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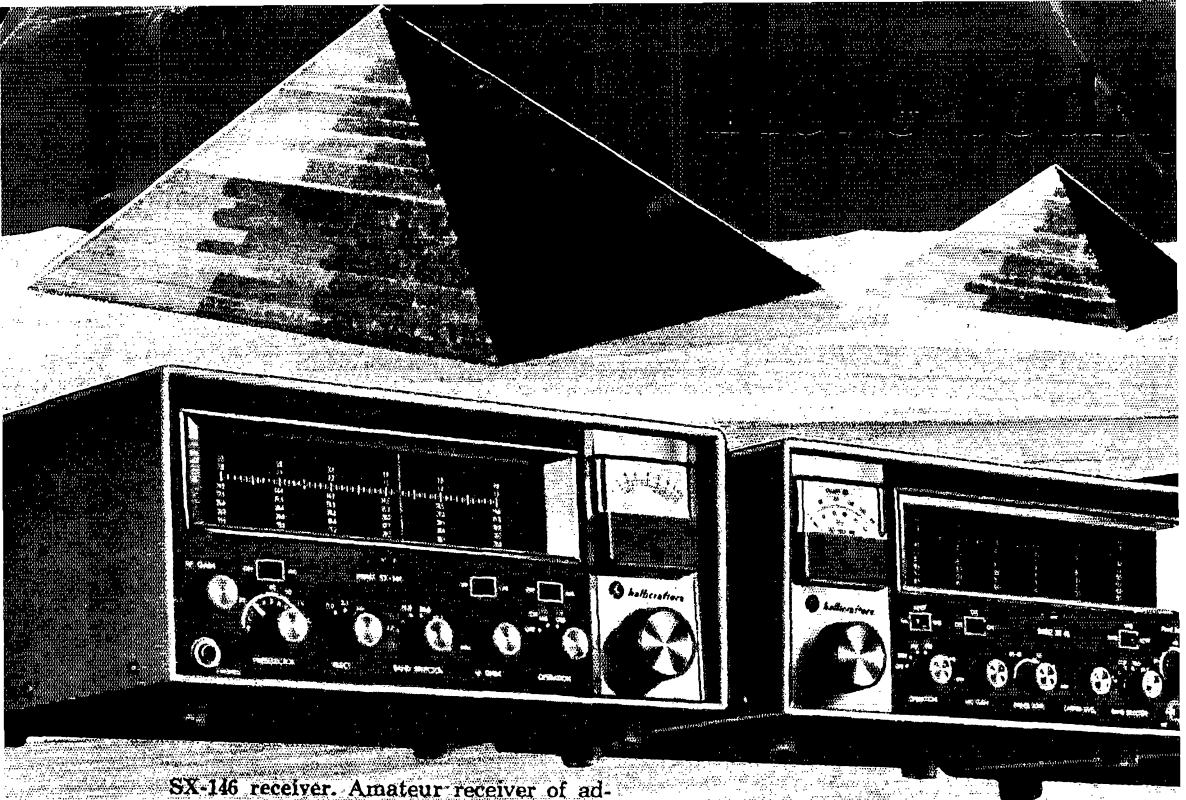
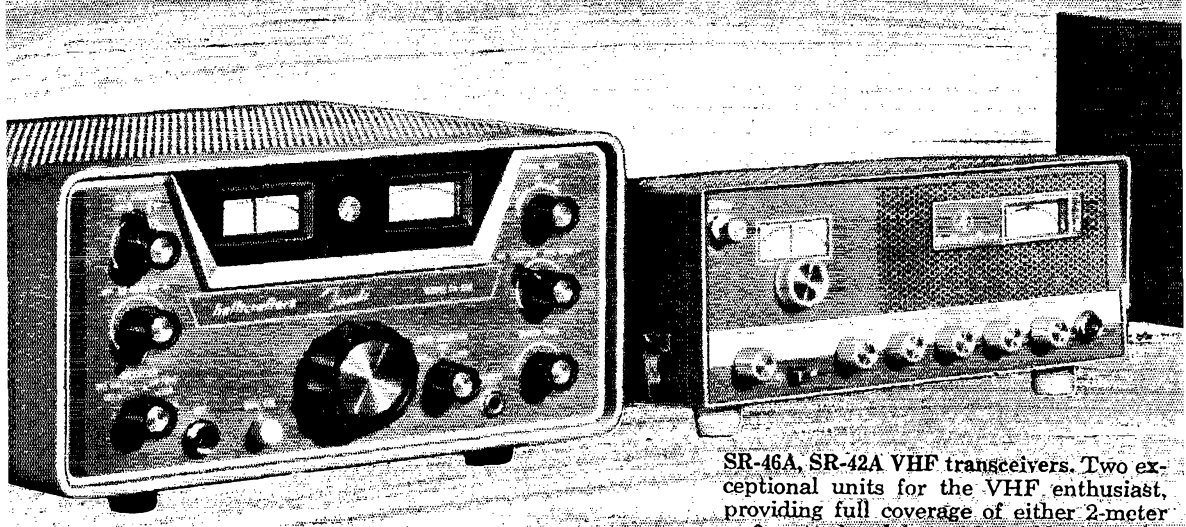


SX-146 receiver. Amateur receiver of advanced design employing a single conversion signal path and pre-mixed oscillator chain for unprecedented frequency stability and adjacent channel-rejection.

HT-46 transmitter. Hallicrafters' great "new breed" transmitter—a five-band twin-brother for the SX-146 that works independently or may be interconnected for transceiving. 180 watts PEP (SSB).



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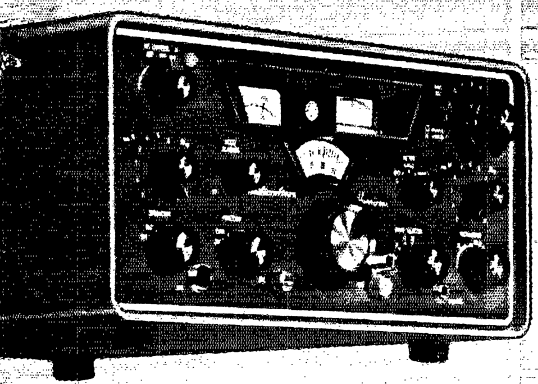

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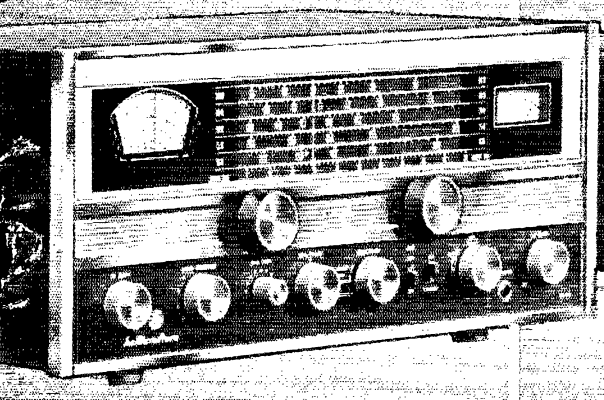

SX-130 general coverage receiver. Very superior sensitivity and selectivity – the ideal general coverage receiver for your ham shack. Excellent reception on SSB, CW or AM. Continuous coverage, broadcast through 31.5 mc.

And now, tomorrow . . . advance preview of the fabulous new SR-540 "Cyclone" transceiver, latest powerhouse in Hallicrafters' great Storm Line of unexcelled transceiver values. Watch for it next month!

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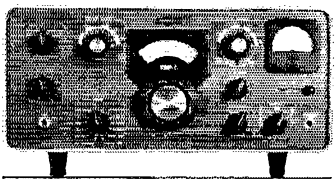

COLLINS

QST

MAY 1966

VOLUME L NUMBER 5

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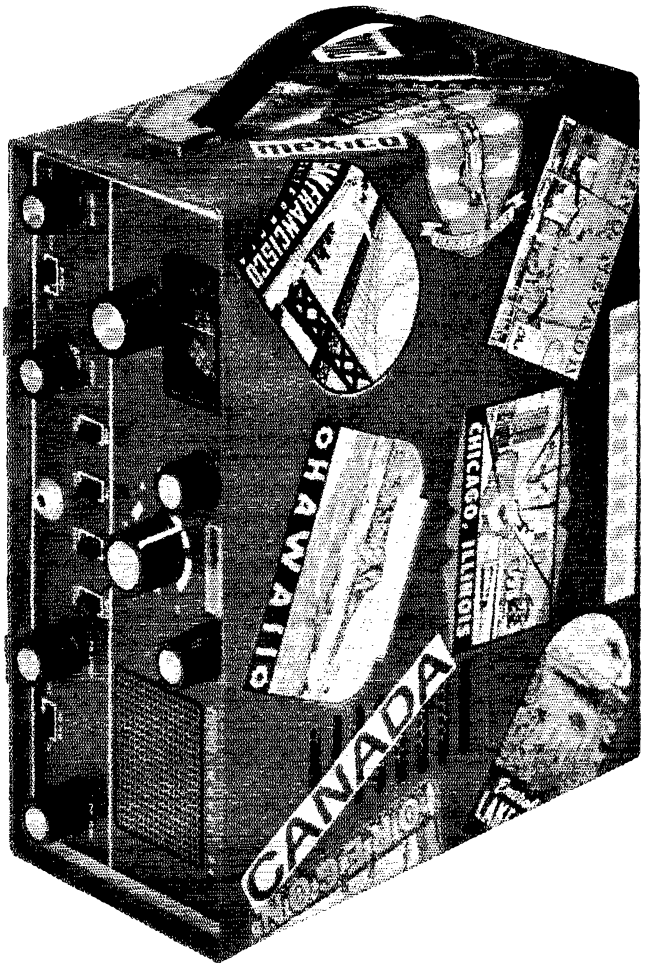

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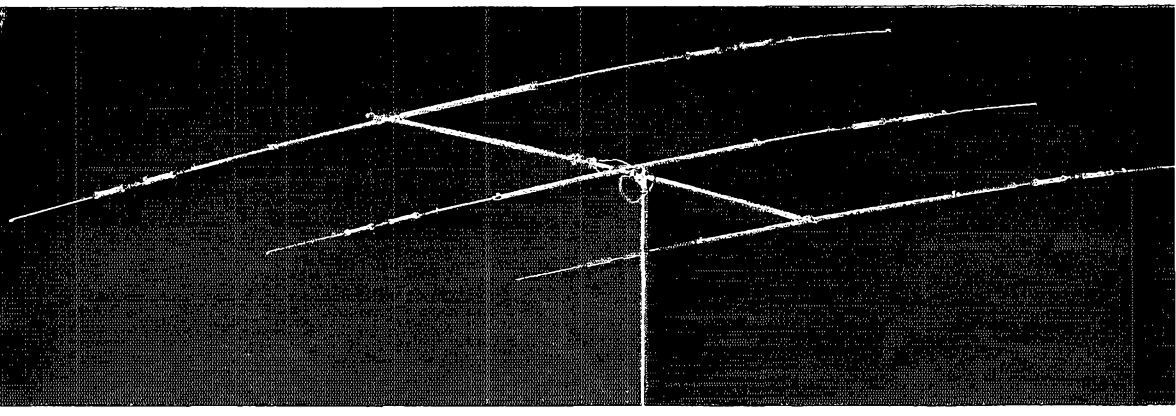

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed *ORS, OES, OPS, OO* and *OBS*. Technicians may be appointed *OES, OBS* or *V.H.F. PAM*. Novices may be appointed *OES*. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

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THE AMERICAN RADIO RELAY LEAGUE, INC.,

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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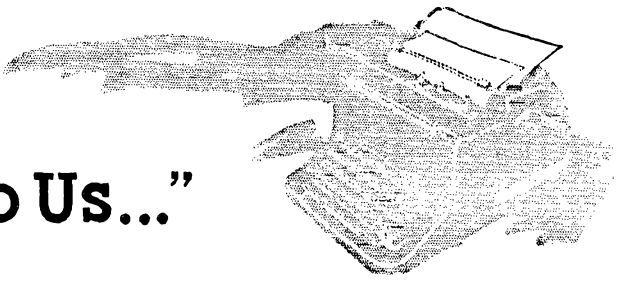


"It Seems to Us..."

THE ARRL INTRUDER WATCH

WOULD it surprise you to know that it is perfectly okay for any commercial station to operate in any of our amateur bands? You bet it would! So read on.

A paragraph of the Radio Regulations, most recently signed at Geneva in 1959, reads as follows:

"Administrations . . . shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations given in this Chapter or the other provisions of these Regulations, except on the express condition that harmful interference shall not be caused to services carried on by stations operating in accordance with the provisions of the Convention and of these Regulations."

Fortunately, most administrations resort to the loophole provided by the above paragraph only when they get in a real bind for a channel to use. With an increasingly-crowded h.f. spectrum, this happens more and more often. Broadcast stations are in amateur (and other) bands; some fixed commercial services are in our bands. We must continue to take the necessary action to protect ourselves; if insufficient complaints are filed on the basis of harmful interference, the intruding station can and will continue undeterred.

A year or so ago the League's long-existing program to oust non-amateur stations from our bands needed stepping up to combat the increasing number of violations. In previous years, requests in *QST*, Communications Department bulletins, etc., brought a few reports for a brief period, but these would soon drop off. So we stole from the Radio Society of Great Britain, which has done an especially competent job in this field, the catchy title of "Intruder Watch," and — resulting from discussion in the Executive Committee — determined to accomplish the program through a smaller but hard-core group of dedicated amateurs. We requested through SCMs, and received, recommendations on active, capable amateurs who would be willing to devote several hours a week to reporting harmful interference to the amateur service.

There are now more than 100 enrolled. We are deeply indebted to *all* these amateurs for the contributions they have made, but we would particularly like to pay tribute to a number who have been active right from the beginning and who have been the mainstays of the program. Our thanks and appreciation to W1NF, W1NZV, WB2TBV, W2VAQ, WA2WBA/Ø, K3FNS, W3KDF, W4MLE, W4MXF, W4OPM, K6KA, W8BU, K8DHJ, W8MSG, W9GFF, KØAZJ and KH6AHZ.

What results?

In the past two years more than 11,000 interference reports have been processed at Headquarters and channeled to FCC. The Commission has a section of its staff assigned to interference problems, and we have — as in years past — received full cooperation. A number of non-amateur stations have already disappeared from our bands since the beginning of our intensified reporting system, resulting from the good work of volunteer amateurs, the coordination at Hq., and the implemetation by FCC. Many sticky cases remain, but even here where success is not promptly forthcoming, the long-range function is to establish a public record of vigilant protection of the amateur bands, so that at future international conferences the intruder nations will not be able to say that their operation in the amateur bands went unchallenged, to rebut their possible argument that "Let's make legal our sharing of the amateur bands, because the amateurs don't seem to mind our being there."

Although a continuing League program for years, the improved "Intruder Watch" is accomplishing an essential task. Is there more we can do? Yes indeed! Other IARU societies are setting up such programs in their countries. But looking at our own case, it seems to us that there must be more than 100 amateurs among our population of some 260,000 amateurs who would be willing to devote a small amount of time each week to the reporting of interference to the amateur service. Remember, we're all in this together, and we need your help. Work off your frustrations by reporting intruders!

Send a postcard to League headquarters today, and volunteer for the Intruder Watch.

QST

COMING A.R.R.L. CONVENTIONS

May 28–29 — Roanoke Division, Natural Bridge, Virginia
May 27–29 — Southwestern Division, Anaheim, California
June 3–5 — West Gulf Division, Arlington, Texas
June 4–5 — Georgia State, Atlanta
June 18–19 — Rocky Mountain Division, Colorado Springs, Colorado
July 2–3 — West Virginia State, Jackson's Mill
September 16–17 — Ontario Province, Niagara Falls
October 15–16 — Hudson Division, Tarrytown, New York
October 21–22 — Great Lakes Division, Muskegon, Michigan

Prospective convention sponsors are urged to check with ARRL Hq. to avoid possible date conflicts.

ROANOKE DIVISION CONVENTION

Natural Bridge, Virginia **May 28–29**

The Roanoke Division ARRL Convention will be held Saturday and Sunday, May 28–29, at the Natural Bridge Hotel, Natural Bridge, Va.

The convention program will include DX, traffic, MARS, antenna and s.s.b. sessions; ladies' activities; a homebrew contest; and a homebrew discussion, at which Joe Galeski, W4IMP, will be the speaker. Other speakers will include Bill Grenfell, W4GF, Chief, Technical and Legal Branch, FCC; Ed Tilton, W1HDQ, V.H.F. Editor, *QST*; and Pete Chamalian, W1BGD, ARRL Communications Dept. staff.

A smorgasbord banquet Saturday evening, offering approximately 75 different items, will be followed by a dance and, at midnight, the Royal Order of the Wouff Hong initiation ceremony.

Natural Bridge Hotel, Motor Inn and Motor Lodge rates are as follows: New Hotel, single — $10 to $13, twin or double — $14 to $16; Motor Inn, $8 to $9 and $11 to $12; Motor Lodge, $8 to $10 and $11 to $13. For more than two persons, add $2 for each additional guest. Tennis and swimming facilities will be available free of charge to hotel guests.

OUR COVER

Three models of the Varimatcher s.w.r. bridge. Construction details for this new design are given on the adjacent page.

Advance convention package is $6.50, which includes registration, banquet and dance. For tickets, reservations or more information, write Roanoke Valley Amateur Radio Club, Box 2002, Roanoke, Va.

WEST GULF DIVISION CONVENTION

Arlington, Texas **June 3–5**

The West Gulf Division ARRL Convention will be held Friday, Saturday and Sunday, June 3, 4 and 5, at the Inn of the Six Flags, in Arlington, Texas.

Convention registration and exhibits will open at 1 P.M. Friday; a pre-convention party will be held in the evening. Saturday activities will begin at 9 A.M., with a general assembly and addresses by Bill Wade, WA5DCH, convention chairman; Rev. William Ryan, WA5BJN; T. H. "Sonny" Gremmett, K5JKN, master of ceremonies; Mayor Vandergriff; West Gulf Division Director R. O. Best, W5QKF; and Major General John B. Bestic, K4BMR. Noon luncheons are scheduled for the ladies, and for MARS, v.h.f. and general interest groups. An afternoon of technical talks and special interest sessions will then get under way. The Grand Ball, at 9 P.M., will be followed by a Royal Order of the Wouff Hong initiation ceremony.

A non-denominational service will be conducted Sunday morning by Rev. William Ryan, WA5BJN. Those wishing to may attend various churches in the area. The ARRL meeting and open forum will be conducted by Director Best at 9:30 A.M., and convention activities will wind up with the banquet at 12:30. The featured speaker will be Clarence Tuska, co-founder and first secretary of ARRL.

Single rooms at the Inn of the Six Flags will cost $8; doubles, $12 and up. Convention package pre-registration is $10 until May 23, $12 after that date. Separate activities: general admission, $2.50; grand ball and banquet, $5.00 each; special interest luncheons, $2.50.

For reservations, pre-registration or more information, write Jay Boswell, WA5KYO, Box 3608, Arlington. Checks should be made payable to the Arlington Radio Club.

GEORGIA STATE CONVENTION

Atlanta **June 4–5**

The Georgia State ARRL Convention is scheduled for Saturday and Sunday, June 4 and 5, at the Lenox Square Auditorium and Mall, in Atlanta. The program will include MARS and net meetings, as well as an antenna clinic and a transmitter hunt. Southeastern Division Director C. J. Bolvin, W4LVV, will conduct the ARRL program, which will include a report on the May Board of Directors meeting.

Main convention housing will be at the Rodeway Inn, 387 Lenox Road N.E., Atlanta. For tickets or more information, write Johnny Fearon, W4WKP, 4165 Club Drive, N. E., Atlanta, Ga. 30319, Phone 237-1261.

THE VARIMATCHER

It's said, "There's nothing new under the sun," and perhaps this is true where s.w.r. bridges are concerned. After all, the field has been well-covered in recent years. Nevertheless, the bridge described in this article represents a new approach, not only in securing better sensitivity from the ham-shack s.w.r. bridge, but also in minimizing the mechanical problems in building such a unit.

An Easily-Reproducible S.W.R. Bridge Featuring Adjustable Impedance

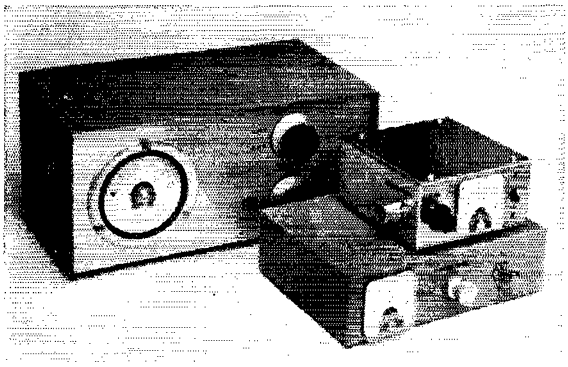
BY DOUG DEMAW,* W1CER

THE "Varimatcher" is an outgrowth of the author's attempt to build an s.w.r. bridge that could be balanced easily and could be duplicated with a minimum of effort. Since it was desirable to have better sensitivity than was common in other bridge types, emphasis was placed on that facet of the project as well.

Four models of the Varimatcher were built and tested. All units performed satisfactorily from 160 through 2 meters and although each model was purposely built with different physical dimensions, line lengths and placement in the cabinets being dissimilar, all four balanced easily and with no fuss. The Varimatcher requires no juggling of resistor values, no pruning or bending of wires to attain initial balance, and no matching of component values other than the diodes. The sensitivity is such that full-scale deflection with a 1-ma. meter will occur on 160 meters when 27 watts of r.f. power is fed through the bridge. A power level of 7 watts will produce full-scale deflection on 3.5 Mc. Progressively less power is needed as the operating frequency is increased.

An additional feature was desired, that being the ability to use the Varimatcher with either 50- or 75-ohm lines without the need for changing the terminating resistors on the pickup line.

* Assistant Technical Editor.



A 100-ohm potentiometer (low-reactance type) used as a termination, and accessible from outside the cabinet, makes it possible to null the bridge for either impedance in a matter of seconds. More on this later.

How It Works

R. f. from the transmitter is applied to the bridge at J_1, Fig. 1. The current flows along L_1 and out through J_2 to the load. The pickup line, L_2, is centered in L_1. Because L_2 is inside L_1, and because the line current does not flow on the inner wall of L_1, coupling between the two takes place only at the ends. This arrangement offers two benefits: The reflected- and forward-power portions of the pickup line, L_2, are divorced from one another physically, resulting in better isolation between the two halves of the pickup element. This contributes to better balance in the bridge. Also, with this construction it has been found that it is unnecessary to tinker with the value of terminating resistance, regardless of the element length or shape. The termination is approximately 51 ohms for 50-ohm lines and 33 ohms for 75-ohm lines.

The bridge in Fig. 2 has an outer conductor, L_3, for the coaxial element (outer channel and L_1) which is necessary to prevent stray coupling between the forward- and reflected-power ends of L_2. The walls of the bridge cabinet in Fig. 3 tend to serve the same purpose.

Some of the forward power is sampled by section A of L_2 and rectified by CR_1. Similarly, the reflected power is sampled by section B of L_2 and is rectified by CR_2. The meter switch, S_1, routes the direct current from CR_1 and CR_2 to the sensitivity control, R_2, and then to the 1-ma. meter. The meter is adjusted for full-scale deflection with S_1 in the FORWARD position by varying the resistance of R_2, and if the line is matched to the load, there will be no reading when the meter is switched to read reflected power. The higher the standing-wave ratio, the greater will be the meter deflection in the REFLECTED position.

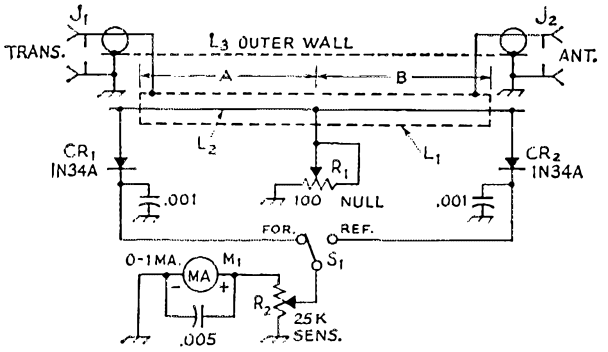


Fig. 1—Schematic diagram of the W1CER Varimatcher. Capacitors are 1000-volt disk ceramic and values are in pf.

CR_1, CR_2—Matched germanium diodes. 1N34A or equal.
J_1, J_2—SO-239 coax fitting.
L_1, L_2, L_3—See Fig. 4.
M_1—1-ma. meter.
R_1—100-ohm, linear-taper carbon control (Ohmite CLU-1011). See text for fixed resistor values.
R_2—25,000-ohm linear-taper control.
S_1—S.p.d.t. toggle or slide switch.

Building the Bridge

Ordinary hand tools can be used for building the Varimatcher. The bridge channel, L_3, can be formed in a bench vise. The ¼-inch diameter copper tube, L_1, can be cut to length with a hacksaw or tubing cutter. The hole in the center of L_1 is made with the narrow side of a flat file. The important consideration when forming the parts of the bridge is to maintain symmetry. The walls of L_3 should be ⅞ inch apart across the entire length of the channel. The center hole in L_1 should be equidistant from the ends of the line. Pickup line L_2 is made from the inner conductor and polyethylene insulation of a piece of RG-59/U coax cable. The ends of L_2 should protrude equally from L_1 (Fig. 4). The connection to R_1 is made by a short length of bus wire (the shorter the better) from the center of L_2 to the center lug on R_1.

The tap on L_2 should be made before the pickup line is inserted into L_1. This can easily be done by cutting away approximately ⅛ inch of the poly insulation at the dead center of L_2 and soldering a 2-inch length of No. 20 bus wire to the element. The bus wire should be folded back against the pickup line and pulled through L_1 until it is visible at the center hole of the copper tubing. It is a simple matter to pull it out through the hole for connection to R_1 after which a few drops of epoxy cement should be placed in the hole. This will insulate the center-tap wire and will anchor L_2 inside L_1, assuring long-term symmetry. (Do not insert L_2 into L_1 until after L_1 is soldered to J_1 and J_2).

The coax fittings, J_1 and J_2, are mounted on one wall of L_3, Fig. 2, and R_1 is at the center of the same wall. L_1 is centered in L_3 and soldered to J_1 and J_2. Fixed resistors can be used in place of control R_1 if only one transmission line impedance is to be used. The resistors should be ½-watt composition units, preferably with 5 per cent tolerance. Normally, the lead length between the fixed resistors and the center of L_2 should be kept as short as possible. The ½-watt resistors showed no evidence of capacitive or inductive reactance that would cause bad effects in the 1.8- to 30-Mc. range but at 50 and 144 Mc., they showed a small amount of capacitive reactance, and some experimenting with the lead length between L_2 and R_1 was required to get a good null. The inductance of the lead between R_1 and L_2 can be used to cancel the capacitive reactance of the resistor at v.h.f. This has no effect on the performance of the bridge in the 1.8- to 30-Mc. range.

Because a 51-ohm ½-watt resistor does not act like 51 ohms at 144 Mc., but more like 56 ohms, the accuracy drops off in the v.h.f. range. An actual s.w.r. on the order of 1.3 to 1 might

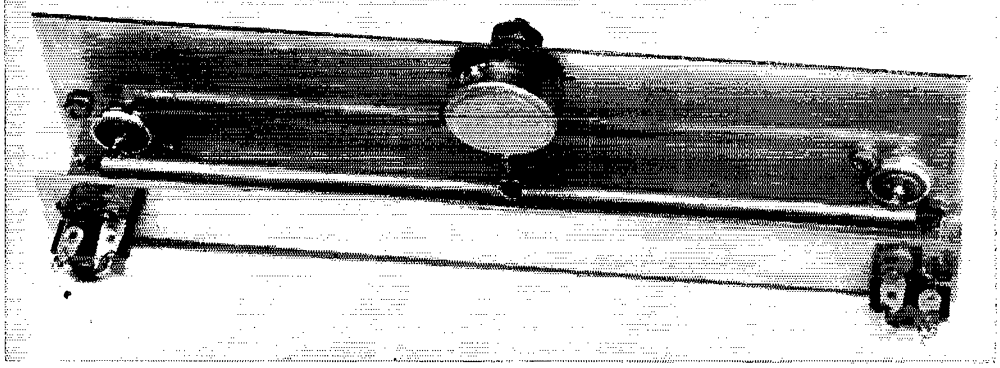


Fig. 2—Bridge element of the Varimatcher. Style of construction permits mounting the bridge in transmitter cabinets, transmatch housings, or individual cabinets. The diode pigtails are routed through the holes in the outer channel and are soldered to the terminal lugs. The 0.001-pf. capacitors are also soldered to the terminal strips at the ends of the channel.

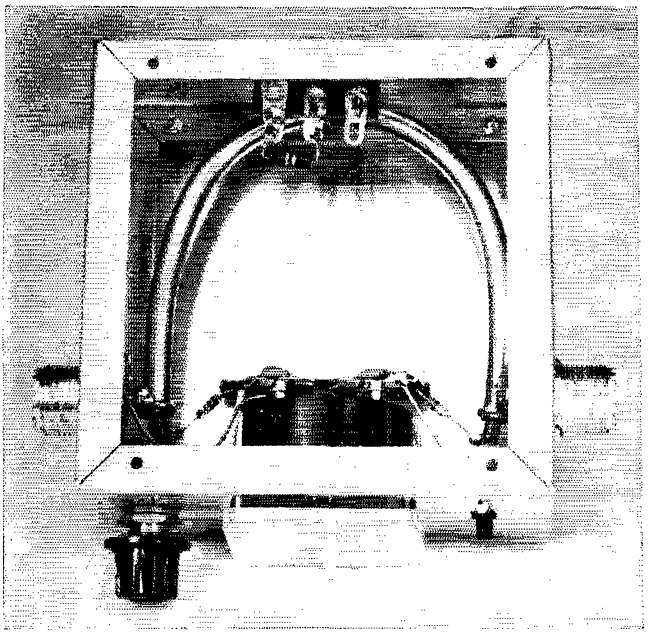


Fig. 3—A miniature version of the Varimatcher. L_1 and L_2 have been bent into a U shape to conserve space. The circuit is the same as Fig. 1 but the length of L_1 has been reduced to 6 inches. The bridge cabinet measures 4 × 4 × 2 inches.

appear to be a ratio of 1:1. Nevertheless, the bridge is accurate enough to be useful for most applications, and is not necessarily any less accurate than other reflected-power bridges used at v.h.f.

The bridge shown in Fig. 2 uses an Allen-Bradley 100-ohm linear-taper control for R_1. Of the many brands tried, the Allen-Bradley (Ohmite) potentiometer was the least reactive. In practice, it compares favorably to the ½-watt fixed resistors used. The bridge of Fig. 1 and Fig. 2 was nulled at 144 Mc. and held calibration over the entire range from 1.8 to 148 Mc.

When soldering CR_1 and CR_2 into the circuit, be sure to grasp the pigtails of the diodes with a pair of long-nose pliers so as to conduct heat away from the bodies of the diodes. This will prevent damage to the units. The wiring from the cathode ends of CR_1 and CR_2 is not critical and can be routed along the sides of the cabinet.

A more compact version of the Varimatcher is shown in Fig. 3. The bridge element is bent into a U shape to cut down on the space required in the box. No outer channel (L_3) is used, as the sides and the bottom of the box tend to serve that purpose. The length of L_1 is 6 inches in this model, but the circuit is the same as that shown in Fig. 1. A 2 × 4 × 4-inch utility box is used to house the bridge and the layout is symmetrical. Details are shown in the photo.

Individual taste will dictate the size and shape of the cabinet for the bridge of Fig. 2, since the length of the bridge element is not critical. The important thing to remember is that the shorter the bridge unit is, the less sensitive it will be, and the less will be the isolation between the reflected- and forward-power sections of pickup line L_2. A 4-inch element was used in the model pictured in Fig. 5. Balancing the bridge at v.h.f. became a bit more troublesome in this model, indicating that this might be a practical limit in miniaturization of the Varimatcher.

Adjusting the Varimatcher

If the bridge is to be used no higher than 30 Mc., it should be checked out on the 10-meter band. A Heath Cantenna or equivalent 50-ohm dummy load should be connected to J_2. The more accurate the termination at J_2, the more accurate the bridge will be. A home-made dummy load, usable at power levels of ½ watt or less, is illustrated in Fig. 6. It is quite accurate from 1.8 to 55 Mc., but at 144 Mc. will show capacitive reactance as in the case of terminating resistor R_1, Fig. 1. As this will cause the bridge to be inaccurate at 144 Mc., an effort should be made to borrow a good 50-ohm termination for 2-meter calibration. If the Vari-

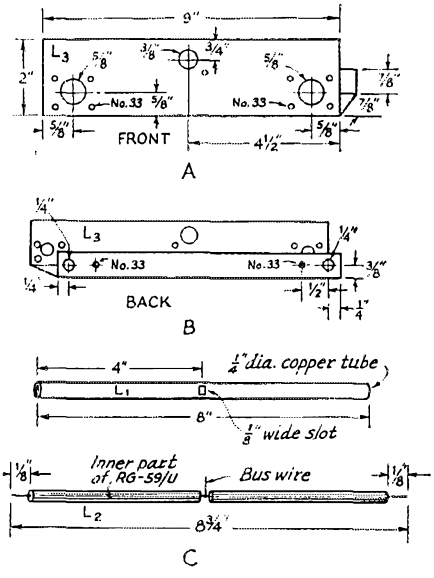


Fig. 4—Layout dimensions for the bridge. At A, the outer channel (L_3). At B, the back side of L_3. Shown at C, the copper tubing dimensions (L_1) and the inner line L_2. L_2 fits into L_1 after the bus wire is soldered to the center of L_2.

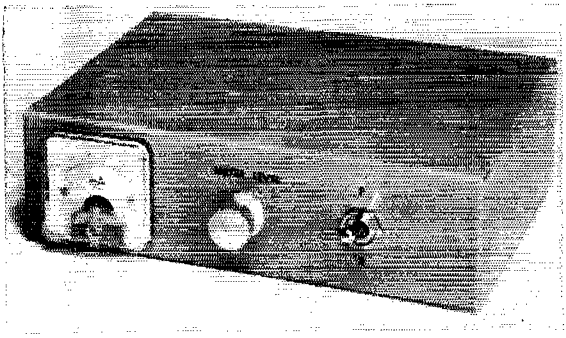


Fig. 5—A mobile model of the Varimatcher, mode to fit under a Heath TWOer or SIXer. The circuit is the same as Fig. 1 but the bridge has been shortened to a 4-inch length. (Built by Chuck Utz, W1DEJ.)

matcher is to be used on 2-meters, the initial checking should be done at that frequency.

With a few watts of power applied at J_1, adjust R_2 for full-scale deflection of the meter while S_1 is in the FORWARD position. Then set S_1 to the REFLECTED position and adjust R_1 for a null in the meter reading. This should be zero deflection when the circuit is working properly. If the bridge is to be set up for use with 75-ohm loads, the procedure is the same but a 75-ohm dummy must be used.

If fixed resistors are used in place of the control at R_1, no tinkering should be required to

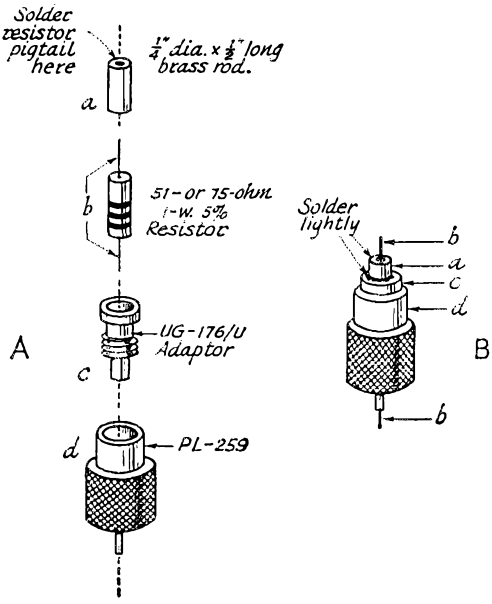


Fig. 6—Details for building a 50- or 75-ohm dummy load for balancing the bridge. This low-reactance load is useful for adjusting R_1 at v.h.f. Do not permit the resistor to become overheated when soldering the unit together. Keep all leads as short as possible. See text for details on the use of this load. (Resistor is carbon).

secure a perfect null in the 1.8- to 30-Mc. range. For 2-meter use, however, the lead length between R_1 and the center of L_2 must be adjusted until a suitable null is obtained.

After nulling the bridge, check again and make sure that full-scale meter deflection occurs in the *forward* position of S_1. Next, reverse the cables at J_1 and J_2, set S_1 to the REFLECTED position, and see if a full-scale meter reading results. If CR_1 and CR_2 are reasonably well matched, the meter readings will match up. If you do not wish to purchase a set of matched diodes, and have a supply of 1N34s on hand, you can select a pair that will work well in the circuit by measuring the front and back resistance of a few of them and picking a pair that are about the same value.

Using the Bridge

The Varimatcher will handle the full output of a kilowatt transmitter. The models described in this article were tested with the author's 2-kw. p.e.p.-input transmitter on all bands from 3.5 to 29 Mc. Additional tests were made on 6 and 2 meters at lower power levels. With R_2 wired into the circuit as shown in Fig. 1, the resistance in series with CR_1 and CR_2, must be *decreased* to maintain a full-scale meter reading as the transmitter power is increased. Table I gives the r.f. power levels required for full-scale meter deflection (1 ma. meter) at maximum sensitivity, for a 6-inch element. The Varimatcher can be used with very low-power v.h.f. rigs for tuning and matching adjustments. A feature which should appeal to the solid-state experimenter. Even greater sensitivity could be realized by substituting a 100-μa. meter for the 1-ma. unit. This should not be necessary, however, for normal applications.

Table I

Power for full-scale meter deflection, L_1 = 6 inches

Band	*Power*
160	22 watts
75	7 watts
40	2 watts
20	0.7 watts
15	0.45 watts
10	0.2 watts
6	0.1 watts

The Varimatcher has many uses. It can be used for mobile, fixed, or portable operation.

If you've put off building an s.w.r. bridge, now might be the time to get the job done. The cost of the Varimatcher is nominal and the unit can be built in a few hours. Don't forget—this is the season for building, repairing and adjusting antennas. The Varimatcher will help you to get that feed line matched to the antenna. QST

A Center-Fed "Zepp" for 80 and 40

Fast QSY for the Phone-C.W. Operator

BY WILLIAM C. GANN,* W4NML

The center-fed "Zepp" antenna is reviewed by W4NML, showing how complete coverage of a single band is made easy by using old concepts. Although the author shows how to use the Zepp on 80 and 40, only, the system can be used from 80 through 10 meters by employing an all-band transmatch.

MULTIBAND antennas fed with resonant feeders were very popular in the pre-coax cable days. This article is presented to review a good, but seemingly forgotten system. This antenna should be of interest to traffic and contest operators, and to the casual operator who likes to use both the c.w. and phone portions of the 80- and 40-meter bands.

Our section s.s.b. net meets on 3965 kc. and the c.w. net meets on 3575 kc. Many schemes were tried to make one antenna usable on both ends of the band so that a low s.w.r. could be maintained while securing efficient operation at the different frequencies. None of the antennas tried would permit an excursion of more than 300 kc. without a serious s.w.r. problem between the transmitter and the line. Getting from 80 to 40 meters with such an antenna was even more perplexing. The writer's dilemma was finally solved by the installation of the old reliable center-fed Zepp antenna.

Choosing the Dimensions

In order to use the antenna on 40, 75, and 80 meters, tuned feeders are required[1]. So that the feeders can be matched to the transmitter, a transmatch is used at the "shack" end of the line. Parallel tuning is used to minimize the complexity of the transmatch. This requires that the transmission line presents a high impedance to the transmatch on both bands.

The charts in the handbooks did not give a set of Zepp antenna dimensions that were suitable for the author's installation. Because of the existing tower, which would permit the antenna to be supported at the 50-foot level, and because the ham shack was adjacent to the tower, the prescribed feeder lengths were not practical. A graph was plotted to show the frequency extremes to which the antenna would be tuned, showing the minimum and maximum impedance points across the bands. It was determined that the combined length of one leg of the feed line and one section of the dipole would be 114 feet.[2] A length of 53 feet was used for the feed line and each leg of the driven element was cut to 61 feet.

To broaden the antenna's response, the driven element's effective area was made larger by paralleling two lengths of No. 12 copper wire as shown in Figs. 1 and 2. With this arrangement, the *Q* of the antenna is lower, permitting the operator to QSY approximately 200 kc. without readjusting the transmatch.

Construction Notes

The driven element and the feed line are made from No. 12 copper wire. The 4-inch wide ceramic spreaders used to hold the feeder wires apart are made by the E. F. Johnson Co. Light-weight poly spacers are used to spread the driven-element wires and are sold as TV "clothespins" by the Telco Co. (Fig. 2). All of the spreaders are attached to the No. 12 wire by short pieces of No.

* 2115 Brookline Dr., Huntsville, Ala.

[1] Center-fed Antennas, *A.R.R.L. Antenna Book*, Chapter 6.

[2] This length is generally 145 feet for operation in the 3.5- to 30-Mc. range when the antenna is mounted horizontally (no droop), away from steel towers, and with a single-wire driven element. — *Editor*

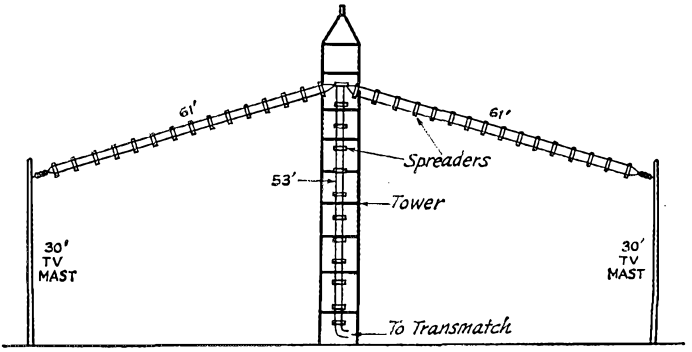


Fig. 1—Layout of the 2-band Zepp antenna. Dimensions for each part of the antenna are shown. Feed point is anchored to one of the wooden support arms (See Fig. 3).

18 copper wire. The distance between the spreaders is 4 feet for both the driven element and the feed line.

Sections of 1 × 4-inch lumber are used to hold the feeders away from the steel tower (Fig. 3). Each piece is 24 inches long, notched at one end, and is fastened to the tower with U-bolts. Porcelain telephone-type insulators are attached to the feed-line end of each board, offering low-loss anchor points for the transmission line. The uppermost support arm, at the 50-foot level, is used as a mount for the center of the driven element.

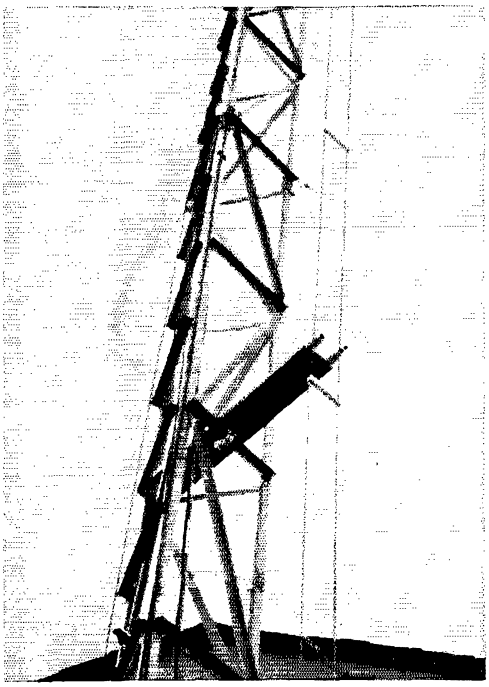


Fig. 3—Wooden support arms hold the transmission line away from the tower. Telephone-type insulators are mounted at the end of each board to make the feed line secure.

The far ends of the antenna are supported by 30-foot TV masts. A pulley and halyard arrangement is used for raising and lowering the ends of the antenna. Because the end supports are not as high as the feed point of the antenna, the dipole has a slight droop, but this does not seem to impair the performance.

The transmission line is brought into the operating position by means of feed-through insulators, mounted on a plywood strip which fits under a partially raised window. Insulated No. 12 house wire is used between the feed-through insulators and the transmatch.

Transmatch

Ideas for the author's tuner (Fig. 4) were taken from the excellent transmatch article by McCoy.[3] Band changing is made possible by a

[3] *QST*, July 1965.

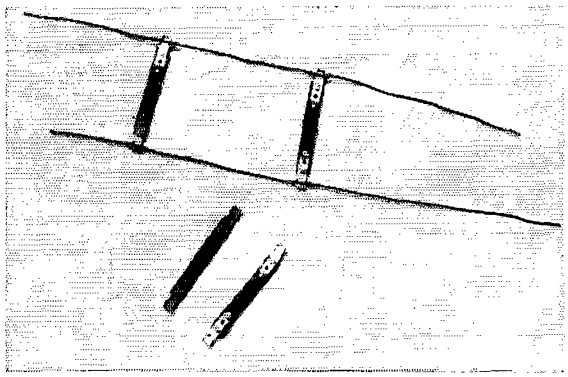


Fig. 2—Details showing how the driven element spreaders are attached to the No. 12 wire. No. 18 copper wire is wrapped above and below each spreader to hold it in place.

large ceramic switch (origin unknown) which was obtained at a hamfest. An identical switch is used for selecting the taps for the feed line (Fig. 5). Coil L_1 contains 56 turns of No. 14 wire, is 3 inches in diameter, and has 8 turns-per-inch (Air Dux 2408T). A stationary link, L_2, at the center of L_1, contains 8 turns of No. 14 wire and is a part of the Air Dux coil from which L_1 is made. The link is tuned with a 300-pf. variable capacitor. The author did not have a unit of the correct type, so two 150-pf. capacitors were parallel-connected (mounted under the chassis). Capacitor C_1 is a 100-pf.-per-section variable with wide spacing. To give L_1 some rigidity, it is mounted on a plexiglass tube which is supported by the frame of C_1 with stand-off insulators.

Results

While using clip leads, the correct tap points for the feeders were found by operating the transmitter through a Collins wattmeter and tuning C_1 and C_2 for zero reflected power. The

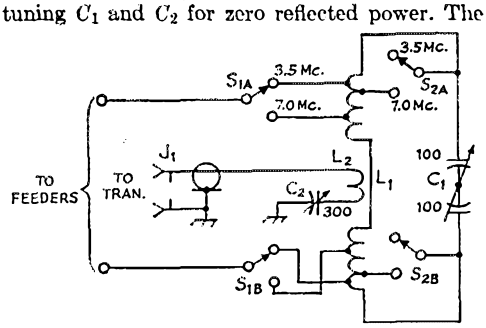


Fig. 4—Schematic diagram of the W4NML transmatch.
C_1—100 pf. per section transmitting variable. (Split stator type with 0.175-inch spacing between plates.)
C_2—300-pf. variable capacitor (0.078 spacing or greater).
J_1—SO-239 coax connector.
L_1—56 turns, 3-inch diam., 8 turns per inch coil. S_1 taps are 9 turns from ends of coil for 80 meters, and are 22 turns from ends of coil for 40 meters. S_2 taps are 5 turns from ends of coil for 80 meters and 17 turns from ends of coil for 40 meters. (Air Dux 2408T or Polycoils 1779 usable.)
L_2—8 turns of Air Dux 2408T (center portion of L_1).
S_1, S_2—Ceramic rotary, 2 poles, 2 positions, 2 sections.

transmatch permitted the transmitter to "see" 50 ohms in any part of either band. After establishing the correct tap points for the feed line, permanent connections were made between L_1 and the switches.

Next, the tuner was used with the 30L-1 amplifier at an output level of 700 watts. After a 30-minute QSO, no evidence of coil heating could be detected.

Results

When compared to other antenna systems used by the author, the new skywire showed improved performance. It was believed that some sacrifice in efficiency would result from changing to the new antenna. Happily, it was found that we could have our cake, and eat it too! Extended use indicated that the performance was, indeed, better than with previous antennas used.

I wish to thank three friends for their help in making this article possible: K4WWN for his tower climbing and photography work, K4ADK for building the transmatch cabinet, and Roy LeCrone for additional darkroom and photographic assistance.

Although this antenna system is an old standard, it may be the answer to your QSY problems. The cost is nominal and the results are most rewarding.

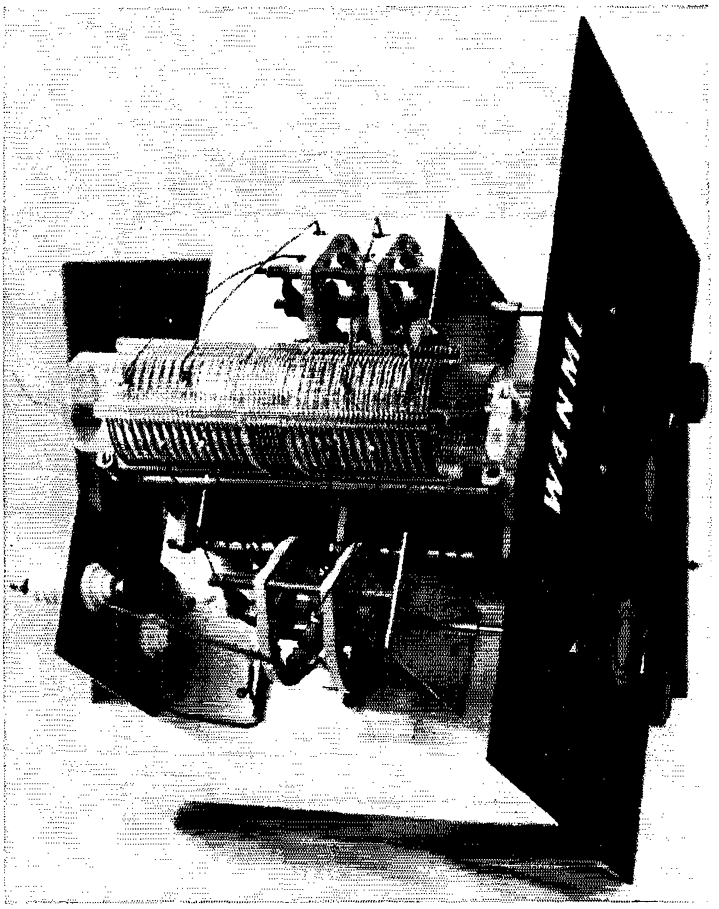
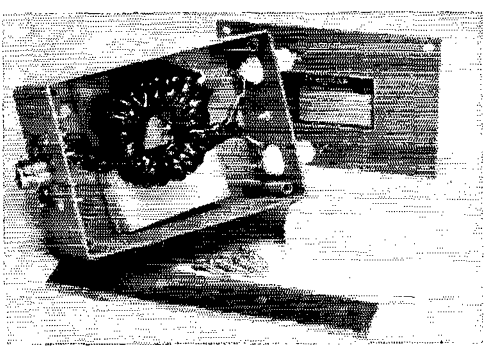


Fig. 5—Top-chassis view of the transmatch. C_2 is mounted under the chassis.

• *New Apparatus*

Broad-band Ferrite Baluns

THE Translab baluns are broad-band ferrite types covering the 2-30-Mc. frequency range. Two models are available, both rated at 2 kw. p.e.p. Model 601 provides a 1:1 ratio to match 50-ohm coax to 50-ohm balanced loads, while model 601A is made for applications that require a 4:1 impedance ratio to match 50- or 70-ohm coax to 200- or 300-ohm balanced loads.



The balun is housed in a 6 × 3¼ × 2½-inch metal box and is electrically insulated from it. A UG-58A/U (type N) waterproof, constant-impedance coaxial fitting is mounted at one end of the enclosure and a pair of ceramic feedthrough insulators at the opposite end. The transformer itself is encapsulated in plastic to prevent moisture penetration and is mounted between two blocks of foam plastic for shock protection. Weight of the entire unit is only 13 ounces.

A fiber glass spreader and mounting hardware, included with the balun, make the assembly usable as the center support of a dipole antenna. In applications where the balun is to be fastened to a boom or a mast, a simple mounting structure (not furnished) must be fashioned from a small aluminum plate and mast clamps. Four mounting holes are located on the back of the box for either type of mounting.

The price for either model is in the $20. price range plus postage, and the manufacturer is Translab Inc., 4754 Federal Boulevard, San Diego, California 92102. — *K1AFC*

THE "STANLEY STEAMER"

A 2-KW. P.E.P. LINEAR AMPLIFIER WITH VAPOR-PHASE COOLING

Get acquainted with a new (in the amateur world, at least) method of cooling high-power tubes. Called vapor-phase cooling, it lets tubes operate at a lower temperature than the more-familiar cooling methods, requires no fans or pumps, and is completely silent in operation. The tube used in the amplifier described here is now commercially available, costs about the same as its air-cooled counterpart.

BY JACK QUINN,* W6MJG

FORCED-AIR cooling is "old hat" to modern radio amateurs who run the maximum power level; during the past decade tubes and components have diminished in size and convection-cooled tubes have given way to forced-air-cooled tubes in amateur gear. In some instances, water-cooled tubes have been featured in specialized equipment. In all cases, however, the nuisance of providing mechanical means of moving the coolant past the tube has been a major headache. Most blowers designed to move appreciable quantities of air have proven to be noisy at best, and a blower with a bad bearing or erratic rotor blades can be intolerable. Thus, by default, high-power operation has come to indicate noisy movement of air past the amplifier tubes.

A recent commercial development in the field of vacuum-tube cooling has been the Eimac vapor-phase cooling system. This article describes this system and illustrates its application in the design of a high-power linear amplifier for amateur service. The few people who have heard of this new cooling technique for transmitting tubes have ignored the principle of vapor-phase cooling by saying, "Oh, that's the system invented by some Frenchman — how can you cool power-grid-tube anodes with boiling water?" Not only can it be done, but in many cases it is far superior to either air or water cooling because it utilizes the highly efficient "latent heat of vaporization" principle.

In 1949 a French engineer, Charles Beurtheret of Compagnie Francaise Thomson Huston (CFTH) in Paris, France, applied the vaporization cooling principle to large external-anode transmitting tubes. He constructed a tube using a thick copper anode with pineapple-like fins, then immersed it in a water-filled boiler. As a result he was able to double the plate dissipation capability over that of a water-cooled tube, and more than triple that of an air-cooled transmitting tube. He also verified his prediction that by using this principle he could build a cooling system that had no pumps, blowers, fans, or, in fact, any moving parts or rotating machinery. Beurtheret's idea resulted in a less expensive, more efficient, and completely-silent cooling system. In 1951 a high-power broadcast station was built and sold to the French Government, the first station to be cooled by steam.

If you have a kilowatt linear, you know how annoying it can be to try to copy a weak c.w. signal over the noise of the air blower in the final amplifier. Most operators tolerate this nuisance as one of the penalties which result from running the legal power limit. When a vapor-cooled amplifier is put into service the major source of noise is eliminated. No motor is required to actuate the cooling system. However, this writer suddenly discovered the noise from the 75-cent fan motor in his exciter now sounded

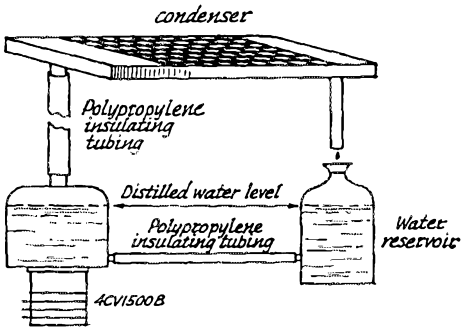


Fig. 1—The vapor-cooling "circuit." Steam generated by boiling water in the tank around the tube anode rises to the condenser, where it is cooled and converted back to water which drips into the reservoir.

*c/o Eimac, Division of Varian Power Grid Tube Division, San Carlos, California.

like a double-decker Greyhound bus in the Holland Tunnel! A pair of wire cutters quickly solved this last remaining objection. Then silence reigned supreme.

How Vapor-Phase Cooling Works

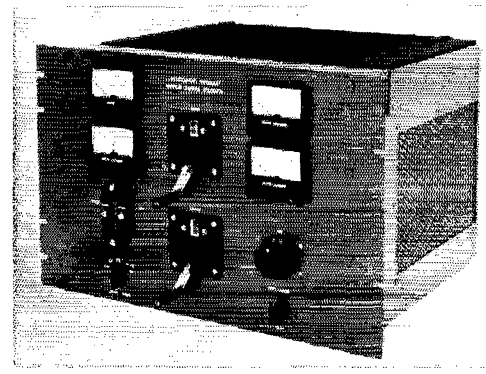
Conventional cooling systems have used forced air or circulating water as a heat-transfer medium. However, these methods have their limitations. Vapor-cooling of power tubes owes much of its appeal to its high heat-transfer efficiency, as shown in the following summary.

Comparison of Cooling Methods

Air — In a forced-air cooling system, air is forced past the external anode fins of the tube to absorb and dissipate the heat. Air is a relatively poor heat conductor, however, and in terms of power densities, forced-air systems are capable of removing only about 50 watts of power per square centimeter of effective internal anode area.

Water — Higher power densities are practical in water-cooled systems. Typically, circulating water removes approximately 100 watts per square centimeter. Thus, a power tube using circulating water as a heat-transfer medium is capable of approximately twice the plate dissipation rating of its air-cooled counterpart. Water temperature must be limited, however, so that steam is not generated inside the tube water jacket, causing localized hot spots which may destroy the tube. In practice, the temperature of water leaving the tube is limited to 70° C. to preclude the possibility of spot boiling. This heated water is then passed through a water-to-air or water-to-water heat exchanger where it is cooled to approximately 40° C. before being pumped over the tube anode again.

Vapor — Vapor-phase cooling systems eliminate some of the disadvantages of both systems by exploiting the latent heat of vaporization of water. Raising the temperature of one gram of water from 40° C. to 70° C. (as in a water system) requires 30 calories of energy. *Transforming one gram of water at 100° C. to steam vapor requires 540 calories.* In a vapor-cooling system, a given quantity of water will remove nearly *twenty times* as much energy as in a water-cooling system. Power densities as high as 500 watts per square centimeter of effective internal anode surface at atmospheric pressure have been attained through vapor-phase cooling. A typical vapor-phase cooling installation consists of a tube with a specially designed anode immersed in a "boiler" filled with distilled water (Fig. 1). When power is applied to the tube, anode dissipation heats the water to 100° C.; further applied energy causes the water to boil and to be converted into steam vapor. The hot vapor is passed through a condenser[1] where it gives up its energy and is converted back to the liquid state. This condensate is then returned to the boiler, completing the cycle.



Apart from the relay-rack panel and chassis, the vapor-phase-cooled 4CV1500B amplifier departs from the conventional in appearance. On top of the enclosure is a heat radiator constructed along the same lines as a car radiator. The water-level indicator and counter dials lend a different touch to the panel layout. Capable of an easy kilowatt average-d.c. input, the amplifier is silent in operation and the tube actually runs cooler than its air-cooled equivalent would with forced-air cooling.

[1] A capacitor stores electrical energy. A *condenser* converts steam to water.

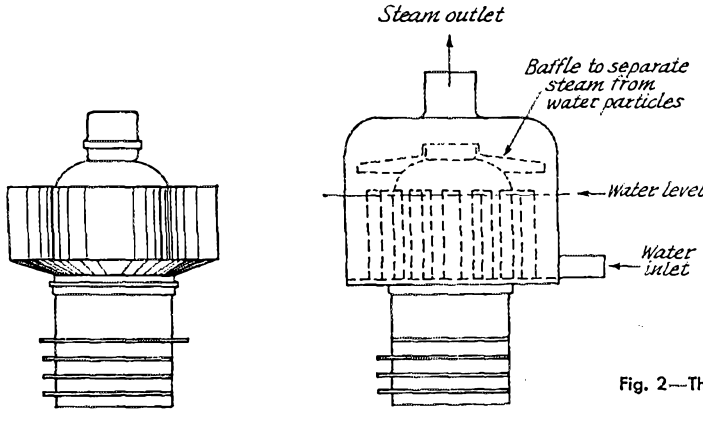


Fig. 2—The "boiler" for the 4CV1500B.

