, WA4EWW 11, WA4BXH 10, W4PRY 10, WA4NEC 7, WB4FCE 5, WA4ZBC 5.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: W4OYI. Appointments: WB4BKG as PAM, WB4EQN as OVS. Endorsements: WB4CIY 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, WA4WQZ, WA4TPD, K4YZU, W4MGT and WA4AGH. Communications during the Russellville Flood Apr. 4 were provided by WA4RTI, WA4SWV and WB4CFH mobile on 75, and W4OYI, W4TOY, K4UDZ, W4MMY and WB4AOH mobile. KTN and KYN went on extended sessions to assit. 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: WA4DYL 270, W4BAZ 128, WA4AGH 126, W4NBZ 124, WA4WWT 114, WA4KFO 105, WA4VUE 97, WB4AIN 91, WA4IBG 78, K4MAN 73, WA4UAZ 68, WA4SMS 61, W4KKG 42, WB4FOT 38, W4OYI 28, WA4UHR 26, W4CDA 22, WB4EOR 22, WA4GHQ 21, K4TRT 21, K4FPW 18, WB4BKG 16, WA4GMA 16, WA4WSW 16, WB4BTM 13, W4BTA 12, K4HOE 11, W4KJP 11, W4SZB 11, K4VDO 10, W4MWX 6, WB4AFH 4, K4UMN 3.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8FWQ, W8RTN, WA8OGR, K8KMQ. PAMs: W8IWF, K8JED. V.H.F. PAMs: W8CVQ, W8YAN. Appointments: WA8GVK, W8IUC, K8KJL as ECs; W8REZ, W8DET, W8HKT, K8IRC/3, K3KRX/8, W8NOH, K8QKY, W8QQK, W8UM, W8ZJE as ORs; W8TIC as OPS; WA8VOG as OBS; W8MBM, 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	3935	1600	M-Sat.	353	258	27	WA8OGR
PON-CW	3645	2400	M-Sat.	140	38	26	VE3DPO
B/R	3930	2230	M-Fri.	793	110	21	W8ZBT
M6MTN	50.7	2400	M-Sat.	314	46	26	WA8LRC
LENAWEE 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.; K8DYI, 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 KH6BGS and LU3AEF. WA8SKU QSOed 5H3JL. WA8NYK has a Gonset G76, and he and WA8EMJ will DXpedition to Alaska this summer. W8IWG has a new SB-101. W8OHS got lost—in Plymouth! K8JQK had his AF67 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, W8MGQ is W8AP, W8IQS is W8CC, Cliff Harding is W8CO. Traffic: (Mar.) K8KMQ 369, WA8LXY 279, WA8SQC 219, W8UM 203, W8IWF 187, W8IV 184, W8ZJU 165, K8MXC 153, K3KRX/8 120, W8QQK 120, WA8OGR 73, W8TDA 70, WA8IAQ 69, W8RTN 66, W8FX 64, WA8VOG 63, K8GOU 62, K8ETU 60, WA8LRC 56, WA8UPB 55, W8IUC 52, W8NOH 47, W8WVL 46, W8BEZ 45, W8EU 45, W8DET 44, WA8KME 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, WA8VGQ 12, W8DSE 11, WA8UYJ 11, W8AUD 9, WA8KRH 9, W8RHF 8, WA8LNE 6, W8OWG 6, WA8TSB 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 WA8PQT is now WA8SHZ. 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 WA8DUR had his Hallicrafter SR-34 transceiver stolen. WN8ZTB and WN8ZTE 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 WN8WHE are in the hospital, the Buckeye Bells held its annual meeting at Columbus, Henry County ARC's 1968 officers are WA8FVC, pres.; WN8WIH, vice-pres.; WA8TZH, secy.-treas. and the Tri-State Weather Net elected W8CDA, pres.; K8OCI, vice-pres.; WA8EWW, secy.; and Toledo RC's 1968 officers are WA8GEL, pres.; W8WHA, vice-pres.; K8DTL, rec. secy.; K8MYN, corr. secy.; K8GOP, treas. W8FFK is now W8DH. 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., WB8AJD was WN8USV. 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. W8WCW 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 anniversay 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 22er. 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-8VL, 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, K8SUB, K8CKY, W8DJD, W8VZE/RO, K8LFI, WA8TGA, W8OE and WA8MHO. Recent Extra Class licensee: 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 440, WA8PQL 336, W8QZK 285, WA8AUZ 267, K8ONA 238, W8IMI 201, WA8PPK 147, WA8TWC 143, WA8TYF 142, W8UDG 140, W8GVX 123, WA8QFK 120, W8ERD 105, WA8FSX 101, W8SZU 94, W8NAL 92, W8CHT 91, W8QCU 87, WA8LVT 84, W8OUU 82, WA8SHP 77, WA8OCG 76, W8FGD 69, WA8LAM 69, WA8SED 67, W8DAE 61, W8LRE 61, W8RYP 60, W8EMB 56, W8OE 51, W8GOE 41, WA8SXI 40, W8WEG 40, W8IWX 38, WA8MVV 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, W9ILC 16, W8PNP 16, K8QYR 16, W8GRT 14, WA8NJR 13, K8DMZ 12, W8FRV 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: W2IJG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT. Appointments: 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 acquaintences 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. WA2PJL operated low-power 6 meters from his dorm room at RPI. His second call is WB2ZBX. Traffic: WZTHE 392, WA2VYS 251, WB2UHZ 221, WA2VYT 116, W2EAF 106, WB2VYS 121, WB2SOA 85, W2ODC 84, WB2FOA 62, W2CVR 40. WB2VJB 38, K2SJN 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 Use	3925 kc.	1100 MTWTF	WA2GPT-Mgr
Mic Farad	3925 kc.	1300 Ex Sun.	K2UBG-Mgr
Mic Farad	3610 kc.	0001 Nightly	K2UBG-Mgr
All Svc	3925 kc.	1300 Sun.	K2AAS-Mgr
NYSPTEN	3925 kc.	1800 Daily	K2AAS-Mgr

*Section nets. All times shown above are local. WA2UWA earned a BPL for Mar. traffic. W2GKZ says it is rather interesting to overhaul a big rotator 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. WB2JJW 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, NLIVHF and NLS! WB2YKL 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 IEEE 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, CP6HI, every week end on 15 meters. WB2WFJ now has an SB-100 to play with. W2YSF 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 W2YSF. WA2FTS, who is headed for the Navy finally received his call letter places but before he could put 'um 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 NLIVHF. Traffic: (Mar.) WA2UWA 974, WA2GPT 359, K2UBG 211, W2GKZ 80, WB2RQF 79, WB2UQP 55, WB2HYK 49, WB2AEK 45, W2EW 39, WB2PJH 36, WB2JJW 22, WB2DRW 19, W2EC 14, W2DBQ 10, WB2YKL 10, W2PF 8, WB2OIL 8, WB2UGP 7, K2JFE 4, WB2WFJ 2. (Feb.) WA2GPT 624.

NORTHERN NEW JERSEY—SCM, Louis J. Amoroso, W2LQP—Asst. SCM: Edward F. Erickson, W2CVW. SEC: WA2ASM. RMs: W2BVE and WB2RKK. PAMs: W2PEV, K2KDQ, WA2KZF, WA2TEK and WB2IYO.

ARPSC 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	W2ZI
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	WB2IYO

Endorsements: WA2CCF and WB2TKP as OPSs. New club officers of the East Brunswick ARC are WB2CGI, pres.; K2EWA, vice-pres.; WB2ZAN, secy.; WB2-MMV, treas.; WA2KVQ, 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 AR Klub (BARK) are WB2RJJ, pres.; WN2DRJ, vice-pres.; WN2EZI, secy.; WN2EZG, 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. WA2BHJ 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. W2IDH 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 FD rules and make it a safe one. Haste makes waste. Good luck and let's have a few more winners. Traffic: (Mar.) WA2IGQ 619, WB2RKK 446, WB2SEZ 301, WB2VLC 236, WB2DDQ 219, WB2TKP 200, WB2NZU 187, WA2TBS 136, WB2-NSV 134, K2KDQ 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, WB2BXK 27, W2CVW 24, W2-LQP 22, K2JSJ 21, WA2KZF 20, WA2NJB 20, WB2-CGI 19, K2ZFI 18, W2EWZ 17, W2TFM 16, WB2SJH 14, WA2WGR 14, K2DEL 12, WA2GLI 11, K2EQP 10, K2-MFX 10, W2PEV 10, WA2BNF 8, WB2NSE 8, W2JDH 6, WB2YPQ 3, WN2DRJ 1. (Feb.) W2CVW 47, WA2-UOO 32, K2EQP 23.

MIDWEST DIVISION

IOWA—SCM, Owen G. Hill, WØBDZ—Asst. SCM: Bertha V. Willits, WØLGG. SEC: KØBRE. PAM: WØNGS. RM: WØTIU. Dick Bischoff, formerly WØQVA, now has a new call, WØGA. Dick has been active since 1938. WØYDV, formerly of Oakland, is now in operation from Omaha. WØEKB is a new OVS. Silent Keys: KØLVF, Joe Phillips, and WØLUF, Len Collett, former resident of Sioux City and ex-Midwest Director. KØAAR has a new tri-band cubical quad. New officers of the Central Iowa ARC (Marshalltown) are KØGVG, pres.; KØLVB, vice-pres. Tom Willits still is secy.-treas. after about seventeen years. OVS WØPFP reports conditions on 50 Mc. were a bit quiet during March. WØQQA 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: WØLCX 400, WØPZO 311, WØLGG 103, WAØGYD 31, WØNGS 31, WAØSDC 23, WAØMIT 16, KØTDO 14.

MISSOURI—SCM, Alfred E. Schwaneke, WØGS—SEC: WØBUL. Please note that WØTPK has changed to WØGS, 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 WAØSNE. WAØDGG renewed as OPS. KØYBD has been appointed RM, replacing WØTDR as manager of MON. WØTDR resigned because he is working nights and cannot make the net. WØGCL has moved to Lebanon. WAØOVG, who was EC of St. Clair and Hickory Counties, has moved to Camdenton. WAØPFU moved but still is in K.C. WAØOXS reports that the Ritenour Sr. High School ARC (WAØJBY) has 5 new Nov. Cl. licensees, WNØTPG, WNØTQL, WNØTSH, WNØTTK, WNØ-TVR; one new Gen. Cl., WAØRTO; and one new Adv. Cl., WAØOXS. KØDEQ received DXCC. The Linn Technical College ARC is a new ARRL affiliated club. KØRWG was in the hospital for a while so WØEZM and WØAVX installed an antenna and rig so Ken could operate there. WØHVJ appointed KØONK asst. mgr. of MoPON. WØEEE is back with a new SB-401 and the SB-200 linear. KØJXI assembled the SB-401 for the club. KØGOB built a 4-1000A linear now being used on a.m. KØJPJ has a new S/Line and pair of 813s final. MEN Net certificates go to WØBHC, WAØCXG, WAØFQX, WØHTI, WAØLKF, WAØLOX and WØ-SQB. WØQEV (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	WØBUL
MON	3585	0100Z	Daily	29	186	151	KØYBD
MNN	7063	1900Z	M-Sat.	25	83	82	WØOUD
MoSSB	3963	2400Z	M-Sat.	25	727	139	WØRTO
MoPON	3930	2100Z	M-F	21	245	149	WØHVJ
PHD	50.4	0130Z	Tue.(GMT)	4	75	2	WAØKUH

Traffic: (Mar.) KØONK 1208, WØOUD 227, WAØHTN 163, KØYBD 111, KØJPJ 102, WØHVJ 73, WAØJIH 66, KØORB 54, WØBV 42, KØVVH 37, WAØDGG 29, WØBUL 27, WØRTO 23, WAØTIL 21, WAØPFU 20, KØDEQ 11, WAØKUH 11, WAØPYJ 7, KØGOB 5, WAØIHV 1, WØKIK 1. (Feb.) WAØPFU 13.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. PAM: KØJMF. RMs: WAØMLE, WAØJFV. V.H.F. PAMs: WAØCCW, WØHAJ, WAØLSH. Reports of the nets for Mar.:

Net	*QNI*	*QTC*	*Mgr.*
QKN	24	3	WAØJFC
KSBN	791	158	KØJMF
KPN	264	32	KØJMF
KPON	953	164	WØLXA
QKS 1st	171	61	WAØMLE
QKS 2nd	155	54	WAØMLE
Kans PI Net, 2 meters	17	0	WAØCCW

WAØPQL will be compiling QKS reports for the summer months. ARRL still is looking for more amateurs to participate in the Intruder Watch Program. WAØNFP 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*, Tee-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. Mgr. KØJDD. Zone 7, 75 meters QNI 34, QTC 0. Mgr. WØFII. Zone 13, 75 meters, QNI 69. Mgr. KØLPE. Zone 15, 75 meters, QNI 61. Mgr. KØUVH. Traffic: (Mar.) WØINH 251, WAØMLE 160, WAØLLC 152, KØHGI 114, WØLXA 101, KØEMB 94, KØBXF 76, KØJMF 71, KØLPE 67, WØPSN 59, WØAVX 54, KØJDD 48, WAØCCW 45, WAØNFP 37, KØMRI 32, KØGII 27, WAØPQL 24, WAØKPE 21, WAØJDG 20, WAØJQV 20, WAØKDJ 13, KØUVH 13, WØFII 9, WAØOZT 9, WAØJFC 7, WAØ-QOH 5, WØFDJ 3, WAØJFV 3, WAØKDQ 1, WAØKHN 1, WAØTAS 1, WAØTEF 1. (Feb.) KØBXF 55, WØFII 6.

NEBRASKA—Acting SCM, V. A. Cushon, KØOAL—SEC: KØOAL. Monthly net reports for Mar.: Nebr. Emergency Phone Net, WAØGHZ, QNI 1778, QTC 61. West Nebr. Phone Net, WØNIK, QNI 801, QTC 27. Nebr. Morning Phone Net, WAØJUF, QNI 1099, QTC 26. Nebr. C.W. Net, WAØQMZ, 0100Z session, QNI 116, QTC 20; 0400Z session, QNI 105, QTC 21. AREC C.W. Net, WAØEEI, QNI 12, QTC 6. AREC Phone Net, WØIRZ, QNI 176, QTC Ø. Dead End Net, WAØMCX, QNI 206, QTC 6. Nebr. Storm Net, WAØLOY, 2330Z session, QNI 685, QTC 102; 0030Z session, QNI 963, QTC 55. 160-Meter Phone Net, WAØCBJ, QNI 513, QTC 3. Cornhusker Teenage Net, WAØOCW, 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: WAØDOU 219, WAØOCW 97, WAØGHZ 82, KØKJP 44, KØJTW 34, WAØOHO 34, KØAIE 26, WAØQMZ 24, WAØOMY 21, KØFRU 20, KØDGW 19, WAØJUF 19, WØGEQ 17, KØHNT 14, KØOAL 14, WØPHA 11, WØIXY 10, WAØPIF 10, WØVEA 9, WAØKHE 7, WØAGK 6, WØCRK 6, WAØGAT 6, WAØIVV 6, KØJPP 6, WAØEEI 5, WAØKGD 4, WAØ-LOY 4, WAØPCC 4, WAØJKN 3, WØLOD 3, WØATU 2, WØBFN 2, WØBFV 2, WØHOP 2, WØNYM 2, KØPTK 2, WAØRPB 2, WØWZR 2, WAØFIQ 1, WAØ-IBL 1, WAØJAV 1, WØNIK 1, KØODF 1, WØSWG 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John J. McNassor, W1GVT—SEC: W1PRT. RM: W1ZFM. PAM: W1YBH. 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—WA1HSN, WA1IGF, WA1GIX. CPN—WA1IEG 30, W1GVT and K1YGS 27, WA1EEJ 26, WA1-FXS 24, WA1HEW 23, K1DGK 22, W1LUH 21, K1EIC,

(Continued on page 107)

EIMAC 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.

The EIMAC metal ceramic X2099B is the only tetrode combining 500 watts of plate dissipation with instant warm-up. The quick-heat cathode in the X2099B takes only 250 milliseconds to warm up to half power or 70% of peak current. You can drive the X2099B with low level solid state, and you can air cool it.

The X2099B is available only at EIMAC. We're ready to talk whenever you are. (415) 592-1221.

Contact your nearest distributor or Varian Field Office for further information. Offices are located in 16 major cities. Ask information for Varian Electron Tube and Device Group.

TYPICAL OPERATING CHARACTERISTICS

Class AB₁ Radio Frequency Linear Power Amplifier

	DC Plate Voltage 1600	2600	
DC Screen Voltage	200	250	V
DC Grid Voltage	−24	−34	V
Zero-Signal Plate Current	250	225	mA
Max Signal DC Plate Current	455	370	mA
PEP or CW Plate Output Power	400	500	W
Third Order Intermodulation Distortion	−36	−38	dB
Fifth Order Intermodulation Distortion	−54	−46	dB
Filament Voltage	2.5	2.5	V
Filament Current	10.0	10.0	A
Warm-up Time (to half power)	250	—	ms

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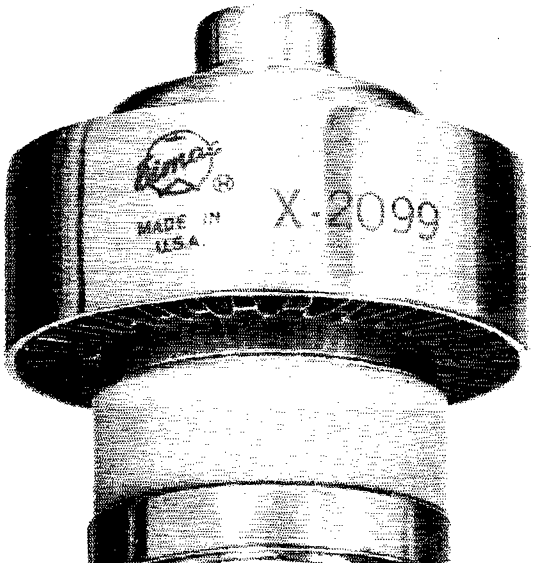
San Carlos, California 94070