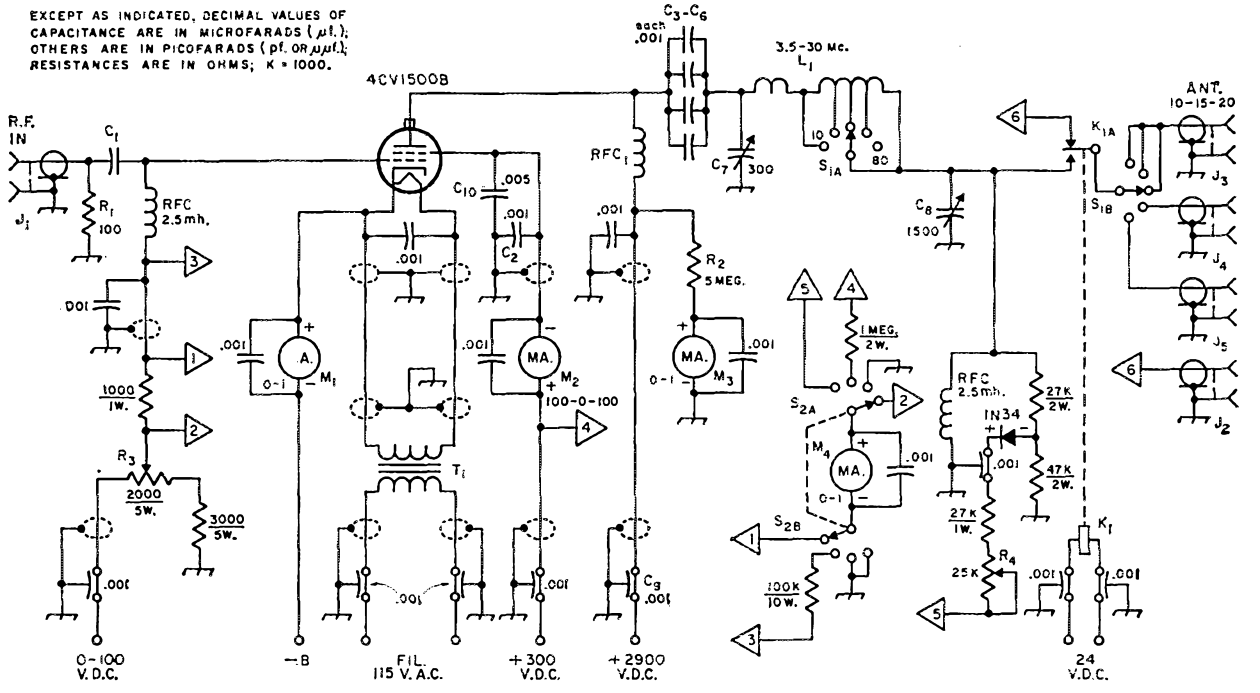


Fig. 3—Circuit diagram of the 4CV1500B amplifier. All 0.001-μf. feed-through type capacitors not listed below are 500-volt rating (Erie CK70AW-102M or equivalent); other 0.001-μf. capacitors are disk ceramic, 500 volts.

C_1-C_6, *inc.*—0.001 μf., 4000 volts (Centralab 858S).
C_7—300-pf. vacuum variable, 5000 volts (Jennings UCSL).
C_8—1500-pf. vacuum variable, 3000 volts (Jennings UCSL).
C_9—0.001-μf., 4000-volt feed-through (Erie type 2498).
C_{10}—0.0015 μf., 400 volts (part of Eimac SK800B air-system socket).
J_1, J_2—Chassis-mounting coaxial connectors, BNC.
J_2, J_3, J_4—Chassis-mounting coaxial connectors, UG-58A/U or SO-239).
K_1—Vacuum relay, s.p.d.t., 24-volt d.c. coil (Jennings RJ1A).
L_1—Turret tank inductor (B & W 852).
M_1—0-1 d.c. ammeter (Weston 1921).
M_2—Zero-center d.c. milliammeter, 100-0-100 (Weston 1921).
M_3, M_4—0-1 d.c. milliammeter (Weston 1921).
R_1—100 ohms; two 50-ohm, 25-watt noninductive resistors in series.
R_2—5 megohms, 10 watts; five 1-megohm, 2-watt resistors in series.
R_3—2000-ohm, 5-watt linear control.
R_4—25,000-ohm linear control.
RFC_1—500-ma. plate choke (B&W 800).
S_1—Part of L_1 (see text).
S_2—Rotary, 2 poles, 1 section, 5 positions (4 positions used).
T_1—Filament transformer, 6 volts, 10 amp.

A Vapor-Cooled Tube

The new highly-linear 4CX1500B was chosen as an experimental vapor-cooled tube. Heavy vertical copper fins were first brazed to the bare anode of the tube, then an integral boiler with the same outside diameter as the regular air-cooled fin radiator was affixed to the tube. A distilled-water inlet of ¼-inch copper tubing was installed at the base of the boiler and a 1-inch diameter steam outlet was placed in the top (Fig. 2).

The 4CX1500B is a recent version of the well known 4CX1000A with improved intermodulation distortion characteristics of at least −40 db. 3rd-order at 1 kw. It has the same external dimensions and appearance; however, the internal geometry has been optimized using new computer design techniques. This new vapor-cooled version has been designated the 4CV1500B. Had a larger boiler been employed, the anode dissipation could have been rated at 3 kw. However, in amateur service this rating could not have been utilized. It was desirable to keep the boiler diameter to a minimum, hence the more than ample 1500-watt dissipation rating. Any standard external-anode tube type could be made with the vapor-phase-cooled anode. The 4CV1500B was chosen only as a vehicle to demonstrate the principle.

The "Stanley Steamer" Circuit

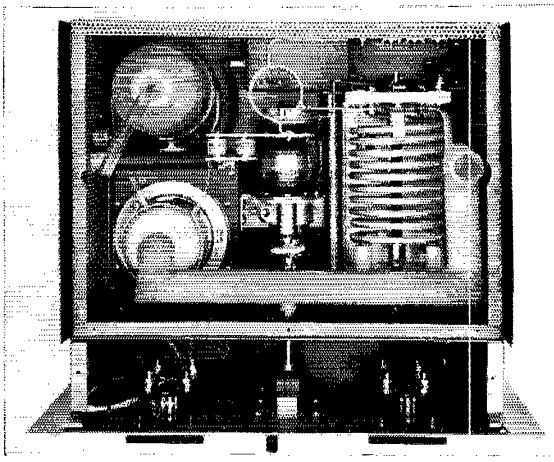
The circuit and layout of the "Compact AB_1 Kilowatt"[2] amplifier by Ray Rinaudo, W6KEV, was used as the design for the vapor-phase cooling amplifier. It is difficult to improve upon the parts, layout, and circuitry which Ray designed.

Under typical operating conditions this AB_1 linear amplifier has an *average* input of 1000 watts, which results in approximately 400 watts of plate dissipation, assuming 60% plate efficiency. This heat causes the water surrounding the anode to change to steam. Under a slight positive pressure, the steam flows up through the polypropylene plastic insulating tube to the condenser mounted in the lid of the amplifier.

The energy from the steam is dissipated by the convection-cooled radiator and the steam is changed back into the water, or liquid, state. The water then flows by gravity into the plastic reservoir. This reservoir and the 4CV1500B integral boiler are connected together by means of a ¼-inch plastic tube to provide the return input water path and to complete the cycle. The water level in the tube boiler is, of course, dependent upon the level in the reservoir. The level gauge on the front panel is connected to the reservoir and provides a visual check of the system.

Pyrex or polypropylene plastic tubing is utilized for the water inlet and steam outlets, providing d.c. and r.f. isolation between the tube anode and ground. A one-quart plastic container is used to store the distilled cooling water. The water level can vary by as much as ½ inch over

[2] Article published in the November 1957 *QST*.



The plastic water pipe helps give the interior of the amplifier the look of a piece of power-house equipment. The water reservoir is in the upper left corner in this view. The radiator, which connects to the plastic tube at the left and the pipe opening at the right, covers this equipment in regular operation.

the length of the anode surface and still supply ample cooling. In actual practice it has been found necessary to add only a few ounces of water every four to five weeks of normal operating time.

A steam condenser, Model #E-56073, measuring 11½ x 16½ x 2 inches, was obtained from the Liberty Radiator Core Company, 250 14th Street, San Francisco, California. It is constructed in the same manner as that of an automobile radiator using several straight-through parallel paths, and is made of copper parts silver-soldered together. Brass or soft-soldered parts should not be used in vapor-cooling systems as the steam will attack such materials. These impurities will contaminate the cooling water and cause high d.c. leakage current. This leakage promotes electrolytic action which in turn attacks the brass or solder joints and results in water leakage. If copper is chosen for all materials which come in contact with the water or steam, none of foregoing difficulties will be encountered. These basic rules have been used over the years in water-cooled systems.

The condenser also forms the r.f. shield and top lid of the amplifier and is cooled by natural air convection. It is capable of fully condensing steam up to anode dissipation levels of at least 600 watts. The condenser is mounted with the steam inlet end slightly elevated over the water outlet end so that the water drains easily back into the reservoir. As mentioned previously, no pumps, fans or blower are required. It is a straightforward, simple, efficient and absolutely silent cooling system.

Many air-cooled ceramic-metal tetrodes are rated at a maximum anode core or seal temperature of 250° C. For longer tube life, most equipment is designed to operate below this maximum, with typical temperatures ranging between

Table 1

RECOMMENDED OPERATING CONDITIONS

Plate Voltage	2900 v.d.c.	2500 v.	2000 v.
Plate Current (static)	300 ma.	300 ma.	300 ma.
Screen Voltage	225 v.	200 v.	225 v.
Control Grid Bias	−34.0 v.	−31.5 v.	−37.0 v.
Plate Load Resistance	2200 ohms	2200 ohms	1600 ohms

R.F. Output Impedance = 52 ohms
Filament 6.0 v. a.c. at 10 amp.

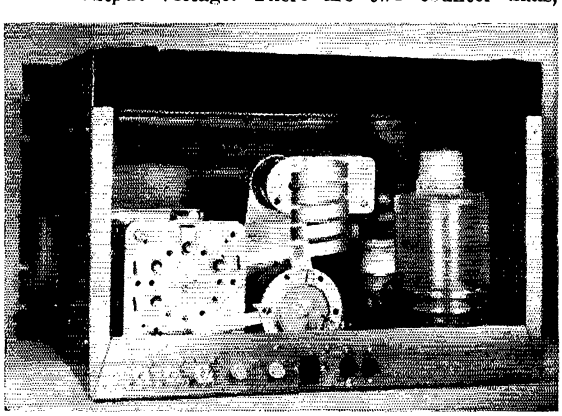
R.F. drive should be adjusted in all cases to a plate-current level of 1 kw. input on c.w. or 2 kw. p.e.p. on single sideband.

150 and 200° C. A properly designed vapor-phase-cooled anode at rated dissipation operates at between 100 and 115° C. maximum. Strange as it may sound, a steam-cooled anode actually runs cooler than most air-cooled tubes.

Amplifier Construction

The front is a standard dural aluminum relay-rack panel measuring 12¼ x 19 x ⅜ inches. The cabinet is 16½ inches wide, 12 inches high and 15 inches deep. A 3-inch section directly behind the front panel furnishes a shielded enclosure for the meters, filament transformer, bias control, meter switch, and water-level indicator as well as the pi-network input and output dial mechanisms. To eliminate TVI, shielded conductors pass from the terminal box at the rear of the cabinet through 1000-pf. feed-through capacitors, then through ½-inch conduit to the section behind the front panel and to the 4CV-1500B tube subchassis.

The front panel contains four 3-inch square meters (Weston Model 1921, black bakelite case). Three are used for monitoring plate and screen currents and plate voltage. The fourth is a 0-1 milliammeter which can be switched to read control-grid current, bias voltage, screen voltage, or to sample the rectified 50-ohm r.f. output voltage. There are two counter dials, for tuning the input and output capacitors of the pi-network. A band switch, bias control, meter switch, and water level gage complete the front-panel layout.



The rear view shows the radiator in place at the top, with the reservoir at the right and the amplifier tube partly concealed by it. The plate tank coil and vacuum variables are easily recognized.

The schematic and parts list in Fig. 3 shows that the r.f. input circuit is untuned and utilizes a 100-ohm 50-watt noninductive wire-wound resistor. Amplifier neutralization is not required when terminating the r.f. drive into this resistor, and amplifier stability is excellent. Only 15–20 watts peak drive is required to produce the full 1-kw. average or 2-kw. p.e.p. input power. A standard r.f. attenuator pad should be used between a 150–200 watt exciter and the amplifier input circuit.

The plate tank is a B&W Model 852 inductor with a "piggy-back" rotary switch coupled to the shaft to automatically select the proper antenna. (This switch was added after the photographs were taken.) Coax connectors are provided on the rear of the cabinet to accommodate 10-15-20-, 40- and 80-meter antennas. A Jennings Model RJ1A vacuum switch serves as the antenna change-over relay to feed the proper antenna back to the receiver. No forced-air filament-seal cooling is required for the tube as it too, is cooled by natural convection and operates at less than 200° C. if proper ventilation is provided.

The tube socket is mounted on a subchassis plenum box. The amplifier is rack mounted, and the area directly under the tube subchassis is open, serving as the air intake. A piece of perforated aluminum covers this opening. Care should be taken in furnishing sufficient air to maintain seal temperatures at or below 200° C. "Templac" colored wax painted on these areas will indicate the temperatures.

This 4CV1500B linear amplifier is the ultimate in amateur equipment. The low-intermodulation-distortion tetrode produces a sharp, clean transmitted signal. The elimination of the air blower noises enables the amateur to receive weak DX signals in the complete silence of the ham shack.

A special debt of gratitude goes to Bob Sutherland, W6UOV, for the use of his shop tools in making the various brackets and cabinetry and for his assistance and words of encouragement.

QST

A Transistorless 300-Watt Mobile Power Supply

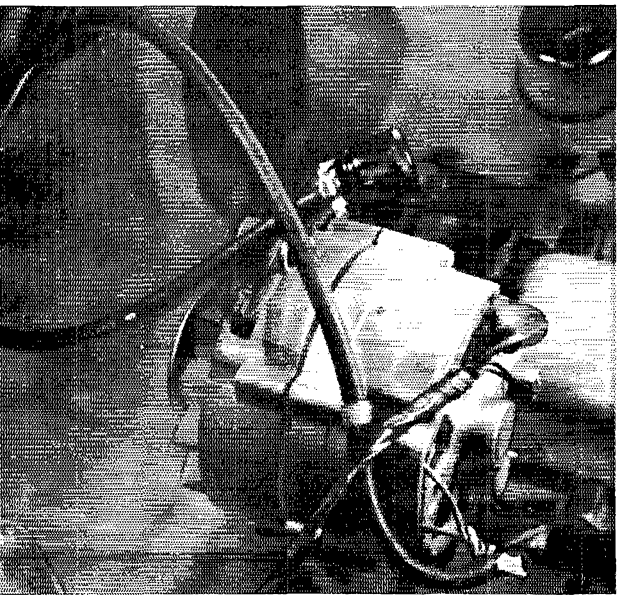
BY FRANK A. EXUM,* WØGIL, and IRVIN D. JOHNSON,** KØHLZ

With the expanding use of the alternator-rectifier system for keeping the car battery charged, the design and construction of mobile power supplies for communications gear begins to parallel ordinary line-powered practice.

THE mobile power supply described in this article operates from a standard automobile alternator and produces d.c. operating voltages directly from the three-phase, 14-volt input.[1] This method eliminates the need for expensive power-consuming, low-voltage rectification and chopper transistor stages. Furthermore, voltages produced by this supply are essentially independent of engine speed and load. The efficiency realized is higher than for other types of mobile supplies. The supply can be built using new parts for about half the cost of a conventional transistorized power supply of equivalent rating. Even further savings can be realized by raiding the junk box and browsing through the local surplus store.

Obtaining The Three-Phase Input

The 1965 Chevrolet in which this supply is used is equipped with a stock 55-amp. Delcotron alternator. The six rectifier diodes which provide the d.c. output for normal automobile requirements are mounted on the rear shell of the alternator case. The three-phase a.c. output from the alternator windings must be obtained by removing the rear half of the case and making connections to the three machine-screw terminals. These wires can easily be routed through existing openings in the case. The output cable should be securely clamped to the alternator case.



Reassembly of the alternator is not difficult, but requires some care. The brushes and springs must be placed within the inside of the case and held in position during reassembly. A small slot is located in the rear shell just above the rear shaft bearing, and a special tool is normally inserted at this point to hold the brushes in place temporarily. Lacking this tool, a short length of wire was used. The brushes were inserted and the wire was routed through the slot and completely around the case. The ends of the wire were twisted together to maintain tension and hold the brushes in place. The rear shell of the alternator was then mated to the front half, but was not quite seated. At this point the wire was carefully removed, allowing the brushes to drop into place. Finally, the shell was seated and bolted, completing the installation.

* 6820 S. Clermont Street, Littleton, Colorado.
** 5725 S. Lakeview Street, Littleton, Colorado.

[1] A similar system has been described by Jennings ("Three-Phase Power Supply for Mobile Use," January 1956 *QST*), using a specially-built transformer designed for high-frequency a.c. — *Editor.*

Fig. 1—The "modification" of the alternator consists only of bringing three leads out from the three-phase a.c. terminals. In the installation described, these leads go to a cable-mounting plug which connects the 3-phase a.c. to the power unit shown in Fig. 3.

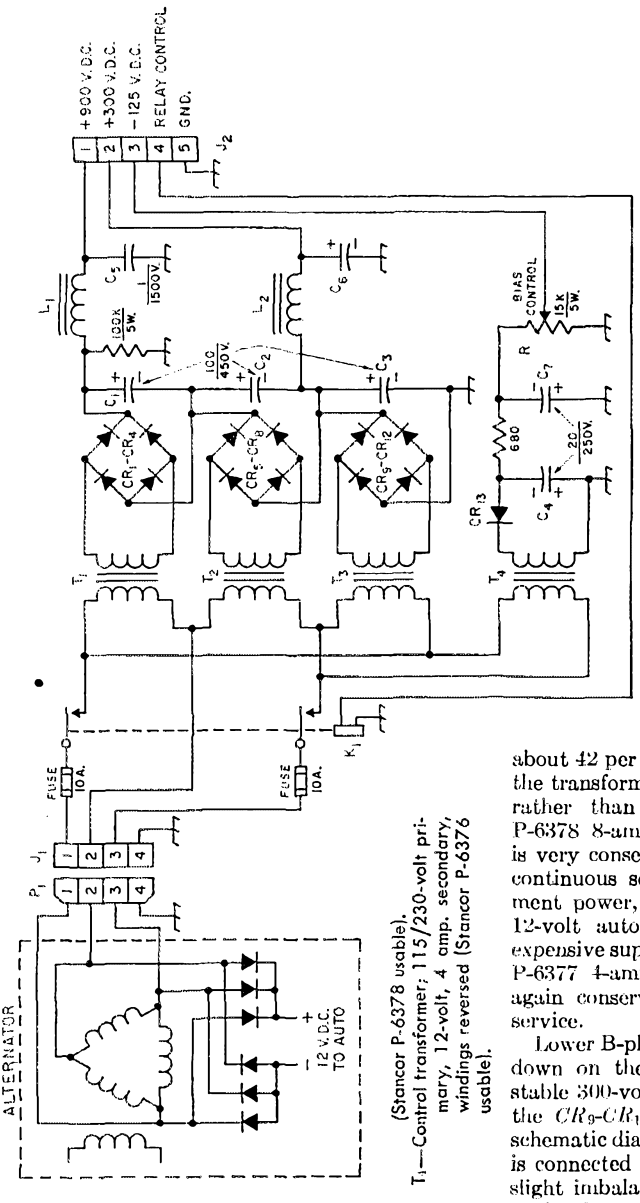


Fig. 2—The power-supply circuit. All capacitors are electrolytic and capacitances are in μf. Resistances are in ohms; K = 1000. Except as indicated, fixed resistors are ½ watt.

C_6—100 μf., 450 volts.

CR_1-CR_{12}, incl.—Silicon diodes, 600 p.i.v., 750 ma.

CR_{13}—Silicon diode, 400 p.i.v., 200 ma.

J_1—4-contact male chassis-mounting connector (Amphenol 86-CP4).

J_2—8-contact socket (Amphenol 78S8).

K_1—D.p.s.t. relay, 12 volts d.c. with 10-amp. contacts (Potter and Brumfield PR5DY usable).

L_1, L_2—2.8-henry 300-ma. smoothing choke (Stancor C-2334 usable).

P_1—4-contact female cable-mounting connector (Amphenol 78-PF4).

R—Wire-wound control (Mallory VW-15K or equivalent).

T_1, T_2, T_3—Control transformer; 115/230-volt primary, 12-volt 8-amp. secondary, windings reversed; see text

T_4—Control transformer; 115/230-volt primary, 12-volt, 4 amp. secondary; windings reversed (Stancor P-6376 usable).

(Stancor P-6378 usable).

Operation

Ideally, the transformers shown in the circuit of Fig. 2 would have 12-volt primaries and multiple taps on their high voltage secondaries. Practically, however, there are no such transformers generally available. The transformers used in this design should be satisfactory for most applications. They are standard control transformers with 115/230-volt primaries and 12-volt secondaries. They are installed using the 12-volt secondary as a primary. The 115/230-volt windings are connected to bridge rectifiers and the outputs of these are connected in series.

A variety of voltages can be obtained without resort to power-consuming voltage dividers by selecting either the 115-volt or the 230-volt secondaries of the transformers. The maximum voltage obtainable should be about 900 volts, and this can be reduced in increments of 150 volts by substituting the 115-volt for the 230-volt windings. An overall reduction in voltage of about 42 per cent can be obtained by connecting the transformer primaries in "Y" configuration, rather than in "delta." Using the Stancor P-6378 8-amp. transformer, the power supply is very conservatively rated at 300 watts under continuous service. This does not include filament power, which is taken directly from the 12-volt automobile supply. A somewhat less expensive supply can be built around the Stancor P-6377 4-amp. transformer which will deliver, again conservatively, 150 watts in continuous service.

Lower B-plus voltages are obtained by tapping down on the bridge rectifier outputs. A very stable 300-volt supply is obtained at the top of the CR_9-CR_{12} bridge rectifier, as shown in the schematic diagram, Fig. 2. A separate bias supply is connected across one phase of the input. The slight imbalance between the loads on each leg of the three-phase supply does not affect voltage regulation noticeably.

Filtering is accomplished by a capacitor-input, pi-section filter for each supply voltage. Because the a.c. input is relatively high frequency (about 180 c.p.s. at engine idling speed), consists of three phases, and has a somewhat flat-topped waveshape, the ripple at the rectifier output is quite low. With the filters the ripple is less than one per cent.

The voltage regulation of this supply is excellent. With a load of 150 watts, the output varies less than one per cent from idling to high engine r.p.m. At the full load of 300 watts the variation is less than five per cent over the full range of engine speed.

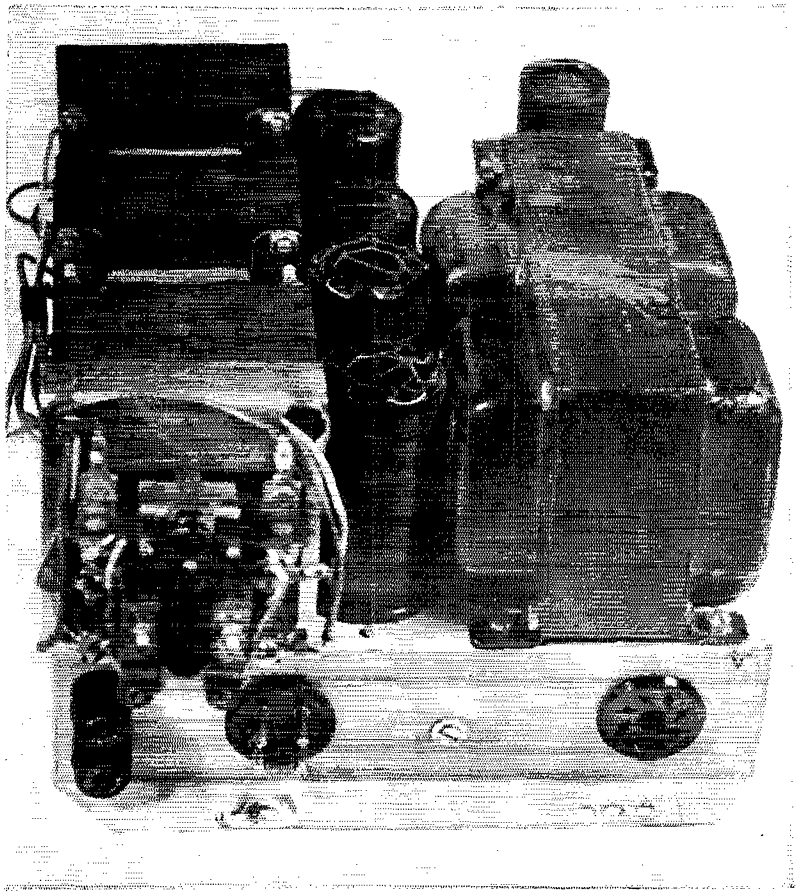


Fig. 3—Regular chassis mounting is used for the four transformers, rectifiers, filter capacitors, and diodes. The relay and remaining components shown in Fig. 2 are also on this chassis. Note that the capacitors are covered with electrical tape for preventing accidental contact with the metal cans.

Construction

The parts arrangement is shown in Fig. 3. A 9 × 10 × 2-inch chassis was used to permit installation in a niche behind the automobile headlight. A slightly larger chassis would have been more convenient, but the arrangement of parts is not at all critical and an unlimited number of chassis shapes could be devised to fit various places in the automobile. Normal construction practices for mobile equipment should be followed. The cans of capacitors C_1, C_2, C_4, and C_7 are at dangerous potentials and should be insulated.

Operation

A 12-volt s.p.d.t. relay is provided to turn the supply on and off. Because this power supply requires no warmup time before delivering its rated output, it is suggested that provision be made to prevent the application of high voltage prior to applying filament voltage to the equipment. A simple system for doing this is shown in Fig. 4.

Of course it is obvious that the engine must be running for the power supply to operate. There are some who might consider this to be a disadvantage. If you have ever found yourself stranded on a lonely road with a dead battery, you might care to disagree! QST

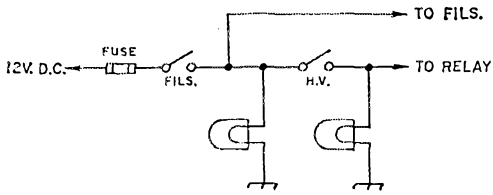


Fig. 4—Simple control system for permitting tube heaters in receiver and transmitter to be turned on before high voltage is applied.

Strays

A convention caravan is being organized by the Copperstate Roadrunners for amateurs living in Arizona who are planning to attend the ARRL Southwestern Division Convention. Departure will be at 0600 on the morning of May 28 and communications will be maintained along the way on both 75 and 6 meters. Any amateurs interested in participating should contact K7UTX or K7VOR for further details.

—•••—

Field Day this year is June 25-26. FD forms are ready now. Request yours early.

• Beginner and Novice

Is One of These Your Problem?

Some Frequently Asked Questions and the Answers

BY LEWIS G. McCOY*, W1ICP

In requests for technical help from both Novices and General class hams some problems appear to be quite common. It is hoped that in reviewing some of these questions we can clear the air a little and help those who have similiar problems.

Here is a typical question:

"The manufacturer of my transmitter states that the rig must work into a 50-ohm load. I assume that if I use 50-ohm coax for a feed line my transmitter will be working into a 50-ohm load, true?"

This is true only under certain conditions. First, in order for you to have a 50-ohm load, the 50-ohm line must be *terminated* in a 50-ohm load. In other words, the impedance of the antenna itself must be 50 ohms, or else a matching network must be installed at the antenna so that the antenna end of the coax "sees" a 50-ohm load. If the antenna impedance is something other than 50 ohms (and it most likely is) then you no longer have a 50-ohm load at the transmitter. Whether or not this is serious is a horse of another color.

If you happen to own one of the many types of commercial rigs that are designed to work into a 50-ohm load *only*, then you do have a problem. Some of the current rigs have no provision in the final amplifier tank circuit to handle a wide range of loads, and if your load departs very far from 50 ohms the transmitter is not working at peak efficiency. The answer, if you have such a rig, is to use a transmatch designed for coax to coax. A transmatch is simply an adjustable circuit which is inserted in the coax feed line to convert the non-50-ohm load on the antenna side, to a purely resistive 50-ohm load on the transmitter side.

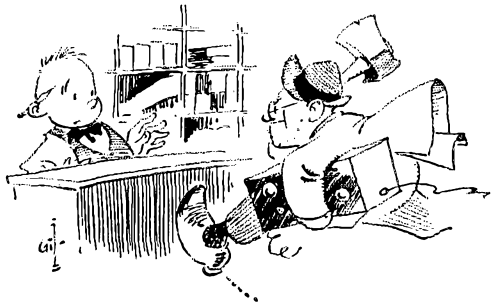
On the other hand, if your transmitter does have a tank circuit that is capable of handling a wide range of loads, it is usually a case of merely tuning the amplifier stage so that it is resonated and loaded. If this can be done no transmatch is required so far as loading is concerned.

Some questions are much more common than others. Possibly you may have one of those discussed in this article. If not, some of the answers may help you when the problem does arise.

Another frequent question:

"I recently purchased a Podunk transmitter and paid good money for it. Recently, when working on 80 meters, I received a 2nd harmonic violation notice from the FCC. As I paid all this dough for the rig, I feel the transmitter is at fault, isn't that so?"

Probably it would be more to the point to ask if the *design* of the commercial transmitter is at fault. And the answer to that is that in all probability, the transmitter design is perfectly sound. Normally, in a properly tuned-up transmitter, the second harmonic attenuation in the amplifier tank circuit is around 25-30 decibels. Let's convert that to power so you'll have a little clearer concept of what happens. Suppose you are running the Novice limit, 75 watts input, and



Gimme my dough back!

* Beginner and Novice Editor

you are getting 50 watts output — this from your 80-meter fundamental signal. One of the characteristics of radio power generation, at least in the type of operation the Novices use, is that, along with the fundamental signal, harmonics of the fundamental will be generated in the transmitter. Assuming 50 watts fundamental output and 30 decibels attenuation of the second harmonic, this means that a second-harmonic signal of 50 milliwatts (1/20 of 1 watt) can be fed to the antenna along with the fundamental.

Of course you can say that 50 milliwatts is a rather puny signal and should never cause interference to any other station. However, this is not always true. Given good propagation conditions that 50-milliwatt signal can do a real good job of interfering with some other service. It might be possible to go along for years without getting into trouble with that second harmonic. But if the right conditions come along you are likely to receive a notice from the FCC.

Now to the basic question: Is the transmitter at fault in its design? Assuming this particular transmitter is designed by accepted techniques, the transmitter is not at fault. The manufacturer or designer has no way of knowing how the transmitter will be used, what type of antenna system will be employed, and so forth. It is true that additional circuits could be built into the rig to provide additional selectivity but this in turn would up the cost considerably. If you remember your Novice exam, you'll also remember there were one or more questions on harmonics.

Basically, always tune your rig up according to the instruction manual. Be sure that all band switches are set to the correct band. (What's even worse than a harmonic is to tune up outside the 40-meter band when you think you have tuned up on 80. Accidentally? Be honest, more likely it was carelessness! Additionally, we mentioned a transmatch in the previous question. A transmatch is also a selective circuit, and if one is installed and used properly in your station there will be little danger that harmonics will reach your antenna system and be radiated. For additional information on this important subject we recommend the ARRL book, *Understanding Amateur Radio*. There are constructional details on filters and transmatches in the book.

"*I have a 75-watt transmitter and just recently passed my General. I see a 150-watt amplifier described in the* Handbook. *Wouldn't it be worthwhile to build the amplifier to up my power to 150 watts?*"

To a newcomer, the idea of doubling his power sounds quite attractive. However, this is a case where looks can be deceiving. First, let's assume that you are running 75 watts input and that you are being received at a distant point by an amateur who has an S meter on his receiver. Your signal reads S4. Let's also assume that his receiver is calibrated so that one S unit equals 6 decibels. If you increase your power to 150 watts, his S-meter reading will increase to S 4½ (not S8). Doubling your power means a signal increase of 3 db. Probably of even more interest is that if the ham on the other end had no S meter and was merely listening to your signal, it would be extremely difficult for him to detect any difference at all in the two power levels.

From a practical standpoint, it is pointless to build a 150-watt amplifier and expect to drive it with a 75-watt transmitter. In the first place, you would have to reduce the output from the 75-watt rig down to only a few watts, because that is all that would be needed to drive the 150-watt amplifier. In other words, it wouldn't be very economical to throw away most of your 75 watts for such a slight signal increase.

If you want to increase your power, it should be a worthwhile increase, probably on the order of at least 6 db. (four times the power) or more. In addition, the driving requirements and cost of equipment or parts should all be taken into consideration.

"*I live in an apartment building and the owner won't permit an antenna on the roof. What do you suggest for an indoor antenna and how will it work?*"

This question, or a variation of it, is probably the most common one we receive. Many hams living in dormitories, apartments, or in housing developments all have this problem. First, let's get one thing clear — rarely, if ever, is an indoor antenna better than one outdoors. This is particularly true in concrete and steel buildings.

There is no simple answer. Some time back there was an article[1] on indoor antennas but to be perfectly honest, the indoor antennas worked rather poorly as compared with the average outdoor antenna. It sometimes took a lot of calls to get any answers. About all you can put up indoors is a random-length wire, end-fed with a transmatch used to couple the wire to the rig.

It's always tough getting out of a concrete and steel building!

However, there is one "out" used by many hams in such a predicament and that is an "invisible" antenna. Most hams think in terms of wire antennas being made from No. 12 or 14 wire. However, the antenna can be made from very fine wire, No. 28 or even smaller, and will do a very excellent job of radiating. For all practical purposes, No. 28 wire is invisible; you have to be within a few feet of it to see it. This in turn presents some interesting possibilities.

(Continued on page 150)

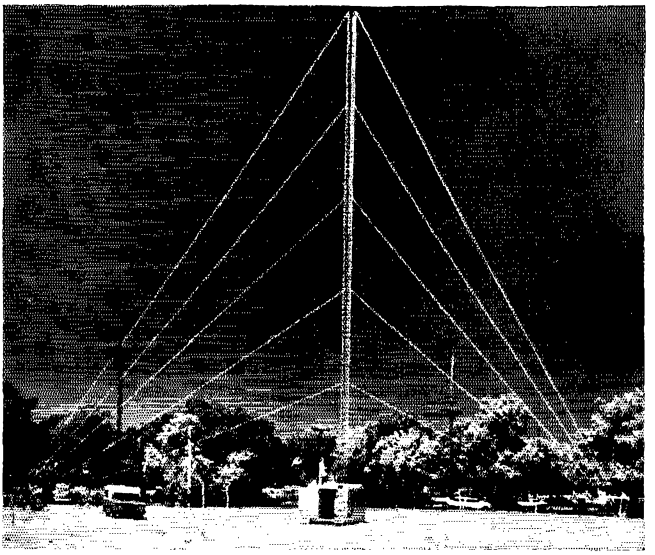
[1] McCoy, "Indoor and Outdoor Antennas for the Apartment Dweller," *QST*, Jan. 1964

A 100-foot transportable tower supported by Mylar guy line. The tower is used for experimental purposes at Stanford University.

Minimizing

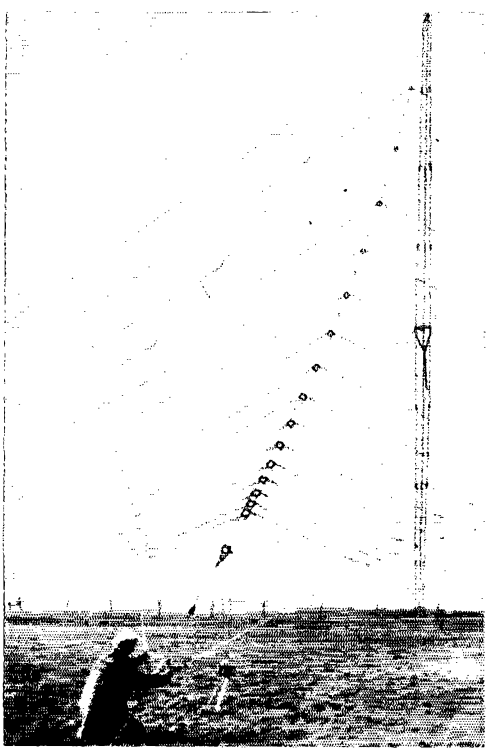
Antenna-Pattern

Distortion



Nonconductive Guys

BY BILL HAMLIN,* WA6SYE



Log periodic antenna using Mylar-line side catenaries and stabilizers. (Grange Associates)

COMMERCIAL and government stations are using Mylar line in place of steel-cable guys for good technical reasons. Hams can, too. The perfect flexible insulator, it is especially good for transportables because it rolls up easily, and there are no insulators to lug around. For holding together multiwire arrays, there is hardly another material that has the strength and stability along with high insulating properties.

The traditional method of guying a tower is to use steel cable, broken every 10 to 20 feet with an insulator of the porcelain compression type. Because they must bear the same strain as the guy line these insulators must be large, and, together with the necessary clamping hardware, usually represent a significant portion of the weight of the guy. Where several guys are required, assembly becomes a major task. The intervals between insulators must be sufficiently short to avoid resonance at the highest operating frequency, or they may cause distortion of the antenna radiation pattern. Replacing the steel with synthetic-fiber line avoids these problems.

The use of nonconductive guys is not new. However, materials previously used for the purpose have had disadvantages. Glass-fiber line

* Engineered Products Co., 1720 Kimberly Drive, Sunnyvale, California 94087

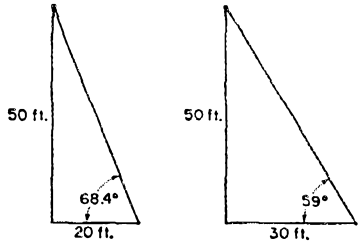


Fig. 1—Guy-line stress increases as the angle that the guy makes with the horizontal is increased.

is not strong enough for heavy-duty work because it fatigues easily. Nylon stretches too much, and good old manila line made of natural fibers is subject to climatic deterioration. But the intrepid ham doesn't readily overlook a good thing just because it was tried once and didn't work. You've heard of Mylar, a polyester film invented by DuPont about 10 years ago. Mylar, as you buy it in the form of tape, stretches pretty badly, but its dielectric strength is so great that a strip one thousandth of an inch thick will withstand 4000 volts. Luckily, a method has been found for pre-stretching this film, heat-treating it, and weaving it into guy-line cable.

The stress on guy lines (excluding supports for wire-type antennas) is made up predominantly of wind loading — the pressure of wind against the surfaces of the tower and antenna — as transmitted to the guy wires. The calculation of guy-line loading has been discussed in detail in an earlier article in *QST*[1], and will not be repeated here. If the information is not set forth in their instruction sheets or other literature, tower manufacturers can supply a recommended guying pattern and guy-line breaking strength for the maximum antenna area for which the tower is rated. Other factors being equal, the stress on a guy line is in inverse proportion to the cosine of the angle that the guy line makes with the horizontal. In the case of a 50-foot tower with a guy anchored 20 feet from the base of the tower, (see Fig. 1) the angle works out to be 68.4 degrees, whose cosine is 0.38. If the guy anchorage is moved out to 30 feet the angle becomes 59 degrees, whose cosine is 0.51. This means that the stress on the guy anchored 20 feet from the base of the tower will be 0.51/0.38 = 1.34 times as much as on the guy anchored 30 feet away. Thus the guy-line stress decreases as the anchorage is moved farther from the tower base. As a general rule, the angle should not exceed 60 degrees or better yet, 50 degrees.

An added factor where synthetic-fiber guys are concerned is the amount of stretch under tension. A perfectly-balanced vertical tower would stand by itself in the absence of wind pressure or other external force, exerting no stress of its own on the guy. However, if the guy has elasticity which permits wind to push the tower out of plumb temporarily, a certain proportion of the weight of the tower is transmitted to the guy. The farther out of plumb the tower is permitted to tilt by the elasticity of the guy, the greater this additional stress becomes. If you have ever erected a small mast by pulling it up by its guys, you will have observed how much less pull is required when the mast is nearing the vertical position as compared to the pull required to get it started off the ground. All synthetic lines exhibit some elasticity but, as the graph of Fig. 1 shows, the stretch factor of Mylar line is about three times less than that of its nearest competitor — manila rope — over the working-load range, which is usually 15 to 25 per cent of the rated breaking strength.

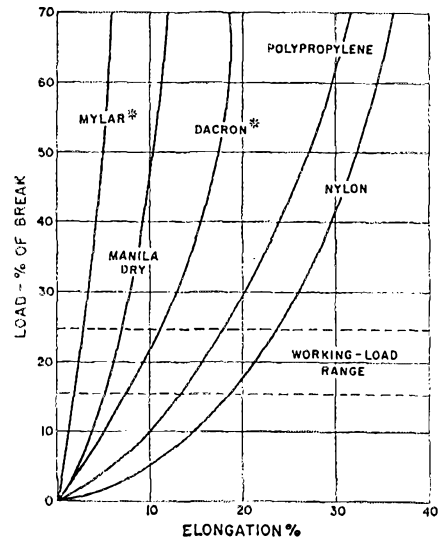


Fig. 2—Graph showing relative stretch (initial, when new) in various types of synthetic-fiber lines with loading in terms of percentage of breaking strength. The usual working-load range is included between the dashed line.
*** Indicates DuPont trade name.**

Mylar line comes in kits of 50-foot multiples (100-feet minimum). The kits include clamps and thimbles which are used for fastening in a manner similar to wire cable. The amount of cable required for the job at hand may be estimated by considering that the guy is the hypotenuse of a right triangle, the two legs of the triangle being the distance from ground to the guying point on the mast, and the distance from the base to the anchor point. The required guy length is obtained by taking the square root of the sum of the squares of the two legs. For a guy fastened 50 feet above the base and anchored 30 feet from the base, the guy length will be

$\sqrt{(50)\ (50) + (30)\ (30)} =$

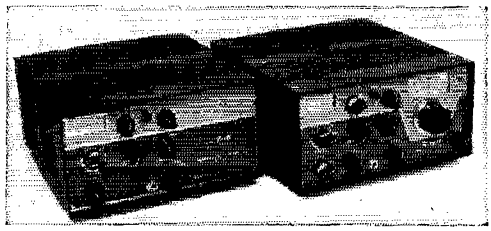
$\sqrt{2500 + 900} = \sqrt{3400} = 58 +$ feet. A foot or so should be added at each end for clamping.

In this day and age where antennas with controlled radiation patterns (directive antennas) are the vogue, non-conducting guy line can be a real boon, since it can be used with the assurance that the guys will not distort the predicted pattern. QST

[1] Abraham, "Guys for Guys Who Have To Guy," *QST*, June, 1955.

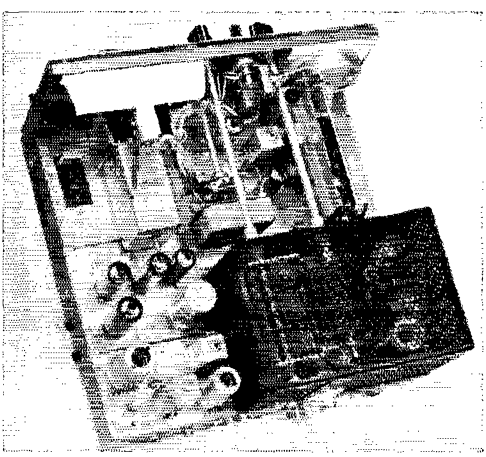
• Recent Equipment —

Drake T-4X and T-4



Aside from power supply, which must be furnished separately, the Drake T-4X is a complete sideband-a.m.-c.w. transmitter having a peak-envelope input power rating of 200 watts. Its design is coordinated with that of the Drake R-4 receiver so that the latter can furnish the frequency control for combination transceiver operation, substituting for the v.f.o. in the T-4X. The T-4 "Reciter" is an abbreviated version of the T-4X in which the v.f.o. and associated conversion circuits are omitted; owners of the R-4 can use the T-4 without having to pay for a duplicate frequency-controlling setup if they want transceiver operation only. There is also provision in the T-4 for using crystal control for fixed-frequency operation, if desired; this feature is not available in the T-4X.

The two sets are rather unique among current manufactured s.s.b. transmitters in that they cover the 160-meter band as well as the customary 80-to-10 range. In fact, either transmitter can be operated practically anywhere in the 1.8-30-Mc. range, by using proper mixing crystals, except for three segments — 2.3 to 3 Mc., 5 to 6 Mc., and 10.5 to 12 Mc. These frequencies are taboo because of the possibility of spurious signals arising from certain beats with the v.f.o.



The T-4X chassis. Except for the omission of the v.f.o. section at the upper left, the T-4 Reciter has the same layout. The amplifier cage is at the lower right, with the audio and balanced-modulator to its left. Sideband filters and r.f. sections are between the cage and the panel.

The stage layout for the T-4X is shown in Fig. 1. The T-4 is the same except that the circuits associated with Q_1, Q_2 and Q_3 are omitted and an external crystal socket (on the side of the chassis) converts the pre-mixer, V_8, into a crystal oscillator when a crystal is plugged in. Both sets have the "external input" connection for hooking to the R-4 for transceiving frequency control.

The sideband layout is straightforward. The carrier oscillator, V_{1A}, operates on 5645 kc. and drives a four-diode balanced modulator. The audio amplifier is a double triode, with the output of the second stage connected to the balanced modulator. The double-sideband output of the modulator drives an amplifier, V_2, also on 5645 kc. Separate crystal filters are used for selecting upper or lower sideband. The s.s.b. signal then goes to a mixer stage, V_3, whose output is on the desired amateur band when the appropriate injection frequency is provided. The mixer is followed by a signal-frequency amplifier, V_4, and finally a power amplifier, V_5V_6, using two 6JB6 TV-sweep tubes in parallel.

The proper injection frequency for V_3 is obtained as the result of mixing the v.f.o. output, which covers a 500-kc. range (4955–5455 kc.) with the output of a crystal-controlled oscillator, Q_3. The injection frequency is always on the high-frequency side of the output frequency, so the v.f.o. tuning dial goes in the same direction on all bands. The frequency combination is such that the crystal-controlled oscillator always operates just 11.1 Mc. higher than the low-frequency edge of the output range.

The v.f.o. circuit is permeability tuned, with light coupling between the tank circuit and Q_1, the circuit being equivalent to a Hartley with the transistor tapped well down on the tank. Coupling to the buffer stage, Q_2, is extremely loose, judging by the circuit constants — a technique which ensures good isolation for the frequency-determining circuit. The buffer output drives the cathode of the pre-mixer, V_8, which tube also has the output of Q_3 applied to its control grid. The beat frequency is taken from its plate and, to suppress undesired harmonics and beats, goes through two tuned circuits before reaching V_3. These two tuned circuits are ganged with the plate tuned circuits of V_3 and V_4, all four being permeability-tuned.

The voice-control circuits include an audio

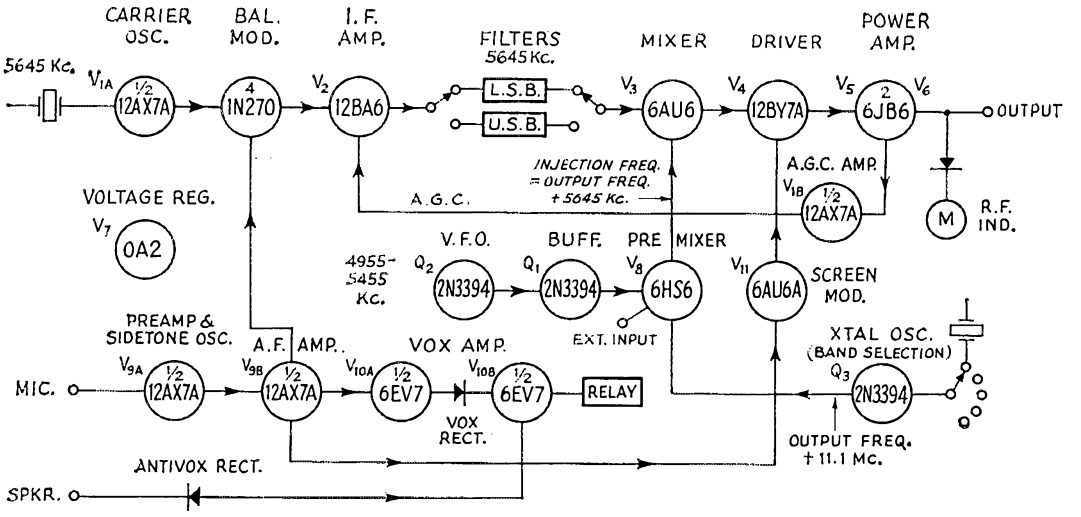


Fig. 1—Block diagram of the Drake T-4X. The T-4 is similar except for omission of the transistor stages.

amplifier, V_{10A}, a semiconductor rectifier, and a relay-control tube, V_{10B}. The relay does the usual VOX switching, including antenna changeover. The anti-VOX system is a diode which rectifies output from the receiver's speaker terminals and works against the regular VOX to prevent the relay tube from being operated by sound from the speaker.

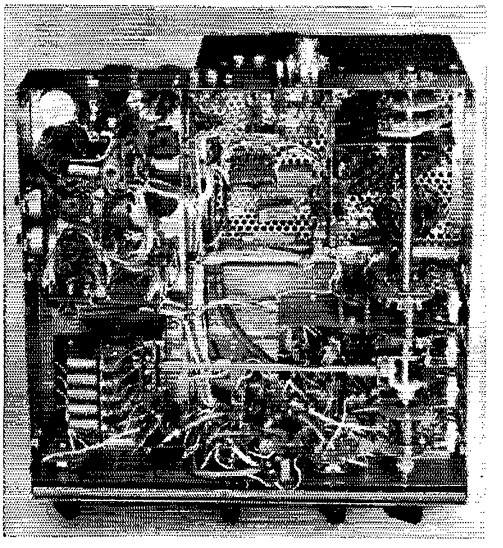
The final-amplifier tubes operate Class AB_1, and if the signal level at their grids reaches the grid-current point there is a small voltage drop in a resistor in series with the bias lead. This voltage is amplified by V_{1B} and applied as a negative bias to the grid of V_2, reducing its gain and with it the level of the signal fed to the mixer, V_3. This automatic gain control prevents overdriving the final stage, eliminating flat-topping.

The sideband filter has a 6-db. bandwidth of 2.35 kc., as nearly as can be determined from the curves in the instruction manual, and a 60-db. bandwidth of 5.9 kc., or a shape factor of 2.5 to 1. The carrier is spotted 20 db. down on the skirt, giving an effective voice bandwidth of 400 to 2750 kc.

C.w. Telegraph

For c.w. work the carrier-oscillator frequency is shifted slightly, by shorting out a small capacitor in series with the 5645-kc. crystal, to move the frequency inside the passband of the lower sideband filter. The switch that does this also reconnects the control that normally adjusts the audio gain so that it acts as a potentiometer to vary a d.c. voltage applied to the modulator to unbalance it. Thus on c.w. the audio gain control becomes a drive control.

The mixer and driver, V_3 and V_4, are grid-block keyed. There is very little attempt at shaping the keying waveform on "make," the only time constant being that supplied by a 0.01-μf. capacitor and 47,000-ohm resistor in the keying line to the grids. There is rather more on "break," as shown by Fig. 2, which also illustrates some other features of the keying circuit. With the mode switch in the c.w. position, V_{9A} is converted into a phase-shift audio oscillator for side tone. The tone is amplified by V_{9B}, the output of which is connected to the receiver's audio output transformer through the anti-VOX line. The tone is keyed, along with the r.f. signal, by the combination of CR_1 and the associated resistors. With the key open CR_1 conducts, since the keying bias is applied to it in the proper polarity, and short-circuits the tone at the grid of V_{9B}. When the key is closed



Various sections of the transmitter are partitioned off, as shown in this bottom view of the T-4X. The right-angle drive and shaft for the converter crystals are not a part of the T-4, which is designed for being driven by the frequency-controlling oscillators in the Drake R-4 receiver.

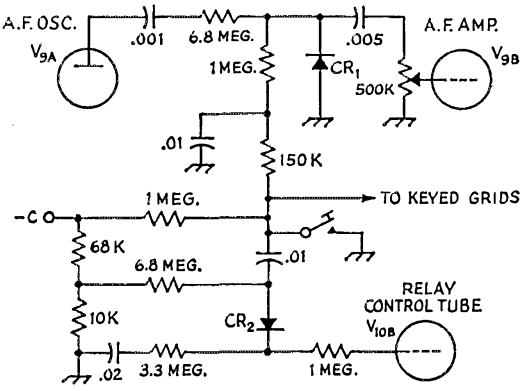


Fig. 2—Keying circuit in the T-4X and T-4 blocks the keyed grids and simultaneously keys a sidetone through shorting action of CR_1. CR_2 and associated network insure fast closing of the send-receive relay controlled by V_{10B}.

CR_1 is no longer biased into conduction and the tone goes through.

An additional feature in Fig. 2 is the circuit associated with the relay-control tube grid. At the instant of closing the key the 0.01-μf. capacitor discharges, feeding a pulse through CR_2 to the grid of V_{10B} to cause the control relay to go to the transmitting side rapidly. This ensures antenna changeover before the r.f. output builds up. The relay stays closed during keying at normal speed and drops out after a pause. The hold-in time can be adjusted by means of the VOX control to make the transmit-receive switching automatic.

A.m. Phone

Most transmitters built primarily for s.s.b. achieve a simulated a.m. signal by transmitting one sideband along with a carrier which is allowed to bypass the s.s.b. circuit. In the T-4X and T-4 a different method is used. The initial carrier-oscillator frequency is shifted just as in c.w. operation so that it goes through the lower sideband filter and eventually to the grid of the driver, V_4. V_4 is screen-modulated by V_{11}, which gets its audio from the last stage, V_{9B}, of the speech amplifier, so the output is true a.m.

V_{11} is operated in much the same way as similar modulators found in low-power transmitters of some years' standing; that is, it gets its operating bias from grid rectification and a grid leak, there being no bias when there is no speech. Since V_{11} is resistance-coupled to the screen of V_4, and since the plate current of V_{11} is relatively high with no grid bias, the voltage at the plate and at the screen of V_4 is low with no audio input. With voice, the negative bias resulting from rectification causes the average plate current to decrease and the voltage at the plate and at the screen of V_4 to rise. Since the carrier output of V_4 depends on its average screen voltage, the carrier amplitude increases with modulation. This controlled-carrier operation permits higher effective output without excessive dissipation either in V_4 or in the final stage, which operates as a linear amplifier just as it does in s.s.b. The p.e.p. input to the final on a.m. is the same as on s.s.b. and c.w., 200 watts, corresponding to a 100-per cent modulated carrier input of 50 watts.

On a.m. the a.g.c. circuit is switched out, since it would have no useful function. The carrier drive level is fixed by the circuit design and is not adjustable as in the c.w. case.

Omitting the power supply from the transmitter assembly makes for very compact and light-weight construction, as the data in the accompanying table shows. The permeability tuning in the r.f. stages preceding the final amplifier no doubt gives an assist in this respect, too. The control knobs are full size, though, and offer no manipulation problems.

The chassis is copper-plated steel, and all the low-power coils are in shield cans. The final-amplifier tubes and tank circuit are in a separate cage. Altogether, the shielding is such that harmonics in the TV bands should be pretty well bottled up. The outer case is in two sections, both bolted to the chassis. Removing the top section exposes all the above-chassis tubes and components, while the underneath part of the chassis is accessible by removing the bottom section. Either can be taken off without disturbing the other.

A line power supply, Model AC-3, is an available accessory. It is designed so that it will fit into the Drake MS-4 speaker cabinet. It furnishes all the power needed by either transmitter, including 650 volts for the final plates, 250 volts for the low-power stages, an adjustable bias supply giving −45 to −65 volts, and a 12.6-volt filament source.

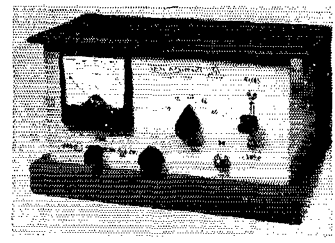
The panel meter normally reads the cathode current of the final tubes and has a range of 400 ma. when so used. A spring-return push-button switch on the panel connects the meter in a diode-rectifier circuit across the output side of the pi-network final tank circuit, allowing relative r.f. output to be read.

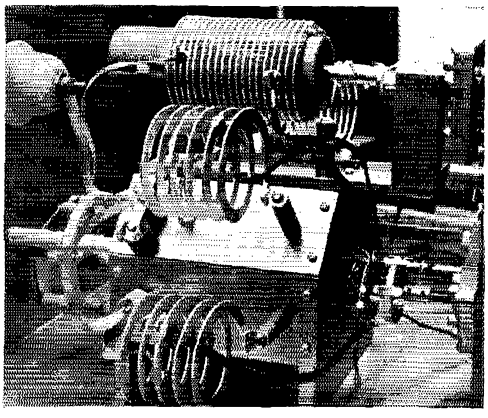
—*W1DF*

Drake T-4X and T-4

Height: 5½ inches.
Width: 10¾ inches.
Depth: 12¼ inches.
Weight: T-4X, 14 lb. 1 oz.; T-4, 12 lb. 7 oz.
Power Requirements: 650 volts, 200 ma. average, 330 ma. max. 250 volts, 120 ma. −45 to −65 volts across 33,000 ohms. 12.6 volts, 3 amp.
Price Class: T-4X, $380; T-4, $270. AC-3 power supply, $80.
Manufacturer: R. L. Drake Co., Miamisburg, Ohio.

Delta VDX-5 Antenna Coupling System





Partial view of the VDX-5 coupling network. The 80-meter coil and its motor-driven ferrite core are at the top of the photograph. Networks for 15 and 10 meters are shown just below the one for 80. The output connector and switch are at the left, the input switch is on the right. This assembly is mounted in a 13 × 17¾ × 20 inch weatherproof enclosure.

THE Delta VDX-5 antenna system takes most of the work out of multiband antenna coupling for a 35-foot vertical. Tuning is reduced to a minimum through the use of a coupling unit at the antenna with five separate matching networks — one tunable over the 3.5-Mc. band and four fixed-tuned for the 7- through 28-Mc. bands — in conjunction with a desk-top control box for remote control. Although the system was designed to be used with the Columbia Products type 222 fiber glass antenna, it can be used with any insulated vertical radiator approximately 35 feet in height. The VDX-5 was built to operate at the legal amateur power limit, a fact quite apparent from the size of the coupler components. Included in the control unit is a directional coupler for the measurement of both s.w.r. and output power.

A schematic diagram of the coupling networks is shown in Fig. 1. There is a separate tapped coil for each band with two adjustable taps per coil. In addition, the 80-meter coil has an adjustable ferrite core. The instruction manual lists the approximate position of each tap for installations that use the previously-mentioned type 222 antenna. Other verticals may require different tap settings, but an easy tune-up procedure makes this no problem. In each case, the tap connected to S_2 is adjusted to resonate the antenna at the center of the band, except on 80 meters, and the tap nearest ground is adjusted to match the coaxial input line to the transmitter. On the lowest-frequency band the antenna tap is set to resonate the antenna at 4 Mc. with the ferrite slug turned almost all the way out.

At 80 meters, the required antenna is only slightly longer than ⅛ wavelength, necessitating the use of an adjustable series inductance, L_1, to tune the system. Series tuning is employed on 40 meters where the antenna is just a bit longer than ¼ wavelength (parallel tuning is also provided). Parallel tuning is used on the bands above 40 meters where the antenna length is greater than ½ wave. The desired matching network is selected by a three-section motor-

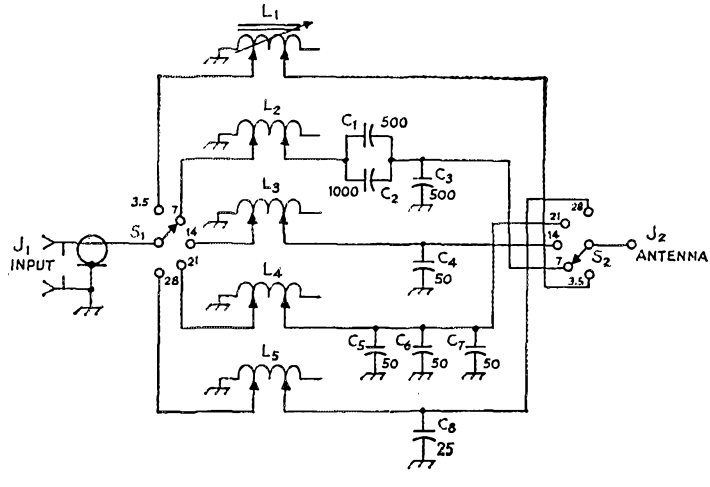


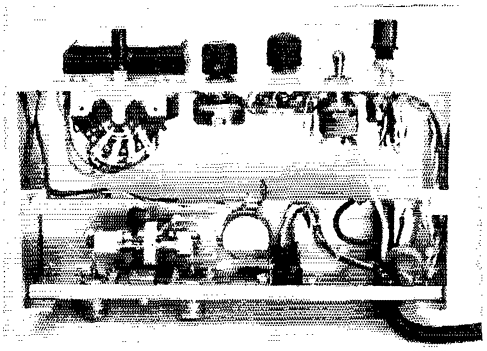
Fig. 1—Schematic diagram of VDX-5 coupling networks. Switches S_1 and S_2 are ganged together along with a third switch (not shown).

driven switch. One section switches the input, another the output and a third (the "homing" deck) shuts off the switch motor when the correct network is found.

It is practical for the 7- through 28-Mc. coils to be fixed tuned since the Q of the antenna is low on these frequencies. This is not true on 80 meters, so a motor-driven ferrite core adjusts the 3.5-Mc. network. Stops on the lead screw of the tuning slug protect the motor from becoming damaged when the ferrite core is fully extended. A spring lever switch on the control unit selects the direction of travel for the ferrite core.

Besides containing the necessary switches for remotely selecting and adjusting (in the case of 80 meters) the appropriate matching network, the control box houses a toroidal type directional coupler similar to one described by Bruene a few years ago.[1] As the directional coupler is independent of frequency over its operational range, the indicating meter is directly calibrated in watts as well as s.w.r. The wattmeter calibration is set at the factory by the adjustment of an internal potentiometer. The s.w.r. bridge sensitivity is set by a front panel control. A three-position switch selects the appropriate coupler function: measuring s.w.r., measuring power output, or calibrating the s.w.r. bridge.

The control box, which measures 9½ × 5½ × 5½ inches, has coaxial fittings mounted on the back, along with a 10-contact female receptacle for attaching the control cable and a phono jack for connecting the directional coupler to a receiver. The latter connection is useful if the antenna is to be tuned without the aid of a transmitter. Using a signal generator in place of the transmitter, the matching network taps can be adjusted for maximum signal suck-out by the antenna system (a dip in the receiver's S-meter reading).



Inside view of the desk top control unit. The components in the lower left corner of the chassis are part of a toroidal core directional coupler used to measure s.w.r. and output power.

An informative instruction pamphlet describes the operation and adjustment of the unit besides containing schematics, s.w.r. graphs and antenna radiation patterns. The graphs show a low s.w.r. (1.7:1 maximum) on all bands for a system using a model 222 antenna. Price class of the VDX-5 (indoor control box, outside antenna coupler and 100 feet of control cable) is $280. Manufacturer is Delta Electronics, Inc., 4206 Wheeler Ave., Alexandria, Virginia 22304. — *W1YDS*

[1] Bruene, "An Inside Picture of Directional Wattmeters," *QST*, April, 1959.

• *New Apparatus*

Polyphase Coaxial Switches

THE Polyphase Instrument Company has introduced a new series of coaxial switches known as "Polyswitches." Three models are available; the PS750, a single pole 5-position unit; the PS751, a 2-pole 2-position transfer switch (can be used for switching a wattmeter, s.w.r. bridge or amplifier in and out of a coaxial-line circuit); and the PS752, a single pole 2-position unit. The switches are rated to carry 1000 watts from d.c. through 100 Mc. at impedances of 50 to 75 ohms with an s.w.r. of less than 1.2:1 over the range. Isolation is rated at 45 db. at 30 Mc. between adjacent contacts and 60 db. at 60 Mc. between alternate contacts.

All three models come with standard SO-239 coaxial fittings. Switch sections are ceramic with 60-degree indexing and double contacts. A knob and dial escutcheon plate are included with the switch, as well as a drilling template. Only four small holes are required, a 25/64-inch hole for the mounting shaft, a ⅛-inch hole for a lock key and two 5/32-inch holes for the dial escutcheon. The switch measures 3½ inches in diameter by 2¼-inches deep and weighs only 9 ounces.

Model PS750 sells for $9.95, PS751 for $8.95 and PS752 for $8.45. The manufacturer, Polyphase Instrument Company, is located at East Fourth Street, Bridgeport, Pa.

— *W1YDS*

Checking RTTY Shifts

Introducing the Mainline TT/O Semi-Counter

BY IRVIN M. HOFF,* K8DKC

Here's a simple solution to what ordinarily is a tough problem — measuring audio frequencies with high-enough accuracy to determine a frequency change within a few cycles. It takes only a few readily-obtainable components and practically no construction.

ACCURATE setting of frequency shift for transmitting radioteletype is probably the most elusive difficulty encountered by amateur operators. A related problem is accurate tuning of the filters used in the demodulator, for optimum reception of incoming signals.

Audio oscillators are often used, but accuracy is normally rather poor because the high range (typically 2,000 to 20,000 cycles) must be used; it would be easy to miss the correct frequency by 100 cycles or more, and this is intolerable. Tuning forks may be purchased for standard RTTY tones [1] and this system works very well indeed for those who have obtained them. Again, striking certain notes on the piano will give 850 shift accurately, and K8UFU for years has used a harmonica for setting his shift! Also, audio tapes that have the standard RTTY tones may be obtained; this method is not only about the cheapest of all, assuming that the operator owns or has access to an audio tape recorder, but approaches the accuracy of a digital counter. However, each of these methods is good only for certain limited aspects.

While designing some multi-pole audio filters for RTTY that required each section to be accurately tuned to a specific audio frequency, the author used a simple technique that is readily adaptable to other applications, such as

(1) Measuring the shift of any RTTY signal being received.
(2) Setting the transmitter quickly and accurately to an incoming signal without using loudspeakers or headphones.
(3) Keeping a "cold" transmitter on frequency.
(4) Estimating transmitter drift over, say, an hour's time with reasonable accuracy.
(5) Quickly and accurately setting the f.s.k. shift of the local transmitter to shifts other than 850 or 170, and then returning to the previous setting accurately.

Thus the "Mainline TT/O Semi-Counter": two extremely sharp filters of 20–25 cycles bandwidth, one of which is tuned to a fixed frequency of 2125 cycles and the other is adjustable by means of a precision capacitor substitution decade box. The two filters are connected to an oscilloscope that displays a "+" pattern when the signal is properly tuned.[2]

The TT/O Semi-Counter is not particularly designed to replace the normal visual display on the demodulator, but to complement and augment such a display.

The 88-mh. Toroid

The common 88-mh. toroid has a very high Q, around 118 at 2125 cycles, and the Q rises linearly to about 157 at 2975 cycles. When isolated properly to take advantage of this high Q, a simple tuned-circuit filter using the toroid will have a bandwidth of 17–20 cycles (see Fig. 2). It is unlikely that such isolation can be conveniently achieved, but it is easily possible to keep the bandwidth down to 20 to 25 cycles. The Qs of the filters in Mainline TT/O Semi-Counter are about 85 at 2125 cycles and 120 at 2975 cycles.

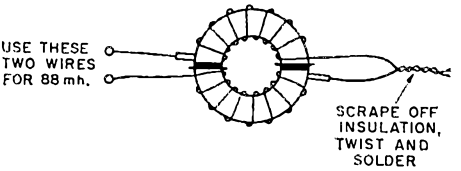


Fig. 1—The 88-mh. toroid. The two windings must be connected in series to give an inductance of 88 mh.

For a number of reasons, such filters are much too narrow for general reception of 60-w.p.m. RTTY signals, but they certainly make optimum displays possible for tuning purposes, for setting the transmitter on frequency and maintaining that frequency, for adjusting the f.s.k. shift, and other interesting applications.

Little we have said so far will be very new to many readers. The new "twist" to the Mainline TT/O Semi-Counter is the use of a capacitor substitution decade box.

The author has found, after working with many 88-mh. toroids from a variety of suppliers, that for the most part they are wound to extremely close tolerances. In checking the resonant frequency with the same capacitor across a dozen different toroids, a variation of only 10–15 cycles was noted. *However*, using various capacitors across the same toroid was something else again.

Take the mark tone of 2125 cycles, for instance. A 0.068-μf. capacitor is often used across an

* 1733 West Huron River Drive, Ann Arbor, Michigan 48103.

[1] From Willard Shears, W8HYE, at $5 each.

[2] Hoff, "RTTY Indicator Systems," *QST*, October, 1965.

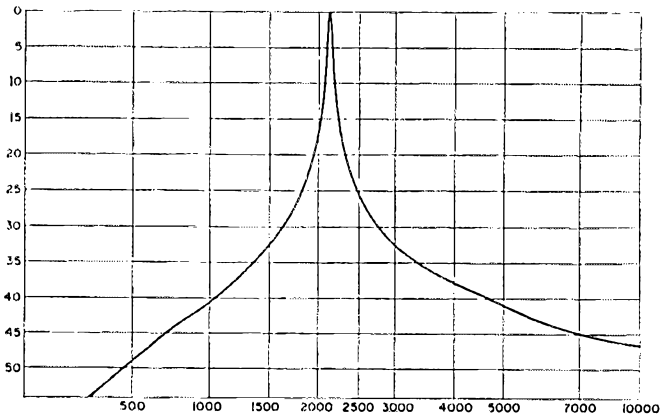


Fig. 2—Single-tuned 88-mh. toroid filter for 2125 cycles. This circuit has a very high unloaded Q of 118. The bandwidth is only 18 cycles. Vertical axis in db., horizontal axis in cycles per second.

88-mh. toroid to tune to this frequency. If the capacitor has a 10% rating (about the best you will find in the local store or mail-order catalog) it can vary from 0.0612 to 0.0748 μf. and be within limits. In frequency this would correspond to 1962 to 2168 cycles. Quite a variation! — *over 200 cycles* for a 0.068-μf. capacitor that is within limits. With a 1% capacitor the variation would be around 20 cycles.

The answer, of course, is to use 1% capacitors, at least for one standard reference filter from which others can then be duplicated. Here is where the capacitor substitution decade box comes in.

The Capacitor Substitution Decade Box

The capacitor substitution decade box uses all 1% capacitors, and is adjustable in 100-pf. steps from zero to 0.111 μf. These boxes are available in kit form and sell for $17.95 (Knight Kit Model 1180-K, Eico Kit 1180, and Heath Kit LN-21, to name three). The box will be useful not only in the Mainline TT/O Semi-Counter for day-to-day use, but also for tuning filters that may be constructed for the demodulator and in other applications around the RTTY station. Tuning filters is a job that most dread to such an extent that very few even bother, but with a piece of test equipment such as the capacitor substitution decade box tuning filters quickly and accurately is quite easy.

Tuning Toroids

An 88-mh. toroid that appears to be "brand-new" and has had no turns of wire removed from it should be chosen for use in conjunction with the capacitance decade box as a standard reference. Other toroids and capacitors to be used in filters are then tuned against the reference combination. Their actual values will be rather immaterial—either a few turns of wire will be removed from the toroid to match the capacitor, or a few smaller capacitors may be connected in parallel to achieve the proper frequency. This process does not take long, nor does it require expensive components of close tolerance.

If the capacitor substitution box is connected across the standard reference toroid, any specific frequency from 2125 to 3150 may be "tuned" immediately by referring to Table I. This enables the operator not only to select specific audio tones for various purposes, such as tuning filters, but also to measure the frequency of an unknown tone. It forms the basis of reading shifts with the Semi-Counter.

TABLE I

Calibration Chart For 88 Mh. Toroid and Decade Box

Shift is measured in c.p.s. with respect to 2125 cycles.

μf.	Shift	Freq.	μf.	Shift	Freq.	μf.	Shift	Freq.
0.0290	1025	3150	0.0410	525	2650	0.0530	205	2330
	5			3			2	
0.0295	999	3124	0.0415	509	2634	0.0535	195	2320
	5			3			2	
0.0300	973	3098	0.0420	493	2618	0.0540	184	2309
	5			3			2	
0.0305	947	3072	0.0425	477	2602	0.0546	170	2295
	5			3			2	
0.0310	922	3047	0.0430	462	2587	0.0550	163	2288
	5			3			2	
0.0315	898	3023	0.0435	447	2572	0.0555	152	2277
	5			3			2	
0.0320	874	2999	0.0440	432	2557	0.0560	142	2267
	5			3			2	
0.0325	850	2975	0.0445	418	2543	0.0565	132	2257
	5			3			2	
0.0330	828	2953	0.0450	404	2529	0.0570	122	2247
	4			3			2	
0.0335	806	2931	0.0455	390	2515	0.0575	112	2237
	4			3			2	
0.0340	784	2911	0.0460	376	2501	0.0580	103	2228
	4			3			2	
0.0345	763	2888	0.0465	363	2488	0.0585	93	2218
	4			3			2	
0.0350	742	2867	0.0470	350	2475	0.0590	84	2209
	4			3			2	
0.0355	722	2847	0.0475	337	2462	0.0595	74	2199
	4			3			2	
0.0360	703	2828	0.0480	324	2449	0.0600	65	2190
	4			3			2	
0.0365	683	2808	0.0485	311	2436	0.0605	56	2181
	4			2			2	
0.0370	664	2789	0.0490	299	2424	0.0610	47	2172
	4			2			2	
0.0375	645	2770	0.0495	286	2411	0.0615	38	2163
	4			2			2	
0.0380	627	2752	0.0500	274	2399	0.0620	30	2155
	4			2			2	
0.0385	609	2734	0.0505	262	2387	0.0625	21	2146
	4			2			2	
0.0390	592	2717	0.0510	250	2375	0.0630	12	2137
	4			2			2	
0.0395	575	2700	0.0515	239	2364	0.0635	4	2129
	3			2			2	
0.0400	558	2683	0.0520	228	2353	0.0637	0	2125
	3			2				
0.0405	541	2666	0.0525	216	2341			
	3			2				

These represent 500-pf. steps on the decade substitution box. The small figures between steps are the cycles for each 100 pf. For example, suppose the decade box reads 0.0321. This is close to 0.0320, so subtract 5 cycles from 874 for resultant final shift of 869. The decade substitution box has 1 per cent capacitors, and the practical results are usually within 2 to 3 cycles of these figures with an 88-mh. toroid that has its normal windings.

Setting Up The TT/O

Referring to Fig. 3, the 2.2-megohm resistor provides suitable isolation to keep the Q of the toroid quite high, and thus very sharply resonant. (The input resistance of the scope will typically be 3-6 megohms and also has little effect on the Q.) By changing the capacitance between points A and B, the frequency to which the filter will respond will be changed accordingly. This is the circuit used in setting up the Mainline TT/O.

Use the standard reference toroid and the capacitor substitution box for L and C, respectively. Referring to Table I, set the box to 0.0637 μf. The filter will now be tuned to within a very few cycles of 2125 — again, of course, assuming that the 88-mh. toroid you selected was "new". Adjust the audio source so that the scope shows maximum indication. (The audio source can be an audio oscillator, a receiver tuned to a 100-kc. calibrator point to give steady tone, a tape recorder, or other oscillator of some type.

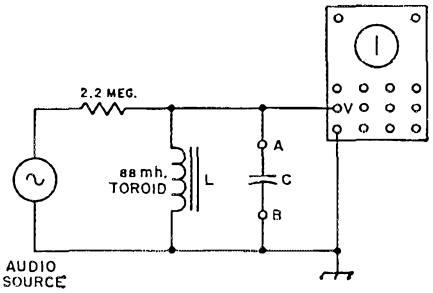


Fig. 3—Tuning the toroid to a specific frequency. The audio source can be a variable-frequency audio oscillator, a receiver tuned to a 100-kc. calibrator point, or a tape recorder with a standard tone. Use only Mylar-type capacitors.

In any event, allow the audio source ample opportunity to warm up so that it will be stable — in the case of the audio oscillator, a few hours; in the case of the receiver, overnight. The setting of the audio source is then left unchanged and it in turn becomes a "standard" against which the 2125-cycle fixed-frequency filter can be tuned. The following steps outline the procedure used in tuning the 2125-kc. filter.

1. Remove the standard 88-mh. toroid and replace it with any other 88-mh. toroid.
2. Connect a 0.06-μf. capacitor across the toroid, leaving the decade box in the circuit.
3. Set the decade box for maximum scope indication.
4. Read from the decade box the additional capacitance that must be added to 0.06 μf to tune the toroid to 2125 cycles.
5. Add the required amount and again adjust the capacitor decade box, to see if any small additional capacitance is needed. If not, and the indication is not as great on the scope as with the decade box alone, the added capacitance was too large. In this case, remove a few turns of wire from the toroid. Each turn removed will raise the frequency about 3 cycles around 2125 cycles.
6. After you think the 2125 filter is adjusted about right, remove the decade box and readjust the audio source to show maximum deflection on the scope.
7. Remove the 2125 filter, and replace with the standard reference 88-mh. toroid and decade box. Again adjust the decade box for maximum scope deflection without touching the audio source.
8. Read the value on the decade box and compare against the values in Table I to see if any small corrections could advantageously be made to the 2125 filter. From Table I, each 100 pf. added will lower the tone about 2 cycles, and each turn removed from the toroid will raise the tone about 3 cycles. (At 2975 cycles, each 100 pf. added will lower the tone about 5 cycles and each turn of wire removed will raise the tone about 4.5 cycles.)

Many variations will become apparent as the operator gains a bit of experience. At any rate, the use of the method explained and retention of a standard reference toroid will make tuning filters simple and easy — and best of all, very likely will surpass any accuracy previously achieved.

Checking Shifts

Most demodulators amplify the audio tones used for mark and space prior to rectification in the detector stage. These a.c. voltages usually reach 50–100 volts or more. The Mainline TT/O Semi-Counter is connected to the demodulator at these points through very high resistances to keep the filters extremely narrow for optimum tuning. This also makes possible the basic purpose of the Semi-Counter: that is, to measure shifts by utilizing the very sharp filters appropriately.

Figs. 4 and 5 show how the Mainline TT/O can be quickly connected to the Mainline TT/L F.S.K. Demodulator [3] as well as showing the actual circuit of the Semi-Counter. It should be easy to adapt the Semi-Counter to whatever demodulator is in use.

In checking f.s.k. shifts, first tune the receiver for maximum mark indication on the scope. Then

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

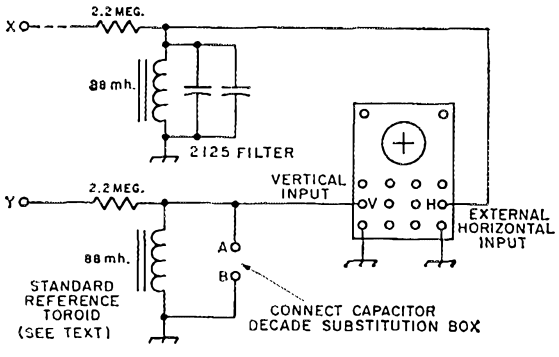


Fig. 4—Basic circuit for the Mainline TT/O Semi-Counter.

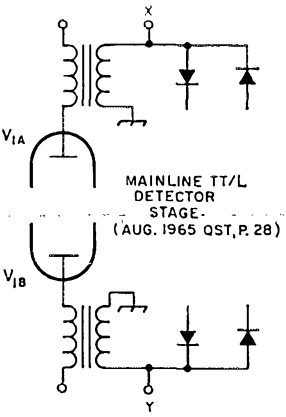


Fig. 5—Adapting the Mainline TT/O Semi-Counter to the Mainline TT/L F.S.K. Demodulator. The device adapts equally well to the detector stage of most other demodulators or converters.

vary the capacitor decade box for maximum space presentation. Note the setting on the box and refer to Table I. After this setting has been noted, the operator can return the box to 0.0325 for 2975 cycles and retune the receiver for "straddle-tuning" the incoming signal for best copy.

Checking Transmitter Drift

Most receivers (after 5–6 hours warmup) are quite stable. Many of the newer receivers will hold a frequency within a few cycles in an hour's time. (Temperature variations in a room will change this picture considerably, of course.) Transmitters, on the other hand, seldom will match a receiver for stability regardless of how long they have been running. While it is not unusual to run a receiver 24 hours a day (many enthusiasts *never* turn their receivers off, and this is indeed highly recommended), few would care to turn on a transmitter more than a few minutes prior to its use.

Under these circumstances, all but crystal-controlled transmitters will drift considerably more than most individuals would think, during the first hour or two. If the owner is curious as to just how stable his transmitter *really* is, the Mainline TT/O Semi-Counter will show him very quickly. Let the receiver warm up overnight at least so it can be relied on as much as possible as an accurate standard. Then turn the transmitter on. Tune it for a beat tone of say 2700 cycles with the decade box on the Semi-Counter set at 0.0395 μf. Then, at time intervals selected as convenient, vary the decade box for maximum scope presentation. By comparing against Table I the transmitter drift can be rather accurately estimated. By keeping track over a period of a few hours, it will become obvious just how long it really takes for the transmitter to settle down.

Keeping the transmitter on frequency is one of the fringe benefits of the Semi-Counter. The filters are so sharp that drift of 15 or 20 cycles will cause nearly a 25-percent change in the size of the scope pattern. As a result, any drift will be quickly noticed. Thus the operator can come on frequency with a "cold" transmitter, and although frequent adjustments may be needed they can be made quickly and accurately in order to stay on a specific frequency.

Accuracy

The Semi-Counter will not compete directly against a digital audio counter for accuracy. However, with a little care in tuning the 2125 filter accurately, and with some practice in the use of the Semi-Counter, an operator with normal skill can readily-enough determine shifts to within 5–10 cycles. You will soon discover that very few amateurs apparently have the foggiest notion of what 850 shift really is, and you will be amazed at the actual shifts in common use. They range from 550 to 1050 cycles and even occasionally beyond these extremes. Probably 80–90 per cent of the fellows are running around 775–810 shift. Only a handful are close to 850, although about 1 out of 10 are *well* over 900 shift.

The Semi-Counter could well become one of the most useful items in the RTTY station. Several enthusiastic amateurs now using it have expressed amazement that they were able previously to get along without such a device at all. We hope you will find as much satisfaction in using the circuit as the rest of us are having.

(The "TT/O" part stands for two toroids and an oscilloscope, for those who have to know!) QST

Strays

Did you notice unusually poor conditions during the second phone weekend of the ARRL International DX Competition? The March 16 *CRPL bulletin* reviewed the conditions as follows: "Storm No. 102 began about 1900 UT March 13 and persisted approximately 24 hours. The storm A-index was 40. This is the most severe geomagnetic disturbance since June 1965 and it had a greater effect on radio propagation conditions than any disturbance since April 1964. Although the disturbance has not been identified with specific solar events, its severity and short duration are characteristic of a storm associated with event-type activity."

Feedback

In the circuit diagram of WA6JCZ's wide-range voltage-regulated power supply, page 23 of the March issue, the polarity of the 80-μf. capacitor connected from the junction of R_1 and R_2 to the negative output line should be reversed.

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The dot circle, made for HB9ADN and mentioned in the Stray on page 93 of March 1966 *QST*, should read 360 degrees, not 260 degrees.

Electrical Interference

BY W. R. NELSON,* WA6FQG

In Two Parts

Part II — Tracking and Cure

Part I, in April *QST*, told you how to spot the various types of electrical noise associated with power lines and the operation of electrical equipment. This concluding section describes tracking techniques that have proved to be effective, and suggests methods of suppressing interference from common sources of noise.

THE similarity of the interference problems afflicting the power company and the amateur, the sources of electrical interference, the frequencies affected, and the characteristics of interference were covered in Part I of this article. How to locate a source of interference and the approach to use when it is located will be covered in this Part.

The patience of Job and qualifications of a top-notch diplomat are the requisites for locating and correcting consumer-created interference. To illustrate the need of patience, an interference affecting 6 and 2 meters as well as TV in a one-block area was clocked for a period of 25 seconds on and 35 seconds off. The interference was not on each day and not prevalent for 24 hours a day, but it had to be some sort of timing device. Twenty-five seconds is not ample time to locate the source of interference easily. The approach to this problem is similar to the children's game "Red Light-Green Light," and when the noise stopped you stopped. Visualize a grown man walking down the street for 25 seconds and stopping for 35 seconds! After the offending house was located it was still difficult to pinpoint the source, but eventually the device turned out to be an old electric clock on the mantle. The interference occurred when the second hand was on its upward travel between 35 and 60 seconds, but as the lady of the house was a fastidious housekeeper and dusted the house every day, when the clock was disturbed the interference would stop for a period of a few hours.

The degree of difficulty in locating interference will depend on the frequency affected. If a noise is heard on 40 and 75 meters and no higher, expect the source to be a considerable distance from you. However, it could be a fluorescent light near you.

When trying to locate interference, first listen to its characteristics to determine the pattern, and consider the weather conditions. Does the noise sound the same on all frequencies or is one noise covering another? How high can this interference be taken in frequency? Does it affect the TV set? What does it look like on the scope? These questions must be answered before you start. *Caution:* Remember frequency and distance — low frequency is far and high frequency is near.

Let us assume that you have a problem of interference — a simple one, to start with. It has the characteristics of a thermostatically controlled device — buzzt — buzzt — buzzt. You can detect this noise on all ham bands and it is noticeable on the TV set as a band of "shot" lines across the picture tube, with the same sequence as that heard on your ham receiver.

Check at Home First!

To avoid later embarrassment you must check your own QTH. Recently a ham complained that he was having intermittent noise problems. He wrote a letter blaming the power company for all of his interference — and investigation revealed it to be the aquarium heater in his own house. Using a portable receiver, battery-operated, tune off a station to where you can hear the interference, and then take the receiver with you to your circuit-breaker or fuse panel and de-

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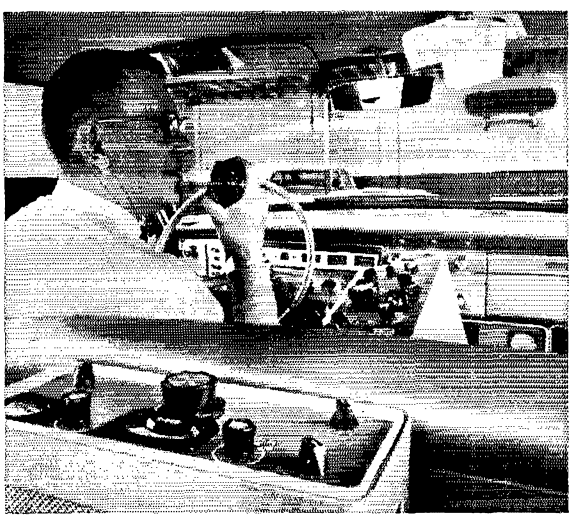


The author in the special car fitted out by the Southern California Edison Company for hunting sources of radio noise. Complete receiving coverage from the broadcast band through 2 meters, plus ham-band transmitters, makes this a really complete mobile station.

energize each circuit in your house. If the noise is still noticeable you can be certain the source is not in your QTH.

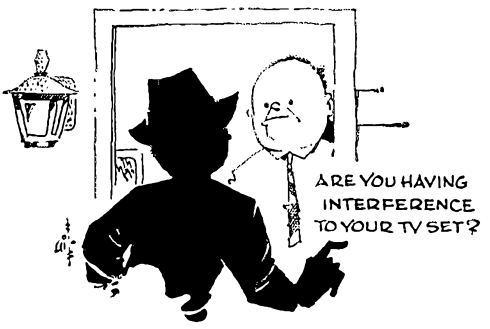
Zeroing In

It will be assumed that you have a mobile rig or that a friend has one available, because you are going on a hidden transmitter hunt. Tune the receiver to the highest frequency at which you can hear the interference. Back off on the r.f. gain control until you can just hear the noise and start driving down the street. If the noise drops out you are going in the wrong direction; turn around — *safely* — and head in the other direction. You will notice that the level is building up as you approach the source. Back off again on the r.f. gain and keep going until you again lose the noise. Turn around and retrace your path, again checking the level. Check the suspected area several times while mobiling; you will be within two or three houses of the source.

Using the portable radio, walk up and down the street until you are positive which house is creating the interference. It may also be necessary to walk into a few driveways before being certain of the location.

How to Influence People

Now what are you going to do? Tell the people that they are interfering with your ham receiver? Are you as sure of the location of the source as they have been when accusing you of TVI? Being a diplomatic ham operator you know that your motto of "Don't do unto others as others have done unto you" must be followed. As soon as that door opens you know you are going to say cheerfully, "Hello, I'm Mr. Jones, the ham operator that lives down the street, and I was wondering if you are having interference to your TV set." Right then you have proved that you were not creating the interference. Ask him if you may come in and check to see if it is the same as you see on your own TV set — and it will be. If the source is in this particular house the interference will be more severe and you will undoubtedly be asked where the interference is coming from. Could it be the power lines? You, of course, can tell him now that only a small percentage of interference comes from power lines.



Tune your receiver so the noise can be heard and show him that it is the same as seen on the TV screen. Tell him that in order to locate the source of interference it will be necessary to go through a process of elimination. Ask him if he would, with your assistance, turn off his circuit breakers one at a time to make sure that his house is not the source of the interference. Let us assume again, to make things more difficult, that his house was *not* the source. You have established good public relations with your neighbors because, when the source finally is found by continuing the same approach, you will go back and tell him the area is now clean. He will express his gratitude for the assistance, and is sure to tell his neighbors of your efforts in eliminating interference. You will not tell him the location of the source. This is your secret as well as the secret of the person with the offending device.

When you located the source you did not tell the individual he was creating interference to the whole neighborhood. You merely asked that he have the device corrected, which he undoubtedly will do. Never suggest that you might go to the FCC. If need be, tell him he is transmitting illegally without an FCC license and the application of a filter will eliminate the noise. In the domestic and commercial fields, capacitor manufacturers have placed filters on the market for practically every type of interference-producing device.

Most individuals will cooperate if the approach is right although, of course, occasionally there are those who do not wish to cooperate. Such an individual was found by one ham operator who determined that the interference bothering him was a fluorescent light. He traced it as described above and found it to be a defective fluorescent light in his neighbor's garage. The neighbor told him the light wasn't bothering him as he never listened to a radio, so he could see no reason for changing it. There was only one thing for the ham to do: He purchased a new light for his neighbor and hasn't been bothered since.

You feel a sense of accomplishment when you help your neighbors and yourself. You have

graduated from the kindergarten class of interference location, and naturally you tell your ham friends.

A Harder Case

One evening you receive a call from one of your buddies. He tells you he has a noise starting at approximately 9 A.M. and stopping at approximately 12 midnight, consequently wiping him out on 40 and 75 meters. He asks you to bring the mobile rig for the purpose of locating the source. Because, like a Boy Scout, an amateur is helpful, you agree. The noise you hear on his receiver sounds very much like a spark discharge. There is a frying and buzzing sound together with intermittent popping. You also note this noise cannot be heard any higher than 40 meters, and there is a characteristic pattern: the noise lasts for approximately 15 minutes and gradually attenuates, followed by the popping, which lasts for a minute or two. The popping sounds become more frequent, building up to the frying or buzzing sound.

Although you are able to hear the noise on your mobile receiver at 40 meters you notice it has a lower level of intensity. This could be because the fixed-station antenna has more gain, or because the noise is being conducted by communication circuits and power lines. As you leave his QTH you observe a slow rise and fall in intensity. These are standing waves, similar to regular fading on a signal. As you proceed you note the standing waves are getting closer together and the intensity of the noise is increasing. Tune to a higher frequency and continue driving.

When dealing with an interference affecting the lower frequencies you will undoubtedly hear other noises. These noises tend to throw you off course, and in some cases it will be necessary to return to your starting point. It is very important that you memorize the sound of the noise you are tracing.

A source of interference will set many traps. As you near the source you will note very high peaks at changes of directions of the circuits and lines on the poles and at transformer locations. You may feel that you have located the source at these particular locations because of the peaks. These are false. In all cases of tracing interference, drive on past the peak. Many complaints have been received blaming a leaky transformer on a pole. The much maligned "leaky transformer" is almost purely mythical, since the usual oil-filled distribution transformer is one of the most trouble-free pieces of equipment on the power system, as far as being a source of interference is concerned.

You have ignored the false peaks and are now able to hear the noise in your 6-meter converter, indicating that you are close to the source. You pin the source down as shown in the previous example. What did you find this time? A color TV set. There was an arc in the cap of the high-voltage tube; the owner of the TV set says they turn it on at 9 A.M. and off at midnight.

Handling Power-Line Noise

When dealing with suspected power-line interference the method of locating the source is the same as described above. It is very helpful if you give the power company the general location of the source definitely responsible for the interference. In all cases of suspected power-line interference, leave the final determination of the location to the power-company interference investigator. Under no circumstances should you shake a guy wire or hammer a pole, as there is

Sources	*Remedial Measures*
Belt static	Bond machines together and to ground. Apply graphite-type belt dressing to belt.
Commutator-type motors	Turn down commutator, seat brushes, filter at motor with effective grounding.
Oil-burner and ignition-type industrial equipment	Heavy-duty spark plug suppressors, line filter near unit. Bond motor, burner unit, and furnace to an effective ground.
Electric shaver	Ceramic capacitor-type filter built into shaver.
Neon signs	Insulate thoroughly, replace defective tubes. Bond isolated conductive material in field of sign.
R.F. heating (dielectric and induction type, diathermy, etc.)	Check frequency and harmonics. Unit should be effectively grounded and shielded. Reduce drive in final amplifier to, reduce harmonic output. Install necessary traps and filters.
Oscillating TV booster (v.h.f.)	Redress input and output leads, check neutralization, provide more adequate shielding. Install switch to de-energize v.h.f. booster when u.h.f. channels are received.
Garage-door opener	Replace superregenerative receiver with nonradiating type.
Thermostatic devices	Filter as close to contacts as possible.

a likelihood of a circuit outage or damage to the pole for which you would be responsible. Using the TV cliche, "Please, amateurs, we'd rather do it ourselves."

Looking for a source of interference is like a transmitter hunt. How many times have you stopped alongside a chain-link fence expecting to find the transmitter tied to the fence? Here again you had the problem of the false peaks. Don't feel bad. A complaint was received from three ham operators who had traced a noise to a transformer. They traced the interference individually, each not telling the others what he had located. When the investigator came on the scene, he located the source three blocks farther away on a street-light mast arm.

Frequency vs. Distance

Interference on the lower frequencies, including broadcast, may be transmitted over a wide area by power lines, telephone lines, metallic, or conductive equipment. The noise may also be transferred from one circuit to another. This condition does not present such a problem on the v.h.f. since practically all v.h.f. radiation is direct. The higher-frequency interference is dissipated by direct radiation within a very short distance of the source on wire circuits. The source may be located quickly using the highest frequency on which the interference is audible and proceeding toward the area of greater intensity, increasing the frequency as necessary to pinpoint the exact offending equipment.

Interference Remedies

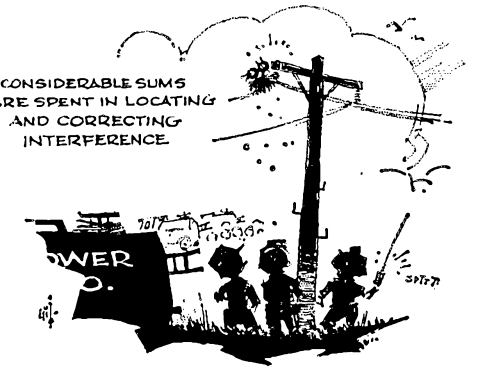
You will be asked what can be done about an offending device. Here are some typical sources and remedial measures.

In general, the largest capacitance readily available, installed as close as possible to the interference source, is the most effective suppressor from a radio interference standpoint. In the case of portable appliances, however, capacitors are limited in size by the requirement that possible current to ground through the capacitor may not exceed 0.3 ma. This requirement is designed to protect the user of the apparatus from appreciable shocks.

What the Amateur Can Do

When you realize that there are 270,000 licensed amateur radio operators in the 50 states it is certain there are many potential interference locaters who could lower the overall level of interference. Here you also have 270,000 amateurs who could improve the image of ham radio by locating and correcting consumer-created interferences. It might take you away from your operating desk where you have been cussing and discussing the interference problem.

It is very easy to take the attitude "let George do it," or "let's let the government set up a minimum level of radiation for all electrical devices and power lines." Who is going to make the checks of the radiation levels? The amateur? If he does, how accurate is his testing equipment? What is the minimum level of radiation permitted? Should the level be the same for the amateur working 2 and 6 meters as for the DX'er working a weak signal? It is well to remember that a high noise level affecting the DX'er would be no problem to the ham working the v.h.f. region and it is very doubtful that government control is the whole answer. Something will still go wrong, even with the quality control in all steps of the manufacture of any device. How many times have you purchased an item and had to return it to the dealer for some change? How about the new car? How about that new piece of amateur gear? How far can we go in the quest for a low noise level? Should we insist on the removal of the interference potential of all devices or should we ask that the devices be electromagnetically compatible with communications?



Many investor-owned power companies have a program of locating interference for their customers, whether it is consumer-created or power-lined created. This is a service that started on a voluntary basis. Each year the companies spend considerable money in the location and correction of all types of interference. Each year considerable money is spent by the R & D engineers in the development of interference-free power lines. The power companies feel that they can take care of interference from their power lines on a voluntary basis as a service to their customers, without the necessity for attempting to establish minimum levels of radiation. All it takes is a call to the business office in your area to register a complaint of known power-line interference. Cooperation and patience by all concerned, whether it be TVI or electrical interference problems, is the keyword. QST

Editor's Note: The March 1966 issue of *Edison News*, a publication of the Southern California Edison Company, contains an illustrated article describing the author's activities as the company's Amateur Radio Representative. If you are a power company employee and would like a reprint copy, ARRL Headquarters has a limited supply which will be sent free as long as they last.

More on S-Line Break-In Keying

BY H. ROMMEL HILDRETH, M.D.,* KØHZF

Some owners of Collins S-Line equipment who have followed suggestions I have made in previous *QST* articles,[1, 2] have complained of the residual backwave signal that remains when the key is open. This signal is not transmitted, but is sufficiently strong to interfere with weak-signal reception when the station receiver is tuned to the same frequency as the transmitter. W4AX has suggested a way of eliminating this backwave,[3] but his method involves several changes in the wiring of the 32S-3. In working with the problem, I have found a simpler solution which requires no alteration of the original circuitry.

The backwave signal is a product of three oscillators — the v.f.o., the b.f.o., and the h.f.o. Hence, it is necessary to suppress the signal from only one of the three to remove the backwave. In the method I use, the b.f.o. signal is suppressed by shunting the r.f. output of the b.f.o. through a 0.005-μf. capacitor to ground. This is accomplished by grounding the capacitor through a transistor switch actuated by the key, as shown in Fig. 1.

When the key is open, negative voltage from the transmitter grid-block supply forward-biases the p-n-p transistor, and the r.f. output of the b.f.o. is grounded through the capacitor and the collector circuit of the transistor. When the key is closed, the forward bias is removed, and the b.f.o. functions normally. Checks with an oscilloscope showed no deterioration of the shaping of the keying characteristic of the transmitter.

The capacitor, transistor and 50K resistor are mounted on a short terminal strip, and placed in a small plastic box. Pharmacies have these boxes in various sizes and shapes. Small holes are drilled in the box to pass the three leads requiring connection external to the box. A small alligator clip is attached to the lead from the transistor emitter, and this lead is grounded by fastening the clip to a screw projecting from the v.f.o. box nearby. The lead from the 50,000-ohm resistor must be long enough to pass through the large hole in the rear of the 32S-3 cabinet to the insulated terminal of the key, and should preferably be shielded, with the shield grounded to the chassis, and to the grounded side of the key.

The lead from the 0.005-μf. capacitor must be connected to the plate of the b.f.o. tube, V_{2B}. To avoid having to drill a hole in the chassis, and solder a connection to Pin 6 of the socket underneath, I purchased a 9-pin "test" adapter (Vector T-9-N, or similar). This type of adapter has exposed terminals, corresponding to the tube pins, to which connection may be made. The lead from the capacitor is soldered to Pin 6 of the adapter. The adapter is then plugged into the b.f.o. tube socket, and the tube plugged into the adapter.

It was found that connection of the backwave-suppressing transistor caused the transistor muting switch to close only partially with the key open, resulting in a slight reduction in receiver gain. This was easily corrected by lowering the base resistance of the muting-transistor base resistance R_1 to 300K.

When tuning up after changing bands, the lead to the key must be disconnected temporarily at the key, or the key held closed to actuate the transmitter stages, of course.

The use of transistors as remote-controlled switches is intriguing. It seems possible that someone will eventually work out a transistor-switch system to replace the present comparatively slow-acting VOX relay, and provide something approaching duplex phone operation.

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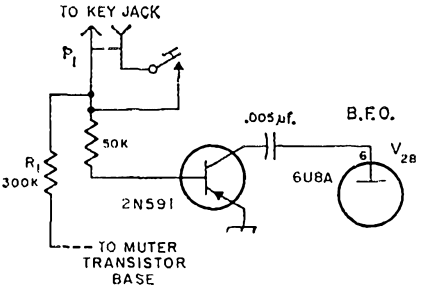

Fig. 1—Circuit of the backwave suppressor. P_1 is a phono plug. R_1 is the base resistor of the muter circuit whose value has been changed from 700K to 300K.

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[1] Hildreth, "Instantaneous Break-In with the Collins S-Line," *QST*, December, 1963.

[2] Hildreth, "Transistor Keyer/Muter for Collins S-Line," *QST*, December, 1964.

[3] Shafer, "Cleaner Break-In with the 32S-3," *QST*, November, 1964.

A Neat 50-Mc. Mobile Antenna

Approaching Dipole Performance with Less Than Dipole Length

BY EDWARD P. TILTON,* W1HDQ

THE modified turnstile for 50 and 144-Mc. mobile [1] recently described works on both bands after a fashion, and this feature makes it very useful to someone who likes to work the two bands from the car. Admittedly it is a compromise, however, and the one-band operator has little to gain from its use. For 2-meter work only, the unmodified turnstile is preferred. The 6-meter man may like the dipole idea, since this type of antenna can be made somewhat less conspicuous than the usual halo, but if he is going to work 6 only there are ways to make a shortened dipole that is more efficient than the center-loaded arrangement inherent in the two-band version.

Loading at the center, as originally described, has two undesirable features that are easily corrected in a one-band mobile dipole. The loading coils are in the highest-current portion of the dipole, which cuts down on the radiation efficiency, and the antenna is inherently unbalanced when fed directly with coax, as in the two-band model. The dipole shown in Fig. 1 gets around these problems, and it is a light-weight and relatively inconspicuous antenna for 50-Mc. mobile service.

Construction

As may be seen from the sketch, this horizontal dipole has loading coils at equal distances either side of center. You can come up with your own dimensions if you want to cut and try; those given are merely one of many possible arrangements. Our dimensions were dictated by two considerations: we wanted to use 2-meter turnstile elements for the outer portions, and we just happened to have a piece of solid aluminum rod 13 inches long that would serve as the center section.

The 13-inch rod is drilled and tapped at each end for 6-32 thread. The loading coils, L_1 and L_2, are made in a manner similar to those used with the two-band antenna. Prepared coil stock is slipped over ½ by 1-inch ceramic standoff insulators, and the wire ends are soldered to lugs at each end of the insulators. The element ends are ⅛-inch aluminum welding rod, threaded 6-32 for about one-half inch at their inner ends. A 6-32 nut is threaded onto the element, and this acts as a stop when the element is screwed into the insulator.

The 13-inch center section is supported in a ½-inch piece of solid aluminum rod about one inch long, with a setscrew running in from the top to hold the rod tightly in place. The lower portion of the block is drilled to take the vertical support, which is ¼-inch aluminum tubing. This can be any length that will stand the strain; ours is 30 inches long.

The diameter of the bottom end of the vertical member is filed down just enough so that it can be forced into the UG-176/U adapter, which, in turn, screws into the PL-259 coaxial plug. Small-

* V.H.F. Editor, *QST*.

[1] "A Turnstile/Dipole for 6- and 2-meter Mobile," November, 1965, *QST*, p. 40.

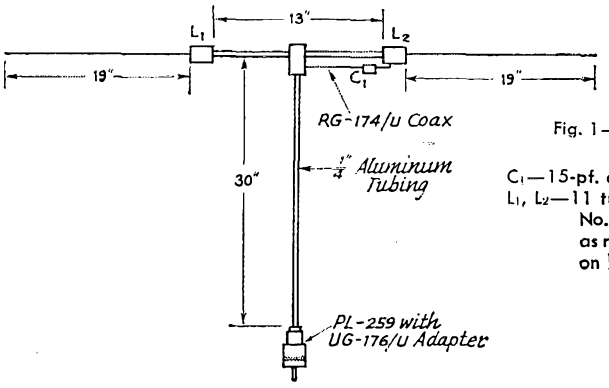


Fig. 1—Principal details of the loaded 50-Mc. mobile dipole.

C_1—15-pf. dipped mica.

L_1, L_2—11 turns No. 20, ⅝-inch diam., 16 t.p.i. (B & W No. 3007). L_2 tapped ¾ turn from inner end, or as required for minimum s.w.r. Coils are supported on ½ by 1-inch ceramic pillars (Millen 31001).

diameter coax, in this instance RG-174/U, is soldered into the plug before the assembly work at the bottom is completed.

The coax is fed in from the top, through a hole drilled in the center support and the vertical member. When you try this, you'll see why we used the small coax. Nothing larger is likely to be amenable to being pushed around such a sharp-angle bend, and down through an opening as small as the interior of ¼-inch tubing. There is nothing to prevent using larger tubing for the vertical support, if you can invent some way of fastening it to the plug. There are ways, no doubt, but the ¼-inch tubing is very easy to fit into the coaxial adapter sleeve, and it makes a neat and unobtrusive assembly that appears to have adequate mechanical strength.

Adjustment

The top end of the coaxial line extending through the hole as shown forms the arm of a gamma match. The series capacitor, C_1, was first set up as a variable, permitting the right combination of capacitance and tap position on L_2 to be selected experimentally — but we're getting ahead of our story.

First the antenna by itself must be resonated at the center of the frequency range you want to work over. This will be a narrow frequency range, a limitation not too important, with most 6-meter operation being in the first 500 kilocycles of the band ordinarily. The resonant frequency can be checked with a grid-dip meter, putting the g.d.o. coil adjacent to the 13-inch center section of the antenna, close to the center block. The trick now is to trim the lengths of the outer elements, or the number of turns in the loading coils, until you hit the desired frequency. It will be a sharp indication; when you approach the desired frequency, do not trim elements by more than one-half inch at a time, or the loading coils by more than ¼ turn. Whichever you cut, be sure that the same change is made on both halves of the antenna. When you're through, the coils should be identical, and the outer ends of the elements the same length.

The antenna used by the writer was trimmed for resonance at about 50.25 Mc. The next step was then to find a value of series capacitor, C_1, and a point of connection on the antenna or loading coil, L_2, that would provide a 50-ohm termination for the coaxial line. This was done experimentally with the antenna support clamped in a vise on the workbench. A recheck of the s.w.r. and operating frequency, when the antenna was installed on the car, showed little change.

Results

It was immediately apparent when this antenna was connected to the 50-Mc. mobile rig that it was going to receive better than the two-band dipole. The noise level in the Newington parking area was markedly higher on the new dipole, and when we were underway along the routes to and from home we found that the signals we normally heard were considerably better. We have no way of making direct comparisons with antennas like the popular halo, but results with familiar stations indicate coverage about equal to anything we've had in the past, including several halos.

Frequency response is about the same as with a capacitively-loaded halo. Resonated and matched at 50.25, the dipole is usable from the low end to 50.5 Mc. before the s.w.r. rises above 2 to 1, a mismatch that is tolerable in a mobile setup.

The antenna plugs into a coaxial socket on a no-holes mount fastened just above an air vent near the rear window of a Corvair convertible. Though very light in weight and low in wind resistance, it stood up under the rigors of New England winter driving. It does not work well when the loading coils are encased in ice, but we know of no mobile antenna that does very well under these circumstances.

Being a half-wave dipole, in effect, it displays appreciable directional qualities. We work people better "coming or going" than we do those perpendicular to the line of travel, but in years of v.h.f. mobile work we have not yet had an antenna that displayed a truly omnidirectional pattern. It is no 5-element beam in operating range, but it does work, and it can be removed in an instant — a feature hard to build into a 50-Mc. halo.

QST

As The Ham Sees ARRL

Highlights and Summary of the Results of a Survey of Amateur Opinion

BY DON WATERS*

AMATEUR radio operators, like Frenchmen, are clearly a breed of individualists. To a conspicuous degree they have positive opinions about anything related to their "hobby" including substantial disagreement as to whether or not it is even a hobby! And these opinions are expressed freely and forcefully.

As one ham put it, "You know, you've got to be a sort of anti-social nut." Most hams are nonconformists, and they just don't like to be told what they have to do.

Appraising the ham's attitude toward — and relationship with — the League is in many respects an exercise in paradoxes. There really is no such thing as a "typical" ham, yet there is a great deal of consistency in their collective views. Hams are individualists, yet their fraternal bond is very strong. They are non-conformists, yet they are overwhelmingly committed to the need for a strong ham organization. They are quick and sometimes violent in criticizing the League, but their feeling about it is very personal and proprietary. Hams are articulate to a fault and they have a unique and efficient means of communication, yet the prevalence of confusion, misunderstanding and misinformation is extensive and considerable.

Recognition of these apparent contradictions is the first key to understanding how the ham feels about ARRL and why he feels as he does. In essence what the ham has to say about the League boils down to this:

- I believe in the ARRL. We need a strong organization to represent us; without the League there would be no amateur radio.
- League publications are what got me started in ham radio, and I still depend on *QST* and the *Handbook* to keep me posted. But a lot of their stuff is over my head and there's too much push on c.w., and building . . . which do not interest me.
- I don't always like the way those headquarters fellows go about things. They say they're democratic, but no one ever consulted me or anyone I know about things like incentive licensing. They're just too far away — literally and figuratively. They don't know what we want.
- As a member, the League needs me and I want to be a part of it. *QST* is my ham bible. As an ex-member, they're out of touch with my interests, or I haven't gotten around to renewing, or I'm just not active now. As a ham who's never been a member, I've just never gotten around to joining, or I see *QST* whenever I want to and get everything else I need without joining/subscribing.

What emerges clearly from this survey is that ARRL has a great reservoir of confidence and belief in the League on the part of hams. By the nature of the art — its strong fraternalism, its dependence upon a Federal regulatory agency — hams have a

* Don Waters & Associates, Ridgefield, Connecticut.

strong feeling of need for the League, and an even stronger feeling of wanting to be personally identified with and by it.

This is the crux of the situation: if the people interviewed are indeed representative, then too many hams just do not feel the sense of personal relationship with the League they want to feel.

Even the most loyal and dedicated members . . . and these appear to be many . . . are critical of headquarters' being remote, impersonal, isolated. At the other extreme, the impression is one of arrogance, high-handedness, indifference to the "rank and file." Many hams are confused, even misinformed not only about specific issues such as incentive licensing, but about the League's basic role and functions . . . despite *QST* and other headquarters communications.

The ARRL message, ironically, has not really gotten through. The signal is not clear.

How Hams Rate The League

In evaluating the general tone as well as specific comments in the taped interviews, 16.0% of the hams interviewed were rated as very familiar with or knowledgeable about the ARRL; 35.4% as familiar, another 35.4% as unfamiliar, and 13.2% as very unfamiliar or lacking in even a basic grasp of what the League is and does. The greatest lack of familiarity appeared to be in the California and New York groups. With this void in knowledge of the League among half the hams interviewed, it is not surprising that many comments were highly critical of ARRL. The survey was to evaluate and appraise, of course, and criticisms were recorded as offered whether or not they were based on misconceptions.

12.5% of the hams interviewed, almost all in the East, said they had had some personal contact with the Staff or Directorate, 14.6% had had contact with headquarters via letters only, 43.1% via W1AW only, and 29.8% had had no contact at all with headquarters. In Louisiana 88.8% and in California 76.5% had had no contact of any kind.

3.5% of the hams interviewed rate the ARRL headquarters performance generally as superior (borrowing the old Army-style rating scale), 18.8% as excellent, 38.1% as good, 18.8% as fair, 6.2% as poor, and 14.6% did not know or had no opinion.

In other words, in the thoughtful judgment of 60% — six out of ten — of a representative group of member, non-member and ex-member hams, ARRL headquarters is performing its job satisfactorily or better. This is a very creditable vote of confidence especially at this particular point of time for an organization representing a highly opinionated group of people.

On the other hand, from the point of view of constructive action, it should be noted that this "60% — satisfactory, or better" performance rating is by no means uniform across the country and in fact varies almost directly with the distance from headquarters:

Massachusetts	78.1%
Connecticut	69.3%
New York	54.5%
Illinois	50.0%
Louisiana	44.4%
California	41.1%

Almost all hams interviewed were critical in some degree of their personal relationship with the League. This was expressed in terms ranging from, "They're arrogant so-and-so's who expect blind obedience from us hams," to "They just don't get down to the grass roots." A minister who is also a ham perhaps put it best, "I think they need to develop a renewed sense of contact with hams."

It is the word "they" which constantly recurs which is significant. Too many hams do not think of the League as the membership or as a grass roots, democratic organization. ARRL is headquarters, those people in Newington — a vague, undefined notion which includes the directors except sometimes their own who may be thought of as a "local" man. This confusion extends to the role and status of the directors — several respondents, for example, were surprised to discover that Mr. Hoover enjoys no salary from the League! Paradoxically, contact of any sort with an area official is not considered the same as contact with headquarters, i.e., a newsletter from the division director is not the same as a communication from "the League."

Information Sources

In interviews we explored (a) original sources of learning, getting started, preparation for exam; (b) current sources to keep posted on technical developments in ham radio; (c) current sources to keep posted on non-technical aspects, regulatory information, etc.; (d) over-all preferences. The results are in Table I on the next page.

In all categories, and by any of the yardsticks employed, ARRL is clearly the primary source to which hams look for information of all kinds about amateur radio. *QST* has at least three times the preference over any other amateur magazine. Other hams themselves, perhaps not surprisingly, are the second most important source of information.

Actually, this could be the cause of some of the confusion and misunderstanding among amateurs. The very freedom of ham intercommunication, in the nature of chit-chat and gossip, may permit the origination and (through repetition on the air) prolongation of misconceptions and erroneous data. The relatively poor showing of local radio clubs might be interpreted as an indication of an opportunity these organizations are missing.

On several occasions ancient copies of *QST*, the *Handbook* and the *License Manual* were produced

The attitudes and opinions of amateur radio operators toward the "art" and the League were surveyed by a public relations firm through a series of interviews in depth, in a number of California, Connecticut, Illinois, Louisiana, Massachusetts, and New York communities between September and December 1965. The purpose of the survey, financed by ARRL, was to elicit critical opinion in order to assist League directors and management toward more effective organization and membership growth.

Table I

	Learning Source	*Current Tech. Information*	*Current Non-Tech. Information*	*Straight Preference*
ARRL, *QST*	86.2%	76.5%	60.5%	61.1%
CQ	—	25.7	8.3	9.0
73	—	23.0	8.3	13.9
Other Hams	56.3	39.6	52.8	—
Club	17.4	9.0	13.2	—

proudly, or voluminous files of *QST* displayed. Many hams, often emotionally, attribute much if not all they know about amateur radio to the League. An Amateur Extra who is an electronics professional, said, "Actually the League publications represent about 80% of all worthwhile technical material available to hams today."

These and other votes of confidence and belief in ARRL manifested throughout the survey should be interpreted as a great asset, a demanding responsibility, and — most important — a challenge to do an even more effective job and particularly to convince more hams that their best interests are indeed being well represented.

QST *Is The Bible, But . . .*

While *QST* is overwhelmingly preferred among the three ham periodicals by those interviewed, there was a good deal of criticism to the effect that its articles and projects tend to be at too high a technical level for the average ham, or that there is not enough material between the beginner level and the highly proficient. It was also evident that few hams really followed *QST*'s coverage of incentive licensing. There was a feeling too that *QST* and other League activities do not truly reflect the majority interests of hams — i.e., there is too much emphasis on building and experimentation, public service activities, etc., and not enough for those hams for whom amateur radio is just a diverting hobby, who have never been or are no longer technically oriented. It is true that some hams, especially the old-timers, and, interestingly, many of the new, very young hams, seem to be firmly committed to c.w., and to building at least portions of their equipment. On the other hand there appears to be a substantially larger group of older hams and more mature newcomers who can afford it whose interests are predominantly in phone transmission and in commercial equipment. Many of these people feel theirs is a perfectly legitimate interest which is not adequately recognized by the League. Often they do not understand or agree with the League's long-time emphasis of public service as an important aspect of maintaining the amateur's access to bands.

"*QST* construction articles are for rich electronics engineers," one ham said. "Me, I just like to get on the air once in a while for a good rag chew."

Several suggestions were made to have more articles devoted to simpler accessory or gadget types of gear and to "hints and kinks" types of items. There were also, it should be noted, comments that *QST* is not technical enough, although these were relatively few and came wholly from electronics people. There is also a minority group which feels that *QST* has not entirely kept up with the times, that it (and the League) are perhaps a bit slow to pick up new trends. It was also occasionally alleged that *QST* is not immune to technical error, that some of its construction pieces may not have been adequately "kitchen tested" before publication.

A surprising number of hams seem to equate ARRL membership simply with a subscription to *QST* — which is another explanation both of the widespread lack of understanding of the League's purpose and functions and of why some hams are not members. Either they can get *QST* without joining, or they prefer another publication, or they do not feel they need any publication.

Incentive Licensing

Incentive licensing is such a virulent current issue among hams that it posed a technical survey problem: how to distinguish or isolate reactions to incentive licensing from attitudes toward the League. Obviously they cannot . . . and should not, for that matter . . . be separated completely. The depth interview approach, the type and format of the questioning, were designed to at least clarify and delineate these interrelated attitudes and to put them into some reasonable perspective.