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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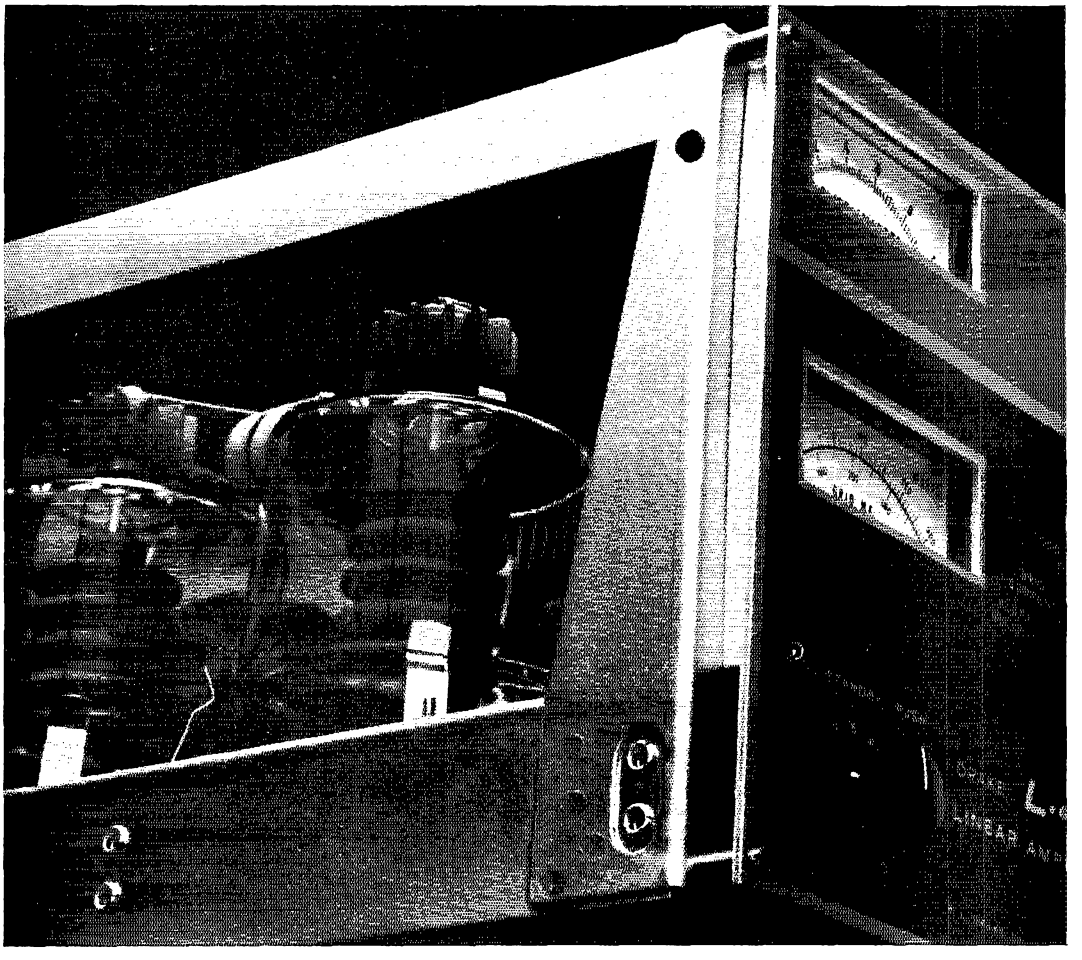


WA1HLP and WA1IWN 18, WA1HEK, K1SRF and W1YBH 17. 6-Meter Net: 50.6 Mc. 9 P.M., 21 sessions, 200 QNI, 33 QTC. EA Slo Net: 3740 kc. 6 P.M., 31 sessions, 217 QNI, 124 QTC. SEC W1PRT suggests that clubs reactivate local EC programs during Field Day. Club bulletins are improving and increasing. The *CN Bulletin* 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 WA1HSN for making all arrangements. New officers: Talcott Mountain U.H.F. Society—K1TZD, pres.; K1YON, vice-pres.; WA1IAO, treas.; W1RNT, secy. Hamden ARA—W1JBQ, pres.; WA1FZE, vice-pres.; WA1EQN, secy.; W1UKX, treas. Congratulations to WA1FVH and WA2YTJ/1 on making the BPL in Mar.; to W1BDI, WA1CYT, WA1HRN and W1NJM on Extra Class licenses; WA1EG on Advanced Class license; to WA1-GLS and WA1GMT on General Class licenses and to WA1GGN and WA1HLP on the CP-25 sticker! Be sure to check the new Field Day rules! Hope all take an active part. Traffic: (Mar.) W1EFW 331, WA1FVH 288, WA1HSN 270, K1RQO 165, WA1HEW 160, WA2YTJ/1 140, WA1FNJ 107, W1KAM 107, WA1IEG 100, W1AW 90, W1WCG 81, WA1FGN 75, K1UDD 74, WA1GGN 69, WA1CYV 68, W1GVT 52, WA1GIX 51, K1SRF 42, WA1-IGF 41, W1QV 41, W1LXV 40, W1BDI 32, WA1HLP 29, WA1FZE 27, WA1FXS 26, WA1GFW 23, K1SXF 22, WA1HWX 20, W1YBH 20, W1BNB 14, WA1EHK 14, WA1DUV 12, W1CUH 11, W1CTI 10, W1CHR 9, WA1-CYT 8, WA1IVG 7, K1YGS 6, K1LMS 3, WB2IIHZ/1 3, WA1CJE 2. (Feb.) WA1GYP 21. (Jan.) WA1GYP (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.* W1-AOG, our SEC, back from Florida, received reports from W1s BB, IAU, RPF, ZMO, EHT, WA1DXI, K1-MPD. 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 WA1JFR. The South Shore Club had a meeting and a talk by W1DTY on transistors. W1KTJ/W1RGX passed the Extra Class exam. W1YZG has a new yacht. W1GN is ex-W1DVX-W3CLR. W1IPZ is in the Montachusett ARC Net. WA1JDR has an HA-460, S-40B and five-element beam. WA1JBK, who was "MCT" in 1911, about 75 or so years young, joined the Barnstable RC. WN1HPA gave a talk to the Stoneham DeMolay on amateur radio. W2AZO/1 has a new SB-301. WA1IOB on 10/15, is building a rig for 6. WN1JBE now is on the air. WN1ICH worked his first DX on 15, G3SVH. K1EKM has his General Class license. WA1JFD and WN1JHM are new in the New Bedford area. WA1BFD has 70 confirmed now. The *6-Meter Crossband Net* had 20 sessions, 137 QNIs, 2 traffic. W1s RSR and SMW and WA1FEU helped W1EHT out during the flood in Wayland. W1JLI said the Dedham gang was on also. WA1ECY is in the Army at Fort Gordon, Ga. New officers of the Massasoit ARA are W1WLZ, pres.; W1AUU, vice-pres.; W1CUY, secy.; WA1EBG, treas. K1ZCU is active in MARS. W1DBY has a new class for amateurs up his way. WA1GDL is now General Class and will be on 80-10 and 2. WN1ISH won 2nd place at the High School Science Fair with his project on oscillators. W1ALP was at a meeting at W1-BB'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 WA1FSI and K1PNB. Those present were W1s ATX, DFS, EAE, DAL, AOG, ALP, EHT, JKB, IFI, SMO, EMG, WA1s DWS, HVZ, FHU, HCD, DRS, FHS, FSI, K1s PNB, VUB, WA1FBH has his Advanced Class license. W1CFU has RK-38s on 160-meter and 7-Mc. c.w. W1DYS is working on vari-actors. K1EMU is rebuilding receivers. W1USH has an RTTY receiver. W1LMU worked VP7VL on 160 c.w. with 16 watts. W1NF has been an OO for 21 years. W1REP is the new EC for Canton, WA1DRS is a new ORS. Appointments endorsed: W1s HKG, IPZ, PST, DBY, RM, K1MPD as ECs; W1FJJ, WA1ECY as ORSs; W1AOG as OVS/OPS; W1HXK as OO. WA1-EZE passed the General Class exam. W1KBN made the BPL in Feb. on Radio Day. K1OJQ 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 Massasoit ARA showed slides of members shacks and antennas. WA1EBG has a new SB-301. The Yankee RC is going to meet at the Jubilee Yacht Club in Beverly. EMNN had 11 sessions, 63 QNIs, 25 traffic. Traffic: (Mar.) W1OJM 438, W1PEX 346, WA1EYY 270, W1FJI 165, WA1FAD 160, W1EMG 156, WA1HXF 106, W1DAL 103, K1CLM 78, W1CTR 48, WA1EUU 33, W1AOG 18, WA1DED 16, W1SMO 16, WA1DEC 15, W1DOM 10, WA1AJN 8, K1YUB 8, K1LCQ 3, K1OKE 2. (Feb.) W1KBN 166, WA1HXF 142, WA1FSI 57, WA1GXC 16, W1UJF 4.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1CLF. RM: W1BJG. PAM: WA1FLG. Traffic nets: Sea Gull Net meets Mon. through Sat. on 3940 kc. at 1700. Pine Tree Net meets daily on 3596 kc. 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. WA1DXU is busy on RTTY and having a nice time there. WA1-BEB 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, WA1FLG 33, W1NND 32, W1YA 11, K1SOW 9.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1-SWX/K1DSA—SEC: K1QES. PAM: K1APQ. RM: K1-BCS. The GSPN meets at 0000Z Mon. through Fri. and Sun. at 1430Z. The NHEPN 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: WA1JDS, WA1JDG, WN1JEA, WN1JDZ, WN1-JFL and WN1JFV. W1BYS has been vacationing in Florida. K1IIK has a new quad on 20, 15 and 10 and is glad to be active again after a year in Vietnam. K1-QES says the NHEPN is doing very well and reports 112 check-ins and 55 traffic. W1KGZ and committee plan a ham repeater on top of Mt. Uncanoonuc. WA1AOH is helping as NCS on NHEPN. 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 Grenier Field, WA1JJW. 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, W1MHX 35, K1QES 7, K1-IIK 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 WIXXX 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: K1NOG, 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: K1LII. 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 W1AQ Club of Rumford is preparing for Field Day. A large area has been picked to set up tents and equipment. K1LII 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 late 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
Vt. Fone	3855	1300Z	Sun.	127	—	W1UCL
VTNH	3685	2230Z	M-F	112	55	K1UZG
VTCD	3990½	1400Z	Sun.	40	16	W1AD
Carrier	3855	1300Z	M-F	308	4	W1KKD
VTSB	3909	2130Z	M-S	807	86	W1CBW
		1230Z	Sun.			

Congrats to new Technician WA1JCE (Steve—St. Albans) and to WA1IET (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, WA1GUV 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: W1DVW, K1AEC, K1WZY, K1IJV. 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 K1DGQ 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 W1IPN (Mt. Hermon Radio Club.) The QSL Bureau reports things are running smoothly. Nice going, K1PMK, on organizing an efficient group of wonderful people. This section could use more appointments. Please contact me anytime. Traffic: W1EOB 166, W1DVW 72, K1AEC 68, K1WZY 23, WA1EYF 15, W1STR 15, W1ZPB 12, WA1ABW 6, W1BVR 5.

NORTHWESTERN DIVISION

ALASKA—Acting SCM, Albert F. Weber, KL4EQ—KL7GEF 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. KL7FLS soon will be on 2 running a full gallon. It seems that her OM likes to build goodies and is in the process. W8KNC/KL7 informs us he monitors 50.0 to 50.5 Mc. daily between 1530 to 1600Z. KL7FLR operates WA1DJU when in port at New London and is always looking for KL7s. KL7-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: KL7CAH 181, KL7FLS 134.

IDAHO—SCM, Donald A. Crisp, W7ZNN—The FARM Net convenes on 3935 kc. week days at 0200 GMT. W7IY again is active with traffic work after being in the hospital. WN7JRO and WN7JML are new hams in Lewiston. WA7EDT is building a new linear. K7CSL received an OPS appointment. WA7HOX reports good DX on 10 meters. W7FBL is moving to Fallon, Nev. WA7ETO is issuing quite a few OO notices. SCM W7ZNN and SEC K7THX 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. W7UIN 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 146.760 Mc. The following stations are on 2 meters in the Missoula area: W7URD, WA7IIQ, W7NEG, K7MGL, W7COH, W7WWS, K7IMZ and W7JIZ. 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.

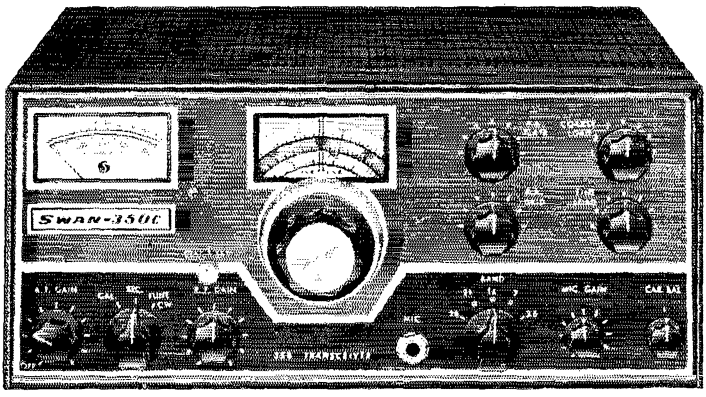
OREGON—SCM, Dale T. Justice, K7WWR—RM: W7ZFH. PAM: K7RQZ. Section net reports: W7ZFH reports for the OSN for Mar., sessions 22, check-ins 105, traffic 57. K7IFG reports for the BSN for Mar., sessions 62, check-ins 1132, traffic 157, contacts 192. WA7AHW reports for the AREC Net, sessions 31, check-ins 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: W7YUY 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 WN7JMY, WN7-JKX, WA7HRG, WA7IBC and W6NHO/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 affilinted 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 WA7CYY 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 May. Field Day was the major topic at club meetings. The Walla Walla Club keeps actively engaged in

GOING STRONG!



The latest evolutionary development of the Classic Model 350

The new SWAN 350-C 5 band, 520 Watt SSB-AM-CW TRANSCEIVER

The introduction of the new model 350-C at no increase in price over the popular 350 is a real triumph of value engineering.

Power rating of the 350-C is the same as the Deluxe Model 500-C, which is 520 watts P.E.P. input on single sideband, 360 watts CW input, 125 watts AM input. A pair of rugged, blast-rated 6LQ6 tubes handle this input with ease. Selectivity is provided by the same superb crystal lattice filter used in the 500-C, with skirt selectivity and ultimate rejection superior to any other filter being used in amateur equipment today. Audio quality has the same degree of fidelity which Swan has stressed from the very first single band transceivers.

The 350-C is designed to operate automatically on the normally used sideband with extended frequency coverage of all five bands, 10 through 80 meters. The high frequency crystal lattice filter is common to transmit and receive circuits. Bandwidth is 2.7 KC. Audio bandbass is essentially flat from 300 to 3000 cycles. Sideband suppression is greater than 50 db; carrier suppression is greater than 60 db. Grid block CW Keying is provided with offset frequency. The VFO is transistorized, temperature and voltage stabilized. Receiver sensitivity is better than .5 μv for 10 db signal-plus noise to noise ratio. Velvet smooth dual-ratio tuning is featured, as in all Swan Transceivers. Basically the difference between the 350-C and the 500-C is in the deletion of optional features which are not essential to communication. These include such things as crystal calibration, sideband selector, CW sidetone, automatic noise limiter, automatic level control, etc. For the operator who desires these features, we are proud to recommend the deluxe model 500-C. However for powerful and reliable communications without all extras, we now offer the new 350-C, and we are confident that you will rate it a truly exceptional value. **$420**

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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 Follies Boat Races in July on 145.65 ke. WA7GCW 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 ke. W7IEU appeared again as NCS on WSN after many years of other varied amateur activities. Traffic: W7BA 1211, WA7DXI 723, W7DZX 421, W7ZIW 385, WA7DZL 194, W7HMA 187, K7CTP 178, W7JEY 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, WA7-GVP 31, W7UWT 24, W7BUN 17, WA7FKM 17, K7OXL 17, WA7DBQ 15, K7YFJ 14, WA7EYN 13, W7OEB 12, W7RXH 12, W7ZHZ 12, WA7HSJ 11, K7SUX 7, W7UU 3, W7BNV 1.

PACIFIC DIVISION

HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: KH6-GHZ. PAM: KH6EEM. RM: Vacant. RACES Nets (40, 10, 6 and 2 meters) coordinate with KH6AIN.

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

WØLTE passed through town recently for some business, surf and sun. KIZJT 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 consistantly 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. VR3DY gave a fine presentation of his slides taken during his business trip DX-pedition to Fanning Isle. K8WXV writes from KG6IC, 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 6 for my address. Traffic: (Mar.) KH6GHZ 193, WØPAN 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 W7-CMG. 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 W6-DQJ on 2-meter s.s.b. KØLES and WAØPPS 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 t.m. activity in the Reno area; the code and theory class is doing FB. WA7ESM, K7-NYU 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. K7-USU 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, WB6-RSY, 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	145.80	0230Z	Wed.	W6ZUZ

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 WB6RVR for Sacramento ARC, W6WGO 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 inetrested 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 ke., 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.) K6IKV 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. W6-GQA 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. W6GGC 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 Rttv 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. WB6QAT 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. JA1YF visited WA6-IVM recently. WN6YMN 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, W6-WLV 194, WA6BYZ 151, K6TWJ 82, WB6LFT 39, W6BYS 20, WA6AUD 18, W6BWV 15, WB6AGP 8, K6TZN 8, WB6IMO 7, W6ON 6, WB6JQP 4, W6MTJ 3, WA6IVM 2. (Feb.) W6JXK 45, WB6LFT 34. (Jan.) WB6LFT 53.

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 atte..d. Officers are WB6JEH, pres.; WB6IKU, vice-pres.; WB6ZWG, 2nd vice-pres.; K6SAM, treas.; WN6WCY, secy. The Madera Amateur Radio Club meets at the Court House. K6KLV is pres. and WB6BWM is vice-pres. Heard on 6 meters: W6ARC and WA7-BUF, who is in the Veteran's Hospital. WB6UYG is on 6 s.s.b. The Kingsburg High School dedicated its new radio club, W6HKV. The club has 13 members and WB6-GJG 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 f.m. WA6-FCR is mobile with a Swan 500. WB6INO is mobile with a Swan 350. K6KOL is experimenting with antennas. The Touloumne County Radio Club will hold FD 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. WN6WGR is now a General Class licensee. W6ADB passed the Extra Class exam. K6SMZ is now an Advanced Class licensee. Traffic: WB6INO 528, W6ADB 266, W7AAF/6 219, WB6HVA 142, K6KOL 141, WA6SCE 115.

SANTA CLARA VALLEY—Acting SCM, Edward A. Gribi, WB6IZF—Asst. SCM: Ed Turner, W6NVO. SEC: W6VZE. RM: WA6LFA. Section meeting places:

Bay Area AREC Net, 3900, Sun., 1830 GMT.
Northern California Net, 3630, Daily, 0300 GMT.
Monterey Bay Emergency Net, 147.16 Tue. 0400 GMT.

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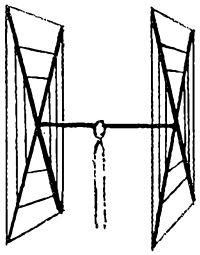

CUBICAL QUAD ANTENNAS — these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) -- absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!

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

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

Dimensions: About 16′ square.

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10′ × 1¼″ OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Steel wire, tempered and plated, .064″ diameter.

X Frameworks: Two 12′ × 1″ OD aluminum 'hi-strength' alloy tubing, with telescoping ⅞″ OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

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

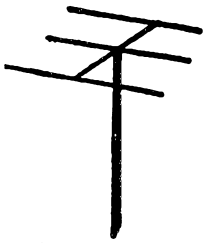
Now check these startling prices — note that they are *much lower* than even the bamboo-type:

10-15-20 CUBICAL QUAD	$35.00
10-15 CUBICAL QUAD	30.00
15-20 CUBICAL QUAD	32.00
TWENTY METER CUBICAL QUAD.	25.00
FIFTEEN METER CUBICAL QUAD.	24.00
TEN METER CUBICAL QUAD	23.00

(all use single coax feedline)

BEAMS

The first morning I put up my 3 element Gotham beam (20 ft) I worked YO4CT, ON5LW, SP9ADQ, and 4U1ITU. THAT ANTENNA WORKS! W N4DYN



Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36′ of tubing for *each* 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ⅞″ and 1″ aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

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

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!