More than three quarters of the hams interviewed are in favor of the idea behind incentive licensing as they understand it. A substantial percentage approve of the proposal itself as they understand it. An even larger group approves the ARRL role in the proposal as they understand that. *But*, very few of the hams interviewed evidenced a full understanding of the proposal and what is behind it. About a third of them were classified as having a "good" understanding, a somewhat loosely applied evaluation. This is surprising in the light of the almost unanimously intense interest and concern expressed, the frequently strong feelings held, and the comprehensive coverage of the issue in *QST* and elsewhere. (There were actually four licensed hams interviewed who said they had never heard of incentive licensing!)

Perhaps the most significant finding with respect to incentive licensing is that the critical reaction to the proposal is focussed not nearly so much on the proposal itself as on the way in which a majority of the hams interviewed feel it was mis-handled, primarily by ARRL. The most violent reactions were to the effect that, "it's being rammed down our throats," "those guys at ARRL tell us this is the way it's going to be whether we like it or not," "they just decided to go ahead and do it without bothering to find out what the membership wants."

Why Are More Hams Not Members?

A concluding question in every interview went something like this: Why is it, with the job the League seems to be doing with its publications, its regulatory liaison, its technical services, its headquarters station, its modest annual dues which include a subscription to *QST*, why is it that more hams are not members — or why aren't you a member?

Why More Hams Are Not Members

Inertia, apathy, haven't gotten around to it, etc.	32.0%
Many hams just interested in getting ticket, not technically inclined, use commercial gear, etc.	22.2
Inactive, lack of time, etc.	21.5
Really don't know, no idea	21.5
Many hams confused, misinformed, don't know what ARRL does, etc.	16.7
Get everything I need or want from ARRL without joining	10.4
Don't want to spend the money, better use, can't afford it, etc.	9.7
ARRL has gotten away from what amateur wants, not representative, clique, etc.	9.0
Hams are non-joiners, individualists	7.0
Critical of ARRL, vague, nonspecific	7.0
ARRL has not "sold" itself, etc.	7.0
Incentive licensing	6.3

Eight former members and one ham who had never been a member cited incentive licensing specifically as the reason for not being a member in protest. These 9 people represent a small percentage of the hams interviewed — certainly not an indication of any substantial protest movement. All 9 said they expect eventually to rejoin (or join).

The prime reason for non-membership in the great majority of cases was simply inertia or apathy. The first response of many hams to the question was, "Why, I don't really know." Then they would go on to say something to the effect that, "I just never got around to it," or "I know my subscription has lapsed, and I'm going to renew it one of these days." The second most frequent response had to do with relative inactivity or lack of time. Interest in ham radio, like many avocations, seems to run in cycles. Some of the hams interviewed said they were not active "right now." Their definition of "inactivity," however, varied considerably. Only two of those interviewed were literally inactive in the sense of not being on the air at all and not having a rig in operating condition — but neither felt he had given up his interest. A frequent answer from members was along the lines of, "Many hams are just interested in getting their tickets and going on the air. They don't need or don't want to achieve further technical skill or proficiency." Another common reaction from both members and nonmembers was, "Many hams are uninformed or misinformed about the League." Related to this was a vague feeling that recurred often that, "the League isn't doing anything for me," or "I get *QST* or any other services I want from ARRL. Why join?" Some younger hams cited "better uses" for the five dollars.

One Novice said, "I have that application in my desk. If someone rang my bell and said sign this and give me five bucks and you're an ARRL member, I'd do it."

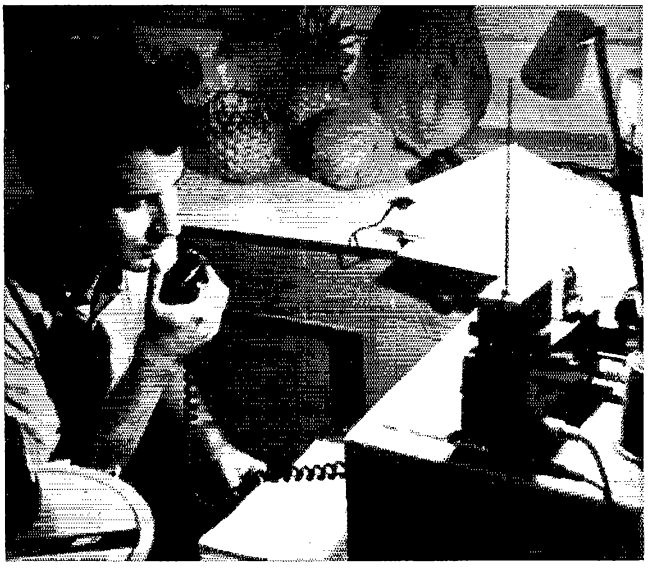
In quite a number of the individual interviews and in each of the three club group interviews, the point was made and discussed at some length that the League has not sold itself, that it doesn't seem to do *much if anything* to promote additional membership.

What hams have told us in this survey is a strong affirmation of the basic soundness of the League's objectives and policies and a unique testimonial to its effectiveness. Of far greater significance, however, the results bring into sharp focus some ways in which the League's purposes can be even better served. These conclusions seem clearly indicated:

- The questions of current member relations, turnover and attracting new members are all part of the same requirement — doing an effective job for amateur radio and, equally important, making sure that the membership understands what is being done and why.
- Hams generally have a strong basic confidence in ARRL and rate it well on performance. Yet headquarters is actually doing a better job than many hams give it credit for.
- There is a great deal of misinformation and misunderstanding.
- Issues such as incentive licensing are disruptive and disconcerting at the time, but in the long run are almost certainly beneficial because they stimulate awareness and participation and bring fresh vitality to the organization.
- League members have a very proprietary feeling about it and a desire to be personally identified with it, but are often frustrated by an impression of remoteness, isolation, even rejection by headquarters.
- There is no such thing as a "typical" ham. In fact, from the League's point of view, there are at least four basic types of hams with distinct interests — the eager neophyte who wants all the information he can lay his hands on, the established operator who is proud of his technical proficiency and his code speed and wants to build or modify the equipment he uses, the experimenter who is far more interested in puttering with gear than in being on the air, and finally, the largest group of all, the ham who has little or no interest in the technical side, uses commercial gear, is probably a phone operator and likes a good ragchew or occasional DX contact. This is the fellow who feels most out of touch with the League. There are probably more of him than all the other "types" combined, and his ranks are growing.
- Headquarters communications have been highly successful technically, less so in influencing attitudes and opinions.
- A substantial improvement in member relations and increase in membership are practical and feasible with relatively modest effort through a program of improved communications. QST

"Yanqui, Come Back"[1]

Amateur Radio and Amigos de Honduras



The Amigos Project Director, Guy Bevil, Jr., at the mike of HR1HZY

BY STEVE COOK,* WA5HZY, HR1HZY AND RAYMOND A. COOK,* WA5IQP

SEVERAL years ago a dedicated group of Houston teenagers under the inspiration and leadership of the Youth Director of their church, Guy Bevil, Jr., conceived the preposterously ambitious project of inoculating the rural population of Western Honduras against major contagious diseases. They finally did it; and they did it so successfully that at the close of their nine-week program last summer, the President of Honduras, Oswaldo Lopez Arellano, HR1OL, authorized the presentation to Mr. Bevil of a special gold medal award, the highest such award ever conferred by Honduras upon any North American. This article will endeavor to describe how amateur radio contributed to the success of the operation, called "The Amigos de Honduras."

The Need for Radio

The complex task of scheduling, moving and supervising drugs and people would have been substantial for a sophisticated, highly organized industrial or governmental agency. For the Amigos, a voluntary, non-profit, non-governmental group on the astonishingly small budget of $80,000, the task of successfully inoculating more than 500,000 Hondurans with more than 1,000,000 inoculations was monumental.

Operating in a foreign country with a thousand miles of water separating them from home, the Amigos found themselves highly dependant upon radio, first for medico-logistical traffic and secondly for personal contacts with the folks at home. Whether in forwarding medical advice, locating missing drugs, indoctrinating workers or in dispatching charter flights, the Amigos were delighted to find that amateur radio could do the job. Fortunately, with the encouragement of President Lopez, himself an amateur radio operator and with a liberal treaty for third-party traffic, the host government put no restrictions on this medico-logistical traffic.

Ignoring the minor casualties of diarrhea and temporary home sickness, the consistent report which came back over the air waves was enthusiastic faith in the project and friendship for the people; of the 268 participants, 97 were boys and 84 girls, mostly of high school age. (The balance consisted of doctors, nurses, medical students and adult sponsors.) As one observer described it, "They arrived in Honduras as strangers and left with a million friends." Amateur radio was privileged not only to assist this wonderful program but also to observe and record the results.

* 1936 Sunset Blvd., Houston, Texas.

[1] This title is borrowed from a TV-documentary program on the Amigos project presented on KPRC-TV, January 2, 1966.

Amateur radio has supported many public service expeditions, some linking the U. S. with many remote parts of the world. Few of the projects are as satisfying to its participants as a humanitarian project, and this article describes one such operation conducted last summer under the name "Amigos de Honduras," Friends of Honduras.

Personnel

Steve Cook, WA5IIZY and HR1IIZY, and Kirby Atwood, WA5CGT and HR1CGT, were the two project radio operators, both participating in the pre-departure communications with Honduras, in the overland convoy to Honduras and in the advance-party activities after arrival. Both applied for and received Honduras amateur licenses. Steve remained as a part of the staff complement for the full period, and Kirby returned after the first three weeks to work on the Houston end. They doubled in brass, serving as truck drivers and inoculators when not on the air. Typical of amateur radio operations, however, the successful handling of scheduled traffic depended upon a reservoir of volunteer operators most of whom had no other connection with the project. In Houston these included: Vic Huvelle, K5MJF, Ray Cook, WA5IQP, Cindy Dougharty, W5ZPD, Gabe Fajardo, K5GHL, Dave Allen, WA5CNP. In addition to the Houston operators, there were a number of other United States and Honduran operators who gave freely of time and interest, particularly those operating in the daily "Intercontinental Net," whose services were invaluable in the early communications with Honduras before Steve and Kirby arrived there. Public service was no new experience to Mac, HR1MD, Leo, HR1LM, or Art, HR2ABC. Without their help to the Amigos — on and off the air — the operations might never have begun.

Equipment

In Honduras the equipment consisted of two transceivers, one Hallicrafters SR-150 and one Sideband Engineers SB-34, contributed by the authors. Another SB-34 was held in reserve. Under Honduran regulations, the transmitter power was limited to 150 watts, but this limitation was never a substantial problem, although it did require constant attention and frequent shifting of frequencies to avoid the heavy QRM, characteristic of 20 meters. An electronic keyer made straight message handling faster on c.w. but s.s.b. was more practical for the mixed traffic. Local 120-volt a.c. power was used exclusively, varying widely in actual voltage (the Variac was indispensible) but never failing completely.

The two antennas used were highly portable types, a simple half-wave dipole and phased dipoles colloquially known as a "ZL Special," distinguishable in transit by its pair of bamboo poles prominently carried on the top of the truck. Even at reduced heights, once at only six feet after some local pranksters stole the nylon supports, the antennas worked surprisingly well. They also served some of the local housewives as clothes lines!

Serious consideration was given to establishing one or two satellite radio stations in sub-centers of the project area, and there were many occasions when it would have been helpful to have direct radio communication between La Lima and the forty-three individual villages. With only two operators available, however, and with only three transceivers, at most, the nets would have been temporary; and for any given village, traffic would have been light in contrast with the heavy traffic between La Lima and Houston. Hence, the radio facilities were committed 100 per cent to Houston traffic; and local telegraph and periodic jeep runs were used for the intra-Honduran communication.

Operations

From the inception of operations, it was found that the most practical times to operate were from 6:30 A.M. to 8:30 A.M. and 6:30 P.M. to 8:30 P.M. Late at night the distance, approximately 1000 air-line miles, handicapped transmissions, and during the working day it was impractical at both ends of the line for operators to be tied to the rigs.

Fortunately, this plan worked and worked well. Except for the three or four occasions when both Steve and Kirby had to over-night it on the road, the traffic always went through. Official liaison between Project Headquarters in La Lima and the volunteer staff in Houston was usually person-to-person. Unofficial messages, with parents or girl friends or boy friends were usually by radiogram — 500 of them — handled on the Honduras end by jeep runs to and from the backwoods, and handled state-side by land line, with XYLs usually having the pleasure of this contact with the Amigos and their friends.

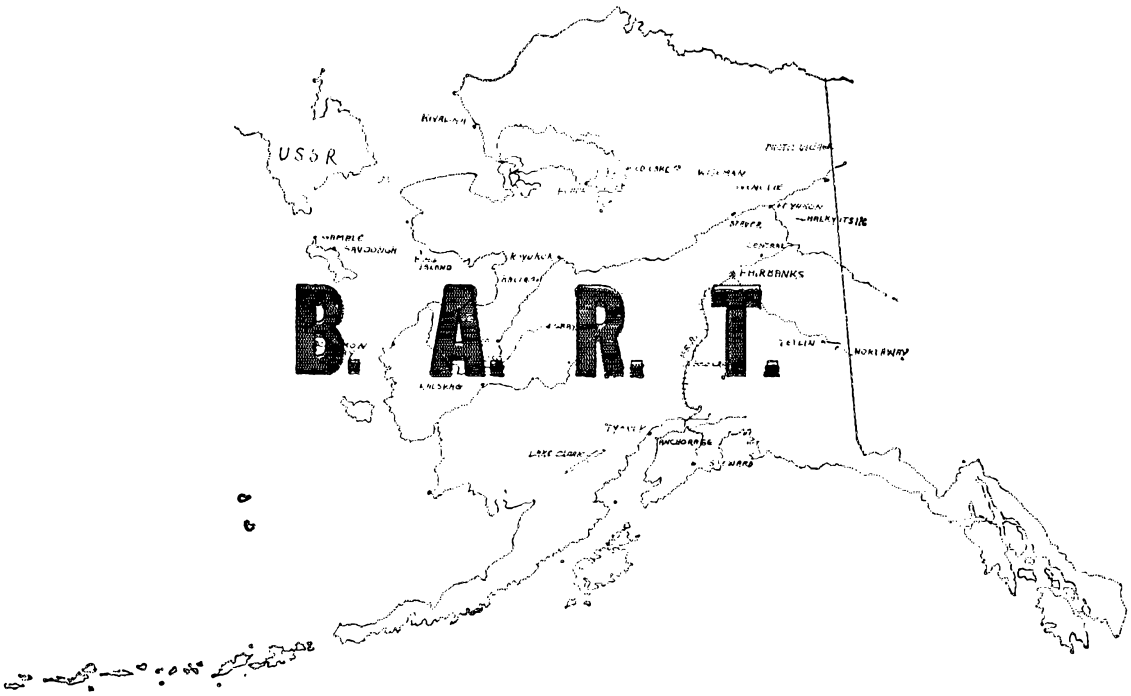
Communication was 100 per cent on the 20-meter band, frequently using cross-frequency technique to utilize the foreign phone band (14.1 Mc. to 14.2 Mc.) on the Honduran end. Had the 20-meter band not proved successful, prearrangements were on tap for shifts either to 15 meters or to 40 meters.

During their spare time, averaging less than one hour a day, Steve and Kirby logged a good number of DX contacts; since HR calls are relatively rare they always had a waiting line. The QSL for this project was appropriately designed as a hemisphere map highlighting Texas and Honduras, and effectively spread the good word about the Amigos.

Future Programs

Happily it can be reported that the Amigos program has now been made permanent. In December it was incorporated as a non-profit charitable corporation under the name, "Amigos de las Americas," with a Board of Trustees which includes old friends and new supporters, and with Guy Bevil, Jr. as its Executive Director. Further information about the Amigos and the participation of hams in its program may be obtained by writing Amigos de las Americas, P.O. Box 66736, Houston, Texas 77006.

One thing is now certain: When the call comes in from our Latin American friends, "Yanqui, Come Back" hams will be among the first called and the first to respond. QST



Every town named on this map of Alaska has a BART student and will, we hope, someday have a radio amateur.

Bush Amateur Radio Training

BY NANCY LEE DITTMANN*, KL7FCG

THERE have been many individuals who have felt the great needs of native and white people alike that live in the Alaskan bush country. One of these is Sandy Jensen — writer, homesteader, ham radio operator, (KL7EWH) a girl having numerous other interests far too many to mention. Since her arrival in Alaska in 1959 she has been involved in many enterprises to help the natives. The most recent, the subject of this story, is a radio training program by correspondence.

She felt that one vital need was a better communication among the various remote settlements. An obvious way to solve this was by amateur radio, but where were the amateur operators to come from? In a town or city it is not so difficult — any would-be amateur can usually find someone who is already licensed and who will take him in hand to provide the necessary training.

But in the Alaskan bush country it would be another problem. There are no next-door neighbors who are amateurs. Any production of new radio amateurs would have to be by mail.

Armed only with the bare knowledge of radio that was required to obtain her ham license, she attempted to get volunteers to write the course, make the code tapes and do anything else that would be helpful.

The first contact was a radio club in Fairbanks. They were interested and expressed a desire to help but mentioned that since everyone was so busy, it would have to be on an individual basis rather than a club project. While disappointed that it could not be undertaken by the club itself, we welcomed individual help. Sandy then wrote a long-time friend, Dr. Henry Forbes of the Association on American Indian Affairs. He had aided her in other projects, and was impressed with this idea and goal. From the very first, he offered not only moral support but numerous personal contributions to help with postage and stationery.

The Alaska Native Rights Association, which had recently become inactive, voted to turn over the remainder of their funds to the cause. A checking account was set up and a committee of volunteers agreed to work on the project.

Dick, KL7DCF, originated the name, Bush Amateur Radio Training — BART for short — to be the title of the project. Letters were typed by Sandy and sent to 19 villages and several individuals. When the replies started coming back, she reported the progress to the club and asked for assistance in typing return letters.

* Box 4, College, Alaska (near Fairbanks).

Rachel, KL7EUW; Joan, KL7EPG and Clara, KL7ENO stepped forth and offered their help. Cards were then made up inquiring about education, background and radio reception in the villages.

Response was staggering. These people from the bush are starved for contact with other villages and towns, and especially need emergency communications. The majority of villages have neither hospital or doctor and must depend upon a traveling health nurse or an occasional visit by a doctor.

Further announcements about the radio course were sent out to the Bureau of Indian Affairs paper, *Native News*, and over a program called *Mukluk Telegraph*, station KENI, Anchorage, and on *Tundra Topics*, sponsored by Wien Alaska Airlines, on KFAR, Fairbanks.

More answers started coming in and things quickly got out of hand. One look at the cards, indicating the low level of education, that averaged between the fourth and sixth grade, was enough to show this would be a gigantic undertaking. However, it was also surprising that a number were from college graduates, teachers and numerous non-natives living in the bush.

The latter could be sent a regular theory text book and code tapes, but for the most part it would be a great struggle. And it was difficult to find anyone with time to help. Sandy was swamped with mail to be answered, letters and lessons to be sent. And what was worse, there was no help and no lessons written!

During weekdays a full-time job at the University Library kept her busy. Weekends were a constant struggle at her homestead to get wood in for the forthcoming week. In desperation, she decided to write the course herself and try to find someone to check its accuracy before mailing.

Sandy also needed help in getting all the rest of the letters answered and books set up, as many of the prospective students had sent in money for a theory book and tapes. Reluctantly she asked me, her daughter, to help. You might think this should be the first place to go for help but my husband and I are also homesteading with two babies. It was apparent that the only way I could help was at night after my boys were in bed. This meant working by candle and kerosene lamp.

These obstacles proved almost too much for us and if it had not been for plain stubbornness, BART would not have gotten under way. Long hours were needed at first to get things going. Sometimes I spent as much as six hours in a day and Sandy used the weekend daylight hours to get in wood and other chores, and evenings writing the first BART lesson by Coleman lantern.

These lessons were written with the sole purpose of making examples of radio theory that could be understood by the uneducated. A language barrier was another big draw-back. There were plenty of reasons for not attempting a project of this size but the love of ham radio and a desire to help the bush people were the strong forces that kept the project alive.

This is Ed Hooley, KL7FMR, one of the first of the students to get an amateur license under the BART program. He's located at Amaktuvuk Pass.

New students were being registered at the rate of about 5 to 10 a month. By February of 1965 there were 64 active and about the same amount interested but afraid to try. We had at first tried to encourage them to go on, but with all the work of keeping up with the 64, it was apparent the best procedure was to let them wait until the others were on the air and then try a new approach by using them for examples.

Through numerous letters and effort, Dr. Forbes persuaded his group, the Association on American Indian Affairs (AAIA), that the project was worthwhile and that we needed financial help. They sent a substantial contribution, part of which went to buy a used mimeograph. The balance went for postage, mimeo paper and other supplies.

We have tried to be a friendly group and gain the confidence and trust of the students. We let them know our interest is in each one as an individual. A few mimeoed letters have gone out that cover everyone, but nearly every lesson and letter has a personal comment. We sent out Christmas cards, and also get-well cards when we knew of illness.

It was a difficult task, as neither of us had time to type up a list of students. The only records we had were index cards with all the information on them. There was panic whenever a card turned

As if in answer to the editorial in February QST, Nancy Lee Dittman, KL7FCG, tells how she and her mother, Sandy Jensen, KL7EWH, organized Bush Amateur Radio Training so that there could be a greater crop of radio amateurs in Alaska to provide much-needed communications among the various isolated settlements.

Some of the BART students have had all sorts of problems. Willis Walunga, an Eskimo from Gambel on St. Lawrence Island, has kept at his studying despite his own hospitalization, the death of his father, and various other setbacks.

up missing. At first we could recall what went where and who needed what lesson. But soon this became impossible to remember. Jo Ann Kelley, KL7EPG, came to the rescue when I moved to town for a couple of weeks. She typed mailing lists, fixed cards with tiny resistors on them to be mailed to the students and helped us to get reorganized.

Technical advice on the lessons has come from AL Weber, KL7AEQ; Bob Merritt, KL7DIY; and Jerry Piland, while George Ryan, president of the 49er's Amateur Radio Club at Ft. Wainwright, set up a bookkeeping system for us which has helped immensely. Rod Leap, Jr., KL7GWD contributed used equipment and componants.

Recently, when we desperately needed someone to make code tapes, help came in the form of Claude Wilber, KL7DIA. Within a week he had six lessons on tape that covered the alphabet, numbers, punctuation marks and some of the Q signals. At present he is working on an organizational outline that should take some of the QRM out of the procedure we've been following.

Sig Wien was contacted to determine if he would consider having code follow *Tundra Topics* since we felt that was the time when most of the people would be listening. He was more than willing and also interested in the project. He also offered help by putting news of the course on *Tundra Topics*.

To date, we have 30 students who are current in their lessons. Eight are using the regular theory book and doing very well. Two are studying on their own and making no reports to us except that they are progressing. Our efforts have been crowned with success in two instances so far, as two of our students have received their ham tickets — KL7FMR and KL7FKR. We feel confident there will be at least a dozen more on the air before long if they are able to continue with their lessons.

We heard a remark the other day that operators in the lower 48 think there are no hams in Alaska because they can seldom raise one to yak at. Looks as though there might be a big surprise in store for them next year. Can't you just hear the sputtering when they try to spell some of the QTH's that will be given! QST

Strays

Need any Arizona counties? Here's your opportunity to work some of the rare ones. The Arizona A.R.V., W7IO. will be on from San Cruz County May 14–15, Greenlee County June 11–12, and Navajo County August 13–14. Activities will begin at noon MST on Saturday and end at noon MST Sunday on s.s.b. only. The schedule will be:

Saturday		
12:00 P.M.	to 5:00 P.M.	14.275 Mc.
5:00 P.M.	to 7:00 P.M.	7.215 Mc.
7:00 P.M.	to 9:00 P.M.	3.875 Mc.
Sunday		
7:00 A.M.	to 8:00 A.M.	3.875 Mc.
8:00 A.M.	to 10:00 A.M.	7.215 Mc.
10:00 A.M.	to 12:00 P.M.	14.275 Mc.

Send QSL cards with SASE to P.O. Box 7543, Phoenix, Arizona.

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The 5th edition of the *Ham Phone Directory*, 1500 complete listings, mostly with phone numbers of greater Miami hams, plus about 300 of other areas, club rosters, Florida QCWA members, etc., is available for $2.00 from the Ham Phone Directory, 1136 S. W. 74th Court, Miami, Fla. 33144. The Directory, put out by Moe Stabin, K4DJW, is published for the express purpose of raising funds for the Variety Children's Hospital in Miami. Checks should be made payable to the Variety Children's Hospital.

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WA3BMM operated portable during the Easter holidays near Lake Chargoggagoggmanchauggagoggchaubunagungamaugg, located at Webster, Mass. (Editor's note: It's for real; look it up!)

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The 1966 edition of the *Kansas City Area Call Book* is just off the presses and is being mailed to all hams in a 50-mile radius of Kansas City. However, there are a few copies available on a first-come-first-serve basis. Those desirous of obtaining one of the books at a cost of $1.00 per copy can write Ben Walker, KØAEU, P.O. Box 139, Kansas City, Mo. 64141

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A position is available as Instructor in Electronics at the State University of New York Maritime College. Those interested should send application and resumé to Prof. G. J. De Simone, Chairman, Department of Marine Transportation, State University of New York Maritime College, Fort Schuyler, Bronx, New York 10465.

17th Armed Forces Day

1966 Armed Forces Day Communication Tests

IN appreciation of the United States amateur radio operator's loyalty and patriotism the Department of Defense through the Departments of the Army, Navy and Air Force, annually sponsors a military/amateur radio communication program on Armed Forces Day. This year's program will be conducted on Saturday, May 21, 1966.

The radio amateur's contributions to communication training, international goodwill, military morale and emergency services are recognized by every echelon of the military services. The Armed Forces Day Communication tests are designed to be a tangible demonstration of the firm and long standing Department of Defense policy to encourage and support amateur radio activity. On this seventeenth observance of Armed Forces Day, all radio amateurs are invited to participate and demonstrate to the world the close partnership and mutual respect that U. S. amateurs and U. S. military enjoy.

This year several military radio stations are scheduled to participate in the communication tests which include military-to-amateur crossband operations and receiving contests for both c.w. and RTTY modes of operation. Special QSL cards will be forwarded to those amateurs who establish two-way contact with the participating military stations. Certificates will be awarded to those who aptly demonstrate their operating ability and technical skill by receiving a perfect copy of the Secretary of Defense originated c.w. and/or RTTY message(s) transmitted during the receiving contest portion of the communication tests. Interception by short wave listeners (s.w.l.) will not qualify for a QSL card. However, anyone who has the equipment and abilities may copy the Secretary of Defense messages and receive a certificate.

Military To Amateur Tests

Washington, D. C. area military stations WAR, NSS and AIR will be on the air from 211400 GMT (1000 EDST, 0600 PST) to 220245 GMT (2245 EDST, 1845 PST). NPG (Navy, San Francisco) will be on the air from 211800 GMT (1000 PST) to 220801 GMT (220001 PST). The military stations will operate crossband by transmitting on spot frequencies outside the amateur bands and establish radio contacts with amateurs in the appropriate sections of the amateur bands. This is a test of crossband operations and contacts will consist of a brief exchange of locations and signal reports. No traffic handling will be permitted.

Amateur contacts from NPG (Navy, San Francisco) will be discontinued from 220245 GMT (211845 PST) to 220400 GMT (212000 PST) during the Armed Forces Day c.w. and RTTY receiving contests.

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POWER FOR PEACE

Station	*Military Frequencies (kc. unless otherwise noted)*	*Emission*	*Appropriate (Mc.) Amateur Bands*
WAR (Army Radio, Wash., D.C.)	4001.5	c.w.	3.5 — 3.65
	4020	c.w.	3.65 — 3.8
	6992.5	c.w.	7.0 — 7.1
	7325	c.w.	7.1 — 7.2
	14405	c.w.	14.0 — 14.2
NSS (Navy Radio, Wash., D.C.)	3269	c.w.	3.5 — 3.65
	4012.5	RTTY	3.65 — 3.8
	4015	c.w.	3.65 — 3.8
	4040	s.s.b./a.m.	3.8 — 4.0
	7301	c.w.	7.0 — 7.2
	7380	RTTY	7.0 — 7.2
	13992	c.w.	14.0 — 14.2
	14385	s.s.b./a.m.	14.2 — 14.35
	14480	RTTY	14.0 — 14.2
	*143.820 Mc.	RTTY a.f.s.k./a.m.	144 — 145.5

* Provided it is consistent with operational and training commitments, this frequency will be keyed from a U. S. Navy aircraft flying between Washington, D. C. and Boston, Massachusetts during the major portion of the time allotted for military to amateur crossband contacts. The flight path will be over Baltimore, Philadelphia, New York City and Hartford, Connecticut. The call sign NSS/AM will be utilized from the aircraft.

AIR (Air Force Radio, Wash., D.C.)	3347	RTTY	3.5 — 3.8
	3397.5	c.w.	3.5 — 3.8
	4025	s.s.b.	3.8 — 4.0
	6997.5	c.w.	7.0 — 7.2
	7305	s.s.b.	7.2 — 7.3
	7315	RTTY	7.0 — 7.2
	13995	c.w.	14.0 — 14.2
	14397	s.s.b.	14.2 — 14.35
	49.980 Mc.	c.w./s.s.b.	50.0 — 54.0
	143.950 Mc.	c.w./s.s.b.	144 — 148
NPG (Navy Radio, San Francisco)	4001.5	RTTY	3.65 — 3.8
	4005	c.w.	3.5 — 3.65
	4013.5	s.s.b.	3.8 — 4.0
	4016.5	c.w.	3.65 — 3.8
	7301.5	s.s.b.	7.2 — 7.3
	7332	RTTY	7.0 — 7.2
	7375	c.w.	7.1 — 7.2
	13975.5	s.s.b./c.w.	14.0 — 14.35
	14385	c.w.	14.0 — 14.2
	49.692 Mc.	a.m.	50 — 54
	143.700 Mc.	RTTY a.f.s.k./a.m.	144 — 148
	148.410 Mc.	a.m./f.m.	144 — 148

(Continued on page 156)

Sweepstakes Phone and C.W. Equipment Tabulation

COMPILED BY ELLEN WHITE,* W1YYM

APRIL 1966 *QST* carried the November 1965 Sweepstakes report. Space just wouldn't permit running the phone and c.w. equipment tabulation, always an interesting list to read. However, we are happy to present here the remainder of the SS report — the full phone and c.w. equipment tabulation for leaders in this popular contest. QST

* Assistant Communications Manager, ARRL.

PHONE WINNERS, 32nd A.R.R.L. SWEEPSTAKES

Section	*Call*	*Score*	*Transmitter(s)*	*Receiver(s)*	*Antenna(s)*
Delaware	W3GAU	30,723	32S-1	75A-4	Dipoles
E. Penna.	W3BES	135,890	32S-3	75S-3	Doublet (75); Ground-plane (40); Beams (40, 20, 15).
Md.-D. C.	W3GRF[1]	150,959	32S-3-30L-1	72S-3	Longwire (75); 3-L (40); 5-L (20); 6-L (15).
S. N. J.	WA2BLV	46,848	HT-37	HQ-170	Inverted Vee (75); 2-L (40); Tribander
W. N. Y.	WA2ZRD/2	66,663	HW-12; Swan 140; 2-B	HW-12; Swan 140; 2-B	Dipoles (75, 40); Ground-plane (20).
W. Penna.	K3KMO	62,985	HX-50-811A; SR-150	2-B	.....
Illinois	W9WGQ	125,575	TR-3	TR-3	Dipoles (75, 40); TA-36.
Indiana	W9AQW	106,029	SB-400	SB-300	Center-fed; Tribander.
Wisconsin	W9RQM	113,552	813	HRO-50T	Zepp (75); Ground-plane (40); Rotary 8JK (20).
Minnesota	WØYC[2]	49,248	Valiant	75A-4	Dipoles; Beam (20).
No. Dakota	K6GII/Ø	82,518	T-4X	R-4	Dipoles (75, 40); TA-33.
So. Dakota	WAØAYP	47,534	SB-33	SB-33	Dipole (75); Ground-plane (20); Quad (15).
Arkansas	WA5IIS	5859	TR-3	TR-3	Inverted Vee.
Louisiana	WA5KLX	66,240	NCX-3	NCX-3	Dipoles (75, 40); Beam (20).
Mississippi	K5SVC	47,700	HT-44	SX-117	Dipole (75); TH-3.
Tennessee	WA4VYL	24,736	6GE5s-6JB6s	6EA8-6AU6s-6EB8-12AT7	Dipoles (75, 40, 20).
Kentucky	K4RZK	40,800	T-4X	R-4	Longwire (75), 40); Duo-bander (40, 20); 3-L (15).
Michigan	K8KJN[3]	121,050	Galaxy V	Galaxy V	Dipoles (75, 40); Quad (20, 15).
Ohio	K8DOC	134,844	HT-37	SX-111	2-L 8JK, Zepp, Vertical (75); 4-L 8JK, Zepp, Vertical (40); 3-L (20, 15).
E. N. Y.	K2AJA	83,124	HT-32	2-B	Dipoles.
N.Y.C.-L.I.	W2RLM	137,751	TR-3	RME-6900	Inverted Vee (75); Phased half waves (40); TA-33.
N. N. J.	W2VJN	54,422	32S	75S-3	Vertical (75); 2-L (40); 4-L (20); TA-33.
Iowa	WØLBS	96,525	KWM-2	KWM-2	Half wave (75); Phased half waves (40); TH-3.
Kansas	WAØBJN	35,295	NCX-3	75A-4	Inverted Vee (75, 40); Quad (20).
Missouri	WAØEMS	145,013	KWM-2	KWM-2	Verticals (75, 40); Inverted Vee (75); 3-L (20, 15).
Nebraska	WØGYM	56,090	32S-3-30L-1	75S-3	Inverted Vee (75, 40); 3-L (20, 15).
Conn.	K1THQ	61,803	5100-B-51SB-B	2-B	Dipoles.
E. Mass.	W1FJJ	78,971	T4X	R-4	.....
Maine	W1GKJ	9504	SR-150-LPA-1	SR-150	Inverted Vee; TA-33.
N. H.	W2NSD/1	119,647	Galaxy V-2-K	Galaxy V	.....
R. I.	W1HQV	43,066	Swan 400	.....	2-L (75, 40); TA-33.
W. Mass	K1NWE	67,620	HT-32	NC-303	Dipoles; TA-33.
Idaho	K7HLR	37,017	TR-4	TR-4	.....
Montana	K7PGL	35,742	SB-34; DX-60	SB-34; NC-300	Dipoles; Tribander.
Ore.	W7WLL	114,048	32S-1-GSB-201	75S-1	Inverted Vee (75); Doublet (40); Tri-bander.
Wash.	W7DK[4]	139,950	KWM-2A	75S-3	Vee (75, 40); 4-L (20, 15).
E. Bay	WB6BKB	47,520	HT-44	R-4	Dipole (40); Ground-plane (20).
Hawaii	KH6FRT	59,280	HT-44	R-4	TH-6.
Nevada	W7KOW	11,077	NCX-5	NCX-5	Vertical; Tri-bander.
Sac. V.	WB6LTY	31,721	SB-400	SB-300	Inverted Vee (75, 40); 3-L (15).
S. F.	K6NCG[5]	81,840	32S-1	75S-1	Dipole (75); Vertical (40); TA-33.
S. J. V.	W6TZN	46,282	HX-10-HA-10	75S-1	Inverted Vee (75, 40); Tri-bander.
S. C. V.	K6VGW	33,408	HX-20-811As	2-B	.....
N. C.	WA4LSA	35,040	HT-32A	SX-115	Windom (75, 40); Fixed Beam (20); Ground-plane (15, 10).
S. C.	K4WJT	80,080	32S-3-30L-1	75S-3B	Doublets; Beam.
Va.	W4KFC	160,650	32S-3; 32S-3-4E27	75A-4	Dipole, Longwire (75, 40); 3-L (20, 15).
W. Va.	WA8GRE	45,396	SR-150	SR-150	Dipoles (75, 40); Tri-bander.
Colo.	WØALG	62,205	Invader	SX-101-A	Tri-bander.
N. Mex.	W5MYN	88,608	HT-32A	Nohawk	Dipole (75); Quads (20, 15, 10).
Utah	K7RAJ	103,707	SB-10	HQ-170A	Dipole (75, 40); 3-L (20, 15).
Wyo.	W7TSM	46,589	SW-350	SW-350	All-band Vertical.
Ala.	W4AKS	38,430	.....	.....	.....
C. Z.	KZ5TD	6965	HX-10-Conv. BC-610	HQ-170	3-L (20, 15).
E. Fla.	WA4NGO	133,683	CE-100V-4-400As; 6100-4-1000A	75A-4s	Inverted Vee (75); 2-L (40); 7-L (20); 4-L (15).
Ga.	W4MCM	156,399	HT-37	75S-3	Inverted Vee (75); 3-L (20, 15).
W. Fla.	W4JJ[6]	70,785	SB-10	NC-300	Ground-plane; Vee; 3-L.
Ariz.	W7AYY	111,362	KWM-2	KWM-2	Vertical (75, 40); 3-L (20, 15, 10).
L. A.	WB6GVV	146,370	Galaxy V	Galaxy V	Inverted Vee (75); 2-L (40); 4-L (20; 3-L (15).
Orange	K6OIZ	47,031	Swan 240	Swan 240	Dipole (40); 3-L (20, 15).
S. Dgo.	W6LWM	31,860	TR-3	TR-3	Vertical; Dipole.
S. Bar.	W3TMZ/6	90,455	KWM-2A	KWM-2A	Longwire (75); Dipoles (40, 20).
N. Tex.	K5RHZ	155,052	SR-150	SR-150	.....
Okla.	K5HWO	88,047	32S-3	75S-3	4-L; TA-33.
S. Tex.	K5LZO	151,548	KWM-2	72S-1	Dipole (75); 2-L (40); 3-L (20); 2-L (15).
Mar.	VE1NV	15,621	4-811s	SB-300	Vertical; 3-L.
Ont.	VE3FUX	51,893	HW-12	HW-12	Phased Array (75); Ground-plane.

Man.	VE4SC	34,224	Galaxy V	Galaxy V	Inverted Vee (75, 40); 3-L (20, 15).
Alta.	VE6OR	31,671	HT-37	2-A	TH-3.
B. C.	VE7AA	37,672	HT-32-HT-33B	SX-101	Inverted Vee (75, 40); 5-L (20).
Yuk.-N.W.T.	VE8BB	26,491	Swan 350	Swan 350	Longwire (75); Dipole (40); TA-33.

[1] K1ANV, opr. [2] WAØGVW, opr. [3] K8MFO, opr. [4] W7BSW, opr. [5] WB6FCE, opr. [6] K4VFY, opr.

C.W. WINNERS, 32nd A.R.R.L. SWEEPSTAKES

Section	*Call*	*Score*	*Transmitter(s)*	*Receiver(s)*	*Antenna(s)*
Delaware	W3GAU	73,183	32S-1	75A-4	Dipoles
E. Penna.	W3BES	129,393	32S-3	75S-3	Dipole (80); Ground-plane (40); Beams (40, 20, 15).
Md.-D. C.	W3MSK[1]	106,005	CE-100V	75S-3	Dipole (80); 3-L (40); 7-L (20, 15).
S. N. J.	WB2APG	101,063	TR-3; Viking II; 6146s	75S-3	Vertical; Dipoles; 2-L (40); TA-36.
W. N. Y.	K2KTK	100,275	Valiant	75A-4	Dipoles; Tribander.
W. Penna.	K3KMO	80,730	HX-50-811A; SR-150	2-B	Dipoles.
Illinois	W9IRH	118,260	Invader 200	75A-4	Doublet (80); 2-L (40); 3-L (20).
Indiana	W9AQW	123,030	SB-400	SB-300	Center-fed; TA-36.
Wisconsin	W9RQM	111,873	VFO-807-813	HRO-50T	Zepp (80); Ground-plane (40); Rotary 8JK (20).
Minnesota	WØAIH	99,760	CE-100V	75A-4	Zepp (80); 2-L (40); 6-L (20); 4-L (15).
No. Dakota	WAØHYI	65,033	T-150A	S-76	Dipoles.
So. Dakota	KØZTV	27,795	TX-1	HQ-110	Dipoles (80, 40); TA-33.
Arkansas	WA5IIS	69,445	TR-3	TR-3	Inverted Vee; Vertical
Louisiana	W5YDC	28,840	HT-20	RME-4350	3-L (20); Doublet (15).
Mississippi	WA5FII	8835	HX-10	SX-101	Dipoles (80, 40, 20); Vertical (15).
Tennessee	WA4PCW	68,970	T-150	SX-101A	Longwire; Inverted Vee (40); Ground-plane (20).
Kentucky	W4BCV	100,368	CE-100V-813s	75S-3	Vertical (80); Beam (40); TA-33; 5-L (20).
Michigan	K8TIG[2]	139,219	32S-3	75A-4; 75S-1	Dipoles (80, 40); Tribander.
Ohio	W8NBK	118,260	32V-1	75A-4	Doublet, longwire (80); Doublet, Ground-plane (40); 3-L (20); 4-L (15).
E. N. Y.	K2AJA	82,338	HT-32	2-B	Dipoles.
N.Y.C.-L.I.	W2PVX	141,844	6100	2-B; RME 6900	Dipole (80); Vertical (80, 40); 6-L Tribander.
N. N. J.	W2VJN	126,263	32S-3	75S-3	Inverted Vee (80); 2-L (40, 20); TA-33 (15).
Iowa	WØIYH	79,740	32S-3	75S-3B	Zepp (80); 3-L (20).
Kansas	KØBYC	18,315	.....	.....	.....
Missouri	WØTDR	86,400	100-V; HT-45	75S-1	Inverted Vee; Phased Verticals; 3-L.
Nebraska	WAØGVJ	61,200	DX-60	BC-348	Dipoles.
Connecticut	K1ZND	87,371	Apache	2-B	Dipoles; 2-L; Tribander.
E. Mass.	K1WJD	93,323	SR-150	75A-4	Dipole (80); Center fed (40); TA-33.
Maine	K1GAX	36,560	HT-32B	SX-115	Dipoles (80, 40); TA-33.
N. H.	W1DYE	60,638	CE-100V	NC-303	Dipoles (80, 40); TA-33.
R. I.	W1KMV[3]	106,200	Valiant	SX-101A	Dipole (80); TA-33.
Vermont	W1QZE[4]	9974	Valiant	HQ-170	Dipoles (80, 40).
W. Mass.	W1EZD	35,179	Ranger II-4X250s	R-388	Inverted Vee (80); Doublet (40); 3-L (20).
Alaska	KL7PI	22,843	S-Line; Thunderbolt	75S-3	Longwire.
Idaho	K7CPC	52,883	DX-60	HQ-170A	Dipole (80, 40); Vertical (20, 15).
Montana	W7HAH	57,183	Marauder	Hammarlund 180	Inverted Vee (80, 40); 3-L (20, 15).
Oregon	W7TDK	135,716	32S-3-4-1000A	75S-3	Inverted Vee (80); Ground-plane (40); Tribander.
Washington	K7SNB	78,401	NCX-3	NCX-3; 2-B	Dipoles (80, 40); 3-L (20).
E. Bay	W6TYM	73,780	32S-3	75A-4	Dipole (80); TA-33/40.
Hawaii	KH6IJ	49,010	32S-3-4-1000A	75A-4	3-L.
Nevada	W7BKK	67,878	Valiant II	2-B	Inverted Vee (80); Vertical (40, 20).
Sac. V.	W6ZGM	39,193	Homebrew 1625s	Homebrew 17-tubes	.....
S. F.	W6BIP	43,400	100THs	SX-128	Zepp (80); 3-L.
S. J. V.	WA6TZN	40,635	Cheyenne; 6AU6-6AU6-807	RME 65; Morrow	Inverted Vee (80, 40); Ground-plane (20).
S. C. V.	K6OHJ[5]	141,529	32S-3	75S-3B	Dipole (80); 2-L (40); TM 30-C.
N. C.	W4OMW	60,860	Valiant (modified)	SX-88	Inverted Vee (80); Beam (40, 20).
S. C.	W4HGW	68,073	Eico 720	SX-115	Dipoles (80, 40); TA-33.
Va.	W4KFC	156,859	32S-3; 310-B	75A-2	Dipole, End Fed (80); 3-L (20, 15).
W. Va.	W8HRQ	48,750	811A	SX-111	Vertical (80, 40); Ground-plane (20, 15).
Colo.	WAØCVS	103,680	Eico 720	HQ-170	Inverted Vee (80, 40); 3-L (20).
N. Mex.	WØJPH/5	86,765	Apache	HQ-129X	Inverted Vee.
Utah	K7RAJ	107,476	Apache	HQ-170A	Dipole; Tribander.
Wyoming	W7TSM	40,880	SW-350	SW-350	Vertical.
Alabama	WA4TID	63,173	HT-44	SX-117	Dipole; Ground-plane.
C. Z.	KZ5TD	52,650	HX-10	HQ-170	Vertical (80, 40); 3-L (20, 15).
E. Fla.	W4ZXI	85,760	6100	75A4	Vertical (40); 3L (20, 15)
Ga.	K4BAI	107,726	NCX-3; 100TH	HQ-170	Dipole (80); 2-L (40); TA-33.
W. Fla.	K4VRT	35,888	Valiant (modified)	SB-300	Vertical.
Ariz.	W7ZMD	100,100	DX-100	2-B	Inverted Vee.
La.	W6RW[6]	120,102	310-B; 4-250A	75A-4s	Zepp (80); 3-L (40); 5-L (20, 15).
Orange	K6OIZ	65,493	32V-3	75A-4	Dipole (40); 3-L (20, 15).
S. Dgo.	K6LKD	73,260	Viking II	SX-101	Dipoles.
S. Bar.	W6GEB	78,965	Apache	Homebrew 20-tube	14AVQ; Vertical.
N. Tex.	K2EIU/5	127,910	Marauder	2-B	Dipoles (80, 40); Quad (20, 15).
Okla.	K5OCX	110,430	SB-400; HX-10	SB-300; 75S-1	Dipoles; Beam.
S. Tex.	WA5HZY	67,804	KWS-1	75A-4	2-L (40); TH-4.
Mar.	VE1ADH	8856	811As	SX-99	Inverted Vee (40); Dipole (20).
Que.	VE2AYU	39,780	803	Homebrew	Vertical (80); 2-L Phased Array (40); Tri-band Quad.
Ont.	VE3BHS	74,498	32S-1	75S-1	Inverted Vee (80); 2-L (40); 3-L (20).
Man.	VE4SC	17,225	Galaxy V	Galaxy V	Inverted Vee (80, 40); 3-L (20, 15).
Sask.	VE5US[7]	67,308	Pacemaker, Thunderbolt	75A-2	Dipoles (80, 40); TA-33.
Alta.	VE6VV	12,852	SB-400	2-B	TA-33.
B. C.	VE7BQB	34,303	DX-60	HR-10	G5RV.
Yuk.-N.W.T.	VE8BB	23,940	SW-350	SW-350	Dipole (40); TA-33.

[1] W6HOH, opr. [2] W8CQN, opr. [3] K1LPL, opr. [4] WB4BHG, opr. [5] W7WJB, opr. [6] K9ELT, opr. [7] VE5UF, opr.

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* WINJM

The Angry Amateur

A special breed of amateur is making itself heard from more and more these days. This is the amateur who grows increasingly impatient and unhappy with the trends he meets, with what he feels are lower standards, the rise of the ignorance factor and selfishness among some of the newer, less experienced, less qualified amateurs now populating our bands in increasing numbers. This is the amateur who deplores the low inclination on the part of his brother amateurs to take the responsibility for meeting the Basis and Purpose of the amateur service as described in section 97.1 of our regulations. This is the amateur who spends untold amounts of energy, time and money (his own) to further the cause only to be met with indifference and apathy on the part of clubs and amateur organizations. This is the amateur who harangues and harrasses and importunes until he gets the job done, even though at the expense of ulcers. This is the "angry amateur."

He gives us a lot of trouble. He causes us to write lengthy letters, disagrees with many of the things we say and do, writes wrathful articles which we cannot print, calls us on the telephone, and in general makes a blamed nuisance of himself. Sometimes we wish he would let us alone.

But without him, we don't know how long amateur radio would last as a public service.

Of course there is anger from the other side of the fence, too — anger that the lowered standards are not lower, that licenses and awards and high scores are not easier to get than they are, that SCM appointments require some degree of effort and achievement as a prerequisite, and that public praise is dished out to some amateurs for doing things other than just occupying space and casual puttering and rag chewing. Amateur radio is a fascinating hobby, they say, isn't this enough? The ARRL award which requires the least effort sometimes seems to be the most popular. If we had an award that read: "This certifies that Joe Blow, a licensed radio amateur, has done absolutely nothing in amateur radio for the period required by the rules," perhaps it would be the most popular of all. Should we have one — a "nothing award"?

Yes, it's easy to assuage the anger of those who demand lowered standards. It's the righteous fury of the "angry amateur" that is hard to alleviate, and yet most helpful, because this requires some action, some progress, some show of energy and enthusiasm and, above all, of altruism. And there is no anger that is more bitter, more invective, more denunciatory than the frustrated ire of the amateur who sees our service gradually losing its stature through apathy and selfishness among its participants, through the failure of a majority to take enough time out from their "fun" to assist in rendering the public service that section 97.1 requires of us. May his voice be heard above the uproar of protests against high standards. May it be heard and heeded by all amateurs able and willing to *do* something about it. — *W1NJM.*

* National Emergency Coordinator.

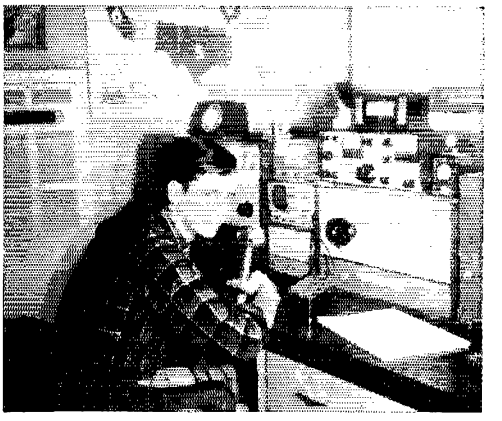
Our Reporters Are You

QST has no paid reporters. We wish we had. When something happens that needs writing up in *QST*, we have to depend on *you* to tell us not only *that* it happened, but specifically *what* happened, when, where, how, and who was involved in it. The diminutive staff of the Public Service Branch of the Communications Department is sometimes faced with the task of interpreting some pretty weird reports of activities in the field. Sometimes we have to engage in correspondence to get further information. No pain in this, of course, but we thought you might like to give us a hand, because this will make your public service column more accurate and complete.

Okay? Okay. Here's the scoop:

Some years ago we devised a form for reporting emergencies and other kinds of PS activities. It is designated Form 35. It's not a cure-all, but it helps a lot as a sort of "check list" of things that should be included. Anyone wants one (or more) we'll gladly supply you. Why not have a couple on hand, just in case you *should* be called upon to report something, some day?

On the back of the form is a blank space on which you can let yourself go in describing in de-



Forrest Suehs, WA5BSD, is one of the regular net control stations for the West Gulf Emergency Net. This net is always ready to provide communications during any emergency that might strike the Gulf of Mexico coastal area.

tail exactly what went on — *after* you have given us the essential data on the front. Now you don't have to be a writer, just tell us everything you know about what the *amateurs* did *on amateur frequencies*. Anything else is only of passing or supplementary interest. If you really get wound up, you can use a separate sheet, of course — but when you send in a long account, don't be surprised (or disappointed) if we have to condense it somewhat.

Pictures? By all means. Send whatever you have or can get. Pictures of amateurs in action are preferred, of course, and be sure amateurs are identified *by call*. We'll return any picture on request. Pictures rate a high priority in a magazine.

Newspaper clippings? You bet. But newspaper clippings usually don't give all the facts we need, so send them *in addition to* (not instead of) your own account.

We get a lot of material, and we try to use everything we get our hands on. There is a space limitation, of course, so we can't make promises. First choice is given to reports of emergency communication by amateur radio; second come "alerts" — amateurs set up for action and maybe even operating, but no communications emergency develops. Third, all other reports. Usually we write them up chronologically, but once in a while we sneak something exceptionally well done up ahead.

This is your column, gang. Help us make it an accurate and complete chronicle of what amateurs are doing in public service.

Diary of the AREC

When communication was required for a search for seven missing persons near Mont Roland, Que., Montreal AREC members answered the call. On Oct. 13, VE2AFM set up the main control station while *VE2s* AZF and BWS operated from Mont Gabriel, linking walkie-talkies used in the search with the main station. Search parties left before communications could be set up, with the result that the missing party was found 12 hours before this information reached the public. The searchers who found them had no walkie-talkies. Luckily, no immediate medical attention was required. This was one way in which the AREC group was able to demonstrate their speed, taking only 1½ hours from the time the initial call was made, to the time when the communications were provided. Other amateurs who participated in the search were: *VE2s* AUU ABV BMS NI AYD AFM JE AE BLR ZA. — *VE2AUU/VE2KO.*

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We have another Hurricane Betsy report.

When it became apparent that a link was needed between Shreveport and Bossier City, La., a 6-meter net was quickly formed. WA5GJO, stationed at the Red Cross headquarters, acted as NCS and was assisted by WA5KBS and WA5IITY. The local c.d. station, W5AVT, was manned by W5JMN and K5VBC. As traffic was received at the Red Cross or civil defense office, it was screened for duplication and passed to K5WWR, assisted by W1MKE, for the main hurricane net or to W5LQV who relayed it to W5ABA for dissemination on the 75-meter net. Over 300 messages were handled by the group. When it was reported that the deputy sheriff for Plaquemines Parish had been killed, W5LQV called the Orleans Parish Sheriff's office where an amateur station had been set up, to inquire about the deputy's safety. From there, the query was relayed via police communications lines and the report came back that the deputy was well and on the job. — *W5LQV.*

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When it was reported that a private aircraft had crashed in the Lee Canyon area, 40 miles from Las Vegas, Nev., on Feb. 4, the Clark County Sheriff's office sent a search party to the scene. Upon their arrival, it was decided to contact Nellis AFB and request a helicopter to aid in the search. Since air to ground communication was not available, WA7EMP was sent to the scene with a communications van. He maintained contact between the helicopter and the search party, and at the same time, maintained a link to the AFB through WA7BAV, who delivered the traffic to the base command post. — *WA7EMP.*

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On Feb. 6, K7STG called the FAA tower at the Eugene, Ore., airport and said he would like to close out an airplane flight plan. The flight plan he wanted to close out was for a plane en route from Tanana, Alaska, to Fairbanks. Instead of going to Fairbanks, the pilot landed at Grayling. The puzzled Eugene FAA operator asked why the report was being made there, instead of to an Alaskan airport. K7STG explained that he had received this information by amateur radio from KL7FKR, who had received it from the pilot, and requested that the FAA be notified that he was safe. As it turned out, the plane had been reported overdue and a search party from Fairbanks was getting ready to go looking for the missing aircraft. After receipt of the information from the Eugene FAA operator, the search was called off. — *K7STG/WA7AQU.*

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On Feb. 21, at 0300z, K5YWG checked into the late session of the Virginia Sideband Net with a request from the family of a man in Richmond, Va., for confirmation of a report that the man was in a Richmond hospital in critical condition. The family had been unable to locate the man by conventional means. WA4QOC in Richmond managed to find the relatives of the man and obtain the desired information for K5YWG. WA1AQS served as a relay station aided by W4OKN (NCS), W5AJY and WA4DAI. — *WA4DAI, EC Area 3, Va.*

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When near-blizzard conditions hit many parts of Nebraska, smaller communities were completely cut off from the outside world. On Mar. 3, WAØIJY received word that a child in Harrison, Nebr., was running a high temperature and medicine was running out. No transportation was available into or out of the town. WAØIJY sent a message to the child's doctor in Richardson. The message was relayed to KØODF who delivered it. KØOAL was contacted and advised of the situation, and was able to provide information regarding a helicopter being flown into Chadron from Alliance to pick up telephone company personnel to check line damage. The prescription was filled and the medicine rushed to the Chadron airport where arrangements were made for delivery to the child's parents. — *KØOAL, EC Chadron, Nebr.*

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South Dakota got its share of snow on March 4–8. With a multitude of NCSs and operators, the South Dakota Storm Net conducted nearly continuous sessions, totaling over 100 hours and handling better than 5000 messages. — *KØTXW, SCM S. Dak.*

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On Feb. 14, the Weirton, W. Va., AREC, under EC K8QEW, was activated because of the flooding of the Ohio River in Empire, Ohio. Communications were established between the flood control shelter in Empire and the Red Cross in Steubenville, Ohio, for a period of 27 hours. About a dozen families were sheltered at the Empire control center. Although Brilliant, Ohio, was not affected by the flood, an operator was dispatched to the area and preparations made, just in case. The following stations were known to have participated: *W8s* ERR BPK DRW IMX CSD DKM DNQ QOB, *K8s* QEW VBH BYF LQM ZPR VBO OZR APH TVT RPB KVY, *WA8s* JTP FRO DRL NLX. — *K8QEW, EC Weirton, W. Va.*

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When a tornado hit Jackson, Miss., on Mar. 4, 9 amateurs activated the Red Cross headquarters station in Houston, Tex., to handle emergency traffic. The operation lasted nearly 13 hours with much traffic being handled. — *K5QQG, SEC S. Texas.*

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When a blizzard hit the area between Syracuse and Rome, N. Y., AREC and RACES members activated, should there be a need for emergency communications. The central c.d. control center was snowbound, but WB2AVY, who lives near by, was able to get to the building and activate the station. Traffic for the district director was handled through the control center, then relayed to W2SSN for delivery.

Jim Freeman, K5HXR, EC and RO for Houston Co., Texas, is shown here operating from the Red Cross headquarters during the tornado that hit Jackson, Miss. (see Diary of the AREC for details.)

Since no emergency situation developed, the alert was cancelled two days later. — *W2IXR, EC Oneida Co., N. Y.*

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On Mar. 4, the Nebraska AREC Net was activated when it was learned that a school teacher was reported missing in a severe snowstorm. *WØs* WRY EXJ LFJ, *KØs* UWK LXS organized a search and rescue team, maintaining communication with the net at all times. The teacher was found the next day. She was in her car, along with a few other people who had also been stranded in the storm but had not been reported missing. — *WØFIG/WØIIYD.*

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Operation Goodwill was again a success thanks to the efforts of K2TXP who acted as the main clearing house and dispersion point for the operation. Starting on Dec. 1, traffic was relayed via K2UBG and WA2GPT who, in turn, relayed it to various nets for delivery and refiling into MARS circuits for overseas traffic. When the Viet Nam circuits were finally opened on Dec. 15, the traffic load almost doubled, and W2OE and WA2JWL were recruited to help handle the load. — *K1QIM/2.*

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Communication for the annual Channel Derby, held on Feb. 6, was again provided by AREC members from Galveston, Brazoria and Harris Co., Texas. The Galveston crew had the greatest area to cover, being both start and finish for the race. The EC had set up the command post which was identical to the one the race officials had. Antennas and equipment for 75 and 2 meters were set up and the station manned by two operators. K5HXR and W5VCE furnished additional equipment and operators for the starting boat and an observation aircraft, operated by K5DGS, which kept the whole course in sight and who reported any accidents as soon as they happened. K5HMF, Brazoria Co. EC, and K5IHK set up a van equipped with 75 and 2 meter gear and were stationed at a strategic point in the course. K5AMA and WA5CYI operated mobile and were instrumental in relaying information to the control center. W5FQQ and K5VQY set up gear in the former's boat and were stationed at the northern end of the course. As usual, the amateurs proved to be indispensible and were thanked by the race officials. — *K5QQG, SEC S. Texas.*

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On Feb. 19, the Dutchess Co., N. Y., AREC again provided communications for the fourth annual Nimham District Boy Scout Derby. Five portable stations in the field, two operating from emergency power sources, transmitted point scores awarded to each participating team at each location. The teams' locations were also relayed to a sixth station at the finish line. The information was used to keep track of each team's progress and to check each score card at the end of the course. Radio facilities were also used to locate officials in the field, obtain rulings on unusual scoring problems, request additional judges for a particular area to handle peak loads and summon first aid when needed. — *W2IIZZ, EC Dutchess Co., N. Y.*

On Feb. 20, K5TOL, EC Liberty Co., Tex., staged a simulated emergency test after the conclusion of the West Gulf Emergency Net's regular session. The situation was an explosion of some type south of Dayton, Tex., and the group had to find out what had exploded, exactly where the explosion had taken place, contact local civil defense officials and provide emergency communication if needed. The drill began at 0825, with K5TOL as NCS and W5AIR alternate. W5VCE activated the two-meter net while K5RNS took control of the six-meter operation. The closest station to the suspected area was W5EPV who had mobile facilities and was dispatched to the disaster area. The two closest amateurs with 2-meter mobile capabilities were K5HXR and K5VIY, both of whom proceeded to the area south of Dayton. One of the operators was given an envelope to be opened after he had traveled 10 miles from Dayton. Upon opening the envelope, it was found that a pipeline had exploded, causing no injuries or property damage and no emergency communications were required. This test was staged to see just how many amateurs would be available at a moment's notice, how quickly they could set up a communications link and just how effective it would be. The test was successful from the standpoint that certain difficulties in liaison were discovered and steps to correct them were taken. — *K5TOL/K5HXR.*

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Early in March, amateurs throughout New Jersey, Pennsylvania and other states were informed that a patient in Tucson, Ariz., was dying from a rare form of bone cancer that could not be cured, but through an operation, the victim might have a little more time to live. Amateurs were requested to contact their local hospitals and inquire about any patient suffering from the same form of cancer who had the same type blood as the patient in Tucson. The operation to be performed was a transplant that was hoped would extend the life expectancy of both patients. The call went out, and several donors were located. — *W2CVW/W3ZXV.*

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Forty-seven SEC reports were received for January, representing 19,395 AREC members. This is two more reports, but 300 fewer AREC members than we had a year ago. C'mon, fellers, let's get 1966 going with a bang. Those Sections reporting were: Ohio, E. Mass., Utah, W. Va., Mo., Que., Ga., Ky., N. Mex., Wyo., Alta., SJV, Manitoba, Nev., E. Fla., S. Dak., Okla., Mont., B. C., Kans., Orange, Colo., La., Nebr., W. Pa., Iowa, E. Pa., N. N. J., N. C., Ore., Ala., Tenn., Wash., Minn., Miss., Del., Va., Hawaii, S. Tex., S. Bar., Sask., S. F., N.Y.C.-L.I., Ont., W. N. Y., S. V.

RACES News

"The idea that participation in both AREC (ARPSC) and RACES in either a leadership or operational capacity causes conflicts; nothing could be further from the truth. It is my wish that, wherever possible, the same person perform both EC and RO jobs. Both SEC's in Texas agree to this and are working with me toward this end. If we are to keep the State level program completely amateur this is the way it will have to be. In areas where two different people already hold the jobs, they should get to know each other well and coordinate their activities with each other to avoid any possible conflict." — *K5TRY, in the Texas RACES Bulletin.*

National Traffic System

When NTS was first started, in 1949, it operated five days a week, Monday through Friday, with maybe a summer vacation to be thrown in. We quickly got out of the summer vacation idea, and within a couple of years we found that we could operate Saturdays too. After a few more years we found we could operate the system *every* day, Sundays and holidays and Christmas and New Year's Eve and Feb. 29th included. For lo these many years, since then, NTS has been an operating entity which has no vacations, no days off.

This sounds pretty hard-nosed, but it really isn't. Because, you see, although the system operates day after day after day, those who participate in it don't. Most participants are in there for one, two or at most three nights per

At a recent Montreal Amateur Radio Club meeting, this photo was taken of (l. to r.) Ken Ransom, VE2ABV, the new SEC for Quebec, and Murray Epstein, VE2AUU, Canada's NEC.

week, and it has been possible to find operators not only willing but eager to fill open spots on Saturday and Sunday as well as the other days of the week. Besides, as the system has developed, its adherents take a fierce pride in the fact that it operates *every* night of the year, and in an emergency can go into high gear at the drop of a hailstone.

But we didn't intend this to be a brag session. What we started out to observe was that NTS's "business as usual" procedure on week ends has been thought, by some, to have limited attendance of NTS people at conventions and hamfests. That is, Joe Ham may not be able to attend because he has NCS duty Saturday night, or because he's liaison from 1LN to CAN. At last year's national in San Jose, some of the ardent NTSers tried to use the convention station to NCS Pacific Area Net one night, we understand with some success, although most of the time the station was tied up.

At the Southwestern Division Convention at Disneyland, this month, WA6ROF tells us of plans to set up a station *just for NTS operation*, which will serve both a display and a utilitarian purpose. Says WA6ROF: "We will have a large NTS flow chart on display . . . and copies of the ARRL *Public Service Manual* available. We will accept traffic at the station, but only in complete form. I am hoping to have personnel on duty who are familiar with NTS to act as consultants. This station will truly conform to the policy of no days off and will bring ARPSC before the convention in true style. There will be an article dedicated to NTS on page 24 of the (program). The station will be kept on the air as long as need be to clear traffic. I am scheduling those NTS operators who wish to utilize the station, first come first served."

Pretty neat, eh? If you have a NTS commitment on May 27, 28 or 29 that is like to keep you from being there, let Jerry, WA6ROF, in on it and maybe he can fit you into the schedule to use the convention NTS rig.

We haven't said anything, above, about the ARPSC and n.d. meetings being planned for the convention, but the former will feature NTS functionaries such as PAN Manager WB6JUH and RN6 Manager WB6BBO and maybe also TWN Manager K7NHL. On Sunday morning SCN Manager W6QAE will throw a traffic breakfast. Sounds like quite an affair, wish *we* were going to be there. Hope *you* will be. — *W1NJM.*

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

FULL TIME

3550	7100	50,550
3875	29,640	145,350

PART TIME

7250	14,225	21,400
14,050	21,050	28,100

Fulltime frequencies are for use 24 hours per day but only for emergency and traffic calling purposes. No transmissions for *any* purpose (except calling for emergency help) the first five minutes of each hour.

Part time frequencies are for traffic calling and general amateur use except in an FCC-requested or FCC-declared emergency, at which times they become *full time* frequencies.

This is a voluntary amateur program, designed to show what we can do without FCC regulation. Its success will require Ss all to work together. Any amateur wishing to assist is invited to use ARRL notification cards to be sent to stations not observing the rules.

February reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
1RN	54	503	.370	9.3	92.2
2RN	56	424	.678	7.5	97.5
3RN	56	730	.159	13.0	100
4RN	48	620	.526	12.9	97.9
RN5	56	1091	.457	19.4	96.2
RN6	56	864	.643	15.4	91.4
RN7	28	498	.618	17.7	79.6[1]
8RN	56	505	.373	9.0	96.5
9RN	28	647	1.127	23.1	99.1[1]
TEN	56	873	.717	15.5	90.6
ECN	28	164	.275	5.9	100[1]
TWN	28	267	.295	9.5	77.1[1]
EAN	28	1596	1.218	57.0	94.0
CAN	28	1450	1.037	51.7	100
PAN	28	1368	1.147	48.9	98.8
Sections[2]	2070	13,923		6.7	
TCC Eastern	112[3]	772			
TCC Central	84[3]	818			
TCC Pacific	112[3]	1056			
Totals	2704	28,169	EAN	9.4	CAN/3RN/ECN
Records	2117	28,659	1.183	19.1	100

[1] Representation based on one or less sessions per day.

[2] Section/Local Nets reporting (76): BUN (Utah); PTN (Maine); EMNN, WMN (Mass.); QFN, FMTN, GN, WFPN (Fla.); 1LN (Ill.); NCN (I), NCN, NCSSBN (N. C.); VN, VSN, VSBN, VSBNL (Va.); EPA, WPA, PTTN (Pa.); Mich. 6 meter, Wolverine, QMN (Mich.); MDDS, MDD (Md.-D. C.-Del.); RIN, RISPN (R. I.); GSN, GTN (Ga.); CHNN (Colo.); Eight Ball, NCN, SCN (Cal.); OZK (Ark.); MOSSB, MOTTN, MON, PHD (Mo.); WSBN (Wis.); NTTN (Tex.); AENB, AENH, AENM, AENP, AENP (late), AENR, AENT (Ala.); LAN (La.); Iowa 75; OSN (Ore.); OQN (Ont.-Que.); VTNH (Vt.-N. H.); SCSSB (S. C.); QIN (Ind.); OSSBN, BN (Ohio); TN, TPN, ETPN, TSSBN (Tenn.); KTN (Ky.); GBN (Ont.); CN, CPN (Conn.); CSN (Ariz.); WSN (Wash.); BCEN, BCSN (B. C.); MSN, MJN (Minn.); NJN, NJ6&2 (N. J.); MTN, MNPN, MEPN (Man.); NLIVHF, NYCLI Phone (N. Y. C.-L. I.)

Well, another batch of new records again this month. Representation seems to have improved greatly with most nets showing better than 90%, and three hit the 100% mark. Congrats to ECN and 3RN for hitting the top mark after a long, hard climb. According to our statistics, traffic handling is on the upswing, but traffic itself is becoming scarce. With all the plugging we have been doing, lots of newcomers are getting into the game, but they just aren't originating enough traffic, so everyone has to starve a little. How about it, let's originate some traffic each time we check into our Section net. The whole system could use a transfusion.

WA2GQZ has just finished a general housecleaning and rearrangement of schedules on 2RN. It seems that some of the boys dropped their assignments without letting Joe know. K3MVO is pleased with 3RN's performance this month, especially the 100% representation. K5IBZ sez everything was up this month, including his spirits, so spring can't be far off (yeah, especially with the summer QRN that has popped up the past few nights). Since the Nevada Section Net has folded, WB6BBO and W6RSY have had to mail all Nevada traffic. K7JHA wonders where all the Montana ORSs are. None of them seem to QNI RN7. W9QLW has issued 9RN certificates to W9IIRY and WA9IQV. All

(*Continued on page 154*)

Hamfest Calendar

Alabama — The Annual Hamfest sponsored by the Mobile ARC will be held on May 28 and 29 at Mobile, Alabama. For entertainment, swap table, and fun for the whole family, plan to attend. Further information and reservations from Oliver Emery, W4VPW, P.O. Box 7232, Mobile, Alabama, Tel.: 477-7634.

Arkansas — The Eureka Springs Hamfest will be the first weekend in May.

California — The 24th Annual Hamfest of the Fresno ARC will be held Saturday, May 14. More details from Dr. O. L. Orme, WB5ETQ, 1939 Fresno St., Fresno, Cal.

California — The San Diego VHF Club will sponsor a family picnic at Santa Clara Point in Mission Bay on Sunday May 15 from 10:00 A.M. to midafternoon.

Florida — The St. Petersburg ARC will hold their annual Hamfest at Phillipe Park, Safety Harbor on Sunday May 15 at the same location they have had the affair for many years. All hams and their guests are cordially invited. Swap tables, and a jolly good time for everyone.

Georgia — The Atlanta ARC, Inc. will hold its 38th Annual Hamfest on June 4 and 5. Saturday evening will feature a social hour and banquet starting at 7:30 P.M., with dancing from 10:00 P.M. to 1:00 A.M. Sunday begins with breakfast at 8:00 A.M., registration and special interest meetings until noon. There will be a dutch luncheon at 12:00. For reservations and information write Johnny Fearon, W4WKP, 4165 Club Drive N.E., Atlanta, Ga. Tel.: 404-237-1261.

Illinois — 15th Midwest YL Convention, May 13, 14, 15, at the Flying Carpet Motor Inn, 6465 N. Mannheim Rd., Rosemont, Ill. near O'Hare Field in Chicago. Program starts with noon registration May 13 until Sunday Brunch May 15 and includes free welcome supper Friday May 13. Registration $2.50. Saturday luncheon $3.50, Saturday Banquet $6.50. Write LARKS, Diane Price, K9TRP, 6123 N. Rockwell St., Chicago, Ill. 60645.

Illinois — The 6th annual Streator Radio Club Pre-Starved Rock Hamfest Dinner Dance will be held at the Grove Supper Club on June 4 at 7:00 P.M. Tickets $3.50. Reservations for dinner and/or Motel must be in by May 21. Write WN9OMG, Myles Van Duzer, Route 1, Streator, Illinois 61364.

Illinois — The Starved Rock Radio Club Hamfest will be held June 5 at the La Salle County 4-H Home and Picnic Area southwest of Ottawa, Ill. Follow big yellow HAM-FEST signs from south end of Illinois River Bridge at Ottawa. Free coffee and doughnuts in the morning, food available and parking amply provided for. Advance registration until May 24 is $1.50, at the gate $2.00. Contact W9MKS, RFD #1, Box 171, Oglesby, Illinois 61348.

Kansas — The Kaw Valley Radio Club will hold its annual Hamarama at Garfield Park, Topeka, Kansas, on Sunday, May 15 at 9:00 A.M. to 5:00 P.M. Registration fee is $1.50, free soft drink, bring family and your covered dish. Swap bench, auction, 29.6 Mc. mobile hunt, come one come all. Information from W. R. Powell, WØYHI, 1654 Withdean Rd., Topeka, Kansas.

Kansas — The Central Kansas Radio Club will sponsor its 18th Annual Hamfest at Kenwood Park in Salina on June 5. Registration is $1.00. Bring a covered dish and the club will provide the soft drinks. Hamfest will be held rain or shine. Additional information from Norm Johnson, WØAMJ, 101 W. Ray, Salina, Kansas.

Mexico — The 6th National Convention of the Association De Radio Aficionados de la Republica Mexicona, A.C. will be held in Monterrey, N.L., Mexico on May 6, 7, and 8. For details, reservations and information write Comite de Reservaciones, Radio Club de Monterrey, A.C., Apartado #1217, Monterrey, N.L., Mexico.

New York — The Rockaway ARC Spring Auction will take place Friday evening May 13 at 8:00 P.M. at the American Irish Hall at Beach Channel Drive (at Beach 81st St.), Rockaway Beach, N. Y. Doors will be open at 6:00 P.M. to accept items for sale. One dollar donation accepted at the door. For information write to P.O. Box 205, Rockaway Park, New York 11694.

New York — Saturday, May 14 is the Western New York Hamfest at Vince's 50 Acres, Route 15, four miles south of Thruway exit 46. Continuous programming with outstanding speakers, state code championships, noon luncheon and evening banquet. Acres of free parking with huge "flea" market. Registration $2.50. Banquet and registration only $5.25 in advance, $5.75 at the door. Write for free program. Rochester ARA, P.O. Box 1388, Rochester, N. Y. 14603.

New York — June 5 is the date for the Ham Family Day at Beck's Grove in Rome, N. Y. Sponsored by the Rome Radio Club, the day will have hidden transmitter hunts, mobile judging, auctions, c.w. copy contests and technical discussions. A special program for ladies is being prepared. Children's activities too. Reservations by mail are $4.25 for adults and $4.75 at the gate. Children under 12, $1.25. Activities start at 1:00 P.M., dinner at 5:00 P.M. For reservations write Ralph S. Kerstetter, Box 721, Rome, New York.

Ontario — The North Shore ARC will hold their Annual Banquet May 14. More information from Bernie, VE3ATI, RR 2, Whitby.

Pennsylvania — The Tri State Sideband Dinner for the Pittsburgh Area will be held May 7, at Johnny Garneau's Smorgasbord, Monroeville, Pa. Activities begin at 7:00 P.M. Details from Joseph Soroka, Jr., W3LGD, R.D. 1, Box 475, West Newton, Pa. 15089.

Pennsylvania — The 21st Annual Banquet of the Lancaster Radio Transmitting Society, Inc., will be held on Saturday, May 14 at the Meadow Hills Dining House located on Pa. Route 324, one mile south of Lancaster. Dinner will be served at 6:30 P.M. Advance reservation from Arthur C. Jacoby, W3OY, 136 Springhouse Rd., Lancaster, Pa. 17603, Tel.: 717-392-6093.

Pennsylvania — The North Penn ARC invites you to attend their 13th Annual Banquet to be held at Sunnybrook, Pottstown, located east of the city limits on Route 422 on Saturday, May 21, at 7:00 P.M. Tickets are $4.75 each and may be purchased from Jack Barnshaw, K2ROK, 309 Prince Frederick St., King of Prussia, Pa. May 14 is the ticket deadline — no tickets will be sold at the door.

South Carolina — Greenville Hamfest, Sunday May 29 at the Greenville County Fairgrounds, Greenville, S. C. Displays, swap shop, auction, cartoons for the kiddies. Sideband supper on Saturday. Look for W4NYK/4 on 3915 and 50.502. For more information contact Don Robertson, WA4KLT, 101 Griffin Dr., Greenville, S. C. 29607.

Tennessee — The Mid-South VHF Club will hold its Annual Hamboree featuring good fellowship and swap tables on Sunday May 29 in Aubudon Park, Memphis. For further information contact WA4KOG, 745 Leacrest Ave., Memphis, Tenn. 38109.

Texas — The El Paso ARC will hold its third annual Swap Fiesta over the week end of May 14 and 15 at the Bassett Center in El Paso, Texas. The Remada Inn will be the headquarters for the event with free beverages at the Falstaff Brewery the evening of Saturday the 14th. Gus, W4BPD and his XYL will show colored slides of his latest DXpedition. For more information write Hurley Saxon, K5QVH, 3714 Frankfort Ave., El Paso, Texas 79930.

Wisconsin — The Ozaukee Radio Club will hold its Second Annual Hamfest on May 14 at Blegium, Wis. Registration at 12:00 noon. Activities include a 6-meter hidden mobile hunt, 75-meter field-strength test, and a swap 'n shop session. A family-style dinner will be served at 7:00 P.M. followed by an evening program. Tickets are $3.75 each in advance, $4.50 at the door. Write Hugh Putnam, K9ZUB, Box 13, Port Washington, Wis. 53074.

Strays

Stolen Equipment

My Hallicrafters SR-150 was stolen from my car in Chattanooga, Tenn. on February 25. The serial No. is 415003 306032. The matching power supply was not taken. Please contact R. C. Gaissert, K4AEY, 3900 Montview Drive, Chattanooga, Tenn. 37411 or the Detective Bureau of the Chattanooga, Tenn. Police Dept.

— ... —

Field Day this year is June 25-26. FD forms are ready now. Request yours early.

You and Emergency Communication

Without Previous Preparation, What Can You Do in an Emergency Situation?

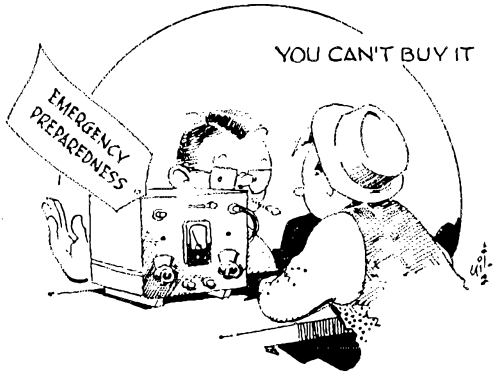
BY GEORGE HART,* W1NJM

During a communications emergency, the bands always seem to be full of amateurs wanting to "help," but not quite knowing how to do so. This article points the way to more effective amateur performance in disaster communications.

IT has often been said that every licensed amateur has an obligation to be prepared to perform an emergency communications service for the general public in time of need, in accordance with section 97.1(a) of our regulations. To that end, we have the Amateur Radio Public Service Corps (AREC and NTS divisions) and RACES, with thousands of dedicated amateurs signed up in both, not only willing to do their part, but *prepared* to do it through frequent drilling and testing.

This is fine. Our hats are off to them. But it is not enough. There is no such thing as too much useful communication in an emergency. The thousands of amateurs in organized preparedness groups are still a minority. The rest of you are, let's face it, unprepared to do anything as amateurs in an emergency.

Unprepared? Yep, that's what we said. An amateur may be knee deep in the most modern equipment available, may even be equipped with emergency power, but you can't *buy* preparedness. Unless you are familiar with emergency operating procedures through frequent use in drills and tests, chances are that in an emergency you will only be in the way. This may be a blow to many who pride themselves on their modern stations, but it's a sad fact.



Shut Up and Listen

In the *CCRC Circle*, a club council paper edited by San Francisco SEC W6KZE, there appears a very apt slogan: **Emergency Instructions — Shut Up and Listen.** This is about the best advice we can give. Unless AREC or NTS or RACES operation is a part of your regular amateur activity, you will cause only confusion and delay by importuning the NCS of any net with inquiries or offers of help.

But you can cause no confusion by listening. Listen on 75 and 80 meters, on v.h.f. if you are in the disaster area, on 40 and 20 if the emergency is some distance from you and especially if it covers a wide area. Take down call letters of principal participating stations. You might even make a tape recording or two of operation that seems to be of particular interest. But don't transmit unless you have some reason to believe that you could serve a useful purpose. This is practically never.

A Hypothetical Situation

Of course an admonition to "shut up and listen" doesn't cover every situation, so let's go into a hypothetical one. Suppose, for example, there is no amateur emergency organization in your town (unfortunately, this is not unusual) and during a very bad storm communication is lost and your c.d. director, who happens to know you personally, asks if you can help. What do you do?

Well, that depends upon a lot of things. In this particular case, let's say that you belong to no traffic nets, neither AREC nor RACES was ever organized in the town, the local radio club consists of rag-chewers, builders, v.h.f.ers and DXers and no one ever took any interest in direct public service. You have a lot of fancy home station equipment — s.s.b., v.h.f., beams, RTTY — but no emergency power, and no equipment in your car. Commercial power has failed because of blown-down lines. Do you tell him no dice?

No, you can't do that. You have to at least make an effort. The first thing you have to do is get on the air. If the town has an emergency generator, chances are you can set up some of your low-power gear nearby and take enough power to run it. What then? Remember, you have no emergency operating experience. Somewhere, you recall having seen a list of emergency frequencies, but you don't remember just which

* National Emergency Coordinator, ARRL

issue of *QST* it was in. In leafing through the current issue, however, you find it in the column entitled "Amateur Radio Public Service Corps." How *about* that? Hmm, looks as though the best bet is 3550 or 3875 kc. Your c.w. is a little rusty, so you fire the little rig up on 3875. Wow, such bedlam! This is an emergency frequency? You throw the switch and timidly request some attention, but no one pays the slightest attention to you.

You have picked the most crowded band in the entire amateur spectrum to make your emergency call. But a crowded band, in addition to being one in which a lot of stations are transmitting, is also one in which a lot of operators are *listening*, so maybe it will pay off. Keep trying. If you don't get an answer right away, perhaps you will be heard when the hour rolls around, because at that time there is supposed to be a five minute listening period on the 3872–3878 NCEF segment.

What happens? Does the frequency clear up magically, on the hour, as casual amateurs observe the voluntary silent period? Do you get an answer to your call? Does amateur radio once again come to the rescue of an isolated town? Well, we hope you get results on the NCEFs. You should. But in order that we can profitably discuss this situation further, let's assume you do *not* get through. The 75-meter band is mighty crowded, and there are many amateurs not aware of the NCEF program. You might do better on 3550.

Anyway, you tune around the band and finally hear what appears to be an emergency net in operation. Your c.d. director is breathing down your neck. "Raise anybody yet?" he keeps asking. "Telephone company say it will be about three hours before they can get the lines repaired. We need contact with state headquarters right away!"

"Okay, Chief, okay," you tell him. "Keep your shirt on."

At the c.d. director's urging, you are tempted to charge into the net snorting and steaming like a mad rhino and expect everyone to pay a lot of attention to you. But you wisely restrain the impulse. Instead, you take about ten minutes to listen to the procedure, particularly that used by stations reporting into the net. You notice that you are not the only isolated station in the net, and now you're glad you didn't barge in. But if their emergency is just as important as yours, by the same token yours is just as important as theirs, so during a momentary lapse in the sequence of transmissions you throw the switch and call the net control. He acknowledges! You explain your situation to him, including the fact that you are an inexperienced operator, and ask for help in contacting state c.d. headquarters. He tells you to stand by.

Yes, that's all he says, just "stand by." You are outraged. The guy didn't even seem excited. Did he misunderstand? Didn't he get the part about your being isolated? You are just about to transmit again to repeat your situation when he comes on the air calling one of the other isolated stations and telling him to "go ahead with your emergency message."

The thing for you to do from this point on is exactly as the NCS tells you. Make no more transmissions until he tells you to do so. When he does tell you, follow his instructions to the very best of our ability. You may have to ask questions if you don't understand, but *do not question his judgment.* Chances are, since you are an emergency station in a disaster area, you'll get lots of attention. But don't expect too much. These guys are old hands at this and they just might not get so excited as you think they should be, or as you are. Remember, there are other disaster stations in the net to be taken care of.

Of course you are still in trouble if you don't know how to handle a message. It's too late to worry about this when the emergency arrives. The only thing to do is take the message the c.d. director gives you (make him put it in writing) and give it to the station designated by the net control station to take it; ask *him* to put it in standard form. See, already you're bolixing up the net. When you have no experience, it's simply unavoidable, and in an emergency it just has to be tolerated. But if you report in to "help" and don't know *how* to help, most NCSs will give you the fast brush. Even this, to a certain extent, disrupts the net. Consequently, if at all possible, *keep your rig off the air.*

If you should find yourself in a situation like the above, you'll be kicking yourself all over the place for not having known these things before. ARRL has lots of literature on the subject, some of it free, some of it in book form,

depending upon how much detail you want. All you have to do is ask for it. But you cannot learn to operate by reading books. You have to *operate.*

Okay, let's assume that you have succeeded in contacting state headquarters for the c.d. director, and this latter worthy now wants contact maintained until telephone service is restored, so it is necessary to stay in the net. This gives ample opportunity to observe the procedure and learn a few lessons. Meanwhile, the c.d.

director is stamping and fuming around because he has no *local* communications available. Some of it he can accomplish through police radio, but the police chief has his own problems in law enforcement and public safety and the contact is unsatisfactory.

"How come the amateurs in this town are so dead?" your c.d. director asks. "Why aren't they organized for this sort of thing?"

The angry retort that comes to mind is another question: "How come you have never contacted any of us about it?" But this is suppressed, because you're not quite sure it would have done any good if he *had* contacted you.

There are several dangers in a situation in which amateurs in a community steadfastly do nothing along emergency communications preparedness lines. The most obvious, of course, is that the community will not be prepared in an emergency, and this is a danger about which *everyone* (not just amateurs) might be concerned. Of more concern to just us amateurs, of course, is that agencies needing emergency communications will turn to other services. Already there is a noticeable trend in this direction in communities, such as the one described above, in which no amateurs are interested. In some others,

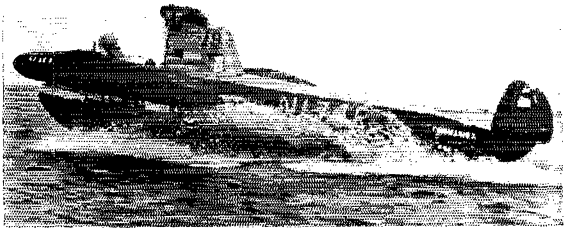
amateurs seem to feel that it would be just as well to let someone else do the job.

The public will be served, if not by amateurs, then by whomever will and can do the job. It is up to us to look to our own interests, and if serving the public by preparing for emergency communication is one of our reasons for being, while hobbying *isn't*, then we had better see that we combine *service* with enjoyment for our own welfare as amateurs. QST

New Jersey Ham Builds Flying Submarine

DONALD Reid, W2FMG, has always been an active radio amateur and has spent many hours in public service work during emergencies and disasters. In fact, going over his log book is like reading headlines from the past for it covers, among other events, the *Morro Castle* boat fire in 1933, the *Hindenburg* explosion at Lakehurst, and the Elizabeth, New Jersey plane crash of recent times.

For nearly a decade, W2FMG, and his son Bruce, WN2SMB, have been patiently designing, building and testing to fullfill a lifelong dream . . . to successfully sail and fly a submarine! Although plagued by laughter and scorn from the professionals, complaints by neighbors and indifference from the military, Reid finally built and successfully tested his flying submarine in June of 1964 and has protected his rights as inventor of the flying submarine with a U. S. Patent. For a detailed story on the flying submarine, see the January 1, 1966 issue of *The Saturday Evening Post*. QST



W2FMG's flying submarine a moment before liftoff.

Don Reid, W2FMG has been active in emergency work since the early Thirties.

Happenings of the Month

BOARD TO MEET EARLY

By unanimous consent, the Board of Directors has agreed to move its scheduled annual meeting from May 13 to May 6, 1966. Informal talks, consultations with staff members, inspection of properties and records, and committee meetings may begin as early as May 3.

Known items for discussion include election of a new president and other officers; amendment of By-Law 8 by striking the words "at least General Class" and substituting therefor the words "a renewable FCC"; changes in the Articles to show current names and addresses of officers and directors and of the headquarters, to enlarge the Executive Committee and place it on a regional representation basis, to remove the limit of three on the number of vice presidents, to clarify requirements of eligibility for office; changes in the By-Laws to provide for 60 days notice of expiration and to consider a raise in dues, to have the Planning Committee function as an "official availability committee" in advance of those annual meetings where elections are to take place, to add a new By-Law creating the Regions under which Executive Committee members might be elected geographically, to add a new By-Law limiting the president to three consecutive terms, and to allow a new director to follow his predecessor onto Board committees automatically.

Members having comments on these items, or other suggestions about the course of League affairs during the coming year should communicate with the appropriate division director direct to the address on page 8 or, as time grows short, in care of ARRL Headquarters, Newington, Connecticut 06111. The meeting date change was suggested by President Hoover so that his successor would have more opportunity to prepare for the IARU Region 1 meeting at Opatija, Yugoslavia, at the end of May. The president of ARRL is automatically president of IARU under its constitution.

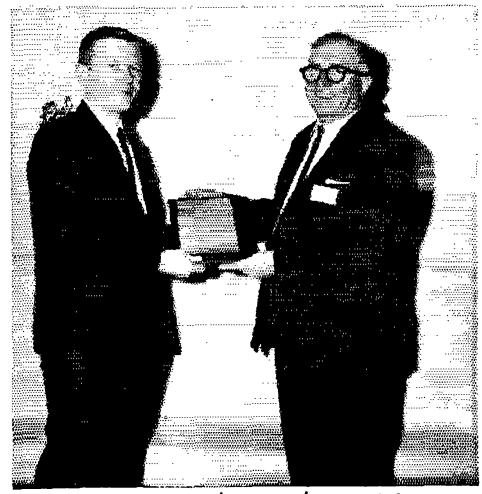
PROPOSED ANTENNA TOWER RULES

The Federal Communications Commission has issued a Notice of Proposed Rulemaking in Docket 16474, released March 1, 1966, with new language for Part 17 of its rules which govern antenna structures for all radio services licensed by FCC. Nearly all station license applications — including those of amateurs — would have to include an FCC Form 714 certifying that the rules have been checked, that notification to the Federal Aviation Agency is or is not required under the specifications, and the FAA has or has not been notified. The form requires one to furnish the exact latitude and longitude of his station to the nearest second. Every application contemplating an antenna more than 20 feet high located within 40,000 feet of an airport must include a topographic map showing precise antenna location, certified by a registered engineer or surveyor, plus some additional paperwork.

The proposed rules will not require a licensee to secure the approval of FAA if the antenna is screened by a taller natural formation or existing man-made structure, but the paperwork with FCC is still required. Since amateur antennas seldom exceed 100 feet, since they are in residential areas over which low flying by aircraft is generally prohibited, since most amateurs will be exempt from notification to FAA because of shade trees in the area, and since amateurs do not have the resources to handle volumes of red tape, the League has filed a brief (the text can be found at the end of this department) in opposition to application of the new rules to the amateur service should they be adopted as proposed. The filing deadline now stands at May 25 and the time for reply comments expires on June 4; the usual original and fourteen copies are required for formal participation in the proceeding (although FCC will undoubtedly give some consideration to a lesser number of copies filed by an amateur).

RECIPROCAL OPERATING WITH PARAGUAY

The governments of the United States and Paraguay have entered into an agreement under which amateurs of one country may operate while visiting the other. The agreement is similar to those previously adopted by the U. S. with Australia, Belgium, Bolivia, Canada, Colombia, Costa Rica, the Dominican Republic, Ecuador, Luxembourg, Peru, Portugal, Sierra Leone and the United Kingdom.



John J. Schultz, W2EEY/W1DCG/DJØBV, left, receives the ARRL Cover Plaque for his January, 1966 article, "Accessory Package for Transceivers," presented by Robert York Chapman, W1QV, director from the ARRL New England Division.

W3BG

NEW AMATEUR CHIEF, W3BG

The reorganization of the FCC's Safety and Special Radio Services Bureau has been completed with the naming of Everett G. Henry, W3BG, as Chief, Amateur and Citizens Radio Division (the title last held by Ivan Loucks, W3GD, who retired from government service in June, 1965). OM Henry is a native of Corvallis, Oregon, and holds a B.S.E.E. from the University of Washington (1930). Early employment was as a shipboard radio operator, broadcast engineer and development engineer in a telephone laboratory. He joined the FCC in 1938 as a radio inspector and has held a number of engineering posts in the Office of Chief Engineer, Broadcast Bureau and Safety and Special Radio Services Bureau. From 1953 to 1956 Mr. Henry was engineering assistant to Commissioner Webster and spent the following four years in the Office of Opinions and Review. From 1960 until his present appointment, he was Chief of the Marine Radio Division. OM Henry previously held the call W7BR.

William S. Grenfell, W4GF, is now Chief, Technical and Legal Branch in the Amateur and Citizens Radio Division. He's quite active as an amateur from his home in Annandale, Virginia. Robert L. Stark, W3KLV of Oxon Hill, Maryland, continues as Chief of the Facilities Branch.

FCC HAMFEST ATTENDANCE SUSPENDED

Because of budgetary problems and vacancies caused by the high number of retirements at the end of 1965, the Field Engineering Bureau of FCC will not be able to conduct special examination sessions at hamfest and conventions as they have done freely in past years. Nor are amateurs the only group inconvenienced by the squeeze — special exams at radio schools, talks at CB clubs, discussions at yacht clubs and Power Squadron meetings, etc., have all been curtailed, we understand. This has been the subject of discussion by League officials with the staff of FCC, who indicate deep regret at the necessity of their new procedure, but have no alternative due to budgetary restrictions.

QUEEN'S COUNSEL HONORS FOR VE3RX

The League's Associate Counsel for Canada, Arthur K. Meen, VE3RX, has been appointed Queen's Counsel, effective the first of the year. The honor is presented to highly-ethical lawyers in practice for at least fifteen years.

Minutes of the Executive Committee Meeting

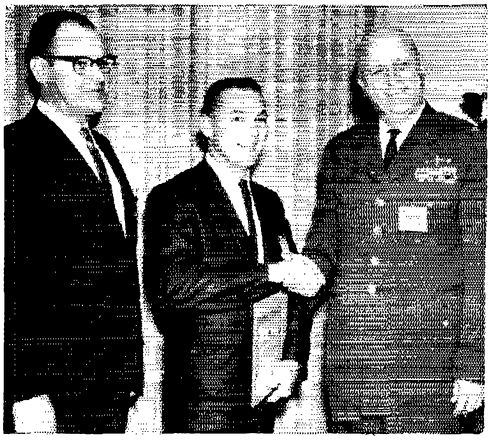
No. 309

March 26, 1966

Pursuant to the requirements of the Articles of Association, the Executive Committee of The American Radio Relay League, Inc., met at the Shoreham Motor Hotel, Hartford, Connecticut, at 9:40 A.M. March 26, 1966. Present: President Herbert Hoover, jr., in the Chair; First Vice President W. M. Groves; Directors P. L. Anderson, jr., Charles G. Compton, Robert W. Denniston, and Noel B. Eaton; General Manager John Huntoon; Vice President F. E. Handy; Treasurer David H. Houghton. General Counsel Robert M. Booth, jr., Assistant General Manager Richard L. Baldwin, and Directors Robert Y. Chapman and Carl L. Smith were also present.

The Committee discussed, particularly with Director Chapman, progress and plans on the 1966 ARRL National Convention in Boston, examined the tentative program, and found it generally satisfactory.

On motion of Mr. Eaton, unanimously VOTED that the General Manager is authorized to reimburse expenses of the Organization and Personnel Committee, and the Official Availability Committee, in an amount not exceeding $750 in each case.



Clinton L. Pierce, K6UEF (at center), receives a certificate of appreciation from Col. Walter H. Coons, USAF for his emergency traffic handling after Typhoon Karen (1962) and more recently for handling morale traffic between Guam and the U. S. mainland. Looking on is C. S. Bridge, a vice president of Litton Industries where K6UEF is employed.

The first two American amateurs to secure British licenses under the recent reciprocal operating agreement are Glen Grazier, G5AAA/KØJBA and Everett Worrell, G5AAB/W3MDI. First QSO was February 16 at 1819 GMT with TF2WJK on 14.2 Mc.

On request of Project Oscar, Inc., *and on motion* of Mr. Compton, unanimously VOTED that the League approves the nomination of Howard F. Shepherd, W6QJW, as Vice President of ARRL affairs in the Oscar association for the year 1966.

The Committee next examined and engaged in extended discussion on the FCC proposal in Docket 16420, to establish the Radio Amateur Civil Emergency Service as a permanent part of the amateur structure. On motion of Mr. Denniston, unanimously VOTED that the General Counsel is instructed to file comments of the League in support of the proposal, but expressing serious concern over abuses of the provisions for non-amateur operators of RACES facilities and requesting the Commission to review and take appropriate action in this area for RACES activity especially under peacetime conditions.

The Committee was in recess for luncheon from 12:45 to 1:30 P.M.

Director Smith, as Chairman, outlined the procedures being followed by the Official Availability Committee, and discussed future plans to implement his committee's assignment. At this point, 2 P.M., Directors Chapman and Smith retired from the meeting.

The Committee next examined and engaged in extended discussion on the FCC proposal in Docket 16474, to establish complex requirements for all radio station applications, including amateur, as concerns permissible tower heights in the vicinity of airports. On *motion of* Mr. Compton, *in* view of the extreme hardship which would be worked on amateurs in excessive paperwork and expense of engineering studies in such cases, and the lack of any real need to apply to the amateur service rules which are obviously intended largely for the broadcast service, unanimously VOTED that the General Counsel is instructed to file comments of the League strongly opposing the new rules as they might be applied to the amateur radio service.

At the suggestion of President Hoover the Committee reviewed the League's standing operating recommendations, with special attention to increasing RTTY activity. After discussion, on motion of Mr. Denniston, unanimously VOTED to add thereto a recommendation urging that the use of RTTY emission be converted as rapidly as possible to 170-cycle shift, in order to achieve better communications efficiency and promote more economical use of spectrum space.

On motion of Mr. Anderson, affiliation was unanimously GRANTED to the following societies:

Bergen Amateur Radio Association Westwood, N. J.
Chemung County AREC Association Elmira, N.Y.
The Deerfield High School A.R.C. Deerfield, Ill.
Elizabeth-Forward High School A.R.C. Elizabeth, Pa.
Eureka High Amateur Radio Association Eureka, Calif.
Greenwich High School Radio Club Greenwich, Conn.
The Hamster Radio Club Bronx, N. Y.
Kings County Band Scanners Brooklyn, N. Y.
Mid-County Net Amateur Radio Club Bethpage, N. Y.
Nome Amateur Radio Society Nome, Alaska
Northwest FAA Amateur Radio Club Auburn, Wash.
Ozaukee Radio Club, Inc. Port Washington, Wis.
Palisades Amateur Radio Club Savanna, Ill.
Proviso West High School Radio Club Hillside, Ill.
6-Up A. R. C. of Burlington (N. J.) Burlington, N.J.
Southern Missionary College A.R.C. (HS) Collegedale, Tenn.
Titusville Amateur Radio Society Titusville, Fla.
Morgantown Amateur Radio Klub Morgantown, W. Va.

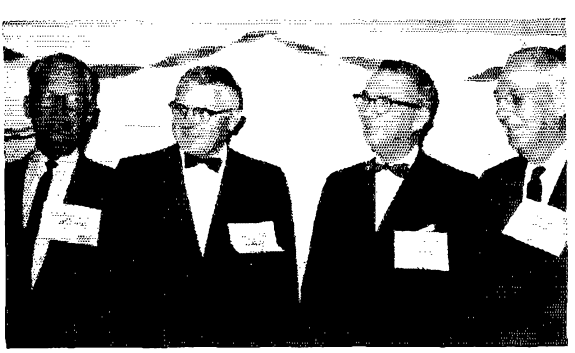
On motion of Mr. Eaton, unanimously VOTED to approve the holding of a Georgia State Convention at Atlanta on June 4–5, 1966.

The Committee next examined the report of Don Waters & Associates concerning the results of a survey of opinion among amateur radio operators; it also approved publication in *QST* of an article by Mr. Waters summarizing the results of the survey.

During the course of its meeting the Committee discussed, without formal action, the progress of IARU affairs and projected officer travel to participate in IARU regional group meetings of member-societies; lack of FCC action in Docket 15928; "phone patches"; radio-frequency interference problems; the change in date for the Board meeting; W1AW; the work of the Organization and Personnel Committee; and measurement standards for advertised transmitter power inputs.

There being no further business, the Committee adjourned, at 6:45 P.M.

JOHN HUNTOON
Secretary



Old Timers Night in Houston — ARRL Vice President Soupy Groves, W5NW, former West Gulf Director Grady Payne, W5ETA, guest speaker Harry Sherrod, W5ZG and West Gulf Director R. O. Best, W5QKF.

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

In the Matter of Revision of Part 17 of the Commission's Rules Concerning Construction, Marking and Lighting of Antenna Structures	DOCKET NO. 16474

COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED

The American Radio Relay League, Incorporated, a non-profit organization with some 80,000 amateur radio operators licensed by the Federal Communications Commission as voting members, by its General Counsel, respectfully submits the following comments in response to the Notice of Proposed Rule Making released February 25, 1966 (FCC 66-174).

The League recognizes the necessity of regulation and control of the construction, marking and lighting of structures which might possibly constitute a menace to air navigation. Unfortunately, however, if Section 17.3 is revised as proposed and is to be applied to the Amateur Radio Service, such an unreasonable and unnecessary burden will be imposed on a very large percentage of the more than 265,000 licensed amateurs and on thousands of applicants each year as to most severely impair the growth as well as the continued existence of the Amateur Radio Service.

A very high percentage of amateur stations, particularly those operating on frequencies below 14 megacycles, employ an antenna consisting of a wire strung between trees, buildings or poles. Seldom are such antennas more than 20 feet above any man-made structure and usually are below the height of nearby trees. Operation on frequencies above 14 megacycles frequently is accomplished by use of multi-element rotatable beam antennas mounted on the roof of the amateur's residence or on a pole or mast located close to the residence. Only a small percentage of all amateur antennas extend more than 20 feet above existing natural or man-made objects. Yet Section 17.3, as proposed, appears to require every amateur living within a horizontal distance of 40,000 feet (7.57 miles) of any airport or heliport to employ, at considerable expense, a registered engineer or surveyor and to file some sort of application every time he desires to erect a new antenna or modify an existing antenna.

The applications and the licenses of the Amateur Radio Service do not now describe or prescribe the size and height of antennas and supporting structures. Part 17 of the Rules, as presently constituted, requires submission of certain information only when certain criteria are not met. To require amateurs to retain registered engineers and surveyors and to file applications for specific antennas would impose such a heavy burden upon most of the amateurs that their desire to experiment, which is the very heart of Amateur Radio Service, would be destroyed. Surely, the Commission is not interested in antennas strung between trees.

The League respectfully requests that language be added to Section 17.3, as proposed, to make it clear that the section is not applicable to the Amateur Radio Service except where there would be a deviation from the criteria of proposed Section 17.8. The following addition to Section 17.3 is suggested:

(e) The provisions of this section shall not be applicable to the Amateur Radio Service unless the criteria of Section 17.8 are not satisfied.

Respectfully submitted,

AMERICAN RADIO RELAY LEAGUE, INC.

By: ROBERT M. BOOTH, JR.
Its General Counsel

[Editor's Note: The proposed Section 17.8 automatically covers all antennas exceeding 200 feet, and otherwise applies to locations within glide path contours which vary with the size of the airport. Antennas "screened" by higher objects between them and the airport are exempt.]

Strays

Another high-voltage mishap has claimed the life of a radio amateur. Bill Kendall, W5ETR of Tulsa, Okla., was killed while working on his transmitter that used a 3000-volt power supply. Although it isn't known exactly how the accident happened, W5ETR's left arm was burned and he had a burned streak across his left hand. A screwdriver was found at the scene. Ironically, the Tulsa ARC had a program on electrical safety during their February meeting. W5ETR did not attend. *Switch to safety!*

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In the Stray on page 10 of April *QST*, "*QST* congratulates . . . ," it reads that Roy Rosner, K2KHR, received the IEEE First Student Prize for 1965. While it is true that K2KHR co-authored a paper that did win such an award, that was in 1964! The 1965 First Prize was awarded to **Robert G. Spindel, WB2PFT** and Roy Schwartz during the IEEE International Convention in New York City in March.

Field Day this year is June 25-26. FD forms are ready now. Request yours early.

First-Day Covers Still Available

When the Amateur Radio First-Day Covers were processed in Anchorage on December 15, 1964, we gambled and had a few extra unaddressed covers prepared, because orders for the first-day covers were still coming in and we didn't want anyone to be disappointed. We still have some of these left. They are all singles, unaddressed but carrying the stamp and the official first-day cancellation, and they will be mailed to you in an envelope. Prices are 35c each, three for a dollar. Send your orders to ARRL Hq., 225 Main Street, Newington, Conn., 06111.

Correspondence From Members-

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

AMATEUR RADIO IN VIETNAM

¶ After many years with no amateur radio activity in the Republic of Vietnam the recent activation of an amateur radio station here has caused a great deal of interest in the ranks of amateurs worldwide and especially among those amateurs now in or about to come to Vietnam. ARRL bulletin #40, other published notices, and your replies to inquiries urging them to write to us have caused this headquarters to receive an unprecedented number of requests for information concerning authorization to operate here. Answering these requests imposes an added burden that can be ill afforded. It is the purpose of this letter to explain the current status of amateur radio in the Republic of Vietnam and ask that you publish this information in *QST*.

For many years the Republic of Vietnam has been torn by strife and it was in this setting shortly after independence was attained that amateur radio was banned and an exception to amateur operation was filed with the ITU. Until late in 1965 there was no legal amateur operation in this country. At that time the Government of Vietnam extended the privilege of amateur operating authorization to Deputy Ambassador William J. Porter, K1YPE, as a courtesy to a high ranking United States diplomatic representative. Simultaneously, action was initiated to withdraw the exception to amateur operation filed with the ITU to enable other countries to recognize his operation.

Ambassador Porter has been authorized by the Government of Vietnam to use the call XV5AA and there is no restriction on third-party messages. However, since other governments have not yet been notified of this action by the ITU, until they are Ambassador Porter is using the portable call K1YPE/XV5 for U.S. amateur contacts at the request of FCC. His use of this call will cease when the ITU notification is received and he will then commence using the call XV5AA. He is already using XV5AA for contact with non-U.S. amateur stations.

There have been some questions received concerning the prefix used for Ambassador Porter's call sign. The exclusive use of 3W8 for amateur stations seems to have been implied by certain published listings in which only 3W8 appeared, but this is incorrect and other listings correctly show both 3W8 and XV5.

While the Government of Vietnam has authorized Ambassador Porter to operate, this action does not represent a general change in the policy which strictly prohibits all other amateur radio operation. In addition, all personnel under military jurisdiction are subject to Military Assistance Command, Vietnam (MACV) Directive 105-6, 14 Dec 65, which prohibits amateur operation in Vietnam.

There have been many requests for amateur operation, and all, with the exception of Ambassador Porter's, have been turned down. Ambassador Porter will continue to encourage the Government of Vietnam to grant additional amateur operating authorizations when in its opinion conditions in the country make that practical. It should be remembered that it has not been the practice of most governments to permit amateur activity in time of war.

Ambassador Porter has found there is an almost complete lack of knowledge in this area on the subject of amateur radio. He has stated his desire to help amateur radio get a start in Southeast Asia and as the situation permits he hopes to carry on his own educational program to bring about a better general understanding of amateur radio activity. This, however, will take time and for personnel in Vietnam now, or going there, Ambassador Porter has already accomplished something of immediate benefit: with his help a MARS system was authorized late in 1965, after three years of effort. There are Army, Navy, and Air Force military unit MARS stations in operation, but individual member and club stations are prohibited. The support for MARS operation rests in large part with licensed amateurs volunteering to operate the stations. As a result many amateurs can satisfy their desire to operate by offering their assistance to the local Army or Air Force MARS Director or Navy MARS Cognizant Officer.

The MARS net structure consists of one in-country net in which all stations may participate to exchange message and phone patch traffic in-country and each station participates in an Army, Navy or Air Force Pacific area MARS net.

The MARS operation is expected to expand, but amateur operation is expected to remain in the present status for some time. In view of this, individual amateurs are urged to refrain from writing for late information. If there is any change in the policies concerning amateur operation in the Republic of Vietnam, this headquarters will disseminate the information promptly. — *Brig. Gen. Walter E. Lotz, Jr., U. S. Military Assistance Command, Vietnam.*

PHOTO WANTED

¶ I was pleased to notice your reprint, in the February issue, of the August, 1919 article by Homer E. Rawson. You may be interested to know that this company was originally organized by him in December, 1918. We are still doing business under the original name, although the direction of the company was taken over by my father, Mr. A. J. Lush, when Mr. Rawson died in 1923. Mr. Rawson was very active in radio amateur circles and one of your readers sent us copies of *QST* ads he ran around 1920. Curiously enough, we have no photograph of the founder of our company, and would like to know if any of your readers would know where we could get one. — *M. J. Lush, W1JUR, President, Rawson Electrical Instrument Company, Cambridge 42, Massachusetts.*

NOVICE ROUNDUP

¶ Along with my Novice Roundup logs, I send my most sincere thanks for everyone connected with this contest. It is a terrific idea, and certainly has provided many of us with much enjoyment. If one

imagines that part of the purpose of the League is to encourage newcomers to go on to more difficult and rewarding things, it is hard to imagine how they could do better than by sponsoring a contest for the beginners . . .

The people I thank most, though, are the hundreds and hundreds of Generals who spent their time in this contest with no chance for awards, just to make sure we were more or less successful. Through their efforts, I raised my states worked to 45. It was wonderful to hear many with a code speed of 15 or 20 w.p.m. struggling to hold it down to 8 or 9 w.p.m. so a Novice could pick up an extra QSO. They have certainly set an example to me of unselfish dedication. The new Novices next year can expect me to be their Iowa contact, whatever that is worth.

One thing I feel could be improved . . . cut the operating period from two weeks to one week, and then hold two contests each year, giving every Novice a chance to work the roundup with at least a few months experience no matter when he got his license . . .

Thanks for the encouragement to become a ham, for the encouragement now that I am a Novice, and for the support when I get my General. I hope I can help this fine organization with some contributions of my own when I gain enough experience to be useful. — *Mark Milburn, WNØNMA, Des Moines, Iowa.*

¶ Enjoyed working the new crop . . . Novice participants tell me it is being pursued by a horde of General Class stations that makes the NR exciting . . . — *Vic Clark, W4KFC, Clifton, Virginia.*

¶ . . . Sure was fun, and a wealth of experience to me. Was almost ready before for the General Class test; now I know I'm ready — a lot of experience on numbers, where I hear a lot of fellows fall down on their code test . . . — *Tom York, WN8SCZ, Youngstown, Ohio.*

CODE PRACTICE QRM

¶ I joined ARRL a few years ago, a confirmed listener. Recently, having decided to apply for a General license, I began to listen to W1AW code practice. The degree and nature of the QRM during these practice sessions is shocking. I encounter strong signals, no more than a few hundred cycles (often a good deal less) from W1AW's signal. Often, even after extending my receiver (a good one by amateur standards) to the limits of its capability, separation simply is not possible. I suppose those who won't listen before they send can disguise their lack of common courtesy by speaking of propagation conditions — but the times and frequencies are well known, and interference under such conditions is inexcusable.

I think such a lack of good manners is a disgrace to amateur radio as a whole . . . — *Robert M. Rose, Cambridge, Massachusetts.*

ART OR HOBBY?

¶ The deepest hurt I experience is when I read ham radio is a hobby! Why anyone would use this fine technical adventure as a "hobby" is a disrespect to the perpetuation of the art. Obviously the many facets of our ham radio (traffic, DX, v.h.f., certificate hunting, etc.) enable one to assume a consuming enterprise, but certainly not a "hobby"!

I am aware of all the people in industry involved pertinent to the development of equipment in the realm of ham radio, but I reason that these long strides would be better spent towards manufacturing and marketing more productive and lower priced implements of cultural and economic tools of citizenry, household devices, space industry devices, commercial radio development, industrial devices, etc. I feel it would be more desirable when entering a ham radio retail store to see only parts for sale, rather than the complete transceiver, transmitter and receiver units. I want to keep ham radio as a technical personal endeavor. I don't want any privilege adulterated with fast talking, ill-mannered, technically unconcerned, frequency jamming, mocking-bird variety of individual. Let's give ham radio back to hams and work out a method of shedding the hobbyist from our ranks. I take pride in being an amateur radio operator, and also in my amateur radio equipment. Please don't put me in the same category with the store-boughten commercially equipped station hobby radio operator. I contend the decadence of amateur radio is a direct result of infiltration by the hobby type operators. — *Joseph C. Szampias, W8JKB, Toledo, Ohio.*

BEGINNER ENCOURAGEMENT

¶ Though I am not yet a member of your organization, I read your magazine with great interest here in Lisbon. The American Embassy supplies it in their library and it is always a month late but it's better than nothing.

I received my Novice license last May with the help of WA1BLY, and your handbooks, which I am sure are the best of their kind.

I received a Portuguese license through reciprocal exchange and have been working from CT1UT and CT1SQ, as I am one of those penniless teenagers who don't have enough dough to buy a 6146.

I would just like to express my gratitude for your good work that has made it possible for me to become a ham, and to let you know that I support you wholeheartedly in your incentive licensing proposal. — *Donald Stanford, Jr., WV4EP, Lisbon, Portugal.*

¶ I congratulate ARRL for its numerous works for the radio amateur. I find *QST* one of the best magazines I have ever read and find many new ideas from your articles. Since I became a Novice last July, I found that if it wasn't for your code runs every night and the many books you publish I would never have received my General Class license. So keep up the good work and as far as we the members can see, the ARRL will always be among the top radio leagues in the world. — *John Ciullo, WA1EXE, Waterbury, Connecticut.*

AN EAGLE-EYED READER

¶ OOPS! Page 41, March *QST* . . . Amateurs and Members . . . total since the Extra became available in 1953. I got one before that date. I took the exam the first Saturday of February, 1952, received the second Extra license in the fifth district, AE-5-2, issued February 7, 1952. If an old memory is still good, the Extra license was made available January 1, 1952. — *Homer L. Apple, W4HER, Burlington, North Carolina.*

[Editor's Note: Nothing wrong with OM Apple's memory; our "Happenings" man was a year late!]

ARE WE GOING BACKWARD?

¶ In the old days the a.m. boys took pride in their excellent and sharp modulation. At present we are going to s.s.b. to make more room on our crowded bands. However, there is a growing group of sideband gadgeteers who use mike input gadgets to see how broad and distorted they can make the modulation, with no respect for other amateurs.

Are we going backward? — *Carl P. Goetz, W8RY, Cincinnati, Ohio.*

GREAT LAKES ELECTION

¶ . . . With reference to your footnote to my letter in February *QST* concerning the Great Lakes Division Election . . . I think the lessons to be learned are the following:

1. There should be more cooperation within the District with regards to nominating a candidate. It is foolish to run more than two.
2. I feel there should be a two term limitation on all directors which would eliminate some of the rumbling within the district, for no matter how hard a man tries, the longer he is in office, the more people he unavoidably alienates.

I will honestly state that I do not know how the above could be accomplished, but I think they have merit . . . — *James W. Voorhees, DDS, WSEGR, Hillsdale, Michigan.*

PROGRESS

¶ I recently up-graded my license from Technician to General Class . . . I want to thank W1AW for code practice. Without this valuable program, it would have been extremely difficult for me to increase my proficiency to the point where I could pass the General Class Test. As my next goal is the Extra Class license, I still plan to make good use of this service.

I am 100% behind the League's position on incentive licensing. I was sorry to see it abolished some years ago, and I hope to see its return in the near future. The Amateur Radio Service needs it. — *Dan Merrick III, WA8ONM, Reynoldsburg, Ohio.*

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¶ Now I don't know, but I think someone's being the funny man. You know who I mean. The guy who put the article about Priscilla Paris, WN6RNR, on page 88 of March *QST*. It may be just a coincidence, but I'd sure like to know what happened . . . — *Philip Brooke, WN4AFE, Signal Mountain, Tennessee.*

FEWER NEWCOMERS

¶ In regard to your February editorial: is it possible that even you, the editors, *have not seen* such a situation developing? I feel inclined to doubt it. You asked for opinions. The following are mine:

Rip the top from any tube carton. Write on it in 25 words or less why you wish to become a radio amateur. Mail to FCC, Washington, D. C. You will receive your license in a matter of weeks. Then there are the kit and the tailor-made rigs. The biggest joke of all takes first honors — the Citizens Band. Any kid with aspirations in the science of electromagnetic waves would drop the whole thing upon reaching maturity, if once a CBer. After years of this big mixed-up mess, suddenly it is decided we need incentive licensing. A brilliant deduction 15 years too late. — *Philip D. Ingraham, W2OSY, Painted Post, New York.*

¶ . . . I remain pleased with the League and its activities. I do not know whether to be pleased or sorry about the drop off of the ranks of hamdom. The editors fail to discern that the bottom of the 33,000 new hams a year, *i.e.*, the differential between 33 and 20,000, is not very much a credit to the League or to the fraternity of hams, and it might also be noted that these thirteen thousand mostly drop out of activity after a few short years. This conclusion seems almost apparent. The twenty thousand newcomers a year are a better selection and potentially of greater benefit to the League and the ham world. I, for one, being appalled at the lack of qualifications of late years, sleep a little better knowing there are fewer lids coming in. Not just lids, for that implies something "juvenile" or something that one grows out of, but those who remain lids despite the best efforts of the League, et al. Therefore, I shouldn't think this drop off is anything to be seriously worried about by the League. — *S. G. Smith, W9ALZ, Chicago Heights, Illinois.*

¶ One way of overcoming the problem of fewer newcomers is to give them reasonable operating conditions! This means keeping high speed c.w. and RTTY operations out of the Novice bands. Non-Novices should only be there to talk to Novices.

As it is now on 40 and 80 meters, it is very discouraging because of an incredible level of QRM from high-powered and thoughtless stations. It's rather hard for a 50-watt station to battle it out with a kilowatt rig.

If voluntary restraints were practiced, newcomers would have the opportunity and incentive to develop their skills and progress into the advanced ranks of amateur radio. — *Nick Leggett, WB2UEQ, Somers, New York.*

MEETING THE CHALLENGE

¶ The fellows from Vista have really accepted the challenge of incentive licensing. It was recently reported that almost 1000 hams passed the Extra Class license exam in 1965. If this is the case, then nearly 1% were from Vista, which included K6ROR, K6ENX, K6JP, W6HAW, W6CCE, W6QHQ, W6NWI, and W6NDH. There may be one or two others who passed, but calls or names are not available.