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

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

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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. apointees 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. K6YKG and W6ACW are both active in Navy MARS. W6MMG 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. W6MKE is a new Oscar director. WA6RXB 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. WB6IZF is operating portable from Long Beach these week days. W6DQY has three new Novices in his group at Hunter Liggett Military Reservation. WØDVI, portable in King City, is now on the air with a vertical. WB6AIK, WA6BXJ, KL7ELF, WB6RPL and W6ZUI are new members of the West Coast Amateur Radio Service. Traffic: (Mar.) W6RSY 1082. WA6LFA 230. K6DYX 193. W6YBV 122. W6DEF 92. W6VZE 60. W6AUC 51. W6OII 47. W6ZRJ 45. W6VK 30. W6ACW 19. W6BVB 5. W6BPT 1. WB6IZF 1. (Feb.) W6VZE 35.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: James O. Pullman, WA4FJM. SEC: WA4LWE. RM: K4CWZ. PAM: W4AJT. V.H.F. PAM: W4HJZ. W4CJD is now operating as DL4CE and says he will try to QNI 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. WA4NUO/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	*Freq.*	*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
SSBN	3938 kc.	2330Z	Daily	53	WA4LWE

Traffic: WB4BGL 253. W4EVN 152. W4LWZ 150. WA4CFN 112. W4FDV 79. WA4GMC 66. WA4ZLK 58. K4EO 45. K4VBG 38. W4ZZC 32. W4AJT 28. K4TTN 28. W4RWL 27. WA4VNV 24. WA4AKX 22. W4BNU 22. WB4IJH 21. WA4VLJ 20. K4CWZ 19. WA4FJM 18. WA4UQC 16. WB4BPH 14. W4NAP 10. K4PKE 10. K4YCL 8. WA4KWC 7. K4ZKQ 6. WB4GAN 5. K4GHR 5. WA4RVI 2.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB. RMs: K4MLC, WA4EUL. PAM: W4OKN. C.w. hounds 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. WB4GTG 257. W4NLC 236. W4UQ 192. K4KNP 182. WA4EUL 138. WB4FDT 111. W4ZM 103. WB4DRB 102. WB4CVY 91. W4SZT 78. K4FSS 58. K4NDH 56. W4OKN 55. K4MLC 46. WA4PBG 43. WB4GTS 39. W4RHA 35. K4TSJ 33. W4IA 31. WB4DOY 24. WB4FLT 24. W4HE 24. K4KDJ 23. W4TE 21. W4KX 20. W4BZE 17. WA4OGZ 17. W4SHJ 16. WA4JJF 11. W4MK 10. K4VCY 9. K4GR 7. WA4WQG 5. W4KFC 4. WA4URN 4. W4GEQ 3. W4WG 3. WB4GYV 2. W4JUJ 2. W4ZAU 2. (Feb.) W4ZM 151. WB4GTS 87. WA4TKB 17. WA4FCS 16. WA4TCF 10.

WEST VIRGINIA—SCM, Donald B. Morris, W8IM—SEC: W8IRN. RMs: K8MYU, K8TPF. PAMs: K8CHW, W8IYD. 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 LO meeting in Greensboro, N.C. Phone Net Mgr. WA8RQB 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. WA8HSZ, 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. WA8YSB 65. WA8WCK 59. WA8RQB 46. K8BIT 25. W8CKX 23. W8HZA 21. W8JM 20. W8IRN 14. K8WEJ 13. W8AHZ 9. K8MQB 9. W8DUV 7. WA8LFW 7. WA8CRW 4. WA8UNP 4. K8UPH 4. W8GUL 3. W8IYD 3. K8QQS 3. WA8TWR 3. K8ZDY 3. WA8AGC 2. WA8AYB 2. K8CFT 2. WA8CKN 2. WA8LFZ 2. K8PRC 2. K8QYG 2. W8AEN 1. WA8BUM 1. W8CUL 1. W8ETF 1. K8OQL 1. W8QEC 1. WA8UFX 1. W8VVE 1. W8WIX 1. WA8YOF 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Richard Hoppe, KØFDH—Asst. SCM: A. E. Hankinson, WAØNQL. SEC: WØSIN. PAM: WØCXW. Congratulations to the Colorado High Noon Net on taking top honors in the March traffic race. Net Mgr. WAØNJZ 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 WØSIN, 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: KØZSQ 732. WØKAU 98. WØUAT 88. WAØMNL 82. KØDCW 55. WØLRN 50. KØECR 41. WØBWJ 37. WAØJTB 23. KØIGA 16. WØLEK 13. KØMNQ 11. WAØQFY 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. K5IWJ 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 puting an n.f.m. repeater on 146.34-146.94. Traffic: WA5FJK 34. W5MYM 30. W5NON 12. W5DMG 9. WA5MIY 9. W5NUI 6. K5DAB 4. WA5JNC 3.

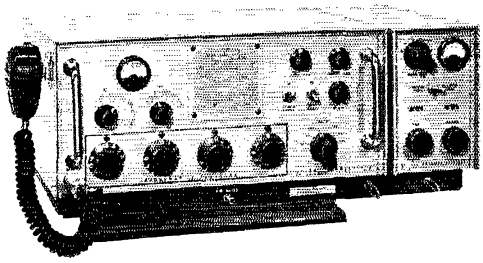
UTAH—SCM, Gerald F. Warner, W7VSS—SEC: W7WKF. RM: W7OCX. Traffic nets:

BUN	Daily	7272 kc.	1930Z
UARN	Sat.-Sun.	2987.5 kc.	1500Z

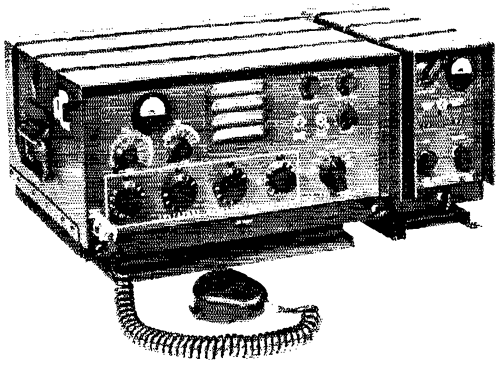
Among the new two-letter calls recently issued: W7HS to W7NPU. New officers of the Utah DX Assn. are K7JVF, pres.; K7RAJ, vice-pres.; K7ZIA, secy. The Utah DX Assn. has announced that trophies will be awarded for first place in the ARRL DX Test. The hamfest and convention season is approaching. Events of interest near Utah: The Rocky Mountain ARRL Division Convention at Cheyenne, Wyo., June 29 and 30. The WIMIU 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. OBSs: K7SLM, K7NQX. Nets: Pony Express, Sun. at 0800 on 3920; YO, daily at 1830 on 3610; Jackalope, Mon. through Sat. at 1215 on 7260; Wx Net, 0630 Mon. through Sat. on 3920. 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?



RF-301
NOMENCLATURED
AN/URC-58



RF-301A
NOMENCLATURED
AN/GRC-165

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"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."

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"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."

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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. WA7CLF now is an official member of the TCC. Don't forget Field Day! Traffic: K7NQX 398, WA7CLF 337, K7KSA 132, W7-TZK 87, WA7DNZ 73, K7DEJ 67, WA7EDC 55, K7ITH 13, K7VWA 31, WA7BDI 21, K7SLM 13, WA7EGK 5, K7LOH 2, WA7FKF 1, K7NKR 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Edward L. Stone, K4WHW—SEC: W4FPI. PAM: WA4EEC. Lots of new Extras are showing up lately. Among the group are W4NLI, W4YER, K4KJD, K4KMG, W4KUP, K4ZYP and K4UKW. WA4-AVM has a new T-4XB. Glad to have WA4NWI back in Alabama operating from Anniston. W4WGI and K4MMG both report excellent results with the FET preamplifier from Jan. *QST*. We are looking for a good turnout during the V.H.F. 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.) WA4AVM 176, WA4EEC 144, WA4VEX 115, W4SVM 102, K4AOZ 77, WB4BLX 74, WA4UXC 40, K4WHW 36, WA4FYO 30, K4BSK 28, K4KJD 23, WA4ROP 15, WA4AZC 14, W4FPI 14, WA4-NWI 14, K4KJM 11, WA4EXB 10, W4DGH 6, K4UUC 6, W4DS 4, K4KMG 3. (Feb.) WA4FYO 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. W4YCZ operated as KZ5HF while his ship, the *Fair-weather* was being repaired. KZ5EM has gone 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 H. Morris, W4-MVB—Asst. SCM: William J. Blasingame, Jr., WA4-NEV. SEC: W4IYT. Asst. SEC: W4FP. RM: C.W.: W4ILE. RM: RTTY: W4RWM. PAM 75M: W4OGX. PAM 40M: W4SDR. V.H.F. PAM: WA4BMC. 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. WA4PWF now has a new Swan 500C. K4YWW has a new Collins receiver, while WB2FYU/4 has a new transceiver. W8-BZY/4 has been QRT for some minor rig repairs but has them all taken care of now. WN4FSF 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. W4ILE now has his XYL studying for the Novice exam. I would like to welcome WA4IFM/4, who is stationed aboard the USS *Topeka*, to our Florida ham family. W3CUL has returned to Pennsylvania. We look forward to Mac'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.) WA4SCK 437, WA4FGH 406, WA4NEV 398, W4ILE 298, K4YSN 182, WB4AIW 172, WA4NBE 136, WB4EPD 133, WA4HED 123, W4SDR 122, W4SMK 98, W4UQZ 95, WA4TWD 78, W4IAD 74, WA4-OHO 68, W4FP 60, W4ZAK 54, WB4FLW 52, K4DAX 47, W4SME 47, WA4KB 45, W4TRS 44, WA4PWF 42, W4OGX 10, K4LEC 39, WA4CIQ 35, W4IYT 34, W4NGR 34, WA4FJA 30, WA4IJH 29, W4DVO 28, K4COO 26, WB4-DSP/4 25, W4ROA 25, WA4BGW 22, WA4EYU 20, K4SJH 20, W4FHZ 19, W4KHY 18, K4LPS 18, K4LBM 15, W4-YPX 15, W4TJM 13, W4PBK 11, W4BKC 10, K8LNE/4 10, K4EHY/4 9, W4VDC 7, K4EBE 3, WB4GUH 3, W4/PQ 3, W4CBE 2, W8BZY/4 2. (Feb.) WA4BGW 24, WB4FSF 16, WA4UFO 14, K4DSN 5.

GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: W4DDY. Asst. SEC: WA4WQU. RM: W4CZN. PAMs: WA4WQU 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. W4YNL is on 2 meters. W4-BGK has a new beam. WA4GYZ now is in Athens. K4HQI reports monthly average MUF around 39 Mc. The Augusta Radio Club again is furnishing communications for the movie crew at the Masters. WA4SIH is on orders for Viet Nam. WA4QBB went to Germany. W4DDY is on s.s.b. WØASH/4 returned from Korea and is on orders for Germany. WA4WQU is experiencing rig trouble. W4KE needs Atlanta on 2.

Net	*Freq.*	*Days*	*Sess.*	*QNI*	*QTC*
GSN	3595	0000-0300 Dy.	62		169
GTN	3718	2200 Dy.	31	86	7
GSSN	3975	0100 Dy.	31	Not reported	

Dixie 6-Meter Net: 50.110 Sun. 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 aerocmobile on 2 and 75 s.s.b. Traffic: (Mar.) W4FOE 374, W4CZN 108, W4FDN 90, WA4RAV 76, W4DDY 59, W4PIM 50, K4-JFY 35, WA4LLI 35, WA4JES 29, W4KE 24, WA4RHJ/4 13, K4TXK 12, K4BAI 7, WB4EMF 4, W4RZL 4. (Feb.) WA4RAV 141.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr. W4RKH—SEC: W4IKB. PAM: H.F.—W7BNR/4; V.H.F. —W4UUF. RM: W4BVE. Section nets:

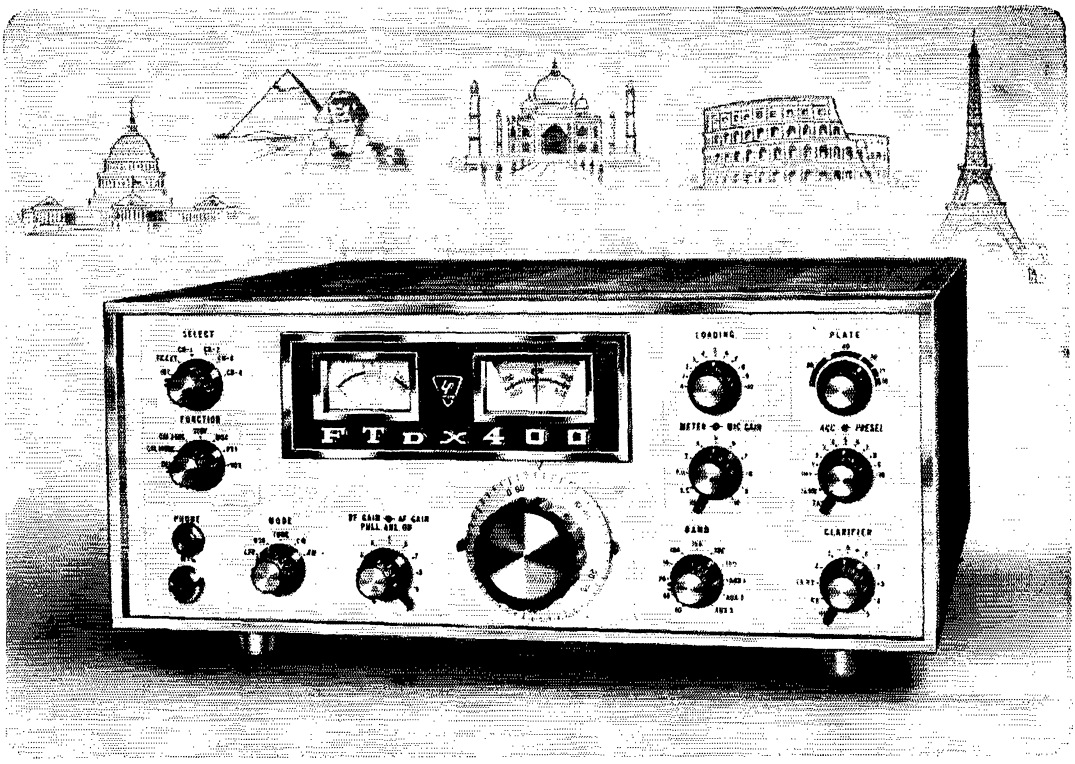
Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3957 kc.	2300Z	Daily	31	767	114
QFN	3651 kc.	2330/0300Z	"	62	—	—

Pensacola: K4NMZ renewed OVS appointment. WA4IZM 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 ARA 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: W4IID went high power on 2 meters with an Ameco TX-62 and a v.f.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: WA4JIM, WA4WHW 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. WA4IMC is working on 2-meter f.m. gear. Chipley: W4IKB handled emergency traffic for the USS *Findley* when the ship's regular radio went out. Tallahassee: W4JGD was appointed EC for Leon County. Madison: WA4GHE 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, WA4JIM 24, W4-IKB 21, WA4EOQ 15, WA4GHE 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 WA7IFD 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. WA7FNN, WA7IFD, 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, K7MTZ 98, WA7IFD 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 Cliftons Cafeteria, 648 So. Broadway, Downtown LA. K6CPT sends code practice from San Gabriel on 145.3 and 29.63 Mc. at 8:30 P.M. local, 8-14 w.p.m. WB6TQS reports completion of requirements for his WAS and WAC. K6EA will be /MM for a couple of months. K6HZU is



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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: 15¾" wide x 6¼" high x 13¾" deep
WEIGHT: 50 Pounds

SPECTRONICS

BOX 356 • LOS ALAMITOS, CALIFORNIA 90720

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. K6QPH/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, WB6WGG, 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 WA6JXG and W6YAN, K6LGR, WA6s BAE, CDR, FNT, KLA, QZY, WB6s HMM, IQT, LOY, LXP, MVD, 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. W6MN has begun work on a solid state modular receiver and exciter. WB6VZD is working on a 3-band quad. Our most recent OVS, WA6FBA, 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, K6ROC, and the West Valley Amateur Radio Club are new ARRL affiliated Clubs. Congratulations! A new SCN member is WB6VHD. 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, WB6GGL 907, W6MLF 530, WB6BBO 529, W6QAE 296, WA6KZI 188, K6CDW 177, W6DSC 118, W6OEO 83, WB6TQS 60, WB6OLD 54, WB6KGK 38, WB6SCK 38, W6BHG 31, WB6YHD 29, K6EA 27, W6USY 26, W6PCP 23, K6UMV 21, W6FD 17, WB6UHF 16, W6HUJ 15, WB6AEL 13, W6MN 13, WB6WDS 11, W6AN 10, K6ASK 10, WB6SXV 10, W6DQX 8, WB6SLG 8, W6DGH 5, WB6TMC 5, W6TN 4, W6TXJ 4, WB6VZD 4, W6RCV 1. (Feb.) W6MLZ 26, K6EA 18, WB6KGK 15, WA6WKF 6. (Jan.) W6QAE 346, 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 WB6RVM's new QTH is 9902 Chanticleer Rd., Anaheim, 92804, phone 635-7067. New officers of the Autonetics Radio Club are WN6YWT, pres.; W6DLE, vice-pres.; WB6RWX, treas.-bus. mgr.; W6HDP, 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. K6IBI is working to effect liaison between NTS

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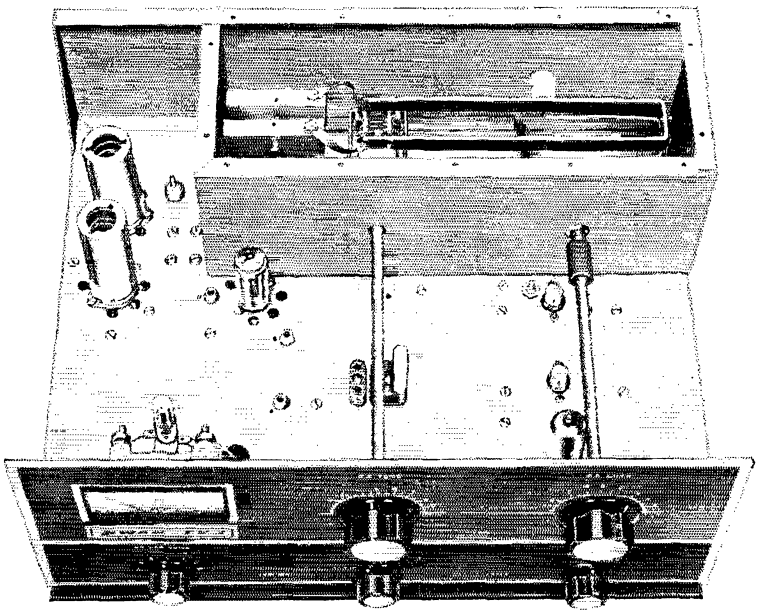
2 METER SINGLE SIDEBAND

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 bandspread and frequency readout 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.

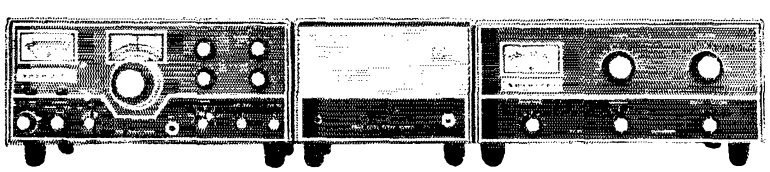
Only a Swan Transceiver and Swan AC power supply, Model 117-XC, are required. The power supply plugs into the Transverter, and the Transverter in turn plugs into the Transceiver. Internal connections automatically reduce the power input to the Transceiver to the required level.

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

SWAN
ELECTRONICS
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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. W6BUK 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, K6IME 22, W8ELW/6 18, W6WRJ 15, W6FB 4, W6BUK 1. (Feb.) WB6JFO 110.