We commend our Vice-Director, John Martin, W6ECP, for his fine work in this area. — *Boots Olsen, W6HAW, Vista, California.*

May 1941

. . . K. B. Warner, in his editorial, eulogizes the late A. A. Hebert, W1ES, treasurer of the ARRL who has passed away in April 1941. Hebie was personally well known to the writer and it can be said that next to people, ham radio was his great love. I think you'd better dig out this issue and read fully about a great guy.

. . . By Goodman, W1JPE (now W1DX) continues his studies of keying methods and circuits, supplying a number of oscillograms to illustrate the points mentioned in the article. This one has to do with crystal oscillators. Real good.

. . . Junior constructors could get a lot of dope from an article by Goodman on a low-power 112-Mc. transmitter and receiver. This rig is free from radiation when receiving, a great advantage over the common transceiver.

. . . Some pretty good looking arrays for five meters are shown and described by Ed Tilton, W1HDQ. All of those shown have proved their merit in operation.

. . . D. F. Metcalf, W5ECF comes up with a negative transconductance circuit to improve the electron-coupled oscillator. It is said to have excellent voltage-frequency characteristics. — *W1JVA*

I.A.R.U. News

FOREIGN PAØ OPERATION

Foreign amateurs may generally obtain licenses in the Netherlands, even if no reciprocal operating agreement exists. At least two months before the license will be required, application should be sent to the Radio Controledienst P.T.T., Kortenaerkade 12, The Hague. The following information must accompany the application: Christian names; place and date of birth; nationality of applicant; home address and call sign; photocopy of home license; indication of length of time for which the PAØ license is needed; residence address and transmitter location in the Netherlands; car identity number, if a mobile license is desired; technical specifications of the transmitter to be used; and a statement agreeing to all license conditions.

The license is generally granted until further notice, although the P.T.T. reserves the right to deny any application without giving reasons for doing so. The transmitter location must be approved, and a record must be kept of all transmissions, including frequencies used, power input, et cetera. Only plain language and prescribed use of call sign are permitted; third-party traffic is prohibited. All transmissions must be free of spurious emissions, and the applicant agrees to safeguard the State against any third-party claims.

Class C licensees may use up to 50 watts, phone or c.w., only on the 144-146, 430-440 Mc. or higher frequency bands. The Class A license permits up to 150 watts, Class B 50 watts, phone or c.w., on these frequencies, as well as on 3.5-3.8, 7.0-7.1, 14.0-14.35, 21.0-21.45 and 28.0-29.7 Mc. A special license is required for certain types of transmission: e.g., RTTY, amateur TV or operation on 1825-1835 kc.

A regular license is required for any stay in excess of one year, but a temporary license will suffice for shorter periods. There is an annual fee equal to approximately $5.60 U.S. for Class A license, $4.20 for Class B or C. The fee is approximately $1.40 per quarter of a year or for shorter periods.

Permission is also required for the joint use of a Dutch amateur's station by a foreign amateur. Application for such permission must be made by the Dutch amateur, who is then responsible for all transmissions. A foreigner without an amateur license may also apply for a Dutch license, but must first pass an examination.

Those interested in more information on amateur radio in the Netherlands may write Mr. W. J. L. Dalmijn, PAØDD, President, Vereniging voor Experimenteel Radio Onderzoek in Nederland, Postbox 9, Amsterdam.

REGION I CONFERENCE IN OPATIJA

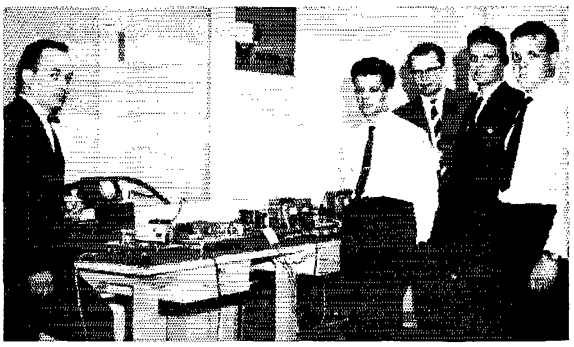
The Triennial Conference of IARU Region I member societies will be held in Opatija, Yugoslavia, from Monday, May 23, to Friday, May 27. Delegates from most Region I societies will attend, and it is hoped that observers from Regions II and III will also be present, in addition to the IARU President and Secretary. The Technical Committee will discuss a wide range of subjects, including v.h.f. and u.h.f., and may recommend Working Groups to examine particular items. The Administrative and Operational Committee will follow a similar procedure. A principal item on the agenda will relate to protection of amateur bands at forthcoming international conferences, and how the Union might best be organized to accomplish this objective. A final Plenary Meeting will be held on Friday, May 27, followed by the customary end-of-Conference banquet.

To help publicize the conference, the host society, Savez Radio-amatere Jugoslavije (SRJ), will operate YUØIARU from Opatija in May. SRJ plans an interesting program for all attending.

MEXICAN CONVENTION

34th Annual Convention of the Liga Mexicana de Radio Experimentadores will be held this year in Ciudad Madero, in May. A cordial invitation is extended to all amateurs. Full details from LMRE, Apartado 907, Mexico 6, D.F.

QST



On May 23, 1965, these Finnish amateurs succeeded in transmitting color TV pictures to a receiver approximately 2 miles away, on 434.0 Mc. Shown grouped around the homebuilt 3-watt station (OH2AJ) are, l. to r., OH2WG, OH2FF, OH2AZP, OH2AZT and OM Stig.

Although there have been earlier amateur TV experiments in Finland, the gang at OH2AJ are to be congratulated on the first successful amateur color TV transmission there.

Hints and Kinks For the Experimenter

QSL CARD MOUNTS

MANY of us pin or tape our QSL cards to a wall, but it leaves the surface in an unsightly condition if the cards are ever removed. By using gummed reinforcements, string and a couple of tacks you only need to make two small holes in the wall for every row of QSL cards. Take some gummed reinforcements and fold them in half with the sticky side up. Glue one to each of the top corners on the back side of your QSL cards as shown in Fig. 1. Thread a length of string through the mounted reinforcements and fasten the string to the wall with two tacks.

— *Steve Day, WN3EQY*

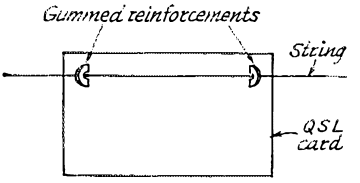


Fig. 1—WN3EQY's gummed reinforcement mounts for QSL cards.

HEATH HW-32 ALIGNMENT

THE instruction book for the HW-32 Heathkit states that a v.t.v.m. r.f. probe and dummy load are needed for aligning the transmitter r.f. amplifier. However, if you have an s.w.r. bridge (such as the Heath HM-11), an r.f. probe is not needed. Just insert the s.w.r. bridge between the HW-32 and the dummy load. The s.w.r bridge makes a sensitive indicator in its forward position. — *Conrad E. Bluhm, K3SWW/KG6*

TOOTHPASTE-TUBE CAP INSULATORS

TOOTHPASTE-tube caps are an excellent source of material for constructing feedthrough and standoff insulators as illustrated in Fig. 2. The feedthrough in example *A* is made by mounting a toothpaste cap on each side of a metal plate and passing a threaded rod through both caps. A spacer of insulating material is mounted at the center of the rod to prevent accidental contact between the rod and the metal plate. The nylon wheel of a curtain runner is ideal for this purpose. In example *B*, the necessary hardware is bolted to the cap and the cap in turn glued to the plate.

A non-insulated standoff is constructed by directly bolting the toothpaste cap to the plate as illustrated in example *C*. An insulated version is made by cementing a machine screw to the concave recess in the top of the cap and gluing the cap to the plate. The cap can also be bolted to the plate as shown in example *D*.

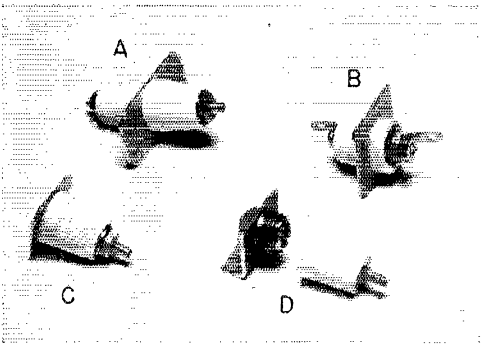


Fig. 2—Toothpaste cap feedthroughs and standoffs.

Fig. 3 shows yet another method of constructing a feedthrough insulator. A small insulated washer, placed at the center of the assembly, prevents a short circuit between the rod and metal plate. — *D. P. Taylor, ex-G8OD*

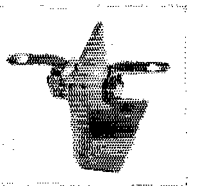


Fig. 3—Feedthrough insulator made from the nylon wheels of a curtain runner.

HOMEBREW KEYER WEIGHT

AFTER losing the weight from my semi-automatic key, I found that a large ceramic standoff insulator made a suitable substitute. The new weight is fastened to the arm of the key with a large washer and an appropriate machine screw. A metal "wing", soldered to the screw head, makes for ease in repositioning the weight. — *Jim Brenner, W.16NEV*

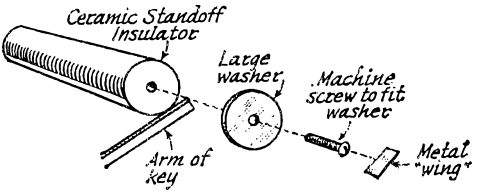


Fig. 4—Ceramic standoff key weight.

USING THE HP-23 WITH THE HW-12 AND THE SB-100

THE Heathkit HP-23 a.c. power supply has a low-voltage winding that is tapped to ultimately supply either 250 or 300 volts d.c. Depending upon the needs of the equipment to be used with the HP-23, the builder wires the power supply in the appropriate fashion. Since the low-voltage requirements of the HW-12 are different from those of the SB-100, a few connections have to be unsoldered when changing from one transceiver to the other. The modifications shown in Fig. 5 make this unnecessary.

Install a s.p.d.t. toggle switch on the power-supply chassis and connect the common contact of the switch to the negative terminal of electrolytic capacitor, C_3. Connect either of the remaining contacts to the brown transformer wire and the other one to the brown-yellow transformer wire. The supply will now provide 300 volts d.c. with the switch in the "brown" position and 250 volts d.c. with the switch in the "brown-yellow" position.

Since only one power cable came with the supply, I chose to wire the cable to the 8-prong female connector supplied with the HW-12. A short adaptor cable was then constructed for the SB-100. It consisted of an 8-inch cable with an 8-prong male plug on one end, to mate with the HP-23 power cable, and an 11-prong female socket on the other end, to attach to the SB-100. — *Charlie Becht, W9LSZ*

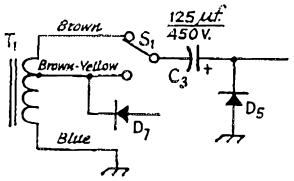


Fig. 5—Schematic of HP-23 modification. C_3, D_5, D_7 and T_1 are components already existing in the power supply. S_1 is a s.p.d.t. toggle switch.

MATING SHAFTS OF DIFFERENT DIAMETERS

MANY projects call for variable capacitors that have 3/16-inch shafts. This is unfortunate, as most knobs and dials take only 1/4-inch rods. A coupling is required, but one that will mate a 1/4-inch shaft with a 3/16-inch shaft isn't sold commercially (as far as we know). It's not too difficult, however, to machine a coupling from a brass rod.

Obtain a 3/4-inch length of brass rod, 3/8 inch in diameter. Drill a 3/16-inch hole down the axis of the shaft through both ends. With a 1/4-inch bit, enlarge the hole to 1/4 inch in diameter half the length of the rod. This can be done best on a lathe, but a drill press will give satisfactory results. Be sure to clamp the brass rod in a vise if the work is done on a drill press. Drill 1/8-inch holes for the 6-32 × 3/16-inch set screws about 1/8 inch from each end of the coupling. Tap the two holes with a 6-32 tapered tap and then with a 6-32 bottoming tap. After deburring the holes, screw in the set screws. Don't forget to use oil during all drilling and tapping operations. — *William C. Bakewell, WB6GHB*

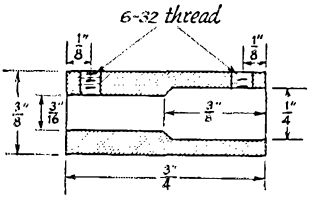


Fig. 6—Cross-sectional view of 3/16-inch to 1/4-inch shaft coupling.

IMPROVED C.W. WITH THE "TWO-BAND V.H.F. STATION"

A simple change can be made in the power supply and control unit of the "Two-Band Station for the V.H.F. Beginner" (July through October, 1961, *QST* and *The Radio Amateur's V.H.F. Manual*) to increase the output of the transmitter when c.w. is used. The "monitor" switch, S_3, was removed, and in its place a d.p.d.t. toggle switch was mounted. One side of this switch is used to short out the secondary of the modulation transformer, T_1. The other opens the screen lead of the 6L6G modulator, cutting off the plate current to that tube. The first switch section protects the modulation transformer during keying, and the second, by removing the drain of the 6L6G, raises the plate voltage available for the r.f. portion of the transmitter. A helpful increase in transmitted power results. — *Martin J. Feeney, Jr., K1OYB*

INEXPENSIVE SILVER-PLATING PASTE

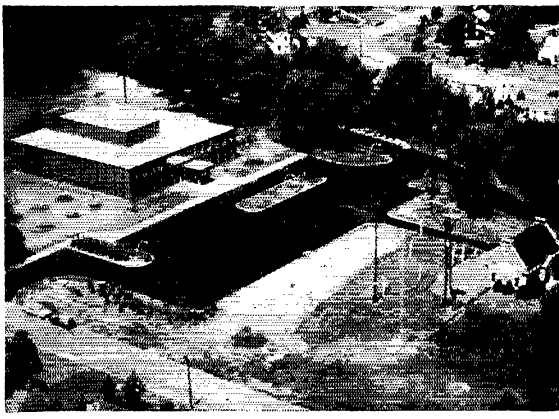
I found a way to make silver-plating paste for about $2.65 for five ounces. This amount of paste is capable of plating approximately 2000 square inches of copper or brass stock. The paste is made from one ounce of silver chloride (AgCl), two ounces of cream of tartar ($KHC_4H_4O_6$) and two ounces of table salt (NaCl). Silver chloride sells for about $2.60 per ounce at any chemical-supply house and the cream of tartar and table salt are found in most kitchens. The materials are mixed dry, and when needed a paste is made from a small quantity of the mixture by dampening it with water. Rub down the metal to be plated with steel wool and make sure the work is clean and free from oils before plating. With a soft, damp, clean cloth, lightly rub the paste onto the metal. After the work is plated, wipe it clean and spray with clear lacquer. — *Jerry L. Russell, K5JIJ*

Building Fund Progress

SINCE our January report to you on the progress of the Building Fund— there has been a steady receipt of contributions, but not enough from any one division to put it over the top. Midwest is still nearest to success, but it is followed by Central, Southwestern, and West Gulf—these latter three being closely grouped.

. . . and the "Milwaukee Plan"

However, watch out for the Central Division, where one of the League's more progressive affiliated clubs has resolved to spur the division toward success. The Milwaukee Radio Amateurs' Club, Inc., although it has already donated to the Building Fund, is taking a second step as the result of a proposal by W9GIL, has resolved to guarantee that it will make up 10% of the outstanding Central Division deficit. Furthermore, the Club has voted that any amount in excess will be matched dollar for dollar from the Treasury of MRAC. The Club has notified all other ARRL-affiliated clubs in the Central Division of its goal, and challenges them to establish similar campaigns to put the Centra Division over the top. This program has the active support of Central Division Director Haller, W9HPG, and former Director Doyle, W9GPI.



These nine ARRL divisions have achieved at least 100% of their Building Fund quota:

Canada	**New England**
Dakota	**Northwestern**
Delta	**Pacific**
Hudson	**Roanoke**
Rocky Mountain	

Which division will be next? We don't know, but we think that whoever adopts that excellent Milwaukee plan will be doing something right!

Members Are Saying . . .

Recently I was able to give [an amateur] some technical assistance through correspondence. He sent me a money order estimated to cover my expenses in preparing the information . . . Since my expenses were actually negligible, I hesitated to accept the order until the thought occurred to me to apply it to the ARRL Building Fund. Accordingly, a check for the amount involved is enclosed. — *W3QA*

Enclosed you will find [a contribution] which I hope you can use to its best advantage for your new building. I am not an amateur as yet, but am proud to support the organization . . . that made my interest in the field of amateur radio. — *Richard Kampf*

Here is a token for the Building Fund in appreciation for what I have gotten from the League and ham radio over 45 years. My interest in ham radio in my formative years had a profound effect on my career. . . . ARRL is doing a great job for amateur radio and for the free world. — *W.13BQE*

. . . As an amateur of over 30 years standing, I feel that the ARRL has always represented the amateur fairly and this gift is only a small token of appreciation for this position on the part of the ARRL, which, under many adverse criticisms, *truly* defends the basic goals of amateur radio! — *W2HYJ*

Enclosed find a small contribution to the Building Fund. Lots of good luck! — *K4UMC*

I have been with and for the ARRL since long before I got my amateur ticket. I want you to know I'm still with you and am for putting ham radio back on a more respectful basis. Enclosed is my second check for the Building Fund. Wish it could be thousand of times as much.— *W0KFM*

Enclosed is a check for my membership, *QST*, and the Building Fund. Being 15 and a ham for only a year and a quarter, I have a lot to learn, and I hope that the League will keep helping us hams as it always has. Keep up the good work. I am 101% behind you. — *W.18RMQ*

Please add this contribution to your Building Fund. It's the least I can do, since I could never have gotten my ticket without your code practice. — *WA0MWZ*

Enclosed find [a contribution] for the Building Fund. Thank you for 35 years of fun. — *W9LNH*

In renewing my membership in ARRL and subscription to *QST* for the coming year, am enclosing an additional [contribution] for the Building Fund, in appreciation of the service provided by the ARRL. — *W9TSM*

. . . A contribution for the Building Fund. Without W1AW I doubt very much if I would have received my General License. Keep up the good work. — *WB6LCI*

As a college student I am not rolling in money, but I feel that I must make some contribution to the Building Fund. The ARRL got me interested in amateur radio with some of its public information literature. The ARRL helped me get my Novice with its code practice and technical materials. I never would have gotten my General without W1AW's code practice and ARRL theory books. The ARRL helped me out whenever I had a tough technical problem. The ARRL is greatly responsible for my two favorite types of operating — traffic and contests. . . . This really doesn't seem like a contribution, but a payment for services rendered to me by the ARRL. — *W.13BSV*

Modern Practice in High-Frequency Radiotelephony

A Discussion of Improved Methods Which Virtually Revolutionize Amateur Phone Transmission

By Ross A. Hull*

In this, the concluding article in the A.R.R.L. Technical Development Program, amateur phone transmission is taken into the A.R.R.L. Laboratory and given the same sort of 1929 treatment as the Program has previously accorded other sections of amateur activity. The results have been highly gratifying.

Amateur phone transmission to-day has progressed but little from the early post-war modulation arrangements, which at high frequencies have inevitably meant poor speech quality and relatively enormous interference, and which have always been wretchedly inefficient as voice transmitters. The application of recent engineering developments in this field, as related in this article, seem to us to justify our use of the word "revolutionize," for they now bring to amateur radio a vastly more efficient phone, one of indescribably better quality, and one in which the interference proclivities of this type of transmission are greatly reduced. — Editor.

IT WOULD be futile to attempt to establish that the technique of present-day amateur radiotelephony differs in any important respect from that of 1920. More specifically, it would be useless to attempt to prove any very general improvement in the technique by offering as evidence the present transmissions on, say, the 3500-kc. band where, with a few notable exceptions, amateurs still converse in the same strange language of gargles, gurgles, jangles and wheezes which has been characteristic of amateur phone since the beginning.

This apparent stand-still is made all the more curious by the realization that in commercial technical circles the transmission of voice probably has been given greater attention, and enjoyed greater advances, than has any other branch of radio communication.

The prime purpose of this article is not, therefore, to describe the design and construction of amateur phone transmitters of the type in present general use — subject-matter treated comprehensively in radio literature of the last eight years — but to introduce to the amateur some of the best modern practice reduced to terms of amateur radio.

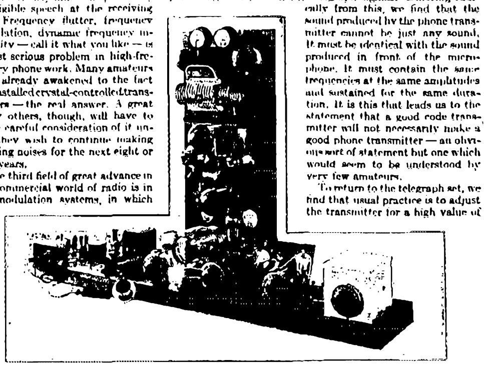
In a few words, the advances of recent years can be described as a substantial reduction in voice distortion in the transmitter circuits, a similar reduction in the distortion occurring between the transmitter and receiver, and a relatively enormous increase in the range of the transmitter for a given value of carrier. Along with the statement we might recall that the most important weaknesses of the average amateur phone transmitter are: Drastic distortion in the transmitter circuits; further drastic distortion between the transmitter and receiver, and a poor transmission range for a given value of carrier.

Let us examine the factors which are involved in these weaknesses. Distortion in the transmitter itself may result from incorrect design or adjustment of almost anything in the transmitter. The microphone, the audio-frequency apparatus or that portion of the radio-frequency circuits into which the modulation is introduced usually are guilty. Distortion after leaving the transmitter is, however, quite another story. In amateur work it is probably one of the most common and least recognized troubles. The cause, it would seem, lies in the varying performance, in the upper atmosphere, of different frequencies. The output of a phone transmitter, essentially a rapidly changing cluster of frequencies, is apparently not permitted to travel as a unit. Some of its frequencies are retarded, some advanced and others, perhaps, are attenuated or weakened to a value below audibility. The net result, of course, is distortion of a peculiarly horrible type. This asynchronous or selective fading, as it is termed, is particularly severe on the higher frequencies, and no method of avoiding it entirely has as yet been evolved. Its intensity, however, has been shown to be influenced greatly by the frequency stability of the transmitter, and by certain provisions within the transmitter a highly improved performance has been made possible. The frequency instability which is so concerned in the trouble is not the type of instability which causes the note to waver or creep. It is the rapid fluctuation of frequency accompanying modulation, known in technical circles as "dynamic frequency instability" — the very same animal as the "frequency flutter" about which we have said so

* Associate Technical Editor, QST, in charge, A.R.R.L. Technical Development Program.

much in these articles. In code work "frequency flutter" results in a poor note and unnecessary interference. In phone work it introduces additional interference also, but a result of greater consequence to the individual behind the signal is that it seriously limits the possibility of producing intelligible speech at the receiving end. Frequency flutter, frequency modulation, dynamic frequency instability — call it what you like — is a most serious problem in high-frequency phone work. Many amateurs have already awakened to the fact and installed crystal-controlled transmitters — the real answer. A great many others, though, will have to make careful consideration of it unless they wish to continue making gargling noises for the next eight or nine years.

The third field of great advance in the commercial world of radio is in the modulation systems, in which modifications have permitted the attainment of 100% modulation without sacrifice of voice quality. This statement does not look as imposing as the substance of it really is. We will have to delve into a few considerations of modulation if we are to appreciate it fully.



A 1929 TYPE PHONE TRANSMITTER

Built to illustrate the practical application of most of the ideas [illegible] in the article, this outfit is much more [illegible] than the average [illegible] phone is likely to be. [illegible] the text a guide, the amateur should not have difficulty in planning a simple though modern [illegible] to suit his own needs.

The Modulation Process

All amateurs know that human speech consists of extremely complex combinations and sequences of frequencies lying chiefly between about 200 and 3000 cycles per second. In order to transmit the voice effectively by radio, all of these frequencies must be conveyed in their original form to the receiver, each with the proper amplitude with respect to the others and all of them, as a whole, a replica of the tremendously intricate pattern of frequencies produced in front of the microphone diaphragm by the voice. To transmit a telegraph signal the requirements are absurdly simple in comparison. All that is necessary is to produce some sort of a noise at the receiver (preferable a clear musical noise), broken up into dots and dashes by a key. The noise need not bear any relation to any noise at the transmitter providing it is keyed on and off in accordance with the telegraph signals. Differing radically from this, we find that the sound produced by the phone transmitter cannot be just any sound. It must be identical with the sound produced in front of the microphone. It must contain the same frequencies at the same amplitudes and sustained for the same duration. It is this that leads us to the statement that a good code transmitter will not necessarily make a good phone transmitter — an obvious sort of statement but one which would seem to be understood by very few amateurs.

To return to the telegraph set, we find that usual practice is to adjust the transmitter for a high value of antenna power when the key is down, so arranging the key that when it is up the antenna power is zero. The idea behind this is to make the key give *the greatest possible variation* in the output power. Should the key be so arranged that it changed the power (and not the frequency) by only 10% of the maximum value, the effectiveness of the transmitter would be very greatly reduced. In fact it could be said that the power of the transmitter would have to be ten times greater than that of the transmitter keyed to zero in order to give the same result. This same consideration holds good in the case of the phone transmitter. All the antenna power possible will not create a phone signal *unless it is varied*. And it is *the amount of variation* that governs the effectiveness of the transmission.

In Fig. 1 is indicated the output of a phone transmitter under three possible conditions. In each case the peak or maximum possible antenna power is considered as being the same. At 1 the

(Continued from page 80)

the tube being modulated. This, in turn, spells frequency flutter or frequency modulation unless the tube generating the carrier frequency is well isolated electrically from the tube being modulated.

(4) Some such isolation of the oscillator or the use of crystal-control becomes of the greatest importance, since frequency flutter definitely and greatly increases distortion between the transmitter and receiver, even if the modulation is perfect.

(5) For this reason, with any transmitter in which the oscillator is modulated (and to some extent with transmitters of the oscillator-amplifier type) the speech quality obtained in a monitor in the station is not necessarily similar to the speech quality observed at a distance.

(6) It must be remembered that a good phone transmitter is quite a different animal from the code transmitter. The tubes, their voltages and their circuits all require treatment differing radically from telegraph practice.

(7) The speech quality can be no better than that put out by the microphone. Good microphones are expensive but the cheap ones are often satisfactory providing they are spoken into in the correct manner.

(8) Good amateur phone transmitters may appear expensive. If, however, expense is considered in relation to the signals produced in distant receivers they represent, in comparison with average present-day phones, far greater value for the amateur's money.

QST

This is a classic among classics of the QST articles of the 1920s. Amateur phone of those days was mostly pretty sad stuff, plagued by incidental frequency modulation, distortion in the audio system, distortion in the modulated stage, and low modulation percentages. Toward the end of the decade the growing technology brought to convergence the paths to frequency stability, clean audio, 100-per cent modulation, and linear amplification. The summing-up here launched a new era in amateur phone.
Space doesn't permit reproducing the article full size, and flavor, not detail is our real objective, but if your eyes or eyeglasses are good you'll have little trouble!

apparatus is adjusted correctly but the percentage of modulation — the variation of the antenna power — is of the low order usually attained in amateur transmitters. In this case the only portion of the output which is doing any service in creating the phone signal is that between a and b. The output between o and a and the possible but unused output between b and c are entirely

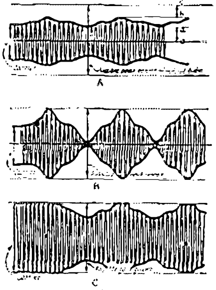


FIG. 1

wasted. In other words a transmitter with an output equal to that fraction between a and b would, when adjusted to give full variation or modulation of the output, be just as effective. At B the output of the transmitter first mentioned is shown to be completely varied (100% modulation). All of the output is being utilized and the signal is therefore the strongest that the output power could possibly produce. In order to obtain the same effectiveness with the 20% variation or modulation indicated at A the power of the transmitter would have to be increased five times!

The diagram C of the same figure indicates the reason why many amateurs fail to get anything approaching successful operation of their would-be phone transmitters. In this case the transmitter is adjusted to give its full output when the modulation is not being applied. The only possible variation of the carrier is then in a downward direction and since the voice frequencies consist of both "ups" and "downs" the "ups" are lost and only the "downs" register. Under these conditions — we hope to talk more of them later — the effectiveness of the transmitter is quite close to zero.

The system of modulation used in truly modern phone transmitters to permit the 100% modulation indicated in Fig. 1B comprises the old "constant current" or Heising system with a few simple but extremely important modifications. It seems unlikely that any amateur does not understand the functioning of the Heising system but since that and the new method are so closely related we should, perhaps, touch its high spots.

In Fig. 2A are shown the essentials of the constant-current system — undoubtedly the most generally used system since the year 1921. In it a modulator tube is connected with its plate circuit in parallel with that of the oscillator or amplifier being modulated and both tubes are adjusted to take the same normal plate current. Power to the plates of both tubes is supplied

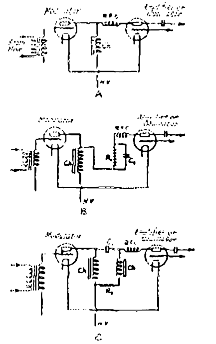
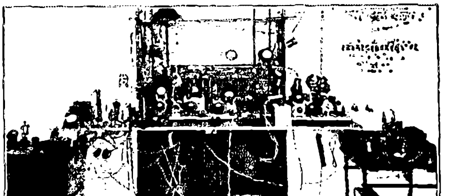


FIG. 2

through the constant-current or speech choke Ch. Any variations of the current in the plate supply system at speech frequencies are greatly opposed by the reactance of this choke and consequently any changes in the current through the modulator must be accompanied by an inverse change in current through the oscillator of the same order. The microphone, through a suitable audio-frequency amplifier, serves to vary the potential of the modulator grid and in consequence serves to swing its plate current up and down in accordance with the speech frequencies. Should the modulator current be driven to zero when its grid goes negative, the oscillator current will be forced to double the normal value; and

when the modulator current goes to double the normal value, on the less negative swing in its grid circuit, the oscillator current is reduced to zero. During each half-cycle of this process a voltage is built up in the speech choke equal in value to the normal plate voltage and whenever the oscillator plate current doubles, the voltage on its plate also doubles, the result being that the

that shown in Fig. 2B. In this case the plate voltage is fed directly from the speech choke to the modulator but is dropped in value by the resistor R1 — fitted with a by-pass condenser C1 — before it reaches the oscillator plate. Another practical scheme (used in the transmitter illustrated on these pages) is that shown in Fig. 2C. Two separate speech chokes are employed in



THE [illegible] TYPE TRANSMITTER

As it appeared towards the end of the [illegible] With this [illegible]

plate power on this tube varies, under such conditions, from zero to four times the normal value. While in practice it is possible to vary the oscillator plate power in this manner, and so obtain 100% modulation, the process requires that the modulator plate current swings from zero to double that of the oscillator. This, in turn, requires that the modulator grid potential be driven down to the point where the plate current cuts off on the negative half-cycle, and far up on the curve on the positive half-cycle — an operating condition which could hardly fail to introduce serious distortion. Practical operation with the system shown in Fig. 2A has therefore been limited to modulation percentages of a relatively low order.

MODERN MODULATION METHODS

The keynote of the new method is in the operation of the modulator tube at a higher voltage than the oscillator, by which means 100% modulation can be attained and maintained without distortion of any consequence. In some arrangements a separate plate supply is included in series with the lead from the choke to the modulator, in others a transformer is used to couple the plate circuits of the modulator and oscillator. Possibly the most practical form of the modified system is

this arrangement, the voltage-dropping resistor R1 being included in series with that one which feeds the oscillator. The plates of the oscillator and modulator, as far as the audio-frequency currents are concerned, are connected together by the large condenser C1.

The effectiveness of the arrangements B and C is so much greater than any other methods of modulation at present available to the amateur that we plan to limit our discussion exclusively to them. In comparison, the methods at present generally employed in amateur stations are so pitifully unsatisfactory that we are not able to consider them worthy of mention. If expense is considered in relation to the reading of the antenna ammeter the modern arrangements undoubtedly are costly. If, however, the money spent on the transmitter is considered in relation to the signal produced at the receiver — as it certainly should be — the methods to be discussed will be found very much cheaper.

And now, having skirmished around the three fields in which major refinements have been introduced by more or less recent development, let us examine the amateur transmitter in detail in order to see what these changes look like in actual equipment.

SUBDIVIDING THE TRANSMITTER

The complete phone transmitter may consist of three separate sections: The apparatus producing the radio-frequency energy to be modulated; the modulator, and an amplifier to amplify the modulated radio-frequency. The last mentioned section is not an essential part, however, and will not be considered at the moment.

The simplest method of producing radio-frequency to be modulated is by means of a self-excited oscillator onto which the modulator is

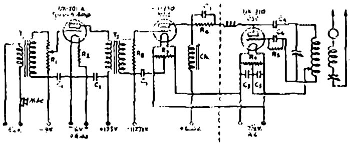


FIG. 3 — SHOWING ONE ARRANGEMENT OF A MODULATED HIGH-C OSCILLATOR

Though such a transmitter [illegible] at low modulation [illegible], it does not compare, in performance, with the transmitter [illegible] at high modulation percentages.

[illegible]

All other components correspond with those similarly designated in Fig. [illegible]

[illegible] tank and antenna coils are of the dimensions [illegible] August, 1928, QST.

connected directly. One arrangement is shown in Fig. 3. The disadvantage of any such transmitter is that its frequency output is not determined alone by the value of L1 and C3 but also by the plate impedance of the tube. As we have said so often before, the plate impedance is varied with any change in plate voltage and a variation of output frequency follows. In the phone transmitter being 100%-modulated, the plate voltage on the modulated tube is being driven from zero to twice the normal value, and if this modulated tube is the oscillator it is certain that serious frequency flutter will result. A well-tuned High-C transmitter can withstand relatively large plate voltage "ripples" without a serious corresponding frequency flutter for code work but for phone, where the presence of flutter is so much more serious and where the plate voltage changes are so much more drastic, even the High-C arrangement gets into trouble. A good High-C oscillator, however, can and is being used for amateur phone work with some success. If it is fully modulated, though, there will be appreciable frequency flutter and distortion in transmission will be a common experience. If there are truly successful modulated oscillator transmitters on the air, their ability to avoid distortion troubles in transmission undoubtedly is due to the use of a low percentage of modulation with its accompanying sacrifice in range. For it is only with a low modulation percentage that the plate-voltage fluctuation on the modulated tube can be avoided and it is in this way that the frequency flutter in the self-excited transmitter is reduced.

EVEN OSCILLATOR-AMPLIFIERS NOT NECESSARILY IDEAL

The obvious move is to turn to the oscillator-amplifier arrangements where the oscillator determining the frequency can be left alone and the modulation applied to the amplifier. The idea is very fine but the unfortunate part of the story is that no self-excited oscillator-amplifier transmitter has yet been built in which changes in the operation of the amplifier did not react on the oscillator to the tune of changed frequency. The frequency of such an oscillator will remain reasonably constant just so long as the load on it, imposed by the amplifier, is constant. Whenever the load varies the frequency will change and the load, when the amplifier is being modulated fully, is changing with a vengeance! A simple self-excited oscillator-amplifier arrangement can be used for amateur phone, with the one and only amplifier being modulated, but experiment has shown that its performance in regard to frequency flutter is not very much ahead of a good High-C oscillator modulated directly. If the full advantage is to be taken of the oscillator-amplifier system there are two alternatives open. One is to use a "buffer" stage of amplification between the oscillator and the modulated amplifier — a tube biased to operate without any grid current — and the other is to use a crystal oscillator. High-frequency communication engineers who really know what they are talking about will disagree with this. They will insist, as they already have done, that consistently high quality high-frequency speech communication is not possible with any conceivable self-excited oscillator-amplifier transmitter — that it can be accomplished only with a crystal oscillator and then only when the crystal tube is isolated from the modulated amplifier by at least one "buffer" stage. Amateurs, of course, cannot as a rule afford to be such purists on these matters and undoubtedly many of them will do without the crystal or the "buffer" tube, and with their High-C modulated oscillators will at least make fewer and more pleasant gargling noises than they have in the past.

Our recommendations, however, are for the amateur to use a crystal with a "buffer" tube as the first choice; to use a crystal feeding the modulated amplifier as the next alternative; to arrange for a "buffer" stage if a self-excited oscillator must be used; and to install a real High-C oscillator particularly well tuned if funds permit of nothing more elaborate. Being in a frank mood we would suggest, however, that amateurs who have the ambition to attempt 100% modulation but who have not the funds to install a good oscillator-amplifier transmitter, would do themselves and their fellow amateurs a great favor by concentrating on code transmission until their finances are in better condition. We say this because we have demonstrated to ourselves that the application of 100% modulation to a transmitter of the more elementary form will result only in disappointment and waste of money to the operator, and untold grief to those obliged to listen to him.

A "good" oscillator-amplifier arrangement, in our opinion, consists of a crystal oscillator with a plate supply of its own feeding the modulated amplifier either through a "buffer" stage or directly. It can consist also of a High-C self-excited oscillator with a plate supply for itself, feeding the modulated amplifier through a "buffer" stage. The transmitter illustrated provides examples of these combinations, and their construction, adjustment and operation are to be detailed later on.

One satisfactory arrangement suited for the modulation of a UX-210 is indicated to the left of the dotted line in Fig. 3. The modulator is a UX-250, a tube highly suited for the work. It is fed with 600 volts of d.c. through the speech choke Ch, and its plate is connected through voltage-drop resistor R1 and by-pass condenser C1 to the plate of the tube being modulated. The grid circuit of the modulator tube is fed from the plate circuit of the UX-201-A speech amplifier through a high quality audio-frequency transformer, the secondary of which is preferably

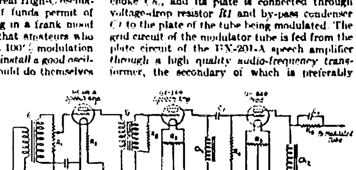


FIG. 4 — THE MODULATION SYSTEM DESIRABLE FOR SATISFACTORY MODULATION OF A UX-[illegible]

[illegible] — [illegible] henry or higher, [illegible] choke.

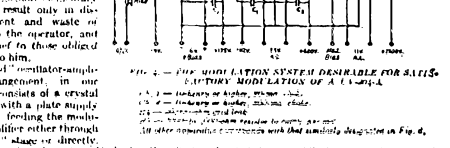
[illegible] — [illegible] henry or higher, [illegible] choke.

[illegible] grid leak.

[illegible]

All other components correspond with those similarly designated in Fig. 3.

shunted by a gridleak-type resistor of about 250,000 ohms. The output of the microphone is fed to the grid circuit of the speech amplifier through a microphone transformer, several modern types of which are now available. The older types of modulation transformers, or Ford coils,



THE OSCILLATOR, "BUFFER" STAGE AND MODULATED AMPLIFIER

[illegible] this unit may be used with the modulator [illegible] watts — the peak power [illegible] modulation, [illegible] watts.

THE MODULATION APPARATUS

The modulator and speech amplifier unit is the vital essential section of the phone transmitter,

are not satisfactory for this work and if a good modern transformer cannot be bought, an excellent make-shift can be built by removing the primary of a high-quality audio transformer and

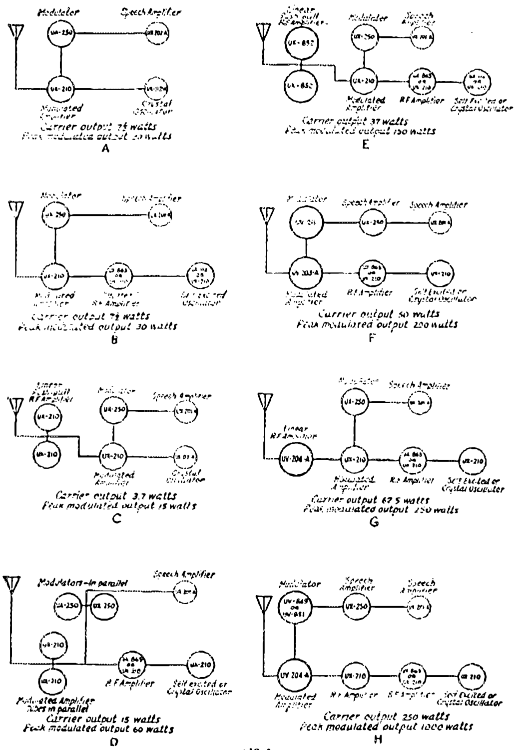
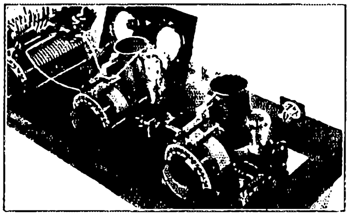


FIG. 5

figure. There are many more double chokes rated at 60 ma. available than single chokes rated at 100 ma.

AMPLIFYING AFTER MODULATION

Let us now consider the third possible section of the phone transmitter — a radio-frequency power-amplifier to amplify the output of the modulated tube. Such amplifiers, as anyone who has tried to operate one will tell you, require very careful handling and are, for the amateur, not always a desirable adjunct. Tubes operated as radio-frequency amplifiers after the modulated amplifier must operate over the straight portion of their grid-voltage plate-current characteristic curves in just the same way as do the audio tubes of the broadcast receiver. For this reason they are termed "linear amplifiers." Some idea of the requirements for successful operation of a linear amplifier can be gained by first remembering that the tube exciting it is having its output modulated from zero to four times the normal value and that distortion will result if the output of the linear amplifier cannot go through the same extremes. This means that the excitation of the amplifier must be reduced to the point where its output is one quarter of the possible maximum power, when the system is not being modulated. The antenna current under these conditions will then be half the maximum value. With modulation, the power of the modulated tube goes from zero to four times normal, the excitation of the linear amplifier does the same, the antenna power also. If a single tube or tubes in parallel are used in the linear stage, the bias must be adjusted so that the plate current is the same with and without excitation, which is just another way of saying that the bias is adjusted so that the tube or tubes operate on the straight portion of their characteristics. When a push-pull linear stage is used, the bias can be increased to the point where the plate current is reduced to zero with no excitation. In all considerations of such amplifiers, however, it is important to remember that the maximum output is limited by the voltage on their plates and that because this is constant, the normal output (when no modulation is taking place) must be reduced to the point where the power is one quarter of the maximum value. *This point, since the antenna power is represented by I^2R, is that indicated by half the maximum antenna current.*



A "CLOSE-UP" OF THE OSCILLATOR AND FIRST AMPLIFIER STAGE

The oscillator apparatus is mounted on a copper plate over which the shield sits. Crystal operation is made possible by plugging the crystal into the two sockets in the right foreground and changing the coil unit to one consisting of a plate coil only. The [illegible] shown in this view is not the coil described under Fig. [illegible] but a [illegible] affair which was afterwards discarded.

WHERE LINEAR AMPLIFIERS ARE A DISADVANTAGE

The limitations on the use of linear amplifiers can best be explained by referring to the diagrams of Fig. 5. At *A* is shown what is considered the simplest high-quality amateur phone transmitter, consisting of a crystal oscillator exciting a UX-210 modulated amplifier. The carrier output power of this transmitter can be 7½ watts and, under these conditions, when fully modulated, the output power will vary between zero and 30 watts. At *B* is indicated a somewhat similar transmitter operating with a self-excited oscillator isolated from the modulated amplifier by a "buffer" stage. The carrier and peak power output in this case is the same as at *A*. In diagram *C* a pair of UX-210 tubes have been added as linear amplifiers and, since their output is limited by their fixed plate voltage to 15 watts, the carrier is adjusted to 3.7 watts in order to permit the four-times increase on the modulation peaks. Absurd as it may at first seem, the modulated power output of the transmitter has been cut in half by the addition of the two output amplifier tubes! In order to obtain the same effective power output as the transmitter *A* or *B* four UX-210's would have to be used in the linear amplifier. In diagram *D* the output tubes are two modulated UX-210 amplifiers. In this transmitter the carrier power can be 15 watts and the peak output during modulation 60 watts — a hefty transmitter as amateur phone stations go. If a UX-852 tube were added to this arrangement as a linear amplifier the peak power would then be 75 watts — an increase of just 15 watts. The transmitter indicated at *E* is the apparatus of diagram *B* feeding a linear amplifier consisting of two UX-852

inserting in its place about 250 turns of 30-gauge wire. The microphone transformer in the transmitter illustrated is of this type. The microphone is, of course, one of the most important units in the whole transmitter. The speech quality is greatly governed and definitely limited by its characteristics. Unfortunately a good double-button microphone is a very expensive item and one which requires much more careful handling than it would ever be likely to get in an amateur station. For the amateur whose aim is to obtain the very best possible voice quality, however, its use is essential. Fortunately, there are many ordinary hand microphones which, though not permitting any very high standard of quality, do provide a high degree of intelligibility. They are really quite satisfactory for the amateur phone transmitter providing they are operated correctly. The usual practice of holding the microphone and yelling directly into it is quite an absurd one. The only sane procedure is to suspend the instrument in a convenient position where it need never be touched, and to adjust the amplification between it and the modulator to the point where it is only necessary to talk *across* it and in a low or possibly normal tone of voice. Across the secondary of the microphone transformer is the gain control indicated as *R2*. It consists of a 200,000-ohm potentiometer, the moving contact of which is connected to the speech-amplifier grid. In Fig. 4 is shown one possible arrangement of a modulator suitable for the modulation of tubes of greater rating than the UX-210. For the modulation of a UV-203-A, a UV-211 could be used with some success. For the modulation of a UX-852 or a UV-204-A, however, the only truly satisfactory tube would be the UV-849. In either of these circuits the speech choke arrangement shown in Fig. 2C could be incorporated. With a UX-250 modulator it is a particularly effective arrangement since it permits the use of a double "B-eliminator" filter choke — a unit readily available to almost every amateur. The disadvantage of the single choke of Fig. 2B is that the choke must pass at least 100 ma. whereas the chokes of Fig. 2C need be rated at only half that

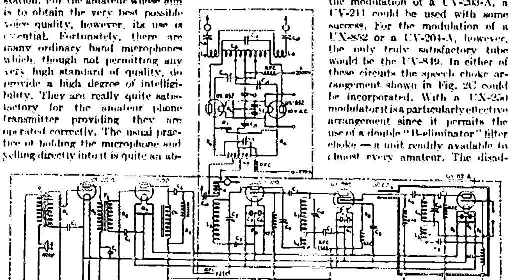


FIG. 6 — THE WIRING OF THE COMPLETE PHONE TRANSMITTER ILLUSTRATED

C1 — [illegible] condensers.
C2 — [illegible] condenser.
C3 — [illegible] condensers.
C4 — [illegible] condensers.
C5 — [illegible] condensers.
C6 — [illegible] condensers.
C7 — [illegible], Cardwell transmitting-type variable condenser.
C8 — A 23-plate Pilot midget condenser with plates double-spaced.
C10 — [illegible], Cardwell receiving-type variable condenser.
C11 — [illegible] receiving-type variable condenser.
C12 — [illegible], National [illegible] condenser.
C13 — [illegible] condenser.
C14 — [illegible] receiving-type variable condenser [illegible] plates.
C15 — [illegible] receiving-type variable.
R1 — [illegible] potentiometer.
R2 — [illegible] Yaxley fixed resistor.
R3 — [illegible] Yaxley [illegible] resistor.
R4 — 2000-ohm Ward-Leonard resistor to carry 100 ma.
R5 — [illegible] Yaxley fixed resistor.
R6 — [illegible] Yaxley fixed resistors.
R7 — [illegible] Ward-Leonard "Adjustat."
L1 — [illegible] turns of 14 gauge wire on 3" diameter tube [illegible] crystal operation [illegible] turns of same wire for plate coil [illegible].
L2 — [illegible] turns of same wire. When running as a self-excited oscillator, a [illegible] fixed condenser is shunted across the extremities of L1–L2, i.e., from grid to plate.
L3 — [illegible] turns of [illegible] wire space-wound on 3" diameter tubing.
L4 — [illegible] turns of [illegible] wire on 2" diameter [illegible].
L5 — R.F.L. [illegible] inductance.
L6 — [illegible] turns of [illegible] copper tubing, turns [illegible] inside diameter.
L7 — [illegible] turns of [illegible] copper tubing, turns 5" inside diameter.
L8 — R.F.L. [illegible] inductance.
L9 — [illegible] 5 turns of [illegible] diameter copper tubing, turns [illegible] inside diameter.
T1 — High quality audio transformer with new secondary of [illegible] turns of [illegible] wire. [illegible] would be better.
T2 — [illegible] transformer.
Ch — National [illegible] "B-eliminator" choke.
R.F.C. — In the lower [illegible] type [illegible]. In other [illegible] type [illegible].

tubes in push-pull. A single UX-210 modulated amplifier serves to excite the UX-852s and the increase in power provided by them is 120 watts — one instance in which the use of a linear amplifier would be justified. This arrangement is exactly that used in the transmitter built to provide examples of the applications of these methods and illustrated on these pages.

It should be pointed out that in no instance are screen-grid tubes specified as linear amplifiers. The types at present available are unsuited for the work.

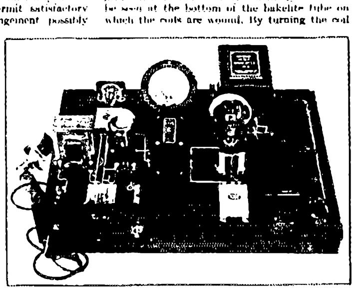
Arrangement *F* of Fig. 5 is one suited for operation from a plate supply of about 1200 volts. Though the UV-211 is a good modulator tube, its power rating is not sufficiently above that of the UV-203-A to permit satisfactory [illegible] modulation. The arrangement possibly would not be a very effective one. Diagrams *G* and *H* represent two transmitters in which the output tube is a UV-204-A. At *G* the 250-watt tube is operated as a linear amplifier and without modulation its output is adjusted to 62 watts. The peak power during complete modulation is 250 watts. A UV-849 (a tube designed for use as a modulator) is employed in arrangement *H* to modulate the 250-watter. In this instance the carrier output could be 250 watts and the peak output during modulation not a watt less than 1000. What a snooty amateur phone that would be!

The transmitter illustrated, as we have mentioned at several points, is that designed and built to provide examples of the application of the methods under discussion. *It was not designed with the idea that it would ever be duplicated by the amateur.* It was arranged and built in its present elaborate form in order to incorporate in the one transmitter as many of the features considered desirable as was possible. A close study of its constructional details together with the diagrams of Fig. 5 should enable the amateur to plan and build a transmitter suited to his own requirements. Then, a study of the tuning methods — to be covered later — should make it at least reasonably possible for him to adjust satisfactorily the transmitter he has built, irrespective of how much it differs from the outfit illustrated.

THE COMPLETE OUTFIT DETAILED

The transmitter consists of the three sections mentioned; the oscillator, "buffer" amplifier and modulated amplifier as one unit; the modulator and speech amplifier as another unit, the push-pull linear amplifier yet another.

The separate illustration of the three-tube radio-frequency unit provides some idea of its lay-out. The close-up gives an impression of the constructional methods used in it. These views may well be studied in conjunction with the circuit diagram of Fig. 6. In the close-up view the oscillator is in the right foreground. It consists of a UX-112 tube arranged in a tuned-plate circuit in such a manner that it can be changed over to crystal-control merely by plugging the crystal into the sockets *X*, *Y* and removing the grid coil *L2*. In the illustration the grid coil can be seen at the bottom of the bakelite tube on which the coils are wound. By turning the coil upside down the plate coil plugs into the same sockets as before but the grid coil extends above it, disconnected. A better scheme is to remove the self-excited coil entirely, replacing *L1* by a separate and larger coil for crystal work. The apparatus of this oscillator unit is mounted on a copper plate over which a shield is fitted. Holes in the side of the shield permit the crystal to be plugged into position from outside. As in the case of other apparatus built under the A.R.R.L. Technical Development Program, the practice has been followed of keeping all radio-frequency leads above the base-board and of permitting no wires to go beneath unless they have first been by-passed above. In addition, the method of mounting units on or from other units has been followed as in previous instances, so permitting the elimination of many wires and the shortening



THE MODULATOR AND SPEECH AMPLIFIER UNIT

On the front panel is the [illegible] switch. Behind it, the microphone transformer [illegible] amplifier can be seen. The modulator tube with its [illegible] is at the [illegible].

of others. In this oscillator, for instance, the total length of radio-frequency leads probably does not exceed six inches. The feeder lead to the "buffer" tube is run through a piece of 3/8" copper tube connected to the shield, the idea being to reduce the capacity between the grid and plate circuits external to the screen-grid amplifier to the lowest possible value. The "buffer" tube is a UX-865, ideal for the purpose on account of the possibility of operating it without neutralization. It can be replaced, however, by a neutralized UX-210. In this particular transmitter these first two tubes are operated at the same frequency as the output tubes but if desired they could be operated at half the output frequency, the "buffer" frequency-doubling into the modulated amplifier. The modulated tube, though, should operate at the output frequency since frequency-doubling into a linear amplifier would not be satisfactory. *Screen-grid voltage for the UX-865 is obtained* from the plate supply through a 25,000-ohm resistor.

The output circuit of the screen-grid amplifier is similar to the usual arrangement, an enamel-wire space-wound inductance L4 being used. The neutralizing coil L3 is wound on a small

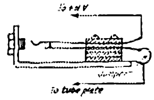


FIG. 7 — Showing the connections of the jacks in the tube plate circuits to permit plugging in the milliammeter without breaking the circuit.

piece of tubing inserted in the bottom of the former on which L3 is wound. Since it is not carrying a heavy radio-frequency current it is wound with 22 gauge wire.

The UX-210 modulated amplifier is arranged much as if it were a 50-watter on account of the high peak voltages which it and its circuits must withstand. The condenser of its tank is of the double-spaced transmitting type and all fixed condensers are of high voltage rating. The neutralizing condenser, to be seen mounted immediately above the plate tank condenser, is a double-spaced midget condenser originally of 23 plates.

The provision of meters for this unit was made with the idea of facilitating the tuning adjustments. A voltmeter is included for the filament circuit, of course, but one plate milliammeter is made to serve for all three tubes by connecting it to a phone plug and arranging a phone jack in the plate circuit of each tube in the manner shown in Fig. 7. By connecting the leaves of the jacks in this way the plate circuit is never opened irrespective of the position of the plug. In addition to the plug, a small piece of bakelite rod fitted with a knob is provided. This gadget is inserted in the jack of the UX-210 plate circuit, disconnecting its plate supply for the purpose of neutralizing. The meters, the jacks and this gadget can be seen on the sloping panel at the rear center of the unit.

The bias-battery leads to the three tubes, the plate-supply lead to the oscillator, and its filament supply are connected by means of a battery cable and plug, the socket for which can be seen at the right rear of the base-board in the close-up view. The high-voltage and filament leads to the two amplifiers are connected to Fahnestock clips on the rear edge of the base.

THE CONSTRUCTION OF THE MODULATOR

The second unit of the transmitter is the modulator system, illustrated separately. It *comprises the microphone transformer, speech* amplifier, coupling transformer to the UX-250 modulator, double speech choke, oscillator plate-voltage drop resistor and by-pass condenser, and a milliammeter for the modulator plate circuit. In the case of this unit all battery leads are connected by means of a battery cable and plug. From the general view of the complete transmitter it can be seen that the modulator unit sits end to end with the radio-frequency unit, the parts being disposed just as indicated in the circuit diagram. The audio frequency enters from one end of the affair, the radio frequency from the other; they meet in the middle where modulation is effected, and the result is a phone transmitter of 30 watts peak output with a high standard of performance. When operated in this manner the coil L6 is, of course, the antenna coil, while C15 is the antenna tuning condenser.

The third unit, the vertical section, is the push-pull linear amplifier which can be excited from the modulated output of the UX-210. In the general view it sits immediately behind the modulated UX-210, but there is no particular reason why it should not be mounted on the wall near the antenna leads or in any other convenient place in the station away from the three-tube radio-frequency unit. The same holds good, of course, for the modulator unit. It could be mounted in relation to the rest of the transmitter at any place which would permit the two interconnecting high-voltage leads to be run conveniently.

The two UX-852 tubes of the linear amplifiers are mounted bottom uppermost so that the grid leads are convenient to the output of the modulated tube. The two leads from the "antenna coil" of the UX-210 are clipped across a few turns of the inductance L7 to provide a coupling link, the adjustment of the turns at both ends of this link being used, in addition to adjustment of the coupling of L5 and L6, in order to provide variation of grid excitation. L7, together with the large variable condenser C11, forms a High-C grid

circuit for the linear amplifier tubes. Aside from its use in coupling the UX-210 to the UX-852s, this circuit serves in reducing the harmonic content of the excitation power and in general improves the operation of the linear amplifier stage. The resistances R6 in the grid leads have an important function in avoiding parasitic oscillation of the amplifiers, while the resistor R7 serves an equally important purpose in providing control of the excitation and in reducing distortion in the push-pull stage. These resistors will be given further consideration in discussing adjustment.

The output tank tuning condenser is that mounted between the two tubes. Above it is the tank inductance and the two antenna coils. The inverted U-shape tubing over the inductance is not, as might be supposed, a handle to aid in removing the coil. It is the connecting link between the two sections of antenna coil, these being mounted, incidentally, from the supporting framework of the tank inductance. Since the outer ends of the antenna coils are connected to the condensers by flexible leads, the coils can be rotated through an appreciable arc for the variation of antenna coupling.

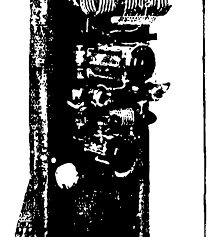
The two neutralizing condensers of this unit are mounted at the rear of the panel and are controlled by two extension shafts, the knobs on which can be seen immediately under the plate leads of the UX-852s. A filament voltmeter, plate milliammeter and two antenna-current meters comprise the meter equipment of this unit.

THE TUNING PROCESS

And now we must discuss tuning and adjustment, in the telegraph transmitter an important business but in the phone transmitter a delicate proceeding requiring the most profound attention to detail.

With everything in operating condition the oscillator should first be given consideration. If it is to be run as a self-excited oscillator the grid and plate coils should be proportioned so as to give steady oscillation with about 8 ma. of plate current when operating from a 135-volt plate supply. With either a self-excited or crystal-controlled oscillator this voltage should provide ample output to excite the "buffer" tube, though if a crystal but no "buffer" is used it is certain that a "power" crystal with about 400 volts on the plate of the tube will be necessary for full excitation of the modulated amplifier. The "buffer" stage is, for this reason, serving the added useful purpose of permitting low oscillator power and convenient operation from a separate plate supply. In the case of this particular transmitter the oscillator is driven from the 135-volt receiver "B" battery but there is no reason why a "B-eliminator" (the 135-volt type of which is almost a glut on the market) could not be used with similar satisfaction. When the tube is running as a self-excited oscillator the "bias" lead is run through a 10,000-ohm gridleak to the negative filament lead. For crystal operation 22½ volts of bias has been found effective.

In checking the oscillator operation, and for that matter the operation of any section of the transmitter, it is almost essential to use a "tuning



THE SECTION COMPRISING THE OUTPUT LINEAR AMPLIFIER

Two UX-852 tubes in an inverted position are used, [illegible] equipment is underneath them. The [illegible]. Though arranged [illegible] behind the two other sections of the transmitter, this unit could be operated in any convenient position in the station [illegible] through a [illegible]

lamp" consisting of a flash-lamp bulb connected in series with two or three turns of wire. These turns, of course, are coupled loosely to the particular tank coil under examination to determine the presence and approximate amplitude of radio-frequency current in the circuit. The tuning of the oscillator, crystal or self-excited, is greatly facilitated by the use of this lamp.

Once the oscillator has been caused to run

steadily on the required frequency the plate voltage is applied to the plate of the screen-grid "buffer" tube with the grid bias at about 135 volts if the plate voltage is of the order of 600. When the oscillator is switched off the plate current of this tube should be brought approximately to zero by adjustment of the grid bias. When the oscillator is switched on this plate current should rise to about 20 ma. With the bias of the tube adjusted to the point where no plate current flows when there is no grid excitation (termed the "cut-off" point) the tube operates on the lower end of its grid-voltage plate-current curve and is said to be running as a Class B amplifier. With the aid of the tuning lamp it should now be possible to tune the plate tank of the UX-865 without difficulty and proceed to the neutralization of the UX-210. This process is accomplished, as usual, with the plate supply to *the UX-210 disconnected. First* the tuning lamp is coupled tightly to the UX-210 plate tank and with the neutralizing condenser set at zero the tank tuning condenser is rotated until the tuning lamp lights. The light may light only dimly and it is necessary to search for the resonance spot with considerable care. Once it has been found the neutralizing condenser should be adjusted in steps (the tank condenser being readjusted each time) until the point is found where no radio frequency can be detected by the tuning lamp in the UX-210 plate tank. It is well then to continue the rotation of the neutralizing condenser until the point is reached where current is again detected. In this way it is possible to find a setting for the neutralizing condenser midway between

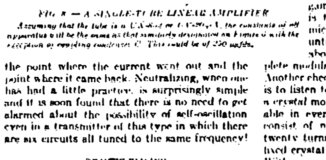


FIG. 8 — A SINGLE-TUBE LINEAR AMPLIFIER

Assuming that the tube is a UX-852 or UX-250, the constants of all apparatus will be the same as that similarly designated on Figure 6 with the exception of coupling condenser C. This could be of 250 µµfds.

the point where the current went out and the point where it came back. Neutralizing, when one has had a little practice, is surprisingly simple and it is soon found that there is no need to get alarmed about the possibility of self-oscillation even in a transmitter of this type in which there are six circuits all tuned to the same frequency!

DRASTIC BIASING

With the oscillator switched off, the bias of the UX-210 should be adjusted to the "cut-off" point (where plate current ceases). This probably will be of the order of 112½ volts. *Now this value of bias should be doubled.* In other words, it should be increased to 225 volts under these conditions. This means that the excitation arriving from the UX-865 will have to swing the grid of the UX-210 112 volts before any plate current flows at all, and much further than that if the plate current is to be driven up to the normal value. *In short,* the grid of the modulated amplifier must be provided with a relatively terrific sock by the preceding tube — the reason why a "power" crystal is advisable if it is to excite the UX-210 directly. When operating with the bias far beyond the "cut-off" point, the amplifier is said to be running as a Class C amplifier. When so operated the efficiency of the amplifier is very high and the output power varies as the square of the plate voltage within certain limits — the condition necessary for modulation free from distortion.

If the UX-210 is to be used to operate directly into the antenna, attention can now be directed to the modulator section. With 135 volts on the plate of the speech amplifier, satisfactory operation should be obtained with 9 volts of grid bias. If possible a low-reading milliammeter should be connected in its plate circuit, however, to make certain that no plate current fluctuation is caused when the microphone is spoken into. The same should hold good with the modulator. With 600 volts on the plate of this tube the correct bias *will be of the order of 112½ volts.* Under these conditions the plate current will hold steadily at 60 or 60 ma., when modulation is taking place. Should it fluctuate, further grid bias adjustments should be made.

At this stage the antenna may be connected and the coupling and tuning adjusted to give maximum antenna current. Adjustment of the gain control and talking position is now necessary in order to obtain speech input to the modulator not greater than that necessary to give full modulation on the loudest tones. The correct adjustment is quite difficult to judge but there are three methods of gaining an approximate idea. The first is to hum a constant note near the microphone and adjust the gain control until the antenna current increases by about 25% of its normal value. Complete modulation probably is then taking place. Another check, probably a very approximate one, is to listen to the output of the transmitter with *a crystal monitor — a rig which should be available* in every amateur phone station. It may consist of nothing more than a hank of, say, twenty turns of wire connected in series with a fixed crystal detector and a pair of head phones. With an assistant talking near the microphone an excellent idea of the voice quality can be obtained by holding the coil of the monitor near an

antenna lead. Then, the gain control and the talking position can be varied until the point is reached where noticeable distortion can first be detected. The third possible check is to listen to the transmission in an ordinary oscillating monitor in order to observe by just how much the carrier is being hacked up by the speech. This probably is the most approximate check of all.

The checking of possible frequency flutter can, however, be made splendidly with the oscillating monitor. With the carrier tuned to zero-beat the quality of the speech should be just as free from distortion as in a non-oscillating receiver. This check also can be made splendidly by an observing station. And, while we're on the subject, try tuning your receiver in an oscillating condition to zero-beat with a few amateur phones. Observe just how scarce are the phones, not crystal-controlled, which are intelligible under these conditions.

TUNING A LINEAR STAGE

The adjustment of a linear amplifier may now be considered. The *primary adjustment* is that of grid bias. With an amplifier of this type it should be adjusted to the point where the plate current is the same irrespective of whether excitation is applied or not. This, however, is presupposing that the excitation has been adjusted, and for this reason the best scheme is probably to adjust the excitation to give the normal plate current of the tube. Then, without paying particular attention to the plate current, the excitation is increased by the means already mentioned until the point is reached where further increase in *excitation does not increase the antenna current.* Then the excitation should be reduced by decreasing the resistance of R7 until the antenna current is half the maximum value. At this stage slight adjustment of bias may be made to hold the plate current constant with and without grid excitation.

Under these conditions the tube will be operating as a linear amplifier, with its output at one-quarter normal power but ready to be pushed up to full power when the exciting tube is fully modulated.

The adjustment of a push-pull stage differs in that the grid bias is adjusted to the cut-off point when no excitation is applied. Then the excitation is brought to the adjustment where half maximum antenna current is obtained, as before.

It might be mentioned that variation of the coupling of L3,L6 and of the resistor R7 upsets the tuning of both the tanks L5-C7 and L7-C11. The condensers C7 and C11 therefore require constant readjustment.

Neutralizing of the linear amplifier is carried *out in just the same manner as in the case of any* other amplifier. In the case of the push-pull stage the two neutralizing condensers are varied together.

Antenna coupling is another important adjustment. Reduction of the coupling below the point of maximum antenna current usually is desirable for phone work.

The transmitter is, of course, an excellent code transmitter when suitably adjusted for that work. When the UX-210 is used as the output tube it is only necessary to provide some good standard keying system to convert it for telegraphing. The linear amplifier, however, when adjusted correctly for phone is not adjusted for the best performance on code. In the case of the push-pull amplifier it is necessary to cut out the resistor R7 in order to get full excitation and maximum antenna current. When a single linear amplifier tube is used it is advisable to increase the bias to somewhere near the cut-off point in addition to increasing the excitation.

YES, IT PERFORMS

Perhaps it would be as well to mention that the phone, provided in this article to illustrate the application of the ideas treated, really has worked. It has been on the air only three nights since it came out of the Laboratory — one night with the UX-210 as the output tube, and two nights with the UX-852s feeding the antenna. Only stations in the Eastern States were heard but all that were called were worked. Reports of the audibility of the signals with the UX-210 output varied from QSA4 to QSA5 and several were to the effect that they were the loudest phone signals on the air. In all cases the voice quality was reported as being excellent. With the linear amplifier in operation the reports were slightly more *flattering. At the same time we* must mention that we overheard one amateur tell another that he sounded like a broadcasting station. We couldn't help thinking what a horrible broadcasting station that must have been. We knew then that we would have to discount heavily the reports we had been receiving.

We feel that even with all these words this is a pitifully incomplete treatment of the subject and we know that contributors to *QST* can make almost limitless additions — possibly subtractions. We do feel, however, that somewhere in the treatment lie at least some partial remedies for the unfortunate epidemic of vocal afflictions with which the amateur phone game has for so long been cursed. Here are the key thoughts:

(1) The strength of phone signals is dependent not upon the antenna power of the transmitter but upon the variation of it.

(2) With modern systems this variation can be carried to the 100% mark on the modulation peaks. A relatively enormous gain in the effectiveness of a transmitter is therefore possible *without the necessity of power supplies or tubes* of higher power rating.

(3) High modulation percentages, however, go hand in hand with drastic voltage variations on

(Continued on page 77)

The series of articles from the first 50 years of QST *that has been appearing each month in 1966, has been devoted entirely to articles technical in nature. This month, in addition to the technical classic shown on the previous pages, we are also presenting a classic article in the feature field.*

"Jim" first appeared in QST *in April 1935 and was just one of many nostalgic stories written by John C. Flippin, W4VT. It was difficult for us to decide which Flippin story to use here and, if you have access to* QSTs *in the middle Thirties, we suggest you read his other stories. They are guaranteed to bring enjoyment and perhaps even a tear to the eyes of the young squirt and old timer alike.*

Jim

A Tug at Your Memory

By John C. Flippin, W4VT*

THE fire in the shack of the university radio station burned low and conversation lagged. Every now and then someone yawned lustily. The hands of the old clock pointed to five minutes after two, yet half a dozen seniors lingered, for the fire was magnetic, the walk back to the dormitory and fraternity houses long; and the night was cold. Lazy, feathery flakes, beginning to drift down at midnight, had changed to a fine, peppery mist swirling in from the north, and the wind moaned down the chimney in icy cadences.

Jug Southgate stood up and stretched.

"See you mugs in church," he grunted, looking around for his overcoat.

"Wait a minute. I will let you walk with me. Hey! get your big feet off me!"

"Freshman, where are the earmuffs?"

"Right here, sir."

"Put them on at once. Anybody would think you had no modesty at all."

"Get up! Get up!"

"Coming, Ivy?"

"Let's go."

Exiled in a shadowy corner, a group of freshmen had been listening in respectful silence. Now they rose, after a discreet interval, and removing their sky blue caps from their hip pockets placed them carefully on the backs of their heads. Beside them stood a little fellow who was busily engaged in wrapping a rather frayed scarf around his small neck. Judging from his stature he could not have been much older than fourteen, and he looked very small and out of place beside them. The shadows from the fire treated mercifully the worn places on the elbows of the coat which was so obviously designed for a larger occupant; they shielded understandingly the worn, cracked shoes with the scuffed toes.

His name was Jim. Nobody knew much about him except that he lived up in town some where, and that every Saturday night he appeared at the shack, slipping quietly into a seat amid the shadows in the corner, and listened with rapt attention to every word that anyone uttered. He always stayed until the group of fellows broke up. Jim replied feebly and shyly to those who would talk to him, apparently embarrassed at the attention. His face and hands were very thin and his eyes were very bright. He was a small outsider looking in on a gathering with which he could join only in spirit. College would never be for Jim.

The wind whined savagely. A flurry of snow beat a faint tattoo on the window.

"Ouch!" muttered Ivy. "Listen to that!"

Jug cast his gaze around as he pulled on his gloves. The staccato clatter of the keying relay in the adjoining room reminded him to caution Parkes about playing the end of the band too closely since the multivibrator was down for revamping. Turning back, his glance rested for an instant on Jim stretching his hands out to give them a last warming. Something about the little fellow's appearance arrested Jug's attention. Maybe it was the tattered edge of that scarf about Jim's ears.

"What do you say over there, sport?"

Jim didn't notice.

"You over there by the fire! Got a way to get in?"

Jim looked up, and saw Jug looking at him. He straightened up quickly and thrust his hands into his coat pockets.

"Sir?"

"Got a ride into town with somebody?"

"No."

"What are you going to do—walk?"

"Yes," answered Jim.

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"Pretty long way, isn't it?"

A pause.

"Not so much."

Jug embarrassed Jim a great deal, because Jug was the chief operator and wore sterling crossed bars of chain lightning on the shoulder of the navy blue jersey. There was no greater this side of Heaven, save perhaps the three comprising the transmitting staff.

Jug shoved his pipe in his mouth and turned the bowl down. He squinted up at the clock.

"Hold on, frosh!"

He pulled off his gloves and searched in his hip pocket, producing nothing but a handkerchief and a crumpled pack of cigarettes.

"Can't find 'em. Listen! You know where the Sigma House is? OK—you go over there and look around in the back. My iron ought to be there, but if it isn't, get any of them that will start. You know mine?"

"Yes, sir."

"Look around in the front seat and find you a hairpin or something and short around the switch under the dash. You know?"

"Yes, sir."

"And hurry up, frosh!"

Rather bewildered, Jim listened.

"I can get there all right," he said finally.

Jug grunted and sat down.

"Where do you live in town?"

"Er—down by the depot. The third house from the corner."

"Guess you know all the trains."

"I guess so. The freights make an awful lot of QRM when I'm trying to listen."

Jug stuffed his pipe slowly and extracted an ember from the hearth.

"You one of these amateurs, too?"

"Yes, that is—I mean, I have a station, but it's not much good, I guess."

A flicker of surprise crossed Jug's persistently sunburned countenance.

"Didn't know there was another station within fifty miles of here," he admitted. "What do you use? Never heard you."

"A 201-A," answered Jim.

The rectifiers down below howled faintly.

"Any DX?" asked Jug, quizzically, glancing at the little chap out of the corner of his eye.

"No, I—you see, I never worked anybody."

"What's the trouble?"

Jim stopped the nervous movements of his small hands and wiggled his thumb, just to see if it would wiggle.

"I don't know."

"Just don't come back, eh?"

"No."

"Call many of them?"

"Yes, I—well, I call a lot of fives and nines and fours."

"Sure you're in the band?"

"Yes."

"How do you know?"

"I cover up my receiver with a cracker box and then I can hear the transmitter. After I take off my receiving aerial," he added.

Jug looked at Jim for an instant, and then gazed again into the fire. There was a pause while Jim twisted his small, thin hands nervously.

"I know it's putting out," said Jim, faintly, "because I get a burn."

"Burn, eh?"

"Yes."

"Just don't come back."

"No."

The pity of it.

"Much of a burn?"

"Well, I can feel it on the back of my finger." Jim held up the radio frequency detector.

"How long have you been trying to raise them?"

"Since about May—I mean, April."

"Nine months."

"Yes," answered Jim, after a pause.

Jug exhaled a cloud of smoke through his nose and regarded the fire. Some game, this!

— Clyde E. Darr, 8AJD, was a regular contributor of QST *covers in the early years. Here is Clyde's first cover, April, 1917.*

QST

Always a Leader

THE contributions of the radio amateur to the technical art have been mirrored by the articles appearing in *QST*. The following are some of the developments which appeared in *QST* during its first twenty years of publication and which were the initial articles on the subjects to appear in the amateur radio press — indeed, these were sometimes "firsts" in *any* segment of the technical press.

super-regeneration — July, 1922
crystal control for amateurs — July, 1924
the single-control neutrodyne — Aug., 1924
5-meter experimental work — Oct., 1924
the single-control superheterodyne — Nov., 1924

Nine months and never a break.

There was a dull rattle of contactors down below, followed by a volley of clicks in the adjoining room.

"What made that?"

"Sounds like he switched in the '7'—the forty-meter rig."

"You mean he's using another set, now?"

"Just the amplifier. Switched over the exciter from the 80-meter to the 40-meter amplifier."

"Oh!"

"Sit down! Sit down! Make yourself comfortable. Guess it'll be about fifteen minutes, yet."

Jim slid cautiously into the nearest chair. Suddenly he turned and regarded Jug inquiringly.

"Would you mind—I mean, would it be all right if I looked in there?" he asked, pointing to the transmitter room.

"Sure! Go ahead. Help yourself. Wouldn't get too close, though, to the one nearest this side."

Jim opened the door cautiously and craned his small neck. He stood transfixed for long minutes.

"Gee!" he whispered.

"Look all right?" Jug asked, pulling his pipe apart and blowing through it with two short snorts.

"Gee!" said Jim again.

Five minutes passed with only the wind, the old clock, and the keying relay breaking the silence.

Jug looked at the swirl of smoke ascending the broad black throat of the chimney, and his thoughts travelled back to a day—so long ago, it seemed—when the UV-202, its plate glowing brightly, brought the antenna ammeter to life. As he recalled, the pointer moved over about a thirty-second of an inch, but at the time, it looked like a foot!

And then that red-letter day. He had just called CQ. It was just one of many scores of CQ's. There was nothing to distinguish it from all the others except that on this occasion 9EKY in St. Louis came back. The wild shout that brought the gardener, the chauffeur, and both maids breathless to the sanctum over the garage was not, as they feared, Mr. Edward Southgate III getting a mortal shock from his peculiar conglomeration of wires and sparkling Mason fruit jars, but merely the result of Mrs. Southgate's youngest son making contact number one with his trusty bottle!

Jug looked at Jim standing in the door. The frayed scarf. The worn old overcoat hanging awkwardly from his small body.

"Know the code pretty well?" Jug asked, rising slowly, and returning the tobacco pouch to his pocket.

"Sir?"

"Can you copy pretty well?"

"Yes—well, I guess I can copy ten words a minute, I guess."

"Want to go upstairs?"

"Upstairs?"

"Want to see the operating room?"

"Oh! Yes!"

Jug led the way with Jim following at his heels. A series of coughs escaped Jim at the top of the flight, and alarm possessed him that he would disturb the operator. He tiptoed in behind Jug, his small face radiant with excited expectation.

"What say, Jug?"

"Lo, Bohunk. How goes it?"

"Fair."

"Where you working now?"

"Using 7005. Don't worry, it's inside."

"Did you check it with the oven?"

"Yes, it's right on the line."

Jim was all eyes. He looked at the Single-Signal receiver, at the typewriter, at the 100-kc. secondary frequency standard, at the steel front control panel alongside the operating desk. The shiny brass handwheel on it. The meters. All the relays in the back. The lacing on the cable runs. Resistors standing upright in groups. Jim's excited inspection saw it all!

"Anything coming through?"

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the skip distance theory — April, 1925
link couplings — May, 1925
the Zepp antenna — June, 1925
the single-wire-fed antenna — July, 1925
screen-grid tuned r.f. amplifiers — Dec., 1927
high-C oscillator circuits — Aug., 1928
satisfactory ham superhets — March, 1929
100 per cent modulation — April, 1929
the Class B r.f. amplifier — April, 1929
the dynatron frequency meters — Oct., 1930
the matched-impedance doublet — Dec., 1930
the first stable 5-meter oscillators — July, 1931
super-regenerative 5-meter receivers — July, 1931
Class B modulation — Nov., 1931
electron-coupled oscillators — Jan., 1932
electron-coupled oscillators in superhets — Apr., 1932
The Single-Signal superheterodyne — Aug., 1932
high-efficiency Class-C amplifiers — Sept., 1932
m.o.p.a. 5-meter transmitters — May, 1933
the Tri-tet circuit — June, 1933
Pi-section antenna coupler — Feb., 1934
suppressor-grid modulation — March, 1934
the Type 53 exciter circuit — Oct., 1934
u.h.f. directive antenna arrays — Oct., 1934
successful 224-mc. DX communication — Nov., 1934
controlled-carrier modulation — Jan., 1935
resonant-line u.h.f. oscillators — Feb., 1935
"air-wave" u.h.f. propagation theory — June, 1935
super infra-generator receiver — Nov., 1935
successful noise-silencing circuits — Feb., 1936
single-control diversity receiver — May, 1936

"Few. Good many VK's and ZL's. Heard J2GX a minute ago. May be pretty fair later on."

Jug rested his elbows on the operating table and said something to Collier Parkes. Jim didn't hear. Jim was busy. He was looking intently at a Kleinschmidt perforator partially disassembled, wondering what manner of thing it was.

Parkes grinned.

"Sure! Sure!"

Jug's voiced dropped lower.

"No," said Collier, "I got one with K6BAZ in fifteen minutes. Plenty of time for that, though. You go ahead while I go out here and look up another pad of message blanks—or something," he added.

His disappeared, clattering down the stairs.

"Want to listen in?" Jug asked, motioning to the receiver.

Jim came over to the operating desk and looked at Jug, then looked at the receiver. A great fear came over him. It was too beautiful to get close to; the baffling controls marked "R.F. Gain," "Selectivity," "A V C" "Voice—C W," and "Crystal Filter" were formidable. It was only to be looked upon from a distance.

Jug pulled the swivel chair up with his foot.

"Sit down. Sit down."

Jim let himself down slowly and looked around at the control panel. His elbow touched the shiny handwheel, and he hastily pulled it back, and then let it slide down again. This was real. It was not a dream.

Jug tripped one of the switches up with his thumb and motioned to the knob in the center.

"Turn that one."

Jim looked up at him inquiringly and touched the knob timidly. The shadow scale above it moved slightly. How easily it turned! Encouraged, he moved it a little more. A faint hiss which had begun to evidence itself in the dynamic speaker was at that instant ripped asunder by a kaleidoscope of crisp, bell-like signals which caused the moving coil of the speaker to wiggle perceptibly. Jim looked at it quickly. The sound seemed to hit him in his stomach, like when the bass drum passed in a parade. Just listen! A procession of grunts, drones and crystal ringing notes shrilled slowly by.

"Slow! Slow! Back this way."

Jim turned the knob back. Gee! It turned so easily, just seemed to glide! Entranced, he watched the shadowy divisions and numbers slip across the sloping, ground glass window. Was this real? His elbow slid back against the handwheel inquiringly. Yes, it was real, all right.

Slowly the dial moved back toward the 7000-kc. end. The terrific honk of W6's tore through. A myriad of faint signals in between that a touch of Jug's finger on the gain transformed into earsplitting intensity.

"Whoa!"

A faint lisping note. Jug brought it up to a good level. It seemed to stand out on top of all the rest, miraculously. The lisp increased in intensity. It signed.

"Hear that?"

Jim nodded.

"Japanese."

Jim's heart skipped a beat.

"Go on."

The dial crept back up the scale. A terrific shot of 100-cycle r.a.c. A fluttering rattle.

"Alaskan."

A hollow ringing crystal note with a peculiar wavering undertone.

"Get this one."

It was a long, slow CQ DX. It signed.

Jim's hands were trembling.

"KAHR. Get it?"

Jim nodded.

"Philippines."

Jim's trembling increased.

The signal faded in slowly, dying away into the background roar, returning.

Jim's heart was pounding so hard it shook him.

"Calling DX."

Thousands of miles of black, tumbling ocean intervened. Outside, the two great towers, outlined irregularly in white, rose up and up into the swirling snow; downstairs the input reactors sang monotonously in the ghastly glow of the rectifiers. The filaments of the push-pull stage in the 7-mc. amplifier imparted a dull radiance to the polished edges of the neutralizing condenser discs. All were waiting, ready to hurl the dynamite.

"AR," grunted Jug, and with his thumb tripped a breaker closing switch at Jim's side. "OK! Go after him! Use the straight key over there.

Little Jim was shaking noticeably. He reached hesitantly over the battery of Vibroplexes strewn before him and grasped the key knob. He felt paralyzed. An hour seemed to pass. Suddenly the knob gave. Awkwardly he sent "KA" and stopped.

"What was his call again? Oh, yes—er . . ."

He began to call slowly and erratically. After a little he steadied a bit, but his heart was pounding so hard he couldn't control his arm. He was trembling as with a chill.

Downstairs, the pair of 204-A's, no respectors of persons, fired skyward all the savage energy that 4400 volts could impart. At every closure of the relay, the burnished plates of the tank condenser paled fitfully in the semi-darkness.

"Give him a long buzz."

Jim heard, but couldn't obey. The strength was gone out of him. Suddenly he found himself signing. He signed twice. K.

"Boy, you sure must believe in this signal all right," grunted Jug, tripping the breaker release.

For an instant only the background roar. Then the wavering drone started up.

Calling them.

"Well, what do you say now?" muttered Jug, glancing quizzically at Jim.

He didn't answer for a moment. Two large drops deposited themselves upon the log.

A faint sob came from the little fellow.

"I worked somebody," whispered little Jim.

QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Whew!

Lids be nimble, lids be quick —
Here we come with a big, sharp stick! . . .
— MOTHER, GØOSE

The gory closing bars of our Wouff Hong Song died away in crowded Long Hall, uplifted flagons of Old Haywire were drained at last, and meeting chairman Hughes D. Braker gaveled furiously for order. Lorne Summanors began the business portion of this annual DX Hoggery & Poetry Depreciation Society conclave with

The final of test pest McMessed
Blew up from an absence of rest.
"Yahh — wun-too-tree-fore,"
And VVs galore —
Yeesh, how McMessed we *detest*.

Guest of honor Speedy deKay beamed down from the dais selfconsciously as Bea Ditbuddy outshouted a rowdy audience with her contribution:

Says Static in tones of despair,
"Not even the atmosphere's rare.
Since lids took to hamming
I get fagged out jamming
The jerks as they work on the air."

Speedy nervously became aware of weird clickings from the p.a. speakers, something not unlike the warning chatter of Geiger counters. Betty Neversigns next noisily volunteered

The sideband of Splatter N. Slyde
Was easily three signals wide.
He hollered so hard
For his 200th card,
It oozed down a sewer and died.

OM deKay impatiently awaited presentation of his Key to the Future, our well publicized 1966 DX award. The staticky racket from the p.a. system increased. Izzy Dunne had to fairly scream his own offering above the mounting din:

Klod's YF looked up from her mending
And said to her spouse, "You're offending!"
He answered, "My queen,
Is it manners you mean,
Or do you refer to my sending?"

Les Clobberim shricked the agenda's next item but was drowned out by Niagara-like staccato outbursts from those loudspeakers. Then three DXHPDS members in lead Batman suits appeared on stage with Speedy deKay's prize, a sparkling cobalt-blue keyer. They gingerly set it down with six-foot tongs and ran for the wings. The p.a. howled completely out of control now, rocking Long Hall with a rending roar. Mr. deKay bowed graciously to what he thought was wild applause.

The feted guest, unwittingly elected DX Hog of the Year, hurried from our deafening discotheque hugging his trophy. The rest of us scrambled behind lead shielding as he passed. That key, you see, was even more nastily radioactive than he was.

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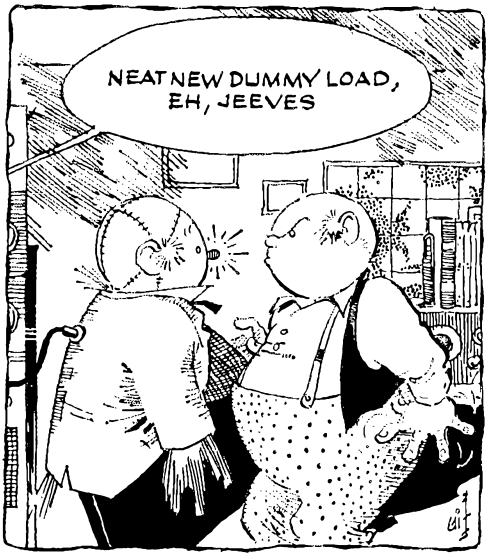
What:

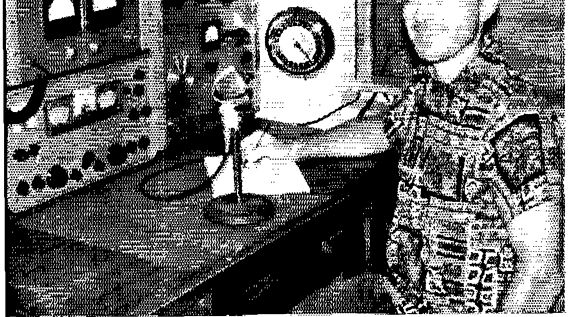
Most of us were looking the other way, hunting hot openings on 15 and 10 (which there were), but 'twas our fairly unsung and hardly heralded lower-frequency bands that really DXploded in early '66 with a bang heard 'round the radio world. What a DX ball on 40, 80 and 160! Even old old-timers are hard pressed to recall better long-haul conditions on those bands. Any doubts that the sunspot shortage is at an end disappeared in a furious flood of 3.5-Mc. WACs, 7-Mc. "DXCCs" and 1.8-Mc. WASs. This propagational surge was occasionally tempered by ionospheric disturbances, that of March 13th-14th being a lulu. Twenty meters, of course, was paying out extra DX dividends as well. Let's check the 14-Mc. DX scene via our trusty "How's" Bandwagon. . . .

20 phone success is reported by **Ws** 3HNK 4EFX 6BNK 8YGR, **Ks** 3FOP 4KSY 7VDZ, **WAs** 6MLW/KH6 8GGN 9IBT, WB6KIL, listeners **WN9PQY**, P. Kilroy and T. Tillman, namely **CEs** 1DD 3RC 8CG **ØZI/mm** (14,276 kc.) 0300 GMT, **CM1EG**, **CN8s** BB (115) 16-18, BV 16, MT 9, **COs** 2FA 8MN 13, **CP6GA** (256) 22-23, **CRs** 5SP (200) 21-22, 6BX 19, 6EC (110) 21-22, 6EV (251) 22, 6HF (151) 18, 6HS (125) 19, 7CI (135) 17, 7GF 19, 9AH (230) 0, **CT1PK** 17, **DU1s** BSP (110) 13-14, BMT (120) 15, MR (226) 13, **EA8s** AH (240) 16, EX (253) 1, FD (240) 12-19, **EI2MK** 13, **ELs** 2AF 2S (115) 18, 8B 22, **EP2s** AX (234) 14, HR (225) 13, **ET3s** AC USA, **F9RY/FC** (130) 13, **FB8s** WW (139) 17, XX 13, **FG7s** XL (227) 3, XX (130) 15, **FK8s** AB AC (240) 4-5, AG 5, **FM7WQ** (135) 17, **FO8AB**, **FR7ZD** (220) 5, **FS7RT** (110) 17, **FY7s** YD YG (125) 22, YJ (102) 21, **GB3RS**, **GC8HT** (230) 16, **GD3ITU**, **HA3KMF** (120) 19, **HBØLL**, **HCs** 1BB 8JG (105-205) 0, **HIs** 3XEG 17, 3XSE/6 14, 4ARM (105) 21, 4XEC 8BGA (135) 17, 8JSM 14, 8XGP (343) 16, 8XMT, **HKØs** AI (122) 15, KL, **HPs** 1AL 1ME 3MC 17, 9FC/mm, **HRs** 2AFK/mm 4WH 8JG, taboo **HS1AK**, **HZ1AB** (245) 15, **IS1VAZ** (113) 14, IT1s CFN TAI 19, **JAs** 1BN 3UI 4BJO 6NP 8NK, **Ks** 1YPE/-XV5 (240) 13-14, 5GCR/**HR3**, **KAs** 2TP 7AB, **KCs** 4AAX 17, 4USB (329) 1, 4USI 8, 4USP (300) 2, 4USS 4USV 4, 4USZ 6BW 21, 6BY (260) 21, 6CE (290) 1, **KGs** 4AN (282) 3, 6IF 6IG 6SB (218) 21, **KL7s** BFB EBK, **KR6s** BF 21, FQ (227) 1, FU (250) 9, KS (165) 23, UL (260) 10, **KS4CA**, **KV4AB*** 3, **KW6s** EJ (245) 0, EM (332) 22, **LAs** 4FG/p (252) 11, 5AJ/p (115) 14, 5CI/p



(255) 19, 6XF/p (121) 19, 8FG/p (240) 19, LU1ZC (250) 6, LX1s DB DO 15, DP (228) 13, LZ1BZ (124) 14, MP4s BBW (110) 14-15, BBL (109) 15, BCC (241) 15, BDP (110) 14-15, MAH (203) 14, TBO (335) 14, OA1BC, OD5s BZ (245) 15, EE 6, LX, OXs 3LP 20, 4FR, OYs 2H 6M (263) 16, 7ML 7S (108) 15, PJs 2CE 16, 3AL, PX1SU (205) 15, PZ1BW (130) 20, SM2HX, SL6BH, SP3PL 13, SV1AE 14-15, TF3EA (206) 18-1, TGs 5LL 20, 8FA (100) 18-19, 8IA (112) 14, TIs 2RFT (122) 18, 3AS 3TIC* 4JP (117) 12, TU2s AK AS BA (101) 23, BD (120) 7, UAs 1KED (121) 15-16 of F.J.L., 2AO 2AR 2AW 2KBD 9VH (230) 1-2, 0EH 15, 0SK (105) 1, 0YE (128) 6, UB5KKA, UD6KAR (245) 16, UG6s AW (205) 14-15, KAA (125) 14, UH8s AY 13, BO 15, UM8FZ 11, UP2AK 16, UR2s AR (124) 5, UL, UWs 3BJ (248) 15, 4HZ, VEs 1AED/SU 8AA 8MA 0MY 17, VKs 6VK (125) 14, 9AG (213) 20, 9CJ (162) 23, 9DJ (115) 13, 9XI 15, VPs 1JU (250), 1LB 1LP 1PE (260) 11, 1RC 22, 2AA (202) 22, 2AC 14, 2AL (260) 23, 2DAG 15, 2GLE 21, 2KD (147) 12-13, 2LT (103, 205) 23, 2ME (250) 22-23, 2MF (246) 23, 2MG 15, 2SJ 2SK 2SY 22, 2VE (260) 21-0, 5AB 20, 5GC 5RB (240) 19, 6JC 16, 7CX (255) 12-13, 7NA 7NE 7NS 7NT 8CW (240) 3-4, 8HZ (260) 5, 8IN (267) 7, 8IP 8IU (208) 3-4, 8IN (267) 7, 9AX* 9BM 18, 9DC 9FE* 9FV, VQs 8AX (195) 7, 9HB (120) 17, 9TC (120) 17, VRs 1S 3, 2AP 4, 2CC (250) 0-1, VSs 6AZ (234) 0, 9ABL 16, 9AJH (108) 19, 9MB (20) 18, 9MP (120) 18, 9OC 14, VU2TX 13, Ws 4CSE/KV4 (310) 4, 4WZN/9HI (245) 12-13, 5HWR/VP9 (110) 23, 5YSM/DU1 (230) 14, 6FHM/DU1 (125) 12, WAIs LER/9Y4 QKY/KG6I (225) 23, XP1AB, XV5AA 15-16, XW8s AX (225) 13, AZ (205) 13, BD (216) 13, BM (119) 13, YAs 1AG (250) 14, 1AW (241) 14, 1KC (220) 10-11, 3TNC (230) 13, YK1AA (201) 14-15, YNs 3FP 14, 4SBM 22, YO9VI 15, YVs 1LA 4HS, YSs 1AG 0, 1EM 14, 1HUKE 2MFI, ZB2s AJ 15, AK, ZDs 5D (130) 19, 5R 7IP 0, 8AR 8BC (244) 43, 8HL (260) 9, 8J 8JJ 8JPL (122) 22, 8RD (235) 19-20, 8WZ (100) 22, ZEs 1AC 2JE, ZF1s BP RV, ZL5AA (119) 5-7, ZSs 3HT (110) 18, 8L, 4S7NE (125) 18, 4U1SU (218) 15, 4X4IX, 5A4TK, 5N2AAF (130) 17, 5R8s AU (100) 20, CM 17, 5VZ8CM (237) 0, 5Z4IR, 6O1s AU (109) 19, GB (213) 21, 6W8AG 18, 6Y5s GG MJ (105) 23, UC, 7Q7s BH BN (130) 16-19, 9G1s BD* 21, BF 20, DU FR PV TV 23, 9J2s AB (130) 16, AD* BV, 9K2AN (244) 11, 9L1s HF 23, HX (256) 23-4, SL, 9Ms 2AV (143) 17, 2DQ (110) 17, 6NQ (139) 14, 8RS (132) 14, 9Q5s BB 21, HD YL (120) 21, 9U5s BB DP (210) 20, ID* 21, KU (202) 20, 9X5s CE (244) 21, MH (330) 14, 9Y4s VP 13, VT and VU (240) 11-12. There appears to be an exodus of DX phone stations from the U.S. 14-Mc. subsegment now that our intracontinental skip has shortened to the point of steady heavy QRM. The scarce asterisks in the foregoing represent non-s.s.b.ers.

20 c.w. comes through for Ws 1BGD 1CNU 1UED 2ICO 3HNK 4UJT 6BNK 6OAQ 7VRO 8YGR 0CVZ, Ks 1ZJA 3FKU 3SLP 7UHE 8YSO 9CNC, WAs 3CUO 4CWA 6JXM 6MLW/KH6 6TZN 7BOA 7BOB 8GGN, WBs 2JID 2LDX 2NLH 2NZU 6KIL 6MEQ, VE2BUW and tuner R. Johnson with code from BV1USA (52) 10, BY3NA (5) 8, CEs 1AD 2CR 2, 6EF 9AY 1-2, 0ZI/mm (57) 4, CNs 2AQ 17, 8FV (30) 13, COs 2JB 21, 3JL 14, 7AI 15, 8HB (49) 22, CPs 1EA/5 (10) 23, 5EC (7) 13-14, CRs 3AD (19) 19, 4AE (77) 19-22, 4BB 21, 6BX (95) 8, 6CZ (65) 20, 6DX 6EC 6FY (65) 22, 6GO 17, 6GS 6IZ (41) 19, 6JA (65) 18, 7IZ (70) 21-22, CTs 1IK 1IT (6) 16, 3AQ (8) 21, CXs 1RY 2AJ, DL2CM, DMs 2ABB 2ABE 2AQF 3EFD 4UBO 4ZCM 6VAA, DU7SV, EPs 2RV (25) 3AM 4, ET3USA, EAs 8EY 9AY (37) 17-19, EIs 2BA 7AJ 8H 9J 9N, ELs 2AE 21, 2D (44) 19-21, 2P (35) 23, 2Y (78) 23, 7A (41) 21, 0B/mm 2, F9UC/FC, FB8s WW (5, 105) 19, YY (30) 5-7, FG7s TD XF 22,



W6FHM/DU1 likes sideband on 20, 15 and 10 from Manila with a homespun 500-watter and vertical. A quad is in the works. Herman also serves as net control for a 12-station "jungle network".

On January 27, a DXpedition set sail from Wallis Island bound for Apia. A typhoon wrote a tragic end to this story; all hands were presumed lost. Among the members of this DXpedition was Jim "Ted" Thorpe, ZL2AWJ who left behind a wife and two young daughters.

The Virginia Century Club is sponsor for a project to raise funds to help ZL2AWJ's family. Gay E. Milius, W4NJF is handling the details and will act as the collecting agent.

Donations may be sent to W4NJF, 421 Saddle Rock Road, Norfolk, Va. 23502

XJ XX (37) 17, FK8BG (60) 6, FL8s CP (22) 21, MC (55) 20, RA (21) 20, FM7s WG (42) 13, WH, FO8s AA (33) 0-17, BJ, FS7RT 19, FU8AG (100) 7, FY7YJ (50), GCs 4LI 18, 8HT (12) 16-17, GD3FXN 17, HC1s EY (35) 6, GC (5) 23, HI3PC, HK0AI (55) 22-3, HL9KF (20) 11, HM1AB (46) 1, HP1IE, HZs 1BC 3TYQ (8) 15, IS1VEA 11, JAs 1AHO 1CIB (30) 0, 1HBX 1MFI (35) 4, 3ART 3BGF (10) 9-10, 3IG 6AA 6AD (75) 0, 6PN (10) 9-10, 7CPE 8SW, JT1s AJ KAA, K2GGN/KL7, KAs 2KJ 2, 9MF (5) 0, KB6CY 2, KCs 4AAA 17, 6USX (45) 3, KG6s AAY AOX (90) 11-12, IG, KM6CE (34) 2, KP4s BBN (72) 21, CKV CKX 13, CQC, KR6s FG KJ 1, MM (9) 11, QW (70) 0, KV4CI 21, KW6EK, KX6DZ (55) 9, KZ5s MV TX 23, LAs 2IK/p (50), 2QJ/p 22, 3P/p (62) 15, 5CT/p 23, LU1s ZA (35) 1, ZC (43) 3, ZX (70) 3, ZY (70) 4, LX1RA (64) 17, LZ1KSV 13, MP4s BEU BFH (6) 15, BFK (24) 14, BFL (6) 15, BFO (58) 13-14, OAIs KF NVE, OD5s EE 6, EJ (49) 19, LX (8) 18, OH0NH (9) 14, OXs 3AB 3BS (18) 21, 3KI 3LP (30) 15, 3MF (75) 19, 5AF 5AX, OYs 1L (52) 13, 1X 11, 2J (5) 14, PI1LS/mm 21, PJ2s CE (68) 21, ME MI (89) 11, PX1BL, PZ1s BE CP (50) 0-2, SLs 2AD 14, 3AG 6BH 15, SM1-CXE, SPs 2JS 6XU 7ID, SU1IM (68) 17, SVs ICC 0WAA (12) 16, TFs 2WJF 22, 2WJJ (37) 17, 2WJP 20, 2WJQ 3KG 23, TI2PZ, TL8SW (50) 22-23, TN8AF, UAs 1KED 2KAP 9KAG 9KAV 9KCA 0AG (83), 0BP (49) 3, 0KAE 0KFG 0KIG 14, 0KSB (12) 10-11, 0KZB 0KZD 0QC (40) 9, 0SK (105) 1, UB5s KAW KDI KDS KHQ 14, WK 14, UC2s DG KAC KMZ, UD6s AY BA 16, BQ (50) 13, BD (34) 12-13, KAR (52) 14, UF6s KUE (70) 13-14, KWF (19) 12, UG6s AW 16, KAA (50) 13, UI8s DK (20) 14-15, LB (30) 16, MF (15) LC MU 20, UJ8KAA (6) 12, UL7s BG (40) 13, IT, UM8KAA (20) 15, UN1BR 14, UO5s KBR (10) 14-15, PK (26) 12, WS (40) 13, UP2s CT 13, KDA KNP (82) 12-15, NR 15, UQ2s CM IIT 15, UT5s EW VQ, UY5MP 0, VEs 8CC 4, 9NA 0NG 20, VKs 6CP 7SM (65) 17, 9CJ (30) 23, 9WE (10) 7, 0MI (50) 7, VOs 1CQ 1EO (5) 21, 1EX 2AG, VPs 1LL (18) 15, 1PV 2AR (50) 12, 2AZ (51) 22-4, 2DAG (18) 3, 2MN (38), 2MU 2SJ (10) 12, 5AR 6LN (59) 19, 6PJ (15) 21, 7NW 17, 8IJ (17) 0-1, 8HZ 8IQ (60) 3, 8IU (28) 4, VQs 8BJ (22) 4, 9TC (25) 14, VRs 2DK (26) 5-6, 4CR (75) 8, 6TC (60) 21, VSs 6FO 9AJK (20) 15-16, 9ARV (50) 20, 9ATH (15), 9MP (49) 19, 9OSC, VU2s GW (22) 14, LE (30) 13, JA 3, TS 16, TZ (25) 14, W2YTH/VP9 21, WAs 4MFS/KP4 21, 6BBR/KL7, XP1AA (8) 18, XW8AZ, YK1AA, YS1RFE 14, YVs 3JZ 6EE 15, ZB2s A (10) 14-15, AH AM (2) 20, AR/mm, ZC4s CL (49) 18, TX (49) 17-18, ZDs 3R 5M (35), 7IP (38) 22-23, 7RH 8BC (56) 22, 8J (30) 23, 8WZ (25), 9BE (29) 22, ZEs 1AS (38), 1BF (10) 21, 1JL 2KL 19, 4JS 8JJ (10) 19, 8JO (25) 20, ZL4CH (20) 6 of the Campbells, ZM7BZ (66) 5, ZP5s CF EC (40) 22, 4S7s DA (22) 15-16, NE (29) 14, 4U1ITU (20) 16, 4X4VS 15, 5A3TX (67) 17, 5B4AC (35) 19, 5R8s CB (73) 5, CQ (20) 5, 5Z4s BM (15) 21, ERR (45) 18, 6O1AU (109) 14, 6W8s BF (24), BL (20) 14, CQ (20) 19, DD (8) 16-19, DG (6) 12-13, 6Y5s BB RH, 7G1A (45) 22, 7Xs 3RT (63) 21, 0AP (80) 18-19, 7Z3AB (25) 14, 8J1RL (35) 2, 9G1s FN FQ (19) 22-0, FY (40) 4, 9H1s AA AE (4) 21, AL (49) 19, 9J2s AB GJ IE (63) 5, 9Ms 6DH (65) 6-8, 8KS (65) 10, 8RS (43) 23, 9Q5s DR PA (25) 6, RD (4) 20, 9V1s DS MK (50) 1, MT (75) 9, MY, 9X5PS (76) 16 and 9Y4VU 20.

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We're overdue for some *vox* DX *populi* as space will allow: "Fifteen's phenomenal to the Pacific here, 40-meter Europeans can break through in early afternoon, and 10 broke open to Africa in March." — *K8YSO*. . . . "Prior to March, 21 and 28 Mc. opened only for one day in the nine months I've been at Mahe." — *VQ9EF*. . . . "Exces-

QST for

MP4TBM is a popular 14-Mc. single-sideband item at Sharjah. Later this year Nigel expects to put MP4QBQ on the air in Doha, also possibly MP4TBM/p/HZ1, Saudi Arabia. DX bands aren't always hot in the Arabian Gulf area but the weather usually is, often 140° in hard-to-find shade.

sive CQ-DXing seems to have diminished somewhat." — *W4NJF*. . . . "Ten opens to South America on week ends, and 20's good to most parts of the world during daylight hours here in the northwest." — *W7TDK*. . . . "I look forward to much more operating and more potent signals with my new 14-Mc. quad." — *W6FHM/DU1*. . . . "Sure missed a load of good DX after my Novice ticket expired but I'm now back at it with my hand-cranked quad." — *WB2VWW*. . . . "A 100/50 DX score so far since moving here from Malta eight years ago." — *VE3FNO*. . . . "Twenty is fine every day at 1900–2000 GMT." — *XE1-EEI*. . . . "Having developed into a DX hound, I now suffer from acute QSLitis." — *WA8PKG*. . . . "Let's have more CQs on 10." — *W5IGJ*. . . . "I'm particularly interested in working W/Ks on 20 sideband." — *MP4TBM*. . . . "Eighty and 40 have been the nuts!" — *W1BGD*. . . . "Running my little 35-watter on 7, 14 and 21 Mc. is a real challenge and lots of DX fun." — *W2ICO*. . . . "Productive 1300-GMT 20-meter openings to Europe for my 50 watts." — *WB2NLH*. . . . "I'm a newcomer to this DX jazz but caught all continents last month." — *WB2JID*. . . . "*Vive la* QRP!" — *VE2BUW*. . . . "Just tried 14 Mc. with a simple vertical and a decent receiver — WOW." — *K7UHE*. . . . "Ten opens for DX more often than is realized." — *WA2VFA*. . . . "Be glad to sked any DX station needing N.H. on 80." — *W1SWX*. . . . "With my new tower maybe I can keep up with WA6TZN on 3.5 and 7 Mc." — *W6YKS*. . . . "A vertical and 100 watts do the DX job here on 15, 40 and 80." — *WA1DBR*. . . . "I'm up to 35 countries on 75-meter s.s.b." — *VE3FUX*. . . . "Conditions *must* have improved — I sent you my last DX-worked list six years ago." — *K6CAA*. . . . "YLs and school still keep me off the air too much." — *WB6NXK*. . . . "Openings on 15 arrive earlier and stay longer." — *WB6PCV*. . . . "Good 14-Mc. darkness breakthroughs to VK and ZL here." — *K3SLP*. . . . "More rare Asians should join the JA gang on 40." — *WB6MEQ*. . . . "Never worked DX before but now I realize what a thrill it is!" — *WA0FRM*. . . . "Teaching and Ph.D. work cramp my DXing these days." — *W9ACS-W4UJT*. . . . "ARRL SCM duties limit my long-haul activity on 20 and 15." — *WA6JDT*. . . . "Now that I have my WAC, DXCC watch out!" — *WA8MAT*. . . . "That 175-ft. vertical at WJAB really gets me out on 160." — *K1OYB*. . . . "Eighty and 160 DX is great relaxation between study periods." — *WA5-KUD*. . . . "Worked thirty-nine countries on hot-as-a-pistol 80 c.w. in the first ARRL DX Test week end." — *W4DVT*. . . . "Good European 75-meter signals at 0500–0600 GMT." — *K4KSY*. . . . "It's swell to hear some Africans among the usual 28-Mc. South Americans." — *K8FKU*. . . . "We've been fighting an S7 noise level lately on 20." — *WA7s BOA and BOB*. . . . "Conditions are certainly stabilizing on 10 and 15." — *W7CWN*. . . .

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Next month we intend to inspect other DX ranges with the assistance of (15 c.w.) **Ws** 1CNU 3HNK 6BNK 7CWN 8BJX 8YGR 0CVZ, **Ks** 1WXZ 1ZJA 3FKU 3POP 3SLP 7QXG 8YSO, **WAs** 5AER 6TZN 7BOA 7BOB 0KIR, **WB2PAZ, WNs** 2TEN 4YZC; (15 phone) **Ws** 7CWN 8YGR, K1ZJA, **WAs** 5AER 9IBT; (40 c.w.) **Ws** 3HNK 8YGR, K3FKU, **WA9IBT, WBs** 2PAZ 6KVA, **WN4YZC**; (40 phone) K4KSY; (80 c.w.) **Ws** 1ECH 1SWX 4DVT 0RJF, **Ks** 3SLP 6PJT 8YSO, **WA5KUD**; (75 phone) K4KSY, **WB6KVA**; (10 c.w.) **W8YGR**, K3-FKU, **WAs** 2VFA 7BOA 7BOB; (10 phone) **W7CWN, Ks** 1ZJA 8YSO, **WAs** 2VFA 5CTD 7BOB; (160 phone) W1BB, K1OYB, **WA5KUD**; and (10, 15, 40 phone) s.w.l. P. Kilroy, plus correspondents reporting before next deadline. One thing about these fantastically fine DX conditions now moving in on us: Guys get so busy hauling in fish they temporarily find scant time to hit Jeevesie's mailbag. Good thing we have those fadeouts now and then.

Where:

OCEANIA — "I send a QSL to everyone I work," assures W6FHM/DU1, "but so far I've confirmed only 67 countries of 94 worked." . . . . . KC6s BO PE, KG6-AOU, KH6FDK, KM6DJ and KW6DS are operated by Page Communications Engineers personnel. Regarding QSLs, the company's D. J. Vellis clarifies: "QSLs may be acquired by forwarding s.a.s.e. (self-addressed stamped envelopes) to their addresses. It must be realized, however, that from time to time amateur radio operators are not available at some of these stations for extended periods of time, thus necessitating delays in return confirmations. However, steps will be taken to ensure confirmation if at all possible. In the event this procedure does not bring appropriate action within a reasonable length of time, the matter should be brought to the attention of Page Communications Engineers, Inc., attn. Mr. C. M. Huntley, KH6FSQ, 1240 Ala Moana Blvd., Honolulu, Hawaii." . . . . . "For the next two years I'll be QSL manager for K6KII/KG6 on Guam," notifies K6JIC, "also for any of Cliff's DXpeditionary ventures. The usual s.a.s.e., or s.a.e. plus International Reply Coupons (IRCs), and GMT-only routine is desired for direct replies." . . . . . WGDXC's *DX Bulletin* learns that W4LCY of HS1P and W4LCY/KM6 is back home welcoming QSL inquiries . . . . . "We QSL 100 per cent via manager W3KTY," guarantees op John of KG6IG.

EUROPE — "As an active member of the Radio Amateur Association of Greece, and a volunteer clearing-house for SVØ QSLs, I am amazed at the number of illegal stations operating in this area," writes SVØWG (W4EMP). "There are only two legitimate prefixes for all of Greece: SV1 for Greek nationals, and SVØ for qualified U.S. personnel. There are only two series of SVØ call signs authorized: SVØWA-WZ and SVØWAA-WZZ, the latter always with double-letter ending (none such as SVØWAE). Since the average tour in Greece is thirty months, SVØ calls are rotated frequently. I note this causes much confusion to Stateside hams. I try to advise them when cards for former call-holders are not deliverable, but this is a difficult job. QSLs for current SVØ licensees can go via Box 564, Athens, or through Army Signal Officer, Hq. JUSMAGG, APO, New York, N. Y., 09223. I get them from both sources and have no trouble delivering them except when operators have left this area without leaving forwarding addresses." . . . . . EI8H tells DXCPR's *DXer* that he tries to help the Eire amateur image with a 100-per-cent QSL policy. RSGB QSL Manager G2MI requests that no cards be sent to him May 3–23, since the QSL bureau will be closed between these dates.

ASIA — Ex-VS6FF (G3MZV) writes, "All QSLs for my three-year operation in Hong Kong have been sent out. It would be nice to get a few back in return. Ever thought about running a list of people who *don't* QSL? I can start things off with two or three hundred." Well, OC, we've been running such a list for years now. It's not really a blacklist, though, because one can rarely be sure that non-QSLing is a station's intentional and/or permanent policy. We preface our list with the plea *help!* . . . . . As mentioned last month, those 9V1 fellers are ex-9M4s with, in most instances, their old suffixes and QTHs.

AFRICA — W7TDK, QSL tender for ET3s FMA USA WH, KC6BW, 9E3USA, 9F3USA and 9M2EF, details: "All QSLs received will be replied to 100 per cent. Direct replies will go only to those stations sending self-addressed stamped envelopes or self-addressed envelopes with International Reply Coupons. Others will be an-

KX6NB, first Marshalls Micronesian to hold a ham ticket, takes a swing over 20 in the KX6DR cockpit. Ricky prefers c.w. from his Kwajalein home QTH and also manipulates KX6BU now and then. (Photo via Mrs. KX6DR)

swered through bureaus. Loose stamps or IRCs will not get direct replies without s.a.e. All stations qualifying for direct reply should expect at least one month turn-around time for my replies. Cards going via bureaus will get lowest priority and may take several months to reach destination. . . . My experience shows that s.w.l.s. are the most skillful QSLers of all. They really know how to get the job done." . . . . . K2MGE can help confirm only s.s.b. contacts with FB8WW. Dorothy suggests 5R8BC for confirmation of FB8WW c.w. QSOs . . . . . Until the 15th of this month W/K/VEs can QSL VQ9EF to his WØBIG address. Thereafter, airmail service will be available through J. W. Fleurdelys, VQ9EF, Satellite Tracking Stn., Box 191, Victoria, Mahe, Seychelles, on receipt of three IRCs with s.a.e. John points out that non-airmail shipment to the States is a two- to three-month proposition . . . . . "EA8EX QSLs 100 per cent via DJ2YJ, airmail direct with no IRCs necessary," declares the latter . . . . . W2GHK's mailing of ZD8AR pasteboards commenced in mid-March, according to VERON's *DXpress*, and many FL8AA QSLs went out in February.

HEREABOUTS — "How's" correspondents W1SWX, Ks 3FOP 3SLP 7QXG 8YSO, WAs 2HIU 5CTD 6TZN 7BOA 7BOB 8GKW 8PKG and 9IBT nominate this month's "QSLers of the Month": CO5CN, EI4N, EL2AE, HC1GC, JA1RXI, KGs 4CX 6AAY, LU9PC, OX3LP, OZs 4KY 8E, SM5CCE, SVØWAA, TG8FA, UF6LA, UWØIK, VPs 2VI 6PJ, VR1Z, XE1s EEI RA, YN1SL, ZDs 7IP 8BC, 5T7H, 5W1AZ, 6Y5BB, 9H1AG and 9L1JW, plus QSL aides Ks 2HVN 9RNQ, Ws 2CTN 2YTH and 6RGG, all for especially snappy affidavit action Any quick QSLers you want saluted here? . . . . . *Help!* The following italicized brethren seek assistance toward confirming QSOs with holdouts mentioned: *W1YQF*, VR3s E and L '62; *W2ADP*, LU3ZI '63, VP8BK '58; *W3NJF*, FY7YL; *W6OAQ*, EA8EY, JT1KAE; *K6PJT*, CR8AC '62, FK8AW '61, HH2AID; *W7CTD*, UAØKZA; and *WA9IBT*, LZ1KKZ. Any ideas? . . . . . W5PXT and T. Tillman, 4657 Iroquois, Lakewood, Calif., 90713, offer their services as QSL assistants for overseas DX ops in need of such help . . . . . Roy Waite, 39 Hannum St., Ballston Spa, New York, 12020, writes in Newark News Radio Club's *Bulletin:* "The SWL/QSL Bureau has been operated as my personal hobby since word was received from ARRL in the fall of 1957 that cards from foreign hams for W/K s.w.l.s. were being returned to the bureaus of origin because there was no provision for handling them. This bureau is not sponsored and depends entirely on voluntary donations for operating expenses." Ham-band s.w.l.s are urged to keep in touch with Roy, supplying self-addressed stamped envelopes in the same fashion that ham DXers cooperate with their own ARRL Bureau . . . . . VERON's *DXpress* reports that W2GHK & Co. began launching QSLs for VP2s ME MG and MS in early March. Remember that the Hammarlund bureau address has changed to: Stuart Meyer, W2GHK, P.O. Box 7388, Newark, N. J., 07107 . . . . . Here are a few individual specifications that may help you reduce your worked/confirmed ratio, but keep in mind that each item is necessarily neither official, complete nor accurate. . . .

CO2DR, Box 6996, Havana, Cuba
CP5EZ (via W2CTN)
CR4AE, P.O. Box 25, Praia, Cape Verde Islands
DU1OR (via W2CTN)

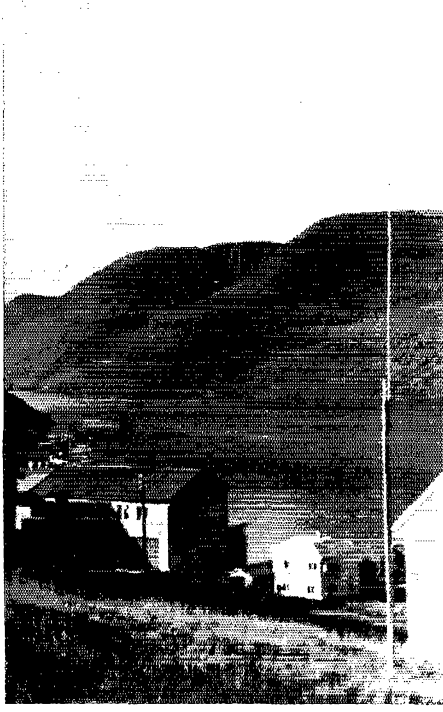
UL7KAA, club station at Alma-Ata, finds UL7GQ (right) entertaining visitor VU2TV. George stayed in Kazakhstan several months, meeting most of the UL7 gang before returning to Bombay in December. (Photo via VU2GV, K1IJV and W1BGD)

OZ-CCA Contest

1300 GMT April 30 — 2400 GMT May 1

Rules arrived too late for April *QST* so here's a brief rundown on the EDR sponsored 15th jubilee contest. This is an all-c.w. affair on 80-40-20-15 and 10 meters, no cross band. Call "CQ/AW" (CQ All World). Exchange RST plus QSO number, each complete exchange counts 3 points. Contacts with OX-OY-OZ count double. Countries (ARRL Countries List) count as your multipliers except that each W/K-VE-PY-LU-VK-ZL licensing area counts as a separate country for this contest. Entries must include a signed statement testifying that all rules and regulations for amateur radio in your country and for the contest have been observed. Mail no later than June 15 to the EDR Contest Committee, Box 335, AAlborg, Denmark.