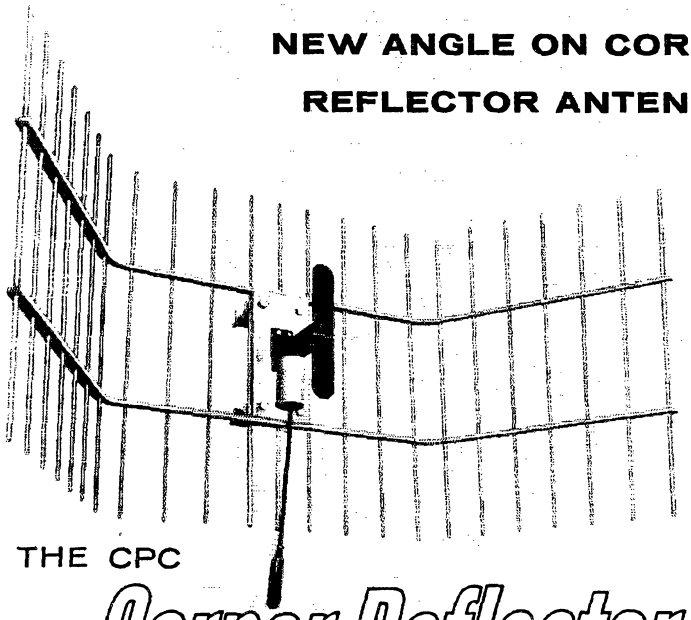
SAN DIEGO—SCM, James E. Emerson, Jr., WB6GMM—The 10-meter section of the San Diego ARPSC Net meets Tue. at 1900 local on 28.585 Mc. W6ZWF reports good DX on 10 with his new beam. K6BTO is using a Channel 9 TV Yagi cut to 222.5 Mc. and mounted for vertical polarization. WB6NMT got into Stockton, 460 miles, 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. W6QI and his XYL are off to Europe, where Steve intends to eyeball many of his DX friends. Look for W6IJO in VE7-Land this summer, and maybe KL7-Land. Your SCM was given a complete guided tour of League Headquarters and W1AW by W1NJM during a recent visit. W6LRU is now mobile on both 40 and 80 meters. OBS 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 ARPSC Net Sun. morning looking for FD traffic. Traffic: K6BPI 9125, W6EOT 500, W6VNQ 469, W6RGF 318, K6CAG 244, W6SE 235, W6LRU 148, WA6QAY 59, WB6UMT 46, W6QJW 37, K6HAV 28, 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 (Simi), K6QXG and WA6RNH. The 3895 gang is assisting in the installation of a Hy-Tower for WN6ZWM, who may be remembered as TI9AM. WA6JBE is back at work after the operation and a couple of weeks sack 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. XE1PGR, 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. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. 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 rotator. He used his safety belt and had a stroke while working on the rotator. 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: K5BNH 431, K5LZA 61, W5HVF 39, WA5TYH 39, W5PBN 33, WA5QQR 29, W5JSM 17, WA5QQQ 9, K7NCG/5 8, W5BNG 6.

CPC ENGINEERS HAD A NEW ANGLE ON CORNER REFLECTOR ANTENNAS



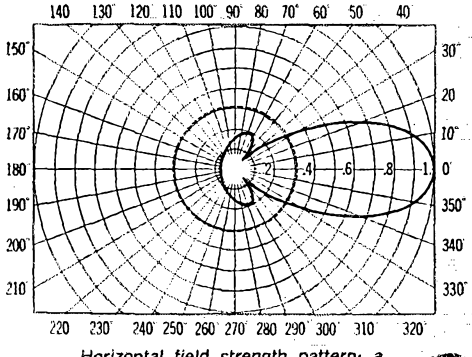
Combining maximum strength with optimum electrical performance, this 10.0 db gain antenna meets the increasing demand for rugged durability at minimum weight. Cat. No. 465-509, has a reflector 55 in. by 29 in., yet weighs only 20 lbs. Its rated wind velocity is 150 mph. The radiating element material 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.

THE CPC

Corner Reflector Antenna

Cat. No. 465-509

Frequency Range 406-470 Mc



Horizontal field strength pattern; a dipole pattern is shown for reference.

Note: dbd gain indicated as per EIA RS-329

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 85 MPH with 1/2" radial ice
LATERAL THRUST AT RATED WIND	164 lbs. no ice 180 lbs. with rated ice load
WEIGHT	20 lbs.

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OKLAHOMA—SCM, Cecil C. Cash, W5PML—SEC: WA5AOB. RM: W5QMJ. PAMs: W5MFX, 75; K5TEY, 40; WA5JGU, 6; K5ZCJ, 2 meters. Congratulations to Extra Class ex-W5FEC, now W5FW. 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:

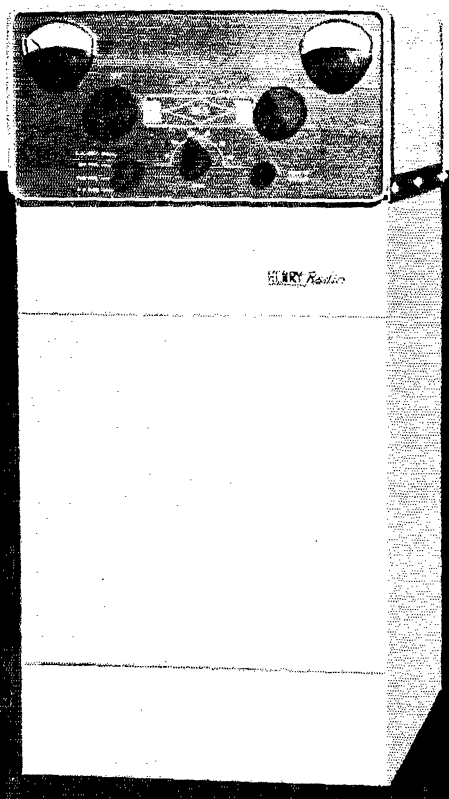
Net	*Freq.(kc.)*	*Time (Z)*	*Sess.*	*QNIs*	*QTCs*	*Mgr.*
OLZ	3682.5	0100	19	91	26	W5QMJ
SSZ	3682.5	0345	9	42	22	W5QMJ
OPEN	3850	1400 (Sun.)	5	269	13	WA5AOB
STN	3850	2330	26	843	147	W5MFX
OPON	3920	2300	21	208	41	WA5KZA

Traffic: K5TEY 1807, W8VDA/5 130, W5QMJ 71, WA5-AOB 69, W5MFX 48, W5PML 43, WA5KZA 38, K5SWL 35, K5DLP 22, WA5KFT 19, K5CAY 9, K5OCZ 8, WA5-IMO 7.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5-AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. WA5RXO 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 W5SC. 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 *W5MS 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.; K5CUV, 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, W5-KLV 36, W5ABQ 33, K2EIU/5 32, WA5IQL 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. OOs: 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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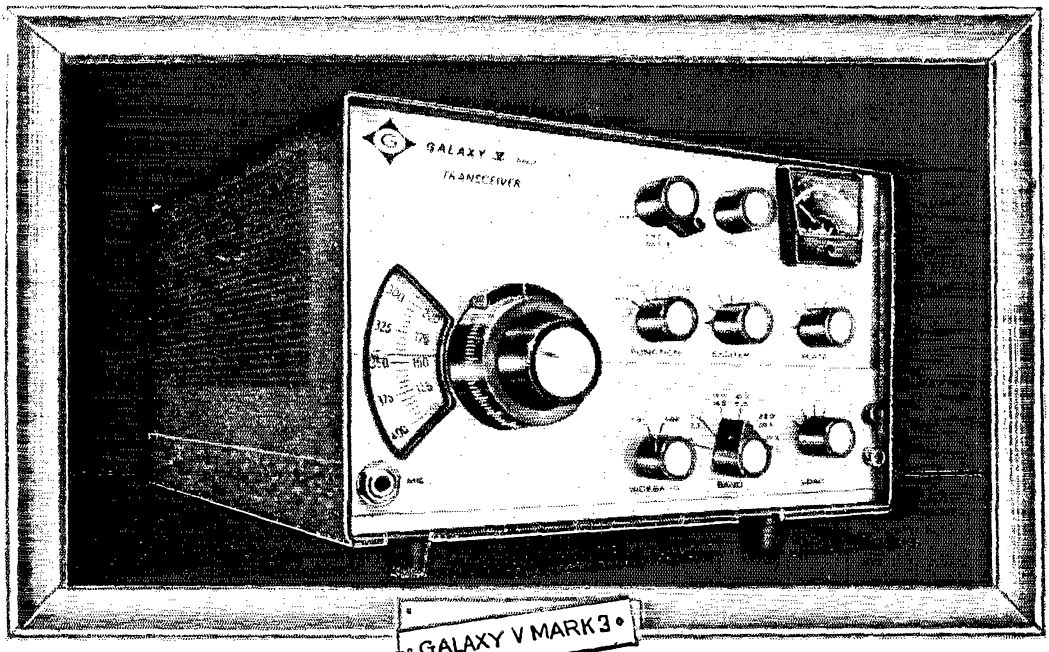
gary and Edmonton on the rest of it. Traffic: VE6HM 67, VE6ATH 42, VE6ATG 38, VE6AOO 13, VE6SS 7, VE6AFQ 4, VE6FS 4, VE6KS 4, VE6FK 3, VE6HF 2, VE6II 1.

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, BCSN 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. VE3BWM is being moved to Saskatchewan and his loss will be felt. VE3PY is sporting a new SB-200 linear. 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 VE3EZM and VE3EVZ 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 BPL and a special thank-you to VE3GI 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 68, VE3GCE 59, VE3EHL 37, VE3ATI 29, VE3AUU 23, VE3AWE 22, VE3BUR 18, VE3DU 18, VE3ETM 13, VE3BQL 12, VE3NO 10, VE3EWD 8, VE3WW 8, VE3GLD 6, VE3VD 5. (Feb.) VE3GMQ 141.

QUEBEC—SCM, J. W. Ibey, VE2OJ—SEC: VE2-ALE. RM: VE2DR. PAM (v.h.f.): VE2AGQ. PAM (h.f.): VE2BWL. We have an EC in all areas except two, Noranda and Gatineau. Here is the list: VE2AP (Quebec City), VE2BU (Pincourt), VE2DK (Gagnon), VE2NT (West Shefford), VE2WM (Mont Joli), VE2-ADE (Valleyfield), VE2AJD (Three Rivers), VE2ANH (St. Laurent), VE2AQI (Verdun), VE2AS (St. Barthelmey), VE2ASP (St. Anselme), VE2BAI (Jonquieres), VE2BBY (Lennoxville), VE2BCB (Iberville), VE2BDU



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It takes a lot of guts to do something *like this*...but we did it!

Changes aren't accidental at Galaxy...we make them on purpose. It takes a lot of guts (and know-how) to improve an already great product and still sell it for the same price...$420.00...*but we've done it!*

That's why we're putting a new name plate on our masterpiece. Those classic lines remain the same . . . but it's now the improved GALAXY V Mark 3!

We use two of the specially designed GE 6LB6's—the most efficient tube of this type. That means a 30% increase in plate dissipation...less heat...more reliability, and longer life!

A new grid/cathode design, coupled with easier-to-drive tubes, means greater protection against TVI. A new, improved ALC circuit design insures positive control of flat-topping and spurious signal emission.

New "horsepower"! The all-new power capability is greater. We're rating the new Mark 3 with a conservative 500 Watt PEP input. Any questions?

See your nearest Dealer—or write us for Free Brochure.

GALAXY ELECTRONICS

"Pacesetter in Amateur / Commercial Equipment Design"

10 South 34th Street • Dept. QST-h30 • Council Bluffs, Iowa 51501

(Sorel), VE2BKA (Ville d'Anjou), VE2BKR (Mont Gabriel), VE2BRO (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'operation. VE2-CQ 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, VE2ADE 34, VE2CP 29, VE2BVY 21, VE2BWL 21, VE2EC 19, VE2BGJ 11. (Feb.) VE2DCW 8.

SASKATCHEWAN—SCM, Gordon C. Pearce, VE5-HP—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, VE5-LM 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. QST

A.R.R.L. QSL Bureau

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

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

W1, K1, WA1, WN1 — Hampden County Radio Association, Box 216 Forest Park Station, Springfield, Massachusetts 01108.

W2, K2, WA2, WB2, WN2 — North Jersey DX Assn., P.O. Box 505 Ridgewood, New Jersey 07451.

W3, K3, WA3, WN3 — Jesse Bieberman, W3KT, RD 1, Valley Hill Rd., Malvern, Pennsylvania 19355.

W4, K4 — H. L., Parrish, K4HXF, RFD 5, Box 804, Hickory, North Carolina.

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 79989.

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.

WØ, KØ, WAØ, WNØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minnesota, 55921.

VE1 — L. J. Fader, VE1FQ, P.O. Box 663, 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 Tettelaar, 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

LOOKING 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.

"I GIVE CLEVELAND INSTITUTE CREDIT FOR MY GOVERNMENT 1ST CLASS FCC LICENSE,"

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."

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.

ENROLL UNDER NEW G.I. BILL

All CIE courses are available under the new G.I. Bill. If you served on active duty since January 31, 1955, or are in service now, check box in coupon for G.I. Bill information.

Cleveland Institute of Electronics
1776 E. 17th St., Cleveland, Ohio 44114

Please send me without cost or obligation:

1. Your 40-page book "How To Succeed In Electronics" describing job opportunities in electronics today, including those in broadcasting, and how your courses can prepare me for them.
2. Your book on "How To Get A Commercial FCC License."

Name _____ (Please Print)

Address _____

City _____ State _____ Zip _____

Occupation _____ Age _____

☐ **Check here for G.I. Bill Information**

Accredited Member National Home Study Council. A Leader in Electronics Training...Since 1934

QT-65

CIE **Cleveland Institute of Electronics**
1776 E. 17th St., Dept. QT-65, Cleveland, Ohio 44114

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.

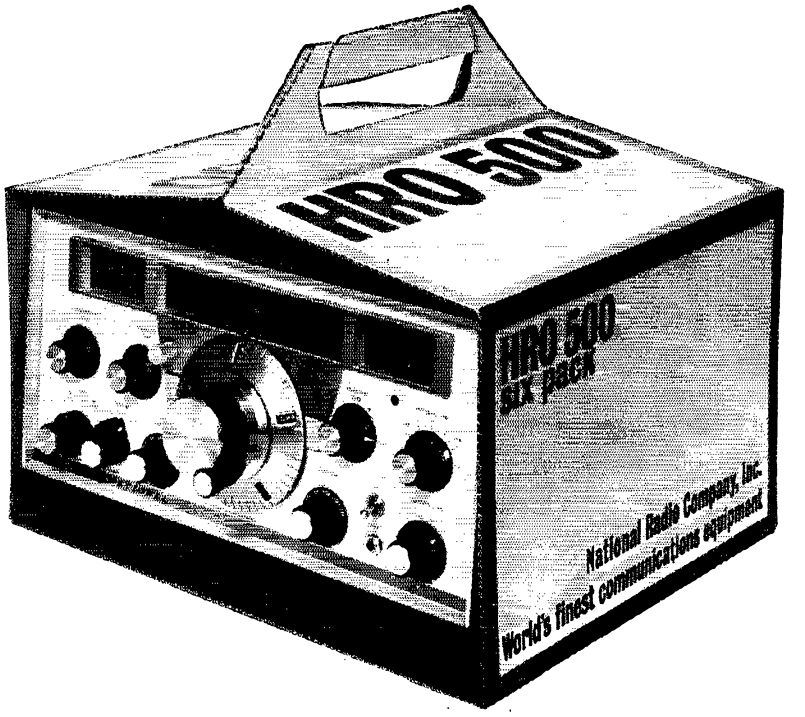
[1] **These bureaus prefer 5×8 inch manila envelopes.**

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
K2JIU, John S. Gaydosh, 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. Hlinsky, 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.
WN4IMR, 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.
W6DVY, Glen Alsbury, Dixon, California
W6EJL, E. M. "Brandy" Brandvig, Manhattan Beach, California
W6JRJ, 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, Manitou Beach, Mich.
W8IAU, Adrian H. Lagedrost, Hamilton, Ohio
W8ILM, John V. Lembas, Warren, Michigan
ex-W8NKN, Marden Locey, Milford, Michigan
K8OXZ, Russell L. Miller, Cleveland, Ohio
K8UBU, Charles West, Owosso, Michigan
W8ZTU, Earl A. Parker, Detroit, Michigan
W9CGY, Clarence J. Halteman, Waukegan, Ill.
W9LTD, 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.
KØAAB, Warren T. Rogers, St. Paul, Minn.
KØEPH, Dr. James H. White, Greeley, Colo.
KØJTM, Warren Liljegren, Des Moines, Iowa
WØQIE, 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.

NATIONAL RADIO COMPANY, INC. 37 WASHINGTON STREET, MELROSE, MASS. 02176

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 μv. 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.

— *W1TS*

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: ±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.

TRANSCEIVE 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.

We're that confident!

Suggested user net..... $ 529.50
Matching speaker..... 24.95

HAMMARLUND
MANUFACTURING COMPANY

73-88 HAMMARLUND DRIVE, MARS HILL, NORTH CAROLINA 28754

Correspondence From Members

(*Continued from page 83*)

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.

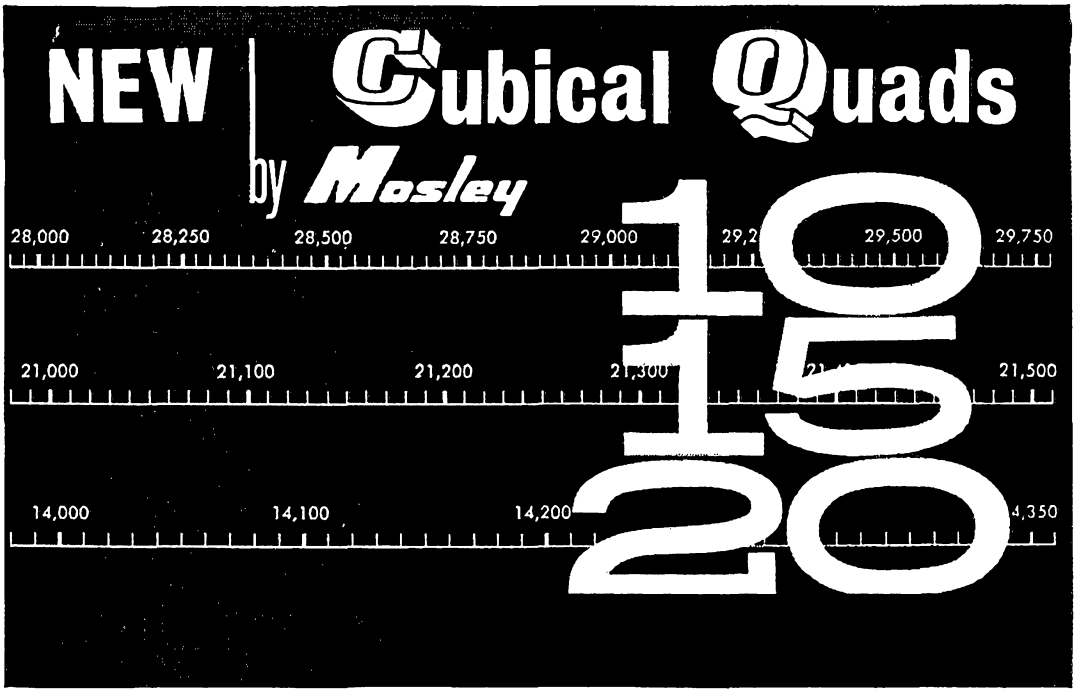
Judging by the length of my letter, I'm pretty sure that you can tell I'm no "R FB RST 589 TNX 73 SK" style ham. I feel ham radio was made to be used, and used well. I feel confident that the League will always fight to keep our fraternity in action, and will always strive to uphold and improve amateur 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 Holsopple, WASVRM, 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



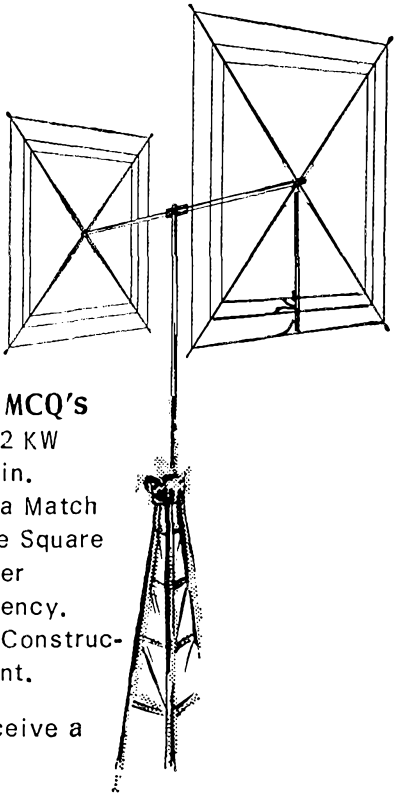
Four NEW Two-Element QUADS

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.

Mosley Electronics, Inc. Dept. 169
4610 N. Lindbergh • Bridgeton, Missouri 63042

upon comparison with a $65.00 manufactured f.e.t. converter it stands up very well.

Total cost to build was under $450 for f.e.t., phono connectors and sockets.

I am sure more hams would build things if aware of what could be done with available parts from old TV sets. Incidentally, both my 6- & 2-meter transmitting converters are built from such sources, cost little, and have given great satisfaction. — *George R. Hill, W9TGN, Evanston, Illinois.* QST

Operating News

(Continued from page 98)

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for March Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K6BPI	5705	1705	1517	198	9125
W3CUL	321	1234	1162	64	2781
K5TEY	14	938	855	0	1807
W5OBD	32	681	681	0	1394
W7BA	9	603	538	61	1211
KØONK	128	548	515	17	1208
W6RSY	41	535	404	102	1082
W6GYH	128	473	459	14	1074
WA2UWA	50	470	452	2	974
K9IVG	18	497	414	3	932
WB6GGL	5	451	430	21	907
W3VR	134	397	364	7	902
W4EML	26	416	320	0	762
KØZSQ	0	367	1	364	732
WA7DXI	9	367	309	38	723
W9AOW	45	322	310	7	684
K3MYS	29	323	287	7	646
WA2IGQ	37	291	215	76	619
WA9HHH	35	275	253	21	584
W3FGQ	18	297	219	42	576
WØZWL	0	316	0	248	564
W6KVQ	8	267	267	0	542
W8MLF	164	186	178	2	530
WB6BRO	50	255	220	4	529
WB6INO	42	256	89	141	528
W1TXL	77	238	184	27	526
WA1EEJ	74	240	190	10	514
WA3BLE	61	230	197	19	507
W6EOT	21	241	237	1	500
Late Reports:					
WA2GPT (Feb.)	41	304	262	17	624
WA9PPA (Feb.)	9	276	226	37	548

BPL for 100 or more *originations-plus deliveries*

W8IV 175	WA2TYJ/1 119	W6DSC 102	
W3TN 142	WA3JCA 117	WA1EVH 101	
WA2APX 141	WA3HLI 112	WA2ZDA 101	
WA7BOO 139	WB2DDQ 111	WA3CQO 101	
WB6TYZ 134	WB2NSV 108	Late Reports:	
W9KII 133	KL7FLS 106	KH6GHZ (Feb.)	170
WAØJKT 131	WA8LXY 105	W1TXL (Feb.)	108
WB2UVB 128	K8KMQ 104	VE3GMQ (Feb.)	103
WA9MHU 124	WA4VEK 103	WA1GYP (Jan)	101
KH6GHZ 124	WA6BYZ 102		

More-Than-One-Operator-Stations

K6QEH 101

Late Report:
W1KBN (Feb.) 105

BPL Medallions (See Aug., 1954, p. 64) have been awarded to the following amateurs since last month's listing: WA1EYY, WA2TBS, WB2QIL, WA3EEC, W3MPX, WB4GTG, WA8ARJ, WAØDOU.

The BPL is open to all amateurs in the United States, Canada and U.S. Possessions who report to their SCM a message total of 500 or a sum origination and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

World Above 50 Mc.

(Continued from page 85)

220 MHz. e.m.e. is being explored by a Minneapolis v.h.f. club. WAØDWM says tentative plans call for a pair of 4CX250Bs, phase-locked receiving system and right-hand transmitting and left-hand receiving helical antennas. Construction is underway and completion is expected this summer. They are interested in contacting others interested in an attempt at the first recorded 220 e.m.e. contact. Write WAØDWM.

About 20 stations are active on 220 in southern California, most operate on s.s.b. around 222 MHz. A number of the stations are planning summer weekend sojurns to Arizona (Nevada also?) and schedules can be arranged through K6IBY. And

1 is excellent

2 are amazing

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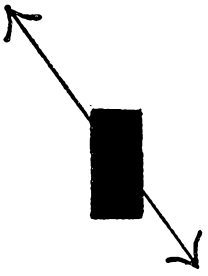
PHASED DOUBLE-TALK®

ANTENNAS

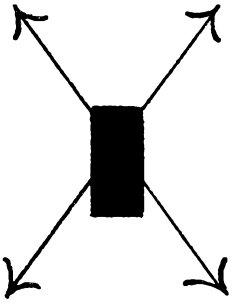
Guaranteed impressive, superior performance over a single antenna system. Most uniform signal pattern superior to any single mounted antenna because of uniquely detailed phasing design. More consistent communication with virtually no fading or blind spots when changing direction in travel. No matter what your needs —HUSTLER will be the only antenna system you'll ever need to buy!

If you have been a happy mobiler—you already have the Hustler mast and resonators. Now for the very best mobile signal, duplicate your present mount, mast, resonators, and buy the Double Talk 20 foot harness,

Model DTLS . . User Net $7.95



Turn the corner and you could get lost with a single antenna.

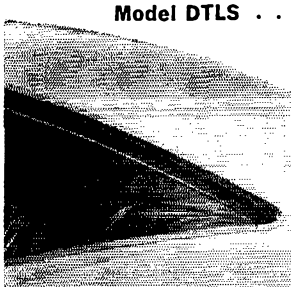


Constant communication with virtually no fading or blind spots when changing direction in travel.

A must for continuous measurement of standing waves. Observe SWR at all times with consistent accuracy.

Model CM-52

User Net—$29.95



NEW-TRONICS CORP. | 3455 VEGA AVENUE CLEVELAND, OHIO 44113

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.

420 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 52)

SOUTHWESTERN DIVISION

Arizona

WN7ISP	36,500-485-73-40
WN7IIE	33,345-498-65-40
WN7ITE	11,092-188-59-23
WN7HTZ	7250-145-50-14
WN7DUX	1992- 73-24-25

Los Angeles

WN6WGO	13,250-265-50-28
WN6ZEB	12,096-216-56-33
WN6VOK	11,395-205-53-40
WN6VVF	9984-177-52-15
WN6VUS	7140-125-51-15
WN6WNQ	5375-110-43-26
WN6WKM	3145- 85-37-10
WN6YWR	2590- 70-37- 9
WN6WKJ	920- 30-23- 5
WN6VXN	480- 24-20- 4
WN6ZFP	375- 25-15- –

Orange

WN6ZXN	18,900-300-63-38
WN6ZEC	290- 14-10- 4
WN6YUS	225- 25- 9- –

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

Northern Texas

WN5TJU	8500-170-50-27
WN5TSM	8415-165-51-23
WN5SIO	7854-154-51-22
WN5TSI	3510- 90-39-11

Oklahoma

WN5RWU	27,202-396-67-35
WN5TWM	195- 15-13-12

Southern Texas

WN5T8F	21,440-320-67-35
WN5RQO	8750-175-50-14
WN5RUU	1- 1- 1- 4

Non-Novice Scores

K1QFD 9456, W1AW (W1ARR, opr.) 13,050, W1DAL 9541, W1ET (WA1CRT, opr.) 270, WA1FNQ 1197, WA1HES 7344, WA1HXH 1560, WA1IOB 3731, WA1IUL 782, K2EIU/5 6107, W2HAE 2820, WA2ABY 3456, WA2BHJ 637, WA2CAL 232, WA2CZQ 3264, WA2PXB 795, WA2ZEW/1 588, WB2IVP 1428, WB2UVB 2025, WB2VAZ 2418, WB2VBQ 1680, WB2WAD 8052, WB2YCX 1404, WB2YJS 2430, WB2YVP 1820, WB2ZCJ 5945, WB2ZXR 770, K3YBW 672, W3CBF 450, W3CSL (WA3HQK, opr.) 187, W3YC (WA3GOV, opr.) 400, WA3AFI 972, WA3AYW 1008, WA3DNH 6300, WA3DSD 15,600, WA3DYW 10,584, WA3EEE 759, WA3ENR 4961, WA3EXX 5842, WA3FFR 2407, WA3FRL 576, WA3FTY 6380, WA3GKI 320, WA3GLP 1189, WA3GUI 4389, WA3GYM 250, WA3HMU 1176, WA3HQK 132, WA3HWW 5904, WA3IID 1800, WA3JGS 464, K4ADT 5616, K4BAI 2576, K4GMR/4 7697, K4NOV 2496, W4DR 7200, W4ILE 490, W4KFC 8910, W4RNL 12,744, W4YOK 2368, W4ZZV 264, WA4EPM 1701, WA4OFS 6570, WA4PAE 255, WA4PRF 4, WB4BGL 800, WB4DVR 1890, WB4EKI 765, WB4EMF 1160, WB4FAY 3434, WB4FDK 430, K5DYL 2310, K5KDG 11,770, W5JFB 2041, W5QNY 6030, WA5HQY 1904, WA5QPA 2730, WA5RWP 2210, WA5TOS 9344, K6BXI 450, W6FEW 3430, W6LS (W6DDB, opr.) 589, WA6VUS 16, WB6TCG 1560, WB6UCK 363, WB6UHF 4141, WB6UIA 36, WB6UQZ 3219, WB6VFL/1 720, W7BNV 273, WA7EWC 648, WA7EYN 420, WA7FBL/7 5328, WA7GLC 96, WA7HRE 504, WA7ITZ 35, WA7JCB 2233, K8SWW 468, W8QXQ 3816, W8RHF (multiopr.) 406, WA8PRA 2059,

We're happy to report to our many friends in the ham fraternity that effective March 28, 1968, E. T. Clegg Associates announced the acquisition of all assets of the Clegg Laboratories Division of Squires-Sanders, Inc.

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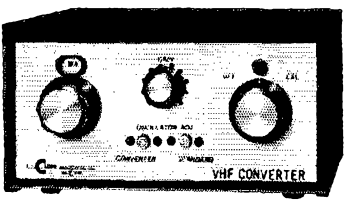

distribution for our products. All sales will be directly from the factory. Placing an order is as easy as grabbing your phone. All stock units will be shipped within 24 hours of receipt of the order . . . (by air if you prefer at slight additional cost). Financing can be arranged to meet your requirements. If you're in the area, stop in and pay us a call . . . we'll be glad to show you around.

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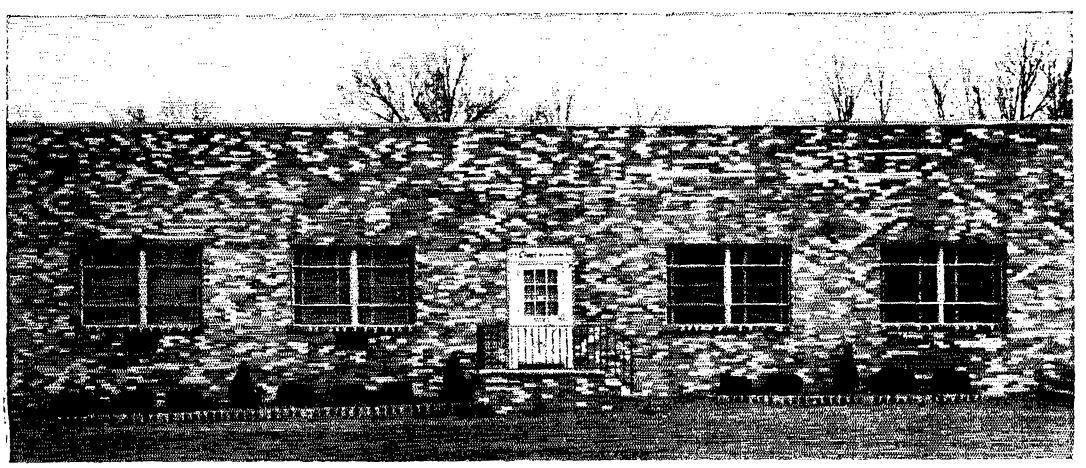

WA8SCZ 16,445, WA8TWR 4251, WA8VLM 18,042, WA8VRB 558, WA8WTT 296, K9HYE 10,914, W9GXR/9 12,582, WA9MMT 10,070, WA9PEH 2848, WA9QBM 1924, WA9QPC 130, WA9RJI 12,220, WA9RJL 6030, WA9SQN 12,138, WA9UNR 245, WA9VIY 116, WA9VPP 3480, WA9WXL 2160, KØRWL 2448, WØLGE 5586, WØQMS 10,547, WA0LYO 2816, WAØPUL 7722, WAØPWR 6762, WAØRJY 468, WAØSAO 80, WAØSEN 1219, WAØTKV 66, KZ5GN 3906, VE3DIE 11,880. Check logs: K1KNI, WA2BEX, WB6YCT, WA8OPD, W9TCU, WØIZV, WØLMO, WAØNMA.

V.H.F. Yagis

(Continued from page 33)

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.[7] 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 11¼ inches long throughout, while those in 2-B are 10⅞ 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.[8] QST

[7] "*Long* Long Yagis," Kmosko and Johnson, January, 1956, *QST*, p. 19.

[8] *Radio Amateur's V.h.f. Manual*, Edition 1, Fig. 8-4.

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An Equal Opportunity Employer

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

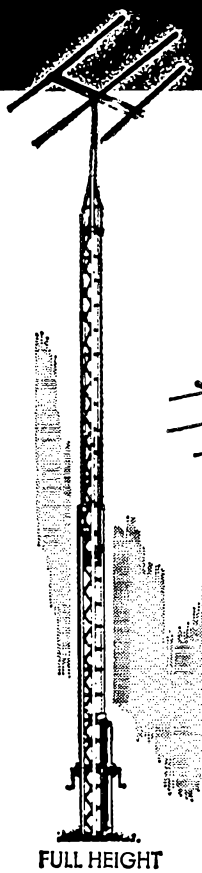
(*Continued from page 87*)

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

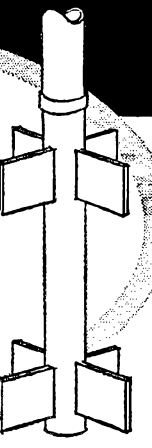
The Houston *Post*, put it this way: "The GAYLARKS are not all twitter and faldorol." And these busy active gals certainly aren't. They set up a message booth at a shopping center to demonstrate that amateur radio is dedicated to public service. The 7.290 Mhz Traffic Net held a special Saturday

INSTALL A 60 FOOT TOWER YOURSELF WITH NO CONCRETE



E-Z WAY PRODUCTS WONDER GROUND POST

WONDER GROUND POST'S stabilizing fins insure a solid setting under practically all ground conditions **WITHOUT THE USE OF CONCRETE!** Simple installation requiring only a post hole digger. Thousands in use throughout the world for over a decade.



Join the thousands of Hams enjoying E-Z Way Towers' exclusive advantages. The easiest Ham tower to install. Also can be raised and lowered to any desired height by one man and with equal ease tilted to horizontal position permitting access to beam and rotor at ground level.

Standard models from 40 to 150 feet and commercial installations to 1,000 feet.

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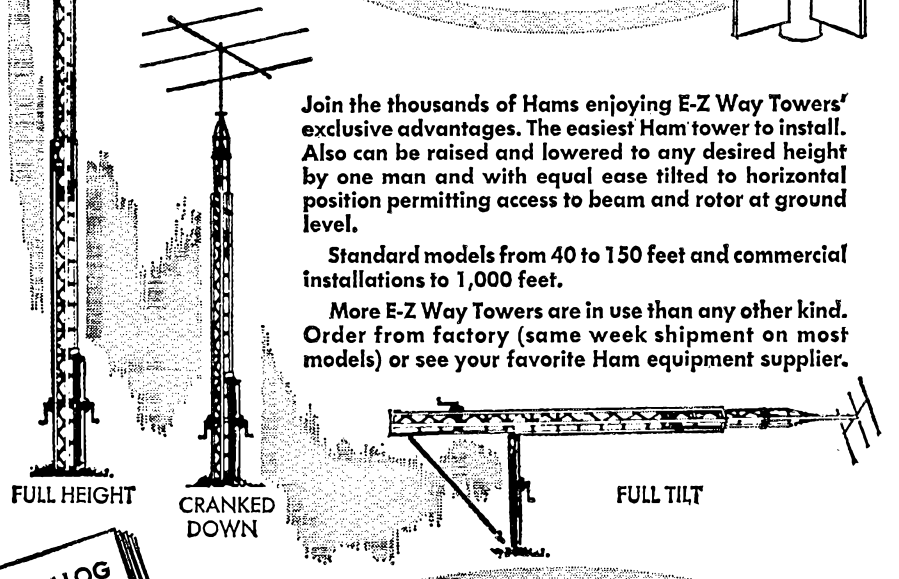

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CUSTOM COMMUNICATIONS STRUCTURES

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 Pearre, K5MXO; Phyllis Riblet W5CXM; Grace Tracy K5YTT; and Lillian Smith WA5NUR, (ex KZ5TT). QST

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 bandspread 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.

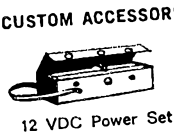
The no-signal current drain of the receiver is approximately 25 ma. when fresh batteries are used. At high volume levels the circuit will draw as much as 250 ma. in the presence of strong signals. A bonus feature results from the use of this kind of power supply: the unwary beginner need not worry about 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! QST

No, we're not lazy! It's just that "Popular Electronics" (Dec. 1967) tells the DX-150 story so well.

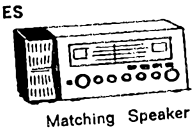
Reprinted Without Editing

"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

And only Radio Shack has this 119.95 receiver!

Thousands of hams and swl's have discovered that Radio Shack's Realistic DX-150 is truly the "breakthrough" 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!

FILL IN AND MAIL ORDER TODAY!

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Please rush me the item I've checked below. Dept. YG

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☐ FREE 1968 Catalog ☐ Matching Speaker, 20-1500, $7.95

☐ Receiver, 20-150, $119.95 ☐ 12 VDC Power Set, 20-1501, $7.95

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Street _____

City _____ State _____ Zip _____

Amateur Radio Public Service Corps

(Continued from page 63)

TCC roster: Eastern Area (W3EML, Dir.) — *W1s* BJG EFW EOB NJM, *W2s* FR GKZ, K2RYH, *WA2s* BLV UWA, *WB2s* OYE RKK UHZ, *W3s* EML NEM, K3MVO, *W4s* NLC UQ ZM, K4KNP, *W8s* AHZ CHT UM, K8KMQ, *WA8s* OCG ZGC. Central Area (W0LCX, Dir.) — W4OGG, *K4s* BSS DZM, WA4WWT, WB4AIN, W5KRX, *W9s* CXY DND DYG JUK VAY, *W0s* INH LCX, *K0s* AEM YBD, *WA0s* DOU MLE. Pacific Area (W7DZX, Dir.) — *W6s* BGF EOT HC IPW TYM VNQ VZT, K6LRN, *WA6s* BRG LFA ROF, *WB6s* 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

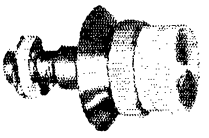
(Continued from page 18)

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.

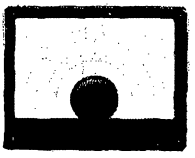
The antenna has been left up for a period of several months, during which there have been many autumn storms and a severe ice storm. It has shown no signs of distress, and it has performed normally when wet or loaded with ice. The small size of the inverted V's parts has led to little wind and ice loading and is probably the main reason for the antenna's durability. QST



2 SPEED DRIVE UNIT

For professional, sophisticated gear. Slow motion 4.5:1 drive shaft controlled from 1" dia. satin anodized aluminum knob. Direct drive operated by 1½" dia. dial. Mounts on outside of any thickness panel.

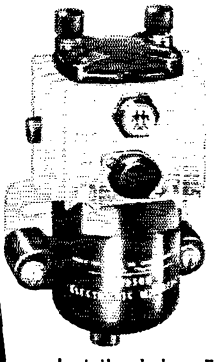
Model 4832/2K $4.95



NEW 6/36 DRIVE

Improved model with improved clutch mechanism for even longer life. New black escutcheon is plastic coated to insure great durability. Co-axial spindle provides 6:1 and 36:1 under control of one knob.

Model 4103/A $7.50



JUDSON ELECTRONIC MAGNETO

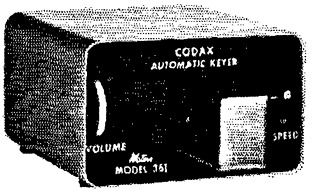
Switches Your Car To **ELECTRONIC IGNITION**

Install a Judson Electronic Magneto, the only completely integrated electronic ignition system available. Provides positive ignition everytime, resulting in fewer tune-ups and better performance. Pays for itself. Get tomorrow's ignition system on your car today. Easy, do it yourself installation.

For 6 or 12 volt negative ground autos

$39.88

plus $.75 shipping and handling

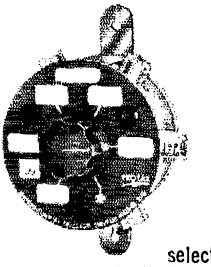


Waters Mod. 361

CODAX AUTOMATIC KEYER

Dot-dash ratio 3:1 • Space-character ratio 1:1 • Controls: Audio output level, on/off switch, speed control • Double paddle key, self-monitoring • Interconnects with any transmitter, transceiver or receiver • Self-powered • Solid state circuitry.

Net $92.50



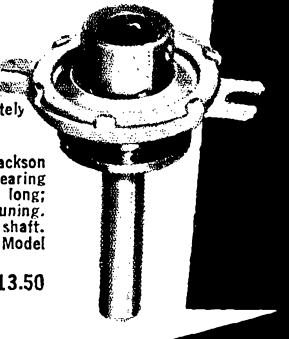
Waters Mod. 376

PROTAX ANTENNA SWITCH

Functions as a regular selector switch with 5 side mounted (radial) connectors. Has the additional feature of automatically grounding the entire antenna system when the rig is not in use. Complete with knob, mounting hardware and escutcheon plate. Power handling 1000 w. VSWR less than 1.2:1 up to 150 MHz.

$12.50

PRECISION PLANETARY-VERNIER *for exceptionally* fine tuning



Shown approximately actual size.

Superb craftsmanship by Jackson Bros. of England. Ball bearing drive. ¼" dia. Shaft 1⅛" long; 6:1 ratio. Vy FB for fine tuning. Easily adaptable to any shaft. Comparable value $5.95 Model 4511 DAF.

$1.50 ea. **10 for $13.50**

COME VISIT ARROW'S NEW NEW YORK CITY STORE AT 97 CHAMBERS STREET

ARROW ELECTRONICS INC • 900 Rte. 110, Farmingdale, N. Y. 516 — MYrtle 4-6822

• 97 Chambers St., N. Y., N. Y. 212 — DIgby 9-4411 • 525 Jericho Tpke., Mineola, N. Y. 516 — Pioneer 2-2290 • 18 Isaac St., Norwalk, Conn. 203 — 838-4877 • 225 Rte. 46, Totowa, N. J. 201 — 256-8555

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! QST

Sale

FREE "HAM SHACK PAK"

$25 WORTH OF
- TRANSISTORS
- RECTIFIERS
- RESISTORS
- CONDENSERS
- DIODES ■ ETC.

Add 25¢ for handling

PLUS ANY $1.00 * ITEM FREE

* or items totalling $1.00.)

BOTH FREE WITH ANY $10 ORDER

709C OPERATIONAL AMPLIFIER $4.88

High Gain ☐

Fairchild, Motorola, Etc.

TYPICAL USES:
- AC AMPLIFIER
- AVERAGING AMPLIFIER
- BI STABLE MULTIVIBRATOR
- RIAA PHONO PREAMP
- DIFFERENTIATOR
- DC AMPLIFIER
- INTEGRATOR
- MULTIPLIER
- SWEEP GENERATOR
- POWER SUPPLY

703H RF LINEAR AMP $1.97

TYPICAL CIRCUIT APPLICATIONS
- ☐ 30 MHZ IF STRIP
- ● 10 MHZ-200MHZ RF AMP
- ● COLOR TV SOUND-IF AMPLIFIER
- ● 10MHZ OSCILLATOR
- ● 30MHZ LIMITING RF AMP

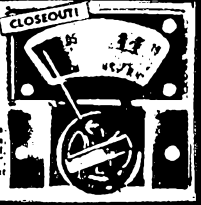
EPOXY TRANSISTORS & IC's

Fairchild, Motorola, Texas, Bendix

- ☐ 4—2N3563 NPN, 600MC, 200MW $1
- ☐ 4—2N3643 NPN, 250MC, 350MW $1
- ☐ 3—B-5000 5W. 3Amp, PNP $1
- ☐ 4—2N4313 PNP 600MC, 200MW $1
- ☐ 3—2N3565, 500HFE, NPN, 200MC $1
- ☐ 3—2N4265, 400HFE, NPN, 350MC $1

☐ 100 MICROAMP PANEL METER 2.99 ea.

- *Made in U.S.A.!*
- *D'Arsonval Meter Movement!*



New! Originally designed to be used with radiation detector! Basic meter movement 100μa. 2 mounting holes for easy installation in panel. Size: 2x2½x1¼". Mounting centers: 1-11/16". Ideal for builders, hobbyists, labs, etc. Hurry, at this fantastic price they won't last long!

HAM SILICON TUBE SPECIALS

	(Replaces)	Sale
☐1N1238	5U4GB)	2.39
☐1N1239	5R4)	4.39
☐1N1237	0Z4)	2.39
☐1N1262	6AU4GTA)	2.39
☐1N2637	866A)	9.99
☐	3DG4)	2.39

TRIACS* AND SCRS **

PRV	3** AMPS	6* AMPS
50	☐ .35	☐ —
100	☐ .50	☐ .85
200	☐ .75	☐ 1.35
400	☐ 1.25	☐ 1.95
600	☐ 1.75	☐ 2.60

Actual Size →

1 AMP 4000 PIV MICRO MINIATURE SILICON RECTIFIERS $1.49

☐

SPECIAL 1.5 AMP 2000 PIV SILICON RECTIFIERS $1

☐

☐ 2 AMP 800 PIV SILICON RECTIFIERS 4 for $1

STEREO PREAMP

- ★ 8 TRANSISTORS ☐
- ★ Ready to Play thru tape Amplifier, radio, TV
- ★ Volume, Tone, Controls sw

$4.88

400 mc NPN SILICON 5 for $1

Similar to 2N706 ☐

1 AMP TOP HAT AND EPOXIES

PIV	Sale	PIV	Sale	PIV	Sale
50 ☐	5¢	800 ☐	19¢	1800 ☐	82¢
100 ☐	7¢	1000 ☐	29¢	2000 ☐	1.25
200 ☐	8¢	1200 ☐	42¢	3000 ☐	1.50
400 ☐	10¢	1400 ☐	55¢	4000 ☐	1.95
600 ☐	15¢	1600 ☐	69¢		

Actual Size →

1 AMP MICROMINIATURE SILICON RECTIFIERS

PIV	Sale	PIV	Sale
50 ☐	7¢	600 ☐	20¢
100 ☐	9¢	800 ☐	25¢
200 ☐	12¢	1000 ☐	39¢
400 ☐	17¢		

2 AMP SILICON RECTIFIERS

PIV	Sale	PIV	Sale
200 ☐	12c	1000 ☐	45¢
400 ☐	16c	1200 ☐	59¢
600 ☐	19¢	1400 ☐	69¢
800 ☐	29¢	1600 ☐	89¢

SILICON POWER STUD RECTIFIERS

PIV	3A	6A	12A	55A
50	☐ .06	☐ .16	☐ .20	☐ .50
100	☐ .07	☐ .22	☐ .25	☐ .75
200	☐ .09	☐ .30	☐ .39	☐ 1.25
400	☐ .16	☐ .40	☐ .50	☐ 1.50
600	☐ .20	☐ .55	☐ .75	☐ 1.80
800	☐ .30	☐ .75	☐ .90	☐ 2.30
1000	☐ .40	☐ .90	☐ 1.15	☐ 2.70

SOLITRON DEVICES,

5 AMP Epoxy Rectifiers

PIV	Sale	PIV	Sale
50 ☐	19¢	600 ☐	59¢
100 ☐	25¢	800 ☐	69¢
200 ☐	39¢	1000 ☐	89¢
400 ☐	45¢		

GLASS AMP ONE AMP

PRV may be exceeded without the rectifier breaking down.

SILICON RECTIFIERS

PIV	Sale	PIV	Sale
50 ☐	5¢	600 ☐	19¢
100 ☐	7¢	800 ☐	21¢
200 ☐	9¢	1000 ☐	32¢
400 ☐	12¢	1200 ☐	45¢

AS ADVERTISED OR YOUR MONEY BACK

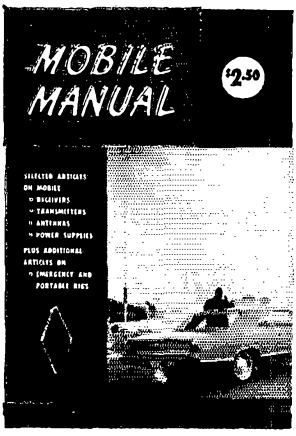
☐ GIANT "SUMMER CATALOG ON: Parts, Rectifiers, Transistors, SCRs, I.C.'s, Equipment, Etc. 10¢

TERMS: include postage. Rated, net 30 days. COD 25%

POLY PAKS P.O. BOX 942 M Lynnfield, Mass. 01940

LATEST EDITION!

Any amateur interested in mobile operation will find the new Mobile Manual a definite asset. This Fourth Edition contains more than 70 articles not only on mobile operation, but also on portable and emergency equipment. Included is a summary of the rules and regulations relating to portable and mobile operation. Articles on solid-state gear are found throughout the newest edition of this popular book.



A few of the many articles of interest:

- **FET Converters for receiving**
- **A solid-state amplifier/modulator**
- **Transistorized VOX**
- **75 and 40 meter Transceivers**
- **Power supplies**
- **Noise suppression**
- **Test accessories**
- **Portable and emergency gear**

This latest edition of the Mobile Manual is a compilation of authoritative articles from QST. No need to search through piles of back issues looking for an answer; just pick up this new edition of the Mobile Manual.

The American Radio Relay League
NEWINGTON, CONN. 06111

$2.50
Postpaid
USA
$3.00
Elsewhere

SURE!

I would like to become a member of ARRL and help support its many services to amateurs and amateur radio. Here's my $6.50 (in the U. S. and Canada, $7.00 elsewhere). Sign me up for a year's membership and twelve big issues of *QST!*

My name .....Call.....

Street .....

City .....State.....Zip.....

(Please see the other side of this page for a list of available League publications.)

THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

QS-668

QST ADVERTISERS

"Advertising is accepted only from firms who, in the publisher's opinion, are of established integrity and whose products secure the approval of the technical staff of the American Radio Relay League."

Quoted from QST's advertising rate card

Amateurs and Electronic Engineers: Practically everything you need can be supplied by the advertisers in QST. And you will know the product has the approval of the League's technical staff.

I would like the following League publications shipped to me postpaid. I am enclosing payment of $_____. (These prices apply only to the USA.)

Ship to this address:

NAME ..... CALL .....

STREET .....

CITY ..... STATE ..... ZIP .....

- ☐ **ARRL HANDBOOK** $4.00 — The standard comprehensive manual of amateur radiocommunication
- ☐ **UNDERSTANDING AMATEUR RADIO** $2.00 — Written for the beginner—theory and how-to-build it.
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- ☐ **LICENSE MANUAL** 50¢ — Complete text of amateur regs, plus Q&A for amateur exams
- ☐ **HOW TO BECOME A RADIO AMATEUR** $1.00 — All about amateur radio and how to get started
- ☐ **A COURSE IN RADIO FUNDAMENTALS** $1.00 — Use this in conjunction with the Handbook
- ☐ **ANTENNA BOOK** $2.50 — Theory and construction of antennas
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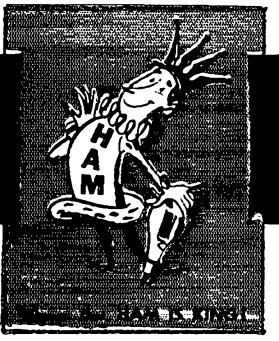
(Please see the other side of this page for an application for membership in ARRL and 12 issues of QST)

THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

TRIGGER Electronics

7361 NORTH AVE. • RIVER FOREST, ILLINOIS 60305
(WEST SUBURBAN CHICAGO)



QUALITY MERCHANDISE — QUALITY SERVICE . . . SO WHY PAY MORE FOR THE BEST!

MERCHANDISE IN STOCK — PROMPT DELIVERY
NATIONALLY ADVERTISED BRANDS, THE LATEST MODELS

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INSTANT SHIPMENT on all cash orders of new equipment. TRIGGER ELECTRONICS has the most complete inventory of amateur radio equipment and accessories in stock, for your convenience. Shipment is usually made the same day your order is received!

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$5.00 DOWN STARTS ANY BUDGET TIME PAYMENT! Order your goodies from this ad!

●

MIDWEST BANK CHARGE CARDS HONORED.

●

TRIGGER ELECTRONICS is conveniently located near the west city limits of Chicago on the main street of North Avenue (State Route #64), 3 blocks west of Harlem Avenue (State Route #43). Just 10 miles due west of downtown Chicago, or 20 minutes southeast of O'Hare Airport. Plenty of free parking. Come in and browse. See the latest in ham gear attractively displayed.

TRIGGER ELECTRONICS — Exclusive Ham store — is as near as your phone or mailbox!

another important TRIGGER service:

WE BUY USED HAM GEAR FOR CA$H

PROMPT SERVICE . . . PROMPT CASH!

ALL PHONES: (AREA 312) 771-8616

STORE HOURS
(CENTRAL TIME)

WEEKDAYS . . . 11:00 A.M. — 8:00 P.M.
SATURDAYS . . . 9:00 A.M. — 3:00 P.M.

WRITE TODAY! Send for free catalog.

LIKE-NEW BARGAIN SPECIALS FOR JUNE

DRAKE R4	$279	GPR90 MINT	$249	HQ110A VHF	$199
DRAKE R4A	329	CLEGG 99ER	79	HQ170A	259
DRAKE SW4A	219	THOR 6W/AC DC	249	HQ170A-VHF MINT	329
SWAN 250 MINT	269	PC7 POLYCOMM	149	HO180AC MINT	379
SWAN 500 NEW	379	HT40	59	HR10 MINT	77
SWAN 410 NEW	79	HT46 MINT	279	DX60A MINT	67
SBE 34 MINT	359	SX110	89	SB200 MINT	229
75S3A MINT	479	SX111	147	SB300 MINT	229
32S3 MINT	549	SX117 MINT	229	SB301 MINT	289
S16F2 W/SPKR	105	SX122 MINT	229	SB400 MINT	279
30L1 MINT	395	SX130 MINT	149	HW12 75 METERS	87
NC183D	149	TX62 MINT	119	HW22A MINT	109
VALIANT	159	T60 KNIGHT	47	2ER WIRED MINT	47
HA650 MINT	89	G76 TRANSCEIVER	59	VF1 VFO	19
REGENCY AR136	67	HO110	149	HD11 Q MULT	14

SPECIAL ↗ ↘ SPECIAL

LIMITED QUANTITY	NEW	EICO	KITS
753 SSB TRANSCEIVER	$140		
751AC OR 751DC	$60		
720 90 WATT CW	$70		
723 60 WATT CW	$40		
722 VFO W/AC SUPPLY	$35		

prices subject to change without notice

TRIGGER Attn: W9IVJ — Q668
7361 North Avenue
River Forest, Illinois — Amount Enclosed
RUSH THE FOLLOWING:

☐ Send free catalog.

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

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

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

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

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

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

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

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

HAMFEST: Annual SRRC Hamfest, June 2. Same place as last year. See May Hamfest calendar in QST for details or write G. E. Keith, W9QLZ/W9MKS, RFD #1, Box 171, Oglesby, 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 XYL while you enjoy amateur radio with friends and acquaintances. The Hamfest climaxes "Illinois Amateur Radio Week August 3 thru 11th" by proclamation of Governor Otto Kerner. For information and tickets write to Charles Borkowski, WA9TWA, 1851 W. 21st St., Chicago, Illinois 60608.

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., W2ATT, 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 W2QY, Lincoln Cundall, 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 I operators will find many of their old buddies are members of the Old Old Timers Club. We welcome all applicants whose first wireless contact was more than 40 years ago but give special consideration to those pre-World War I Pioneers, including Charter Membership. Write to W5VA, Secretary of the Old Old Timers Club, P. O. Box 840, Corpus Christi, Texas 78403.

WELCOME To Maritime Mobile service net. 14317 Khz, daily 2130Z. Amateur Radio's service to the Fleet. Vic Barry, RDC USS Corry, DD817 FPO, N.Y., N.Y. 0950.

TRADE ARRL 1968 Handbook for one of 10 old Handbooks not in W4AA 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. Laverty, 118 N. Wycomb, Landsdowne, Penna.

TUBES Wanted. All types higher prices paid. Write or phone Ceco Communications, 120 West 18th St., N.Y., 11, N.Y. Tel: 242-7359.

QSL Cards?? America's Finest. Personalized made-to-order! Samples 25¢. DeLuxe, 35¢. Religious 25¢. (Refunded). Sakkers, W8DED, P.O. Box 218, Holland, Michigan 49423.

QSLS "Brownie" W3CJI, 3111 Lehigh, Allentown, Penna. 18103. Samples 10¢. Catalog 25¢.

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

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

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

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

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

QSL, SWL, cards that are different. Quality Card stock. Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio 45015.

CREATIVE QSL Cards, Personal attention, Imaginative new designs. Send 25¢, Receive catalog, samples, and 50¢ refund coupon. Wilkins Printing, Box 787-1, Atascadero, Calif. 93422.

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

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

QSLS. Professional, neat. 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio 43935.

3-D QSL cards, recognized leader among raised designs. Compliments aplenty! Prized collector's item. Samples 25¢ (refundable). 3-D QSL Co., Monson, Mass. 01057.

QSLS, SWLS, WPE. Samples 15¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz. 85017.

QSLS, samples, 20¢. Fred Leyden, W1NZJ, 454 Proctor Ave., Revere, Massachusetts 02151.

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

QSLS 3-color glossy 100, $4.50. Rutgers Vari-Typing Service. Free samples. Thomas St., Riegel Ridge, Milford, N.J. 08848.

QSLS's. Free samples, attractive designs. Fast return. W7IIZ.

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

ORIGINAL EZ-IN double holders display 20 cards each in plastic. 3 for $1.00 or 10 for $3.00 prepaid and guaranteed. Free sample to Dealers or Clubs. Tepabco, John, K4NMT, Box 1981, Gallatin, Tenn. 37066.

QSLS: 3-color glossy: 200, $6.99 postpaid. Samples, 10¢. Gates Print, 317 11th Avenue, Juniata, Altoona, Penna. 16601.

QUALITY QSLS: Samples 25¢ (refundable). R. A. Larson Press, Box 45, Fairport, N. J. 14450.

QSLS's. Free samples, attractive designs. Fast return. W7IIZ Press, Box 2387, Eugene, Ore. 97402.

QSLS. Kromkote glossy 2 & 3 colors, attractive, distinctive, different. Choice of colors 100-$3.00 up. Samples 15¢. Agent for Call-D-Cals. K2VOB Press, 240 West Kinney St., Newark, New Jersey 07103.

QSLS by K1FF, $2.00 for 100. Others at reasonable prices. Samples 25¢ deductible. K1FF QSLS, Box 33, Melrose Highlands, Mass. 03177.

QSLS. Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms. WA4FJE/W3COP, 905 Fernald, Edgewater, Fla. 32032.

EXCLUSIVE QSLS. Picture, custom, standard. Over 250 styles available. Samples dime, K1NCZ Press, 535 Walpole St., Dept. C, Norwood, Massachusetts 02062.

RAISED Lettering QSLs, Ace Printing, 6801 Clark Ave., Cleveland, Ohio 44102.

QSLS by Jansen, K2HVN, samples 25¢. 860 Atlantic St., Lindenhurst, New York 11757.

QSL cards. Finest quality. Economical prices. Fast service. Free samples. Little Print Shop, Drawer 9848, Austin, Texas 78757.

QSLS. Neat, different 10¢. Filmcrafters, P.O.Box 304, Martins Ferry, Ohio 43935

QSLS. 100, $1.25 and up, postpaid. Samples, dime. Holland, R3, Box 649, Duluth, Minnesota 55803.

QSL 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-clasp, $1.45. Also 1½" x 6" wall signs $2.95. W2DF, Gorby, Box 213, Faringdale, 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, 1 KW, all-band, $7.95; wired, $12.95. Ham Kits, P. O. Box 175, Cranford, N.J. 07016.

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

CANADIANS: Ranger 1, $115.00; HQ-145, $135.00, plus shipping costs. Both good. H. Walker, VE7XX, Box 880, Hope, B.C., Canada.

MANUALS for surplus electronics. List 15¢ S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

HAM'S Spanish-English manual $3.00 Ppd., Gabriel, K4BZY, 1329 N.E. 4th Ave., Fort Lauderdale, Florida 33304.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 07032.

1916 QSTS needed for personal collection. Price secondary. Ted Dames, W2KUW, 308 Hickory Street, Arlington, New Jersey 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, ARM, GRM, etc. Best offer paid. 22 years of fair dealing. Ted Dames Co., 308 Hickory St., Arlington, New Jersey 07032.

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

INTERESTING Sample copy free. Write: "The Ham Trader," Sycamore, Illinois 60178.

WANTED: For personal collection: Learning the Radiotelegraph Code, Edition 4; How to Become a Radio Amateur, Edition 9; The Radio Amateur's License Manual, Edition 2, 11, 12. W1CUT, 18 Mohawk Dr., Unionville, Conn. 06085.

RTTY gear for sale. List issued monthly. 88 or 44 Mhy toroids, five for $1.50 postpaid. Elliott Buchanan & Assoc., Inc. Buck, W6PVC. 1057 Mandana Blvd., Oakland, Calif. 94610.

WE'RE Trying to complete our collection of Callbooks at Headquarters. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington, Conn. 06111.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 07032.

WANTED: Model 28 Teletype equipment. R-388, R-390A. Cash or trade for new amateur equipment. 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: CQ, QST, Handbooks, old radio magazines, any quantity. Buy old radio gear and publications. Erv Rasmussen, 164 Lowell, Redwood City, Calif. 94062.

NOVICE Crystals: 40-15M, $1.33, 80M, $1.83. Free list. Nat Stinnette, Umatilla, Fla. 32784.

TOROIDS, 88 mh uncased, 5/$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 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, W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan 48104, Tel. NOrmandy 8-8262.

RTTY Channel filters, octal mounted, 2125/2975, $5.95 pair. Special filters for TT/L-2, SASE for information. 88 Mh. toroids, uncased, 5 for $2.50. Herman Zachry, WA6JGI, 3232 Selby Ave., Los Angeles, Calif. 90034.

TR-4, $480.00; AC-4, $83.00; DC-3, $123.00; R4-B, $360.00; T4-XB, $360.00; MS-4, $17.50; RV-4, $83.00; L-4B, $580.00; W-4, $43.00; factory-sealed boxes, fully guaranteed. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C. 27404. Tel: 919-299-8767.

1000 PIV 1.5 amp. epoxy diodes, includes by-pass capacitors and resistor. 10 for $3.75 ppd U.S.A. Fully guaranteed. East Coast Electronics, 123 St. Boniface Road, Cheektowago, N.Y. 14225.

ESTATE Liquidation. SSAE brings list quality equipment. Paradd Engineering, 284 Route 10, Dover, N.J. 07801.

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, K4RJZ, 102 Leesville St., North Charleston, S.C.

RADIO Parts and equipment. Stamp for complete list. W6ME. Rte 1, Box 666B, Arroyo Grande, Calif. 93420.

TOOOBES—Tranzeesters: New, unused, 6146B, $4.00; 6CW4, $1.60; 811-A, $4.25; 417-A, $4.50; 6146-A, $2.95. Free catalog. Vanbar Distributors, P.O. Box 91z, Paramus, N.J. 07652.

GE. Used Two-Way FM equip. SASE for list. 75A4, $425.00; SR-150 transceiver AC and DC p.s. $350. QSTs 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., Coca, Fla. 32922.

HISTORICAL Rare documents. Large number of QSTs from 1923 on to swap for Colin B. Kennedy longwave receiver. John Brolley, 719 41st, Los Alamos, New Mexico 87544.

HALLICRAFTERS HT-44 less supply and SX-101A, both in like-new condx and A-1 shape. Any reasonable offer accepted. K9DQO, W. J. Dres, Box 273, Palos Heights, Ill. 60463.

A Business of your own. An industry leader shows you how to get 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 300 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. Hot showers, fireplaces, light housekeeping, children half. Lake shore camp sites. Literature. Al. 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; CDR 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. 516-WA1-6188.

SELL: QST; June 1935, June 1936, Dec. 1940, July 1953 through July 1956 and September 1956; CQ: 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. 98106.

SELL: SX-101A, in exclnt condx, $225.00 or partial trade on S-band transceiver. David Shaffer, K3NXO/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. WØLPB, 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, K2ROK, 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 4CX1000A, $50.00. Very low noise preamp, for 2, APA-2. See 73, June 1966, $35.00. Model 15 keyboard, $17.00. 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, WB2GKF, 506 Mt. Prospect Ave., Clifton, N.J. 07012.

HEATH HW-22 Transceiver, with mobile power unit: $110. W5BSU, 74112.

116 Copies QST, ten year run, 1951 thru 1960, with Index: $25.00. F.o.b. WØCAW, 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-c R.F. probe and 336W H.V. probe. All Heath factory assembled, $55.00. Heath V.T.V.M. IM11, $22.00. Ed O'Brien, W2IW, 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 gud condx. Only $650.00. Drake MN4 Matchbox, $55.00. Eico 460 'scope, like new, $60.00. Philip Schwebler, 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, Orange, Calif 92668 Tel: (714)-532-1022.

SALE: S-108, $59; Mosley CM-1, $85: DSB-100, $45; UM-1 modulator, $25; BC-459, $8; Heath Twoer, $35; HQ-150, $115; HQ-140, $95. Wanted: NC-45, W3NCX, 1005 Wyoming, Allentown, 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, Dunedin, Florida 33528.

6-Meter transceiver 1967 Hallicrafters SR-46A W/mobile kit, Squalo, like new condx. $145.00. W1OML, tel: (617)-922-4819.

SELL Locally: Globe Chief deluxe xmtr, Globe VFO V-10, Globe modulator SM-90; Astatic mic JT-30. All in xclnt condx for $100. WA2JZU, 18 Elm Road, Pompton Plains, N.J. 07444. Tel: 835-3804.

COMPLETE station priced to sell: 75S-3C, 312B-4, 32S-3, 516F2, late Henry 2K kilowatt Matchbox with indicator, complete 70 foot tower, with Ham-M rotator, 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 Morlyn 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, Gonset, Hallicrafters, Hammarlund, Hy-Gain, Mosley, Waters, SBE, Henry Linear, BTI linear, towers, rotators, other equipment. We meet any advertised cash price on most equipment. We try to give you the best service, best price, best terms, best trade-in. Write for price lists. Your inquiries invited. Henry Radio, Butler, Mo. 64730.

NC-200/AC supply, 10D/PTT, 12AVQ. $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 Riverview Boulevard, Silver Lake, Ohio 44224.

VACATIONERS: Free use of my antennas for back-home QSO's. Gerald Ozburn, WØARW, Tentel Campground, Peyton, Colorado. Near Colorado Springs. 80831.

COLLINS 75A4A (Stankus modification): 3 filters, 3, 6, 12 kc., Ser. No. 5557, $435.00; Swan 500 117X. $375.00; Hallicrafters HA-2 HA-6 power supply, $300. Irving Haimowitz, WB2HZP, 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 Marye 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. K4SCT, 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-1 w/SB-10. Best offer any or all. A. Jacobs for WAØLUP 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 Rohn 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 $34.95. Dealer inquiries invited. Send your order to M & M Electronics, 6835 Sunnybrook, NE, Atlanta, Georgia 30328.

R-392/URR recvr, in exclnt 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 xmtr, 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 Merribrook Drive, Saratoga, California 95070.

PRINTED Circuit Board. Single or double-sided, 9 x 12: 75¢; 6 x 9, 40¢; 4½ x 6, 20¢; 3 x 4½, 15¢. 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 Xtals, $250, 75A4 #5362 (0.5, 3.1 filters), immaculate, $495. F500B-31 (51J4), $35. UTC LS-103, $15. Transformer, 115/1300 @ 3.0 amps, $25. 115/6.3 or 7.5 @ 21 amps, $7. New-Tronics transistor ignition, 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, $575.
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 blanker 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 UCSXF vacuum variable capacitor, unused, $10.00. Carborundum 250-watt dummy load, unused, $8.00. VSWR Bridge, $8.00. Want: Swan 410, Drake 1A, 2A, 2B, Samkofsky, W2YSF, 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. Alamagordo, New Mex. Write for details. Gary L. Grothen, W5OPL WØOMH. 710 Arnold, Alamagordo, 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 scr. 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. HT-37 with switchable A.L.C. HT-41 spare 7094S. 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 xfrmr, $10.00; 500 watt multitap modulation xfrmr, $18.00; 5G selsyns, $10.00 pair, xfrmr 5v 100 amps, $8.00; 10 VCT 10 amps, $4.00; Johnson 55 mmfd/section .250 spacing, $5.00; 5 ft. Part-Metal enclosed cabinet with dolly, $25.00; dynamotor 12 VDC input 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, KØRHK, 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, warranty card. Bought new from Henry Radio, February 1968. $330.00. Sorry, no trades. Write offer to Bob Randall, WØRNR, Ashland, Kansas 67831. Box 672.

FOR Sale: Like new Collins: 75S3B recvr, 32S-3 xmtr 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.

DRAKE 2-C and 2-CQ, like new, in original cartons, $195.00; Collins 75A-3 with 3.1 mech. filter, plug-in product detector and crystal BFO, in perf. condx, no scratches, $240.00. Johnson Viking 6 and 2 RF unit, VFO and Eico 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 rotator TR44: $44.00, with 100 feet of control cable. HA-1 T-O keyer with Vibroplex 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 VF1, also military 24-hr. clock. Will trade for what have you around the shack. Frank Rodio, 243 Senator St., Brooklyn, N.Y. 11220.

872As, 10,000 PIV, 5A peak, 1.25 A continuous. New surplus, $5.00. WAØNQP, 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 480- 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, excint cabinet. First best offer. Mrs. Bill Wilson, 62 Somerset Road, Norwood, N.J. 07648. Tel: (201)-768-6504.

ELECTRONIC components for less. Write for free catalog. EDL, Wescomm Electronics, 1491 Overlook Dr., Alliance, Ohio 44601.

SELL: Two Dow-Key relays, $5.00 each. Both: $8.00. KØAHO, 45 Green Meadow Park, Clear Lake, Iowa 50428.

REBUILDING Antenna? Write Ham Hardware Headquarters. Best QVS Stainless Steel, brass, screws, bolts (½"-6"). Nuts, washers, eye-bolts, rods, clamps. Bargain packets, 25¢ to 44¢. Postpaid. Stamp for lists. W8BLR, Straesser, 29716 Briarbank, Southfield, Mich. 48075.

MUST Sell: Hammarlund used 20 hours HQ-180XE receiver. (Cost $499.00) for $250; HX-50A exciter. Cost $399. For $200. HXL-1 linear cost, $375. For $187. All perfect, in cartons. W2WK. 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-60G2C, 115 v., ant. relay, $15.00. G. Black, K8VAS, 563 Center Ave., Essexville, Michigan 48732.

COLLINS 75A-4, ser. No. 5799; 6 Kc @ 3.1 Kc filters, manual, excellent condx. $450.00. HT-44 with p.s., manual: $225.00. Pick-up deal only, sry. WB2OYA. Tel: (212)-339-0271.

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, WB2DWR.

COLLINS KWM-2 and AC power supply. In perf. condx: $725.00. WA8GGC, 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 excint condx: $625.00. Also two beautiful linears. Pr 4-1000's and pr. 4-400s. Write for details or call a.c. 313-647-8249. Robert Day, K8TAH, 325 Keswick, Bloomfield Hills, Michigan 48013.

SELL: Twoer transceiver Heath with crystals. Best offer. KØAXY, St. Joseph's Hill Infirmary, Eureka, Missouri 63025.

SELL: Hallicrafters SX-117, R-48 speaker; Johnson Navigator transmitter; Heath HW-32, HP-23, PTT microphone; Hallicrafters HA-1 keyer; Vibro-Key; Telex MRB-30 headset, new; Model 15, p.s., table, spare keyboard and type basket; Essco W2JAV type T.U. All units are in excint condx with manuals. Best offer. Donald Porter, WB2QKD, 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, WA5MKK, 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 rcvr, $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, Loudenboomer rotator and indicator. Bearings, 275 feet 1" O.D. Lo-Loss coaxial cable, 550 feet Neopreme 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 117 volt output constant voltage transformers. $100 each. Anderson, W4GUC, Apt. 505, 390 North Federal Highway, Deerfield Beach, Florida 33441.

HAMMARLUND HX50-A. Must sell, getting married. Joe Babcock, WA3GPA, 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. F.o.b. Providence, R.I. Ronald Simonton, K1GMW, 48 Tryon Ave., Rumford, R.I. 02916.

FOR Sale: SX-99, in excint condx, $80.00. David Holm, WB2WSU, 71 Delaware Ave., Metuchen, N.J. 08840. Tel: 201-549-9015.

SELL Swan 350, a.c. power supply, MARS SW-10, 14AVQ, Heathkit Cantenna. All for $325.00. Lee J. Delworth, WB6RDW, 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, WA2KHV/1, 134 Lexington St., Woburn, Mass. 01801. Tel : 935-5035.

SPORTS-CAR Fans: Road & Track, Car & Driver, 250 early issues. Will swap for test equipment, other gear? Walt Schwartz, WØLQI, 4138 Wentworth Ave., Minneapolis, Minn. 55409.

TRADE: SX-111 and DX-100 together only. Want 2¼ x 3¼ or larger high quality photo-enlarger. Super 8 mm movie camera and projector. Transceiver, or cash. W9EFV, 419 S. Oakwood, Angola, 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 75S3B, $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 Eico 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. WA5RWT, Mark Morrow, Route 4, Box 53, San Benito, Texas 78586.

HALLICRAFTERS 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, WØLOT, 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 Heli-whip antennas. All like-new condx: $550.00 package price. Will deliver within 50 mile radius Chicago or F.o.b. Joliet, Illinois. Karl E. Luckhart, W9YWX, 123 Roy St., New Lenox, Ill. 60451. Tel: a.c. 815-485-6368.

HALLICRAFTERS 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 mhy. Center tapped, unused, 5/$1.50 ppd. RTTY page printer paper. $5.50/case. New Heath DX-60A. $55.00. Tecraft Criterion 6-meter converter, $30.00; Apeco photo-copier with paper and chemicals (trade?) $40.00. TT63A regenerative repeater $20. Polar relays, $3.00; sockets $1.25 postpaid. Wanted: tower, NC-300, RTTY gear, rotator. Stamp for list. Van. W2DLT, 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 rotor, and 25-foot Rohn 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. W9BOE. 4061 North Drive, Ft. Wayne, Ind. 46805.

HALLICRAFTERS 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. WA8LYF. 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, 120/240V, 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 Hogg, KØEOH, 1304-1 E. Chestnut, Garden City, Kansas 67846.

HEATH DX-100, in excint condx, with Heath antenna load mod. and silicon HV rectifier, $100. W1TF, Elmer Turner, Box 87, Melvin Village, N.H. 03850.

TRADE Globe-King 400-B and VFO for gud stereo recorder, or $120. More bargains! Send stamp. Metzler, R.I. Box 39, Manheim, 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, WB2WFJ/1, 83-19 141 St., Jamaica, L.I., N.Y. 11435. Tel: (212)-V19-7568.

DX-40 xmtr, $40.00; S-85 rcvr with built-in 100 kc. xtal calibr. $75; Heathkit Q-multiplier, $5.00. All are in xcint 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 excint condx. WB4DQA. W. N. Giles, 128 Manor St., Roanoke, Va. 24019.

SELL: Drake 2-A, matching speaker, xtal calibrator. In excint 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 excint condx. Fred, WA1HKV, 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 scope, $40.00. 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-bedroom, 1 and ½ bath QTH with large hamshack. 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. WB2-UZV, 101 Aldrich Ave., Binghamton, N.Y. 13903.

PREPARE For new FCC exams! You need Posi-Check. Multiple choice questions, diagrams, explained answers, IBM sheets for self-testing. Same form as FCC exams. General Class, $3.25; Advanced Class, $3.50; Extra Class, $3.75. 295 to 300 questions or diagrams in each. Each complete for a specific exam. Basic questions duplicated if they apply. Third class postage prepaid. Add 26¢ per copy for first class mail; 54¢ for air mail. Send check or money order to Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322.

SELL: Swan 350 (latest). A.C. supply, crystal calibrator, selectable sidebands. $325.00. WA1CHL, East Shore Drive, Burlington, Conn. 06085.

SELL: HQ-129X rcvr, $89.00; Knight T-60, $27.00. WB2SBA. Tel: a.c. (516)-269-9818.

CLEGG Zeus, excellent, $320.00. Best offer or will trade on Drake T-4X and power supply. Also need carrying case for SB-33. K8JZW. Tel: (614)-322-5341.

APACHE Transmitter, in exclnt 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. WØGEP, 907 Deandell Ave., St. Louis, Mo. 63135.

DRAKE TR-4, pwr. supply and spkr, $500; R4A, $325.00; Heathkit SB-200, $200.00. All very clean. K3FPY, Rick Feld, Cedarbrook Hill #1221, Wyncote, Penna. 19095.

SELL: 75S-3, SSB and AM filters, $350; DX-20 and Dow-Key relay, some crystals, $25.00. Both good condition. WB6AGN, 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 6M converters, $10. Power supply and converter selector box, $15. Donald Greenbaum, WB2DND, 20 Sunnyfield Terrace, Neptune, N.J. 07753.

NCX-5 with NCX-A pls. 1½ 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; xmtr Hallicrafters HT-37; D-105 mike, new; Vibroplex, like new, straight kew, new; Mosley vertical for 40, 20, 15 and 10 meters, trap, new; headphones; callbooks, foreign and local, 1968 issue. Dow-Key changeover relay; SWR Bridge. All instruction books. Extra tubes, co-ad cable. All in perfect condx. Package deal: $350 buys a complete station. W2IZW.

DISCOUNT Prices. Time payments. New equipment, factory-sealed cartons, full warranty. Drake R-4B, $379; T-4XB, $379; L-4B, $599; TR-4, $511; Galaxy V Mark III, $369; National NCX-200, $315; NCL-2000, $595; SBE-34, $380. All new factory-sealed cartons, no down payment with approved credit. New CDR Ham-M and indicator. $99.95. TR-44, $59.95. All equipment in stock, immediate delivery. Mosley TA-33 (regular $120.99). Discount price, $99.95. New Tri-Ex W-51 self-supporting tower (regular $362.00), $299.95 prepaid. Reconditioned specials: Swan SW-500C, $399; SW-350C, $319; SW-250, $239. Time payments on any purchase. Send for free catalog. Edwards Electronics, 1316-19th St., Lubbock, Texas. Tel: (806)-8759.

SPRING Sale savings! New Swan-500C, $520 (117XC 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. Mosley 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).

SWAN 350 and 117XC, like new, $300. WRL Meteor 175-watt, DSB, CW and 140 watt AM. Transmitter. $50. Eico, 722 VFO, $25.00. Enlisting. W8HHX.

FOR Sale: NC-303 recvr in mint condx. and 10 meter 120 W. AM xmtr with 4 power supplies. Air cooled. Package deal, $275.00. Bob Fleishhauer, W4GNW, Box 88, Rt. 3, Moncks Corner, S.C. 29461.

MOON Bounce. Texas Instrument 1.0 MV recorder, $150.00; Westron 1.0 MV recorder $175.00; Rustrac 0-3 Ma. recorders, $50 each; L & N Wheatstone Bridge $100. 0-600V regulated power supply, $50.00. Model 14 teletypes, $20.00 each. Triplett mod. 310 multimeter $20; pair new 813's, $10 each. new 833 and socket, $10.00; scintilation counters $30 each. Gibson Girl emergency transmitters. $15.00 each. 153 Mc FM walkie-talkie $50. Herb Belin WB2RIP, P.O. 567, Sparta, N.J. 07871.

CLEANING House: Swan-400, power supply 110 and 12 volts. Both VFOs. All for $500. Heathkit Apache and SB-10, $150; Hammarlund HQ-145X, $100. Ham-Scan, rotator, TH-6DX, towers, you make offer. WAØFNS, Starbuck, Minn. 56381.

KNIGHT R-100A, exclnt, $60. Jim Simpson, 304 So. 9th, Bozeman, Montana 59715.

CRYSTALS Airmailed: SSB, Nets, Marine, etc., Novice .05% crystals $1.50. Custom finished etch stabilized FT-243 .01% any kilocycle or fraction 3500 to 8600 $1.90, (five or more this range $1.75 each), (nets, ten or more same frequency $1.45). 1700 to 3499 and 8601 to 20.000 $2.75, with overtones supplied above 10.000. 10.001 to 13,500 fundamentals $2.95. Add 50¢ each for .005%. Add 75¢ each for HC-6/u metal miniatures above 2000. Vacation closing from July 7. to August 15. Many ARRL publication and QST builders crystals, groups or singles. Be specific. Write for order-bulletin. Crystals since 1933. Airmailing 10¢/crystal, surface 6¢. C-W Crystals, Marshfield, Missouri 65706.

MODEL SBA, 300-4, two-meter converter and Heath HW-30, both for $50 or will trade for 6 meter gear. Contact WAØRKQ, Juniata, Nebraska, 68955.

DRAKE 2B with calibrator, $125.00. Heath HX-20 with homebrew supply, $55.00. Both in gud condx. Send certified Check and I will ship collect. R. Rasmussen, W6GXK, 129 Club Drive, San Carlos, Calif. 94070.

WHIPPANY Labs "L'il Lulu" 6-meter xmtr. 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 @ 3mfF brand new GE Pyronal oil capacitors, $3.00 each. Can mail. 3-lbs. each shipping weight. FOB P. Wandelt, RD #1, Unadilla, New York 13849.

SELL: 10 meter Johnson Messenger 1 transceiver. 6 VDC or 110 VAC. Good condition. $45.00 REA prepaid. Dave Melone, WØVYT, 5022 38th Place, Des Moines, Iowa 50310.

MOHAWK Receiver, gud condx, with instructions. $100. W1ECH, 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. WB2IMD. Tel: ES-2-7927 (please call after 7 PM). Sy. 2790 86th St., Brooklyn, N.Y. 11223.

SELL: All are in excellent condition: Collins 51J3 with cabinet and speaker, $450.00; HRO-500 with speaker, $900; SB-34, $275.00; P & H LA1000 1 KW linear, $75; P & H 1000PS transistorized 12VDCp/s, $75; Hallicrafters SX-104, 30-50 Mc., $40.00; BC-342N receiver, $65.00; Tapetone converters, 201 6-meter $35.00, XC-144 2 meter, $40; TC-220 mc $40.00; custom 417A 6-meter, $40.00. Antennas at 1/2 price: Telrex 20-meter 326B, 6 meter 1136SR, 6 meter 309, 2 meter 2148, 220 Mc 2129. 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).

CLEANING House. Reasonable offer accepted. New SSB multiband xcvr, Eico 753, less supply; ATR-13 Collins Autotune 2-18 MHz, 5" Hitchcock 'scope, DC-5MHz, Navy surplus rcver 2-6 MHz, 8 tubes, a.c. powered. All equipment with manuals, schematics, etc. in A-1 condx. WB2OHF, A. K. Dietrich, 12 Bennett, Binghamton, N.Y. 13905.

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 gud 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, please! New Swan 500 in factory sealed carton, regular price $495.00. Cash price $369; SB-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 $599.95. Cash price, $469.00. Used equipment: TR-4, $399.00; T4X-B, $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, WA2ACF, 722 Carlisle Road, Jericho, L.I., N.Y. 11753. Tel: (516)-931-5922.

CLAUS Amateur Radio Shop offers highest trades on Galaxy, Hallicrafters, Hammarlund, National Swan, Hy-Gain, Mosley, CDR, 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.

HENRY 2-K, $550.00; Collins 32S-3, $550. W. H. Jay, K4TWK, RFD #3, Box 261-A, Douglasville, Ga. 30134. Phone: (404)-942-3192.

EARLY QSTs, 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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COMPLETE Collins station: Rare KWM-2A, with factory-installed noise-blanker. Also, almost new 75S-3B with 500 cycle filter $575. New Waters rejection-tuning, 312B5 station control, PM-2 AC supply with speaker, CC-2 suitcase, MP-1 dc supply and mobile mount, and 30L-1 linear. Equipment is like new condx. All for $1750. 30L-1 itself, $375. Want 62S-1 or Swan 500. John F. Ashton, W1WNY, 1 Dew Lane, Darien, Conn. 06820. Tel: (203)-655-997.

CLASSIC Vintage, National "One-Ten" receiver manufactured c. 1936, and in "as-new" condx, including all coils, schematic, spare tubes. A true collector's item, with beautiful HRO dial. Make offer. W2DAP, 21 Twisting Dr., Lake Grove, N.Y. 11755.

FOR Sale: RX-Trans and equipt. of W2GAE. Phone Saturdays CRoton 1-3055. Mrs. F. Del Bourgo, 64 Penfield Ave., Croton-on-Hudson, N.Y. 10520.

SELL: NCX-3, in mint condx $225.00. Wanted: NCX-D DC supply. W2BHZ. RR #2, Pine City, N.Y. 14871.

COLLINS 75A-4, vernier, 2 filters, updated. Hi sensitivity, low noise level, hot, in exclnt condx. Original carton. F.o.b. $425.00. Collins matching speaker, Hallicrafters Panadaptor companion; Collins 302C directional wattmeter, available. W2ASI, 15 Kensington Oval, New Rochelle, N.Y. 10805. Tel: 914-NE3-7077.

HT-33A with MK II screen modification, $250.00 or you make offer. You pay 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.

18AVQ ant. $25.00. W2HI, 161 Evans St., New Hyde Park, N.Y. 11040. Fone 516-FL4-3122.

SELL: HT-37, $220; HQ-170, $180; 18AVQ, $30. Will ship REA collect. Tom Ward, WA8RNA, RFD 4, Hillsboro, Ohio 45133.

BUYERS For used ham gear, let us sell your used equipment for you. New McGraw-Hill electronic books in stock. We can supply all books in latest edition. Write Ken, WØZCN, Electronic Engineering & Equipment Co., 1028 Central Ave., Ft. Dodge, Iowa 50502.

MODEL 28 page printer (typing unit only) $100. G. E. White, 5716 N. King's Highway, Alexandria, Virginia 22303.

SBE34 Transceiver, in excellent condition, complete with Hustler 15-20 and 40 meter antennas, mounts, extras. Sell or trade with cash for commercial 2 KW PEP linear, Collins 75A3, Johnson Ranger also for sale. Kermit Slobb, W9BT, 1605 Oakwood Road, Northbrook, Illinois 60062.

WRL'S Used gear has trial-terms-guaranteed SR-46, $99.95; Utica 650A and VFO, $99.95; TX1, $99.95; Valiant, $149.95; HA-10, $189.95; SX-99, $79.95; HO-100C, $109.95; 75A1, $169.95; SX-140, $69.95; HR-20, $79.95; NC-300, $149.95; RME4300, $79.95. Low prices, hundreds more. Free "Blue-Book" list. WRL, Box 919, Council Bluffs, Iowa 51501.

HEATH TWOER, $30.00; Matching 6-12 volt power supply, $12.00. K9TVC.

COLLECTOR'S Item: Thompson & Levering Co., Philly, Penna., Serial 17556 bridge. WW I vintage. Size 9 x 7 x 3, boxed. W2COT, 12 Washington Park, Maplewood, N.J. 07040.

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/Q-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. WB2OQK, 1129 Astor Avenue, Bronx, N.Y. 10469.

HEATH SB-300 receiver with three filters; SB401 transmitter with all crystals; SB200 linear, all in perfect condition $650.00. Lafayette HA-350 ham-band receiver, like new, $80.00. Elmac AF-68 transmitter, $40.00. Philip Schwebler, W9GCG, 4536N 50 St., Milwaukee, Wis. 53218.

SELL: Clean HW-12, $75.00. Certified check or money-order. WA8JWK, 8525 M-36 Whitmore Lake, Michigan 48189.

HEATH SB-110A prof. construction 1967 with power supply and manual: $350.00; Cov 6 beam antenna, $15.00; Hallicrafters HA-6 transverter power supply and manual, like brand new, $125.00; Clegg Interceptor B with Interceptor allbander, $325.00. HQ-180C mint, $375.00. Ted Valpey, W1ATP, 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 3 ft. rack; legal limit on c.w., a.m. SSB. Guaranteed OK. For $150.00 or your best offer Clark Still, K4BMG, Box R1632, Emory University, Atlanta, Ga. 30322.

HQ-170, $165.00; Vallant, $130.00; Matchbox with SWR, $65.00; Thor VI, complete, $160.00. List available. WA2VHW, 18 Hillcrest Terrace, Linden, N.J. 07036. Tel: (201-486-6917).

FOR Sale: HT-37 SSB xmtr, $250.00; HQ-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

CRANK-UP Tower, 40 ft. galvanized steel, weight 200 lbs., in exclnt condx. Moving. Must sell: $75.00. No shipping, sry. You haul. Winckel, W6QQB, 1643 Rotary Dr., Los Angeles, Calif. 90026.

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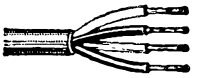

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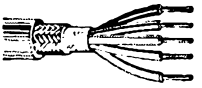

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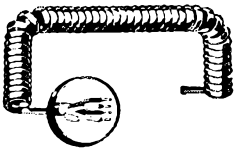

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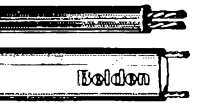

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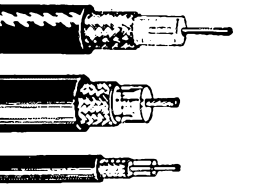

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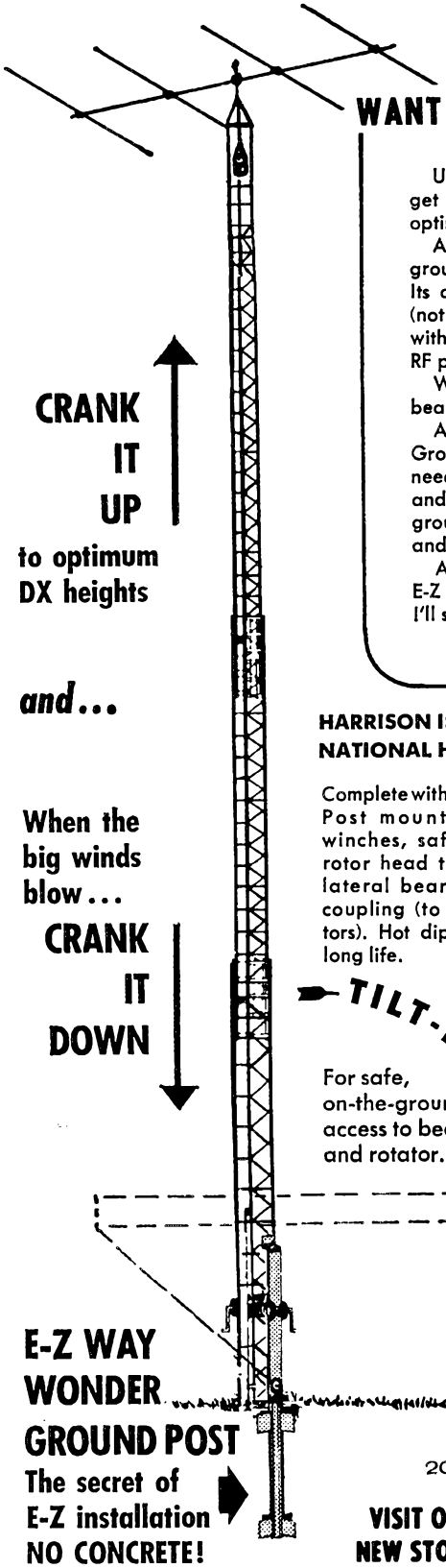

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Unless you're trying for inter-planetary communication, you'll get more and better DX if your beam can be elevated to its optimum height for each band.

Any beam, as it is raised to different heights above *electrical* ground, goes thru changes in impedance of as much as ±30%. Its angle of radiation likewise shifts significantly. At optimum (not necessarily highest) elevation you get best impedance match with lowest angle of radiation. This puts more of your precious RF power into the long DX path!

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*Antenna sq. ft. for 50 MPH winds, full up; 100 MPH when down.
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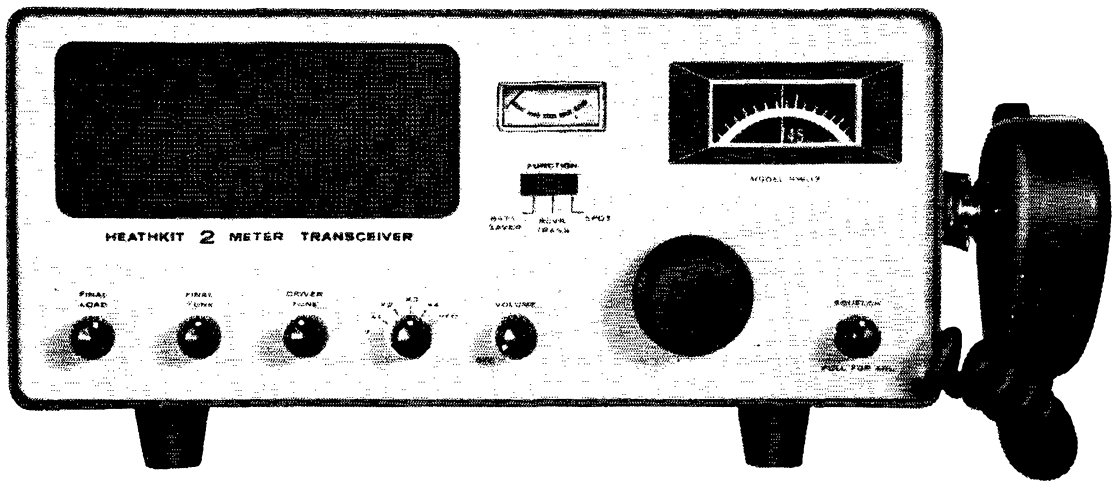

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The Heathkit HW-17 in detail. It's really a separate receiver and transmitter in one compact, versatile package (the only common circuitry are the power supply and the audio output/modulator). Frequency coverage is 143.2 to 148.2 MHz. The solid-state 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 uV 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-Receive/Transmit-Spot switch; rear panel has S-meter Adjust, Headphone 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 14⅛″ W x 6⅛″ H x 8½″ 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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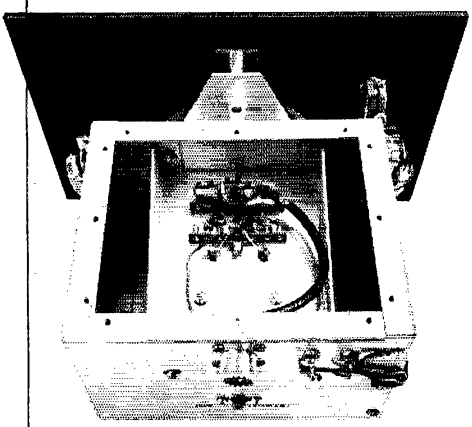
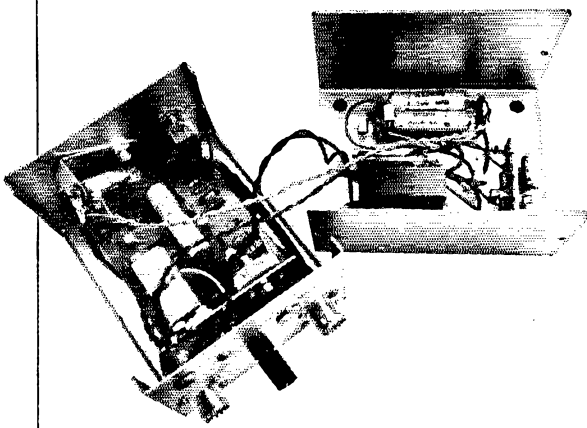


Here's an almost drift-free VFO built around the RCA-3N128 MOS/FET for flexible operation. After just 30 seconds warm-up, it tests out at less than 30 cycles drift in a two hour period.

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