EA8EX (via DJ2YJ)
ET3AC (via K8UZA)
ET3s FMA USA WH (via W7TDK)
FG7XJ (via W2CTN)
FW8RC, R. Cleret, P.T., Mata-Utu, Wallis via Noumea, New Caledonia
HB3ITU (via HB9AAT)
HI3PC, M. Cordero, Box 282, Santiago, D.R.
HP1IE (via W2CTN)
KC6BW (via W7TDK)
KC6CE (via W7WLL)
KC6FM (via W2CTN)
KC6PE, Page Communications Engrs., P.O. Box 148, Ponape, E.C.I., Pacific T.T., 96941
KG6AOU, Page Communications Engrs., P.O. Box CE, Agana, Guam, 96910
KG6IG (via W3KTY)
KH6FDK, Page Communications Engrs., P.O. Box 458, Kekaha, Kauai, 96752
KW6DS, Page Communications Engrs., P.O. Box 217, Wake Islands, 96501
OX4FR, M. Lyle, Dir. MARS, 2004th Comm. Sqdn., APO, New York, N. Y., 09121
OX5CF (via W1YQF)
PX1BL (to DL9BL)
SM5DFM/mm (via SM5DKH)
TG8CJ, Box 5, Retalhuleu, Guatemala
TG8FA, Aptdo. 42, Reu, Guatemala
VKØMI (via W1A)
VP1EYB (to W6EYB)
VP1JU (via WA5CST)
VP1TC, P.O. Box 192, Belize, Br. Honduras
VP2MU (to VE2YU)
VP5RB (via W4RC)
VQ9EF (see preceding text)
ex-VS6FF (to G3MZV)
VS9AMD (via RSGB)
VS9KRV (via RSGB or VS9ABL)
VS9OSC, Simmonds, Sig. Sect., RAF Salalah, BFPO 69, % GPO, London, England
W4WZN/9H1, W. Bonsky, Box 13, Chattanooga, Tenn.
XE3MF, P.O. Box 329, Merida, Yucatan, Mexico
XE4BE (via LMRE)
YV4OP, Box 448, Valencia, Venezuela
ZC4RM (to G3EMY)
ZD8J (to K4LJV)
ZF1DG (to VE6TP)
5B4AC (to G3AFQ)
6O6AU/5R8 (via VE4OX)
6W8DS (to 5A3TT)
6W8DX, P.O. Box 971, Dakar, Senegal
7X0AP, P.O. Box 414, Alger, Algeria
9E3USA-9F3USA (via W7TDK)
9G1FY, Box 194, Accra, Ghana
9K2AD (via RSGB)
9M2DF (via MARTS)
9M2EF (via W7TDK)
9V1MZ (via MARTS)
9Y4LZ (to G3LZZ)
9Y4MM, 40 Long Circular Rd., St. James, Trinidad, W. I.
9Y4VU (via WA2CBB)
9Y4VV, Box 149, San Fernando, Trinidad, W. I.



W4BPD makes the scene as OY2GHK from OY7ML's Torshavn layout. Faeroe Islands DX activity per capita is among the world's highest, led now by multioperated club station OY6FRA. Remember when old OY3IGO carried the ball almost alone on 20? (Photos via VE3FXR)

The preceding info turned up in the generous offerings of **Ws** 1BGD 1CNU 1ECH 1SWX 1UED 1WPO 1YYM 2ADP 4DVT 5RIT 6OAQ 8YGR 9LNG, **Ks** 1AFC 2MGE 3SLP 4KSY 6DQB 7QXG 8YSO, **WAs** 2HIU 5AER 6TZN 7BOA 7BOB 9IBT, VE4DB, DARC's *DX-MB* (DLs 1EP 3RK), *DX Club* of Puerto Rico *DXer* (KP4RK), Far East Auxiliary Radio League *News* (KA2LL), Faeroe Amateur Radio Society *FRA* (OY7ML), Florida DX Club *DX Report* (W4MVB), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (WB2HXD), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif.), Puerto Rico Amateur Radio Club *Ground Wave* (KP4DV), VERON's *DXpress* (PA0s FX LOU TO VDV WWP) and West Gulf DX Club *Bulletin* (W5IGJ). We could use *your* shoulder to this wheel.

Whence:

EUROPE — The International Telegraphic Contest, an annual affair sponsored by Russia's Central Radio Club, takes place from 2100 GMT on the 7th of this month to 2100 the 8th, 3.5 through 28 Mc. You may use the entire 24-hour contest period but each log entry must cover no more than your best solid 12-hour stretch. "CQM" is the contest call, the usual RST001, RST002, etc., serials will be exchanged by non-U stations, U.S.S.R. stations will transmit RSTs plus oblast (district) numerals, and a given station can be worked but once per band. Each completed contact counts one point, this total to be multiplied for final score by the number of different countries accumulated during the fracas. Log entries go to the Central Radio Club, P.O. Box 88, Moscow, and must be mailed by June 1, 1966. Certificates of merit will be available to certain high-scoring participants, and your submitted logs may help you qualify for such U.S.S.R.-issued sheepskins as W-100-U and R-150-S. . . . . Wallpaper hunters should check with OE1IU concerning an OE1 award based on contacts with at least 15 Vienna districts, and another award involving QSOs with eighteen central European countries. Releases from SRJ Award Mgr., Box 48, Belgrade, Yugoslavia, and LA4ND of Norway's NRRL also invite attention to SRJ's Jubilee Award (five YUs worked in '66) and rules changes in the WALA (Worked All Norway) certification . . . . . W8HCL forwards excellent newspaper coverage of ex-YU1FR's new theological career in Warren, Ohio. Fr. Popovich eagerly awaits the day when he will rejoin the on-the-air DX fraternity with his own FCC-type callsign. As was unfortunately necessary in the central Europe of his youth, ex-YU1FR started hamming secretly with a one-watt Hartley oscillator on 40 meters. Got out just fine with a Windom wire and only 130 volts on the plate, he recalls . . . . . WA0EMS hears from s.w.l. D. Beale of Malta: "About seven active 9H1s here, mostly a.m. and c.w. Two have s.s.b. but are rarely active. U.S. Zeroes are considered quite rare on Malta; I'm still watching for South Dakota." . . . . . "I plan to make an extensive study of 3.5-Mc. propagation while at sea," states SM5-DFM/mm, "My next voyage may take me on the VK run. While I will use most c.w. bands, W/K calls will be especially welcome on 80 meters." . . . . . Continental comments via club newshawks: HB9AFM expects to radiate as HB0AFM from Liechtenstein for a few days beginning on the 7th of this month. . . . UA1ZM/mm operates aboard atomic-powered *Lenin*, 15 and 20. . . . . UB5UN emcees a DX program in English over Radio Kiev on the last Thursday of each month, 0030-0100 GMT on 7180, 7290, 7310, 7330 and 9659 kc.

OCEANIA — "Two operators here now, Lee and myself," remarks John of Chichi Jima's KG6IG. "We're active on 20 s.s.b., also 15 s.s.b., and I try c.w. on those bands occasionally." They're tallying up the KG6IG QSL file with DXCC in mind . . . . . KG6AKZ takes exception to KG6APJ's claim in January's "How's" that the latter's October '65 QSOs were the first Guam-U.S.A. single-sideband contacts and the first KG6-U.S.A. work in seven years. KG6AKZ has QSLs confirming two-way 28-Mc. s.s.b. QSOs with the States as recently as February 25, 1962. "I won't say that mine were the first Guam-W/K sideband contacts, either, because there have been many hams operating on Guam for a long time." . . . . . KC6PE, Ponape installation of Page Communications Engineers, is inactive at present due to lack of ham-licensed personnel. Page stations KC6BO, KG6AOU, KH6FDK, KM6DJ and KW6DS are going strong, however, most of them since 1962 . . . . . K6KII, a 300-country man, will be based on Guam as K6KII/KG6 for a year and more. K6JIC says Cliff will be active on 80 through 10 meters, also hopefully 160 . . . . . Oceaniagrams via club periodicals: Macquarie's VK0MI, though not an out-and-out DX man, intermittently obliges the mob on 14,050-kc. c.w. or 14,150-kc. a.m. Neighbor VK0PK's sideband is reported audible around 14,250 kc. at 0730-0830 GMT. . . . Norfolk islander VK9CB likes to work Europe around 1230 GMT, 14,105-kc. s.s.b. . . . W9WNV, roughing it alone after the tragic sea disappearance of fellow rovers K7LMU and ZL2AWJ, has his Pacific DXpeditionary sights set on the isles of Nauru, Minerva, Maria Teresa, Manihiki and Heard.

ASIA — K9CNC, visiting the MARS shack at Tan Son Nhut Air Base, Saigon, found Ws 1DEO 2AZS 2MEL 2OBU 2SSC 2ZY 3FMC 3KDP 3KFQ 3KT 3MHR 3VKD 6LDD 7NPU 8EDU 8HDB 8OKL 8UXP/8 9GIL 9GIR 9IOP, Ks 2CHQ 2QIL 3FKG 3JCT 8STI, WA8CIA and VE2AYU rolling through nicely on 20 c.w. in late February. "Too bad I couldn't fire up the gallon and join the fun." . . . . . From 8th U.S. Army Amateur Radio Club secretary M. L. Smedley: "Effective March 5, 1966, requirements for the 'Kimchi' award reverted to those of five months ago. That is, five two-way contacts with five different HL9 stations." For full filing details consult the club via APO, San Francisco, Calif., 96301, U.S.A. . . . . ARSI secretary VU2CZ announces that his society will sponsor this year's Third VU2/4S7 DX Contest on October 8th-9th (phone) and 15th-16th (c.w.) . . . . . "Two-thirds of the many JAs we work on 15 meters are running 25 watts or less," report brother WA7s BOA and BOB. "The 807 seems to be the standard JA bottle, usually hooked to dipoles or quads." . . . . . Iraq may be a

(Continued on page 168)

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS,* W1FZJ

420-Mc. Preamp

IT is not within the scope of this column to present detailed constructional information, but it is our aim to pass along the latest on the state of the art, whether it be operating or equipment news. Within the past year we have seen much advancement in the low-noise transistor field, particularly in the u.h.f. range. Many transistors are now available at reasonable prices that are capable of delivering noise figures lower than any vacuum tube provides.

A recent addition is the Texas Instruments experimental germanium transistor currently known as the TIXM101. We first heard of this one from Henry Cross, W1OOP, who heard a paper on it at the recent NEREM Conference in Boston. Technical data on the TIXM101 looked so good that Walt Zandi, K2KWL/KP4, thought that we should try them here at A.I.O. The result is shown herewith: a 2-stage 432-Mc. preamplifier that out-performs anything we have made with the best silicon transistors. We hope to have more details for you at a later date.

Old Sol Comes to Life

If you've been on the v.h.f. bands less than four or five years, you have some new experiences coming up, thanks to a rapid upswing in solar activity now in progress. Some of our v.h.f. DX phenomena show little correlation with sunspot activity, but others are closely tied to it. There have been several signs of life in the latter department in recent weeks.

Auroral propagation occurs to some extent at all stages of the "11-year" solar cycle, but it is much more frequent and widespread in times of high sunspot number. The first major aurora of the currently-rising cycle broke out early in the evening of March 13. Stations all across the northeastern quarter of the country had a fine time of it. As often happens, both 50 and 144 Mc. were open in the early evening, followed by a quiet spell and a reopening in the hours just before midnight.

An encouraging sign of things to come for 50-Mc. men in news of the first transequatorial 50-Mc. DX in several years, from our old friend XE1GE, Cuernavaca, Mexico. Geoff worked many South American stations on 6, beginning March 17. At 2345 GMT March 16, CVJ, Montevideo, Uruguay, 49.37 Mc., was heard, but this may have been too late for a 50-Mc. opening. XE1GE worked LU1CX, LU7DAL, LU9ABJ, LU3AED, LU7AT and LU1AM, beginning at 2045 GMT March 17. Some of the same stations, plus LU5ACK, LU2DZH, LU1AAT and CX9AJ were worked on the 18th. On the 20th, starting at 2130 GMT, CX6BO, CX1AO and HK5GZ were worked, and CE3BM and CE3NH were coming through well. Several of the South Americans were heard calling KP4s.

It may be too early in the solar cycle for much of this sort of thing to come our way, but observance of low-latitude *TE* propagation is certainly an encouraging sign. CRPL F_2 layer predictions show the m.u.f. to be up over 40 Mc. during the daylight hours in the lower latitudes, and it is possible that the southern part of the United States, at least, may catch some South American openings on peak days. U.S. 50-Mc. men should watch conditions to the south particularly after the breakup of ionospheric disturbances on the lower frequencies, for it is at this time that the north-south m.u.f. rises to its highest.

All this should not be confused with sporadic-*E* skip propagation, which is just moving into its spring season as we go to press. E_s skip is not closely related to solar activity, and it is always in prospect at this time of year.

VE Land

The following letter was received from Yellowknife, N.W.T. and VE8BY, "During the last couple of months I haven't checked six meters because the coax line was being used for 432 Mc., so I don't know how things are on that band. Six has been bad for a year now.

"On 432 Mc., a new band for me, I'm using a 2N3399 preamp at the antenna, and another 2N3399 at the receiver end of the coax. This feeds an 8058-diode mixer, converter with an i.f. of 50 Mc. The antenna is a six-turn helix fed with RG17 coax. I don't know the gain or noise of the system

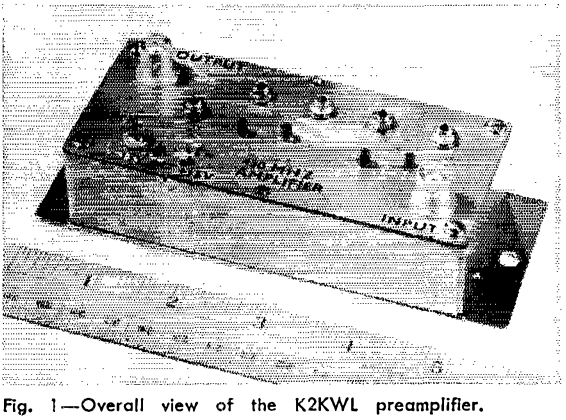


Fig. 1—Overall view of the K2KWL preamplifier.

* P.O. Box 1738, Arecibo, Puerto Rico 09613.

but it picks up Oscar IV. My six-meter converter crystal, 36 Mc., is my only source of 432 at a low enough level for testing; that and car engine noise. One problem: I can't track! January was the coldest for 20 years, 5 weeks of 40 to 50 degrees below zero, even going to minus 57 at times. That's even too low to put a transistor outside. Today (February 12) it's 38° below. Summer is coming!" (We know what you mean, Pete. One night during February the temperature went down to 66 degrees above zero and we almost froze to death!) "I haven't been able to make out any calls through Oscar IV and the signal is up and down and moving frequency, and my c.w. is not as good as it should be. Last time I copied Oscar was 1730 GMT, Feb. 12, and it was in for about an hour." Only comment I can think to make is "Br-rr-r"!

VE3HW writes that he has spent considerable time experimenting with baluns for two meters and trying to evaluate the factors which put them off frequency, impedance, etc. Dick is also working on the conversion of commercial f.m. gear for 144 Mc. and building power supplies and a vertical colinear antenna for two-meter f.m. work. Nice to get these reports from our neighbors. Keep 'em coming boys.

144 Mc. and Up

Several months ago W2BVU/K1JIX wrote us that the bright spot in his spectrum during the fall and winter months of v.h.f.ing was 2300 Mc. John wrote that "one-way schedules with K2GRI in up-state New York (K2GRI transmitting to K1JIX) didn't really get started until October 20 and in a month's time has been heard here on three occasions. This is real sport, considering that K2GRI is running one watt average power output (Dick is using an AN/APG-5 pulsed oscillator system similar to that described in the February 1963 *QST*), and the 128-mile path crosses the mountains of southern Vermont and New Hampshire, far from line of site and no knife-edge refraction. The path goes directly over the top of Hogback Mountain, Vermont, but this is of minor importance since the path is blocked much more effectively by elevations much closer to the stations. This makes five states that have been heard on 2300 Mc. at K1JIX (three states worked). It shouldn't take too long to work New York two way once K2GRI gets his receiver together." These two boys are to be complimented for their endeavors on the u.h.f. bands. Another pair of u.h.f. pioneers.

Activity on 1296 Mc. is also forging ahead by small steps and large enthusiasm. WB6IOM is looking for skeds on this band to see what can be done with high power. Pete's receiver has TIX3024 r.f. amplifier and 1N21 mixer. Antenna is a five-foot helical 45 feet above ground. Receiver noise figure is between 4 and 5 db., and feedline loss is 6 db. Under construction is a new high level mixer to drive the 1296-Mc. kw. linear, and Pete sez he's down to only two amplifier stages between mixer and antenna. The new mixer is a 2C39 cavity driven with 10 watts at 1268 Mc. and plate modulated from a 28-Mc. s.s.b. rig delivering about 70 watts. Output from the mixer is about 10 watts at 1296 Mc. Output power from the final is about 350 to 400 watts. Great rejoicing has taken place at this Los Angeles QTH 'cause as Pete sez: "Reducing the number of amplifiers has eliminated all signs of instability." Down North Carolina way K4QIF tells us that the mount is constructed and ready to accept the dish for his moonbounce project. The receiver is operational on 1296 but Rusty still lacks the final for his transmitter. The dish will be mounted on an el-az mount and calculations are in progress to determine the position and path equations for the moon. Hopes are high in Salisbury that the proper data can be tracked down so that the antenna can be pointed at the moon and the speed controls set thus allowing reasonably accurate tracking for an hour or so. We're with you, Rusty, but golly, aren't those mathematics somepin'!

In spite of fairly poor conditions on 432 Mc. during the winter months, the gang on that band has not lost any interest. W3BDP in Delaware sez he's finally got the SWR on his 32-element collinear for 432 down to 2 to 1 but it's so touchy that he's afraid to try to improve it for fear he won't ever get it as good again. (Gee, sounds just like home!) Sam has his 4X250B-tripler rig working on 432 and has made a couple of contacts with c.w.

Once again ham radio took a place in a school science fair. This time WA3DJH and WA3DJI won honorable mention in the Moon High School Science Fair at Coraopolis, Pennsylvania, for their 420-Mc. portable transceivers. From Alexandria, Virginia, K4SUM writes that 432 is quiet except for the locals W4UBY, W4API, W3RF, and W3AHQ, who meet each night on frequencies from 432.05 to 432.18.

Among the list of things "in the works" at W5UKQ are several projects for 432 Mc. John is working on his s.s.b.-kw. rig and has everything ready except the power supply and a 50-Mc. s.s.b. source. Skeds are being run with W4GJO in Sarasota, Florida, and although Grid has not been heard as yet John does hear W4TLV in Demopolis, Alabama, very well and all the time.

Out in California WB6RWF is planning to build a 432-Mc. helical antenna and is testing both horizontal and vertical polarization with this in mind. In the Detroit area W8FWF has taken on the tremendous job of printing a bi-monthly bulletin devoted to 432-Mc. news only. It includes a list of stations heard on 432.9-Mc. w.b.f.m. (22 stations as of February 10 in Ohio and Michigan), a "station equipment report" which features one of the 432 gang heard and his equipment, and rumors and facts concerning operators and operation on the band. Good job, George! W8CVQ has his 432-Mc. transmitter on the air with 25 watts input to a 2C39B in a cavity resonator. George sez a cross-band contact with W8GOV indicated that the J-slot beam is working O.K. At Monroe much experimentation has been done by K8WXO with transistor 432-Mc. preamps with good results. Final design uses 2N3478 with tuned-line input and output for high gain and maximum rejection of spurious signals. Sounds good! K8ZES in Galion, Ohio, has completed a 432-Mc. solid-state converter (December 1965, *QST*) with excellent results. Sid added an I.F. stage and used 26-Mc. i.f. frequency for receiving but encountered no problems.

At Cranston, Rhode Island, K1ABR has completed his 220-Mc. converter and sez it will soon be pushing a 4X150-cavity doubler and a 4X250B-cavity final on 432 Mc. He should be on 220-Mc. a.m. and c.w. by the end of April. K1YON sez: "Activity on 220 Mc. continues to be good from this northern Connecticut QTH (northwest of Hartford). Contacts with W1NOC and K1POP in southern Connecticut and with W2WOF, WB2CNK and K2IIPC reveal nightly activity in those areas. (220-Mc. activity also seems to be surging!) In New York WB2TNB has completed the dual-purpose audio section of his 220-Mc. transceiver and is working on the final; and WB2UIV has been bitten by the 220-Mc. bug and is busy designing his rig. Out in Geneva, Indiana, WA9ABI sez his 220-Mc. con-

verter is working (he thinks) but he either hasn't heard or can't hear any signals since it was completed.

"On February 9 two meters was in above average condition into the New York City and Long Island areas." So sez K1MTJ of Portland, Maine. Joel comments that during his sked with K2HLA on the 9th signals both ways were 5-9-9 but lack of activity produced little DX. On the 24th of February signals were again above average but again no activity. Dick, K2HLA, worked W3LUL and K4TXP on the 9th and worked W8WEN and heard W8KAY on the 24th. K1BTF in Massachusetts is keeping skeds with W8WEN although they haven't yet made contact. Barry sez he is available for two-meter QSOs or skeds during the week on 144.9 until 1400 Z. At Chelmsford, Massachusetts, WN1FFY caught a 20-minute band opening on 144 Mc. on February 18 but because of heavy QRM no complete calls were copied. However, he definitely heard 1's, 2's, 3's, 4's and VE2's. Jim tells us that he has had fairly good results with his homebrew six-element beam. The elements are coathangers but the antenna has lasted more than two months with never a bad report. From Rhode Island K1ABR will be trying again for that Georgia contact on 144 Mc. with K4SJF during the Perseids. Dick is available for skeds with anyone needing his state. WA4FJM in North Carolina sez that two-meter activity is booming in his area. "I worked two (count 'em) different stations in the past two weeks!" However, these were Jim's first local contacts in two months so we can see what he means. Keep it up, O.M. and build up that activity! February 5 was a good date for WA4STI on 144 Mc. John caught an opening into New England at that time and picked up six new states. Spartanburg, South Carolina now has quite good activity on 144 Mc. with K4NTO, K4EIB, WA4TRY, K4JOR, K4PEF, WA4PGR and WA4QHB all having prominent signals on the air. Alexandria, Virginia, is represented this month via K4SUM who tells us that local activity is very good in the Washington, D. C., area each night between 7:00 and 11:00 P.M. Joe sez he's been able to work WA2LTM in New Jersey just about any night in the week and that other good signals heard were from W2BV, WB2ECR, W2EIF, WB2CYL, W2NKO, WA2TSZ and K1PXE. Narrow shift teletype on 144 Mc. is the experiment in the works at the QTHs of W5UKQ and W5LUU. Good luck, fellers.

W5UGO, who has picked up at least one new state during each "shower" recently, has a suggestion for anyone interested in meteor-scatter work. "Run a series of skeds with another DXer during non-shower times to get the feeling of operation, also to help rid buck fever." Larry carried on non-shower skeds with K4IXC in Florida and calls were heard almost every day plus pings and short bursts. They completed two QSOs during this series of skeds.

Out in Inglewood, California, WN6QWE has been doing some work on the effect of smog on 2-meter propagation. Using a reliable source (WA6TPD repeater) for a signal Ed noticed that on the very smoggy days the signal strength dropped 4-S units. Our Nevada report from K7ICW sez: "A special sked using W6CDB (southern California, 260 miles) on an obstacle gain path and WA6RLW at Exeter (400 miles over a mountain-obstructed non obstacle gain path) produced a few meteor pings at K7ICW and WA6RLW, proving to a number of people that although obstacle gain exists for fantastically consistent signals to a few stations, this phenomenon is not widespread and other than meteor scatter, signals on attenuated mountain paths are not easily overcome with just a few skeds and increases of a few db. in equipment parameters."

Michigan seems to have its share of sidebanders on 144 Mc. and W8YBM, K8DUH and K1AYA/8 have just joined their ranks. We hear that W8QEV of Ann Arbor has completed a good A.L.C. system in his two-meter s.s.b. final. At Saginaw K8AQA comments that conditions were fair to good during the month of February on 144 Mc. Bob sez that QSB was very prominent and affected stations as close as 15 miles away. "During periods of heavy QSB the peaks and nulls were quite extreme causing signals to alternately disappear and then come back very strong." K9DBR at Janesville, Wisconsin would like to arrange skeds with stations beyond the normal range and capable of RTTY operation on six or two meters. While waiting for these skeds Neil is keeping busy by rebuilding his two-meter s.s.b. exciter.

2-METER STANDINGS

W1REZ	32	8	1300	K5WXZ	29	8	1225
W1AZK	29	8	1384	K5TQP	26	7	1250
W1JSM	27	8	1330	W5UGO	25	7	1384
W1AJR	25	7	1130	W5UKQ	25	8	1150
W1KCS	24	7	1150	W8SWV	20	5	960
W1MEH	24	6	1000	W5MIL	17	6	700
W1MMN	22	8	1200	W5KFU	15	5	1360
W1HDQ	22	6	1020	W5WAX	11	5	735
K1ABR	20	6	1140	W5BEP	9	3	1000
W1AFO	19	6	920	W5EDZ	8	5	1375
K1CRQ	19	6	800	W5YYO	7	4	1330
K1AFR	17	6	675				
				W6WSQ	15	5	1390
W2CXY	37	8	1360	W6NLZ	12	5	2540
W2ORI	37	8	1320	K6HMS	10	5	1240
W2BLV	36	8	1020	W6DNG	9	5	5250
K2GQI	35	8	1365	W6GDO	6	3	864
K2LMG	32	9	1710	W6AJF	6	3	800
W2AZL	29	8	1050	WB6KAP	5	3	1300
W7PUA/2	26	8	1150	W6MMU	3	2	950
K2CEH	25	8	1200				
W2AMJ	25	5	960	W7JRG	24	6	——
W2ALR	24	8	1100	K7NII	19	5	1275
WA2PZE	22	7	1200	K7ICW	12	4	1246
W2LWI	22	7	1050	W7LHL	10	4	1170
WA2PGK	22	7	1340				
W2ESX	21	6	750	W8PT	41	9	1260
W2UTH	20	7	880	W8KAY	39	9	1210
WA2EMA	19	6	1010	W8IFX	39	8	1225
K2HLA	19	6	1005	W8SDJ	37	8	1220
WA2PZE	18	6	750	W8YIO	36	9	1250
WA2LTM	17	7	730	K8AXU	34	9	1275
WA2YXS	17	6	720	W8LOF	31	8	1060
WA2PMW	17	6	675	W8MVF	33	9	1155
K2OEI	16	6	1010	W8NOH	31	8	1090
WB2CCO	16	6	780	W8EHW	31	8	860
WA2RAT	16	5	700	K1CRQ/8	30	9	850
K2JWT	16	6	550	W8WNM	25	8	900
WA2JAM	16	5	670				
				W9WOK	42	9	1170
W3RUE	34	8	1100	K9UIF	41	9	1150
W3GKP	31	8	1108	K9AAJ	36	9	1200
W3TDF	30	8	1125	W9WDD	35	9	1300
W3BYF	30	8	1125	W9AAG	35	9	1050
W3LST	22	6	800	W9GAR	34	9	1075
W3LNA	21	7	720	K9SGD	33	9	1100
K3OBU	20	7	930	W9OII	32	8	1090
W3MFT	19	6	600	W9PBP	28	8	820
K3CFA	17	6	600	W9OJI	27	9	910
W3HHC	16	6	550	W9IFA	27	6	1000
				W9CUX	24	7	1000
W4HJQ	39	9	1150				
W4HHK	38	9	1280	W9BFR	43	9	1350
W4WNH	35	9	1350	W9LFE	33	9	1040
W4ZXI	34	8	954	W9ENC	28	7	1250
W4MKJ	34	8	1149	W9DQY	27	8	1100
W4MNT	31	8	1225	W9MOX	23	6	1150
K4QIF	31	8	1000	W9IDY	22	8	1050
K4IXC	29	8	1255	W9IC	22	7	1360
W4FJ	28	8	1050	K9ITF	21	6	940
W4RFR	24	9	820	W9JAS	19	7	1130
W4TLV	23	7	1000	K9JXI	19	7	750
W4AWS	22	7	1225	K9CER	17	6	1225
W4RMU	21	7	1080				
W4OLK	20	6	720				
K4YYJ	20	6	720	VE1CL	8	5	800
K4MHS	20	5	800	VE3DIR	37	9	1300
W4LNG	19	7	1080	VE3AIB	29	8	1340
K4VWH	18	6	590	VE3BPR	24	7	950
				VE3BQN	23	7	1180
W5RCI	39	9	1280	VE3AQG	18	8	1300
W5AJG	33	9	1360	VE3HW	17	7	1350
W5PYZ	33	9	1275	VE5HO	1	1	915
W5JWL	33	7	1150	KH6UK	2	2	2540
W5DFU	29	9	1300	OH1NL	1	1	5250

The figures after each call refer to states, call area and mileage of best DX.

Clubs

The Texas VHF-FM Society recently held its second semi-annual meeting, and during the technical session, chose some standard-operating frequencies for the state. On six meters, the suggested national frequency of 52.525 is in wide use, and 52.88 was chosen as the standard-repeater input frequency. On two meters, 146.94 is the primary frequency, and the apparent national standard 146.34-repeater input frequency is confirmed for Texas. Choice of three-quarter meter frequencies generated a great deal of discussion, with 449.1 finally being chosen as the main frequency, and is proposed for a national f.m. calling frequency. For repeater operation the input chosen is 449.7 for use with 449.1. A secondary pair of frequencies was also chosen, 448.9 and 449.5 repeater input.

50 Mc.

Up in Wisconsin W9HWQ is working on a linear for his 50-Mc. s.s.b. rig, about 250 watts. K8VEX at Wayland, Michigan is "in there trying" but is in danger of being discouraged soon. Ivan has been calling CQ on 50-Mc. RTTY for some time now, but no takers. From Saginaw K8AQA observes that conditions on 50 Mc. were fair to good throughout the month of February with extended groundwave copied on the morning of the 13th. "During the last half of the month considerable QSB was prevalent most of the time on stations more than 30 miles away."

Another good report received from K7ICW at Las Vegas, Nevada: "E_s observed on February 3, 10, 12, and possibly the 20th. The opening to northern California was most interesting on the 3rd when the Stanford 49.8-Mc. signal came in full strength with sidebands. A total of 8 sidebands of phase modulation were heard. On a good ionoscatter day 6 sidebands can be heard intermittently here. Peculiarly, low-power amateur signals did as well as the Stanford signal during given periods of the E_s opening as far as signal strength was concerned. This shows that E fallout is very selective to particular stations on a path. When all the northern California stations disappeared, W6NZX of San Diego, California, using s.s.b. conquered the backscatter path which was directly west, a rare and heretofore unobserved occurrence here. I often get backscatter west or southwest, but I feel that my antenna side and backlobes are mainly responsible for this. Comparison of the beam and halo antennas on the Stanford signal at given times show that backscatter is the strongest path at almost all times, but that amateur signals are rarely strong enough, the maximum scattering being associated with path length, etc." Interesting information, Al.

From South Carolina contributes WA4LTS reports six meter openings on February 2 and 9. 1's and 2's were heard on the 2nd and 5's in Texas on the 9th. Dick recently completed a new 6 element beam, optimum spaced, and results are 3 to 4 db. greater than the 11-element spiralray on a longer boom. Another station in South Carolina now active on 50 Mc. is WA5ZBV who is running 250 watts and can run a.m., s.s.b. or c.w. W2IYR shares the interesting news picked up via the low frequencies that OA4C in Lima, Peru, is ready with 200 watts of s.s.b. on six meters. O.K. fellas, quit crowding the frequency! Up in Maine K1MTJ sez that activity is increasing and it looks like there will be a lot more later in the spring.

ARRL Propagation Tape Talk Revised

For some years now one of the more popular items in the ARRL Library of films and tapes for radio club use has been a talk by Ed Tilton, W1HDQ, *QST*'s V.h.f. Editor, on v.h.f. propagation. Included is a brief discussion of each of the known forms of long-distance v.h.f. propagation, followed by recordings of actual communication selected to show the distinguishing characteristics of each DX mode. The recordings date back, in some instances, more than 25 years. Some are unique historically, as in the case of the work across the Pacific by W6NLZ and KH6UK. Others are amusing as well as instructive.

This tape talk was recently brought up to date, with the inclusion of recent moonbounce and satellite communications examples. Signals received through Oscar III, and excerpts from the W6DNG — OH1NL 144-Mc. moonbounce contact may now be heard, along with new commentary, where required by changing times.

Copies of the tape are available for loan to ARRL-affiliated radio clubs, without charge. To obtain it for one of your club meetings, address your request to Training Aids, ARRL Headquarters, Newington, Conn. 06111. QST

Strays

WB6FDR reports working the following stations: KØLBJ, WA8LBJ, WA6HST, KL7FDR and WA4FDR!

—•••—

Melpar, Inc., of Falls Church, Va., has developed a hydrogen-oxygen ion exchange membrane fuel cell for the Army that uses bananas as the source of power! A company spokesman said that squash, grapes or almost any fruit could be substituted for bananas. The device produces approximately 4 0.76 volts at 4.92 amps. of power continually for 24 hours. (from *Metalworking News*)

If you'll keep an ear on 3525 kc., you may hear W1DDB, Allison Macomber, a well-known American sculptor who is artist-in-residence at Boston College. The photograph shows him at one of his classes in art theory and art practice for students who have never before tried their hands at artistic creation.

CONDUCTED BY JEAN PEACOR,* K1IJV

Understanding through Communication

FOR years you could believe a saying such as "a little bit of knowledge is a dangerous thing." Amateur radio disproves it. All you have to do is add up all you have learned as a result of the little bit of knowledge you started out with as a radio amateur. Instead of danger resulting, you've ended up with far more knowledge in many different directions than perhaps even you realize.

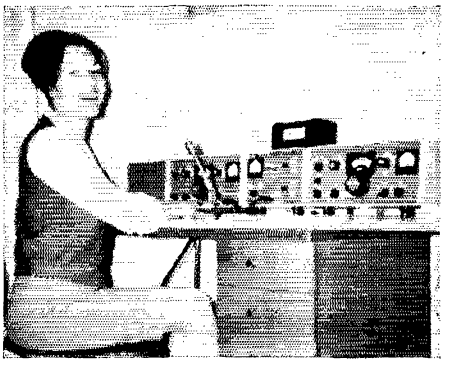
Your technical knowledge has had no choice but to increase, if you wanted to keep your station on the air. Your understanding of people has grown, as has your knowledge of propagation to name but a few. Another vast area is found in the learning and use of different languages. Many hams who have never studied a word of English can speak it fluently as a result of listening and practicing it on the air. The same is true of the opportunities to communicate in French, Spanish, and so many different languages.

Rather than being hesitant in attempting to communicate in a language that you may have only studied for one year, take advantage of the chance to become more proficient through amateur radio. Some humorous stories can be the result.

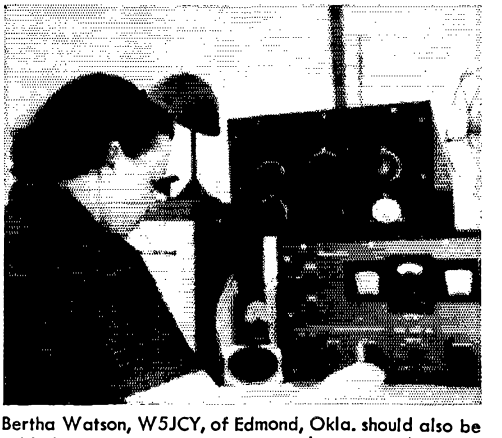
Renata Krause, DJ9SB, has had so much fun with her 150 watts and dipole, that she was prompted to write about her many experiences in a story entitled "Around the World in 88s." An excerpt from this story illustrates the fine humor everyone has the world over and why no one should be afraid to give another language a try. To quote Renata: "Of more recent date, I have become a student of the Spanish language, and occasionally try to increase my proficiency on the

Renata Krause, DJ9SB, has a long list of awards to her credit since becoming licensed in Nov., 1963. This very active YL is a member of German American ARC, CHC, RCC, Int. SSBers, NAHC, HSC (the only European YL), along with being in many of the contests.

* YL Editor, *QST*. Please send all news notes to K1IJV's home address; 139 Cooley St., Springfield, Mass.



Opal Nash, KH6FQU, is a very active YL on 10, 15, and 20 meters, where she managed to contact 75 countries in her first six months on the air. She also handles traffic for the outlying islands when time permits, as she's also mother of two and works part time. Opal is most anxious to meet other YLs on the air or through correspondence. Courtesy of KH6FHX, her OM.



Bertha Watson, W5JCY, of Edmond, Okla. should also be added to the Phone DXCC listings (Oct., 1965), as she holds Cert. No. 960 with 202 confirmed besides having a combined total of 203 confirmed.

Merrilee Gnong, WN1FHK, of Abington, Mass. is a charming newcomer to the Whitman Amateur Radio Club. As a result of the club's classes, Merrilee plans to take her General exam this month. Courtesy of WA1DDP.

«

Carlie Hull, W2YCX. »

air. One day I had a problem with a certain translation. I called the first EA station I heard on 20 meters, and asked him if he would translate the following Spanish sentence into English for me: "La calle esta' muy encharcada." The OM, probably not understanding my query, replied: "No, Rena, the WX here is FB and the streets are good too. Would like to meet you here." Unfortunately, the OM thought I meant to visit his QTH and was worried about the conditions of the streets. A short time later, I was able to find out that "encharcada" meant an abundance of water on the streets following a heavy rainfall."

Renata had similar humorous situations occur in trying English too, as have many others. Perhaps what is not realized, is how much DX stations appreciate attempts by others to communicate with them in their own language in some instances, regardless of the outcome. Under these circumstances, it is not merely communication which results, but rather understanding.

So, next time the chance arises, try a "Buon giorno", a "Bonjour", or a "Guten Tag". The response will be rewarding and you may be well on your way to finding another real value of amateur radio — understanding through communication.

Carlie Hull, W2YCX

The Morris Radio Club in New Jersey has an outstanding member in their group in the person of Carlie Hull, W2YCX, of Boonton, N. J. A graduate of Newark College of Engineering, Carlie is now employed as an Electronic Engineer at Picatinny Arsenal, where she designs special test equipment for the electronic parts of missiles. There are a few other women engineers at the Arsenal, but Carlie is the only one in her department.

Since starting her new job, Carlie has allowed time for many extra-curricular activities, one of which is to conduct an amateur radio code and theory class. Presently, the class, open to all civilian and military personnel at Picatinny, includes a sergeant and his son, a lieutenant and chemical engineer, a physicist, and another interested YL. The Picatinny Chorus is also another of her favorite activities.

Carlie built much of her radio gear and her ham shack has several pieces of test equipment such as a secondary frequency standard, and a heterodyne frequency meter that were built while she was attending college. If you don't get to have a rag chew with her before June, you'll no doubt hear her then, as she rarely misses a Field Day.

Coming Events

The 15th Annual Midwest YL Convention will be held May 13, 14 and 15 at the Flying Carpet Motor Inn, 6465 N. Mannheim Rd., Rosemont, Ill. 60018. Motel reservations should be made directly with the motel, but mention the convention, as they're reserving a special wing. Registration tickets may be obtained by writing Diane Price, K9TRP, 6123 N. Rockwell, Chicago, Ill. 60645 — $2. until April 1; $2.50 later.

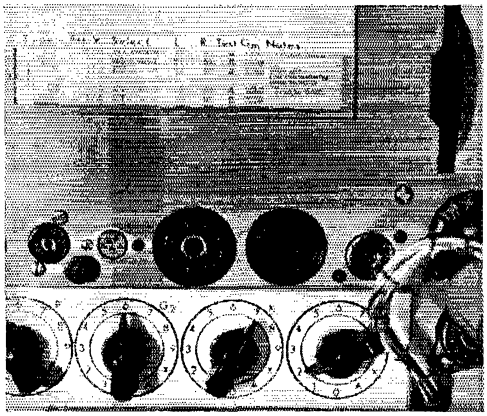
(Continued on page 152)

Clara, K2TXP, and her OM, W2JEB, of Troy, N. Y.

Some of the LARKs, hostess club for the 15th Midwest YL Convention to be held in Rosemont, Ill. on May 13 to 15 are: (l. to r.) WA9IYG, K9IWR, WA9PAF, K9EMP, K9LUI, K9TRP, and W9LDK.

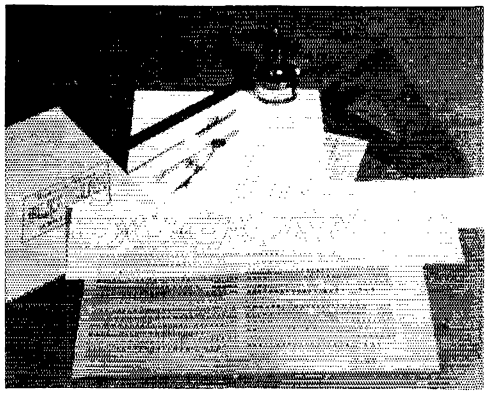
Equipment Marking and Labeling

GEORGE P. Schleicher, W9NLT sent us this series of photographs that illustrate how some very simple operations can result in some presentable dials, labels, etc. for equipment that has been home constructed. QST

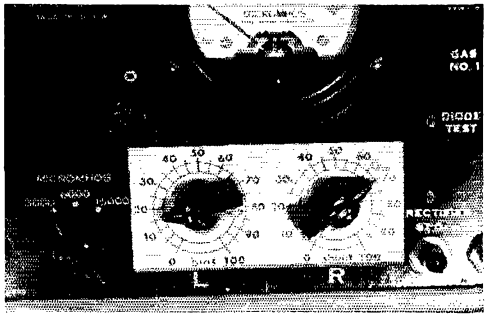


This is a view of the inside of the cover of a I-177 tube tester that was modified according to K4YPY's article in *QST*, November 1964. The dials, chart cover and the column headings are quite presentable although strictly homemade.

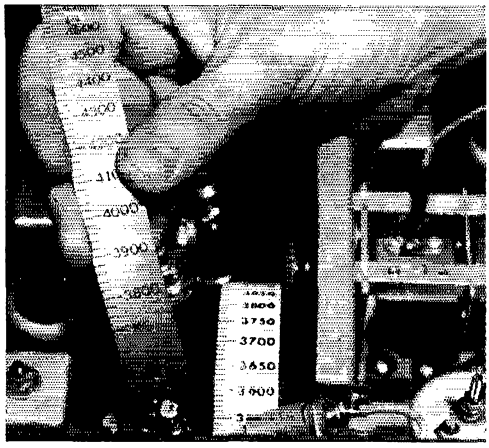
Some equipment can be labled neatly by using movable rubber type and printers ink. Modified dating stamps can be used to stamp tube-type numbers on a chassis.



Only simple tools are needed to prepare serviceable dials and panel markings. Shown above are a ruling pen, a bow pen, ruler and triangle. Supplies include white paper, india ink, transfer letters and numerals, and clear-sheet plastic.



The "L" and "R" dials on the tube tester were changed to conform to the new chart values.



View looking into the receiver of a BC-654A. After being padded down to cover the 80-meter band, the metal dial scale was replaced with a paper one. The dial is protected by a layer of invisible cellophane tape. The tape also holds the scale on the dial drum.

Operating News

F. E. HANDY, W1BDL, Communications Mgr.
LILLIAN M. SALTER, W1ZJE, Administrative Aide — GEORGE HART, W1NJM, National Emergency Coordinator
ROBERT L. WHITE, W1WPO, DXCC Awards — ELLEN WHITE, W1YYM, Ass't. Communications Mgr.
GERALD PINARD, Club Training Aids — PETER CHAMALIAN, W1BGD, Communications Asst.

Correct, Accurate Reports a Road to Operating Improvement. A couple of years ago one Official Observer suggested that every serious amateur should padlock his transmitter and spend an hour tuning the bands, just listening for poor notes and sick signals. In his own attention to work between stations he had ran across many distortions and flatteries and plain dishonest signal strength and tone reports. An amateur radio in which we each seek and give honest reports and more elaborate exchanges about our signals can be a powerful influence in bettering conditions in all the bands. But all operators must bear in mind that *any report* that is *not correct* is a disservice to whomever it is given to.

Let us each (1) be more careful and critical in checking out our personal signal before we allow it to go on the air and (2) let us seek and give careful and accurate reports in every particular, at all times. Get our Operating Aid No. 3 (the RST definitions) and post this. Follow the tone and other *definitions* accurately when giving reports. Many times in voice contacts a detailed signal description can be given *beyond* mere reporting by the numbers. ARRL certainly favors this. Another Observer, W8GIU, in a recent note confirms the need for more-and-better individual reporting of signals operator-to-operator. For all who are interested in improving amateur operating and the image of good operating we conclude with his statement of principle: "Always in contacts with fellow amateurs be truthful and correct in giving reports. To do so enhances our service creating a better atmosphere."

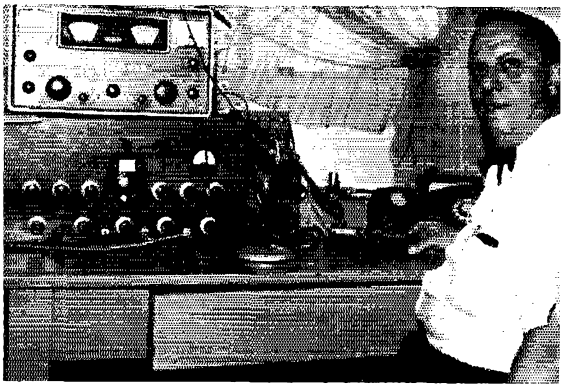
Have You Put a Stand-By Receiver on NCE Frequencies? Do you have our Operating Aid No. 12 giving the full-time and part-time National Calling and Emergency Frequencies? A radiogram will bring it, so you can post it in your operating position. The NCEFs, 3550 3875 7100 7250 kc. etc., should be used *all the time* by radio amateurs. The FIRST FIVE MINUTES each hour are designated LISTENING TIMES and all amateurs are asked to keep the stated frequencies clear for emergency calls at that time! The purpose for amateur radio having these NCEFs is to permit quick-alerting on emergency calls, and additionally for moving traffic. Some of this latter use has dropped off, due we suppose to the many efficient Section Nets in the National Traffic System that everybody depends on. But we think whenever a net is NOT in session is a time to try and use NCEFs. We have heard *many* using these frequencies for directional calls. They are mighty good for that. When correctly employed you may find an amateur near a city for which you have a message.

Every amateur can benefit by being able to move traffic at any time. If you're not a netter you can use the NCEFs to seek out a skilled operator who is, one holding appointment as ORS, OPS or OES who knows the relaying game. This is next-best to getting the Net Directory and reporting on the net that covers your own area. Keep a receiver tuned to one of the NCEFs. You may be first to know about a developing emergency — or to hear a call that brings you some interesting traffic or an adventure.

Using the NCEFs. We ran a whole article on this. But if you don't wish to dig out the March '65 *QST* here's the information very briefly anyway. We start by assuming your receiver is on, and tuned to one of the above NCEFs. YOU HEAR A GENERAL OR EMERGENCY CALL OR YOU DECIDE TO GIVE A GENERAL CALL TO MOVE A PIECE OF TRAFFIC. This must be at a time outside those first five minutes. (1) Tune your transmitter temporarily to the frequency. (2) Make a brief call after listening to see there is nothing important there being interfered with. (3) Make it directional, or indicating states, or listing your traffic, on the NCEF chosen. (4) If you get your station be very brief; *move off this frequency to some suitable adjacent frequency to complete the working.* (5) Always limit your use to calling and making-contact. (6) KEEP A RECEIVER GOING THERE. BE SHARP. KNOW MESSAGE FORM AND PROCEDURE. BE

C. D. ARTICLE CONTEST

A Communications Department article contest, a continuation of the very successful *QST* Article Contest during the 1964 anniversary year, needs your best ideas (800–1200 words) relating to League organization, clubs, training exercises, and operating techniques. Periodically, the best articles submitted for the "CD Contest" will be chosen to appear, with the winner electing to receive (a) a bound 1966 *Handbook* or (b) a *QST* binder, League emblem and the ARRL DX map.




W 7 P B V


LOADING
DEPT

READY TO TAKE OR GIVE TRAFFIC TO HELP OTHERS AND HAVE A PART IN MAINTAINING THE PUBLIC SERVICE RECORD OF THE AMATEUR. KEEP ALERT TO NOTE ANY EMERGENCY OR DISASTER CONDITION. RESERVE ANY TRANSMISSION IN SUCH CASES UNTIL CALLED FOR.

A Special Word to Traffic Netters. We would be remiss here in concluding our remarks on this subject of the NCEFs if we did not address a suggestion for a special use of the NCEFs to all traffickers, whether phone or c.w. May we urge *you* to monitor these frequencies. Besides general NCEF use we would like Net Managers to study full activation and use of their nets as might do most good in conceivable emergencies. Plan (please) with nearby Section Emergency Coordinators and other officials to use the NCEF you agree upon to alert YOU to get your group going when needed for emergency or predicted approach of hurricanes, flood waters and the like. Lots of "traffic business" can be picked up here on the NCEFs, if you and other traffickers make a habit of utilizing the NCEFs.

SCM Recognition; Posts for Techs. The League's OES (v.h.f.) appointment has achieved excellent *popularity with v.h.f.ers*. This post is available to active members and v.h.f. netters and granted on approval of application by SCM. A monthly activity report to the SCM, whose address is given (page 6 *QST*) will help bring your v.h.f. netting and work to his attention; all active member-operators may qualify. Technician members are fully eligible with others for this SCM-recognition as OES, also for OBS and VHF-PAM posts, where openings for such net leadership or management still exist. Besides this each Section Manager, later in the season as nets establish their regularity and coverage, will have available for those nets covering their ARRL Section or extensive portion thereof, the League's *Section Net Certificate*. It can be issued to all regular reporters in nets; is sometimes issued toward the end of the season at conventions or special net meetings!

One or two stations in each net that addi-

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for Feb. Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	216	3447	3306	92	7061
K6BPI	901	2916	2784	132	6733
K6WAH	664	906	992	4	2566
K6MCA	168	1176	1129	15	2488
W1PEX	66	1203	1157	20	2446
WØLGG	15	1170	1097	21	2303
K2KQC	5	1066	1066	5	2142
WA9CCP	30	972	772	8	1782
W3VR	67	794	771	15	1647
WA4BMC	1451	45	5	0	1504
K6EPT	142	643	365	278	1428
W7BA	11	698	632	63	1404
K3MYS	13	691	669	16	1389
WA4SCK	12	685	683	4	1384
K9IVG	70	854	391	5	1320
KØONK	30	857	548	24	1259
WA4IJH	11	521	515	6	1053
K5TEY	8	511	487	5	1011
W3EML	25	536	443	6	1010
W8UPH	7	485	411	72	975
WB6JUH	23	459	409	49	940
W9JOZ	21	411	411	0	843
WB4AIW	4	387	373	12	776
K3PIE	21	363	345	18	747
W6RSY	147	300	223	65	735
W7HMA	16	348	345	2	711
W7DZX	18	374	304	11	707
WØOHJ	5	350	338	12	705
WB6BBO	13	342	271	27	683
K7TCY	18	334	271	56	679
W4FX	8	323	313	11	655
W1CRX	71	293	276	10	650
WB6QXY	13	306	2	320	641
W6ZJB	12	304	296	8	620
W5OBD	29	295	281	1	606
WA4TID	4	290	266	24	584
K0GSY	61	259	258	1	579
WA9NFS	26	251	248	12	537
W4RHA	11	255	228	34	528
WA4NEV	29	249	161	88	527
W8RYP	20	250	228	17	515
K1CLM	55	205	251	0	511
K6LRN	45	233	212	16	506
W5GHP	43	233	26	202	504
Late Reports:					
WA9CCP (Jan.)	111	590	376	6	1083

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6IAB	1097	3204	2485	719	7505
W6YDK	1679	751	680	71	6181
W4LEV	94	1298	1246	52	2690

BPL for 100 or more *originations-plus deliveries*

WA7CFY 356	K3SOH 122	K4EVY 105	
WB6GMM 249	WA8F8X 120	W4KRC 105	
K1GPH 247	W3ZRQ 118	WA9GJU 105	
W4PQP 178	WA8KME 116	WA8NDY 104	
WA4YDT 141	W8DAE 112	K2UBG 103	
WB2RBA 136	WAØKQU 112	WAØDEM 103	
K5MBK 131	WB2IYO 111	W2OE/6 107	
W4RZL 128	WAØJKT 111	K6MDD 100	
W3KUN 126	K5GDH 108	*Late Reports:*	
WA8QND 124	WN8PXB 108	W5GHP (Jan.) 104	
	WA8HVR 106		

More-Than-One-Operator Stations

WØYC 107 WA4UCE 106

BPL medallions (see Aug. 1954, p. 54) have been awarded to the following amateurs since last month's listing: WA9CCQ.

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 of 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.

Meet Your SCMs

This month we're proud to present a page full of hard working section operating-administrative leaders. Starting on the left top and reading down; *Alabama* SCM K4KJD with an interest in amateur radio dating back to 1950 covering most activity phases (clubs, contests, public service, v.h.f.); *Nevada* SCM W7PBV (ex-W5CIN, W6JLY) with a history of League service as SEC, EC, OO and OPS; *Indiana* SCM K9IVG, the only operator in her family, with extensive public service, club and contest activity also holding OPS and PAM appointments; *Oklahoma* SCM K5CAY, a printer by trade with an ardent amateur interest in v.h.f.-u.h.f.; (right top) *Manitoba* SCM VE4JT (ex-VE2XB, VE3EIL), licensed for 20 years with a vocation as Chief Engineer for CKX-TV and active participation in NTS; *Hawaii* SCM KH6BZF (ex-K8HQR) with diverse activity as Asst. Dir., Acting SEC, OO, OPS, contest and MARS participation, when time permits as Radio Engineer for the Hawaiian Telephone Co.; *Kansas* SCM KØBXF, a member of the active Jayhawk Amateur Radio Society with service as ORS, OBS, OO, SEC, EC, MARS; *Los Angeles* SCM W6BHG (ex-5ANF, U5ANF, W5ANF, W5ZZH, K6BHG of Honolulu) with 30 years of service in the U. S. Navy and a great deal of time devoted to amateur radio as OBS, OPS, ORS, RM, past director of the Associated Radio Amateurs of Long Beach,

cp-35, A-1 opr, BPL, RCC, OTC, MARS and contests.

tionally can work *other than v.h.f. frequencies* often are given the special and important net job of contacting other nets for interconnection and mutually advantageous coverage with other nets. Steps toward v.h.f. net organizing should go a long way toward making more fun and prestige and results for all in the new groups. The ties *between nets* in an area (accomplished by appointment of liaison stations and alternate NCS) are important. These can bring national connections to your local net! Net interconnections also can, in some cases, double the number of towns that are firm outlets and extend the patronage and use of a given net in its own section. Comparisons with a previous year indicate v.h.f. net registration increases of 12% in the overall picture, except that there was a 28% increase in the registration of six-meter nets. Readers should also note that there can be a PAM, if the SCM is willing, for *each* v.h.f. band on which there are enough operators to constitute a good net.

— *F.E.H.*

DXCC Notes

The 15-day period covered by the DXCC presentation this month does not represent any change in administrative policy but is simply the result of illness to staff personnel concerned with processing the DXCC. The remaining portion of the submissions received during the last 13 days of February will appear in the June issue.

A.R.R.L. ACTIVITIES CALENDAR

May 5: CP Qualifying Run — W6OWP
May 14: CP Qualifying Run — W1AW
June 11–12: V.H.F. QSO Party
June 14: CP Qualifying Run — W1AW
June 17: CP Qualifying Run — W6OWP
June 25–26: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Apr. 30–May 1: OZ-CCA Contest EDR (p. 88, this issue)!

May 7–8: International Telegraphic Contest, USSR Federation of Radio Sports (p. 89, this issue).

May 14–15: North Dakota QSO Party, North Dakota State University Amateur Radio Society (p. 108, this issue).

May 14–16: Georgia QSO Party, Columbus Amateur Radio Club (p. 138, this issue.)

May 21: Armed Forces Day (p. 55, this issue).

May 21–22: Kansas QSO Party, Jayhawk Amateur Radio Society (p. 118, this issue).

June 11–13: New York State QSO Party, South Shore Amateur Wireless Assn. (next issue).

DX CENTURY CLUB AWARDS

From February 1, through February 15, 1966 DXCC Certificates and Endorsements based on contact with 100- or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

New Members

W6VUW....239
W6DYJ....167
UB5KJE....128
DL1GK....127
JA5AB....126
G3TKK....121
K8KGC....115
XE1KKV....114
KX6DR....108
SP9YP....108
UA3IM....108
4X4HK....108
HA0HC....105
UC2AZ....104
W6VEB....104
K9QCT....103
WA6TKQ....103
WA1ANR....102
K7ZKH....101
LA9EG....101
CT1UT....100
DL1VN....100
DL5FL....100
OZ5KU....100
VE3CCB....100
W2IWP....100
W8OUU....100
WA4TLI....100
WB2HJW....100
YU3JS....100
YU3NP....100

Radiotelephone

W2MES....281
W3TMZ....165
4X4TP....138
CT1IK....129
DJ4YP....120
T12RMV....117
YV1LA....113
DJ5BV....111
UA1IG....110
KX6DR....107
DJ6NE....106
W4WSF....103
WA4GCS....103
DL3LS....101
K5AAD....101
W6RGG....101
DL6XV....100
K7ZKH....100

Endorsements

Endorsement listings through the 300 level are given in increments of 20, above the 300 level they are given in increments of 10. The totals shown do not necessarily represent the exact credits given but show only that the participant has reached the endorsement group indicated.

330
W4VPD

310
W1HA
W2MES

300
K4SCT
W8CUT

280
SM5BPJ
W1EOB

W8WT

260
K6BPR
SP9KJ
WB2HXD
W3BVL
W3KDF

W3TMZ
W6BIF
W9IRH

240
DL9RK
VE3ADV
W1QV

W1RLQ
W9VZP

220
W1FTX

200
DL1CF

VE3ACD
VE3BHS
W1BFA
WA2EFN
W6GSV
W9GHK
W9GXH

180
DJ2WN
DL1AM
DL1ES
K8GHG
SM3BNV
SM7BHF
SVØWAA

VE1AFY
WA2BRI

160
F8OQ
SP9PT
OZ6RL
OZ7X

W2BTG
4X4TP

140
K3MCO
SP2LV
VE3BXY
VE3WX

W1BGD
W1EOA
WA4HOM
W6NUU
W9ALP

120
K1KDP

LA9TG
W1ZLX
W4WSF
WA4GCS
WA4JLY
WA9IVL

Radiotelephone

280
W2FGD
YV5AXQ
IT1TAI

240
W1DGJ
W8CUT

220
SM5BPJ
W6VUW
W9TKD

200
SM5HK
W4EFX

180
VE3ACD

160
K4IKR
K6BPR

PY2CYK
VE1AFY
W9GXH

140
SM7BHF
VE3BHS
5X5IU

120
DJ2WN
IS1VAZ
K4RHL

WA4JLY
WB6GOV
W7UVR

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Considerations to bear in mind include a clean signal, good keying, careful enunciation, correct procedure, judgment and courtesy. The League's Operating Aid No. 11 lists further examples. Send your vote for "Operator of the Month" to the ARRL Communications Department, 225 Main St., Newington, Conn. 06111.

During March the following additional amateurs were nominated by their fellow amateurs in recognition of their extra skills and courtesies:

W1LK	W3JNN
W1RSN	W4JDG
WB2CEX	WA5FRK
K2EPT	W5GY
WB2EZG	K5KQG
WB2IFC	W5NNZ
K2KER	W6ADB
W2KXL	K6YVN
WB2NSG	K6ZHO
WB2PSG	WAØBGU
WB2RRT	WAØCHH
WN2TIB	WAØEAC/7
W3AMM	WAØELM
K3CTS	WØGAX
K3DCP	KØIWJ
W3GJY	G3SJE
LU1DAY	

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 times 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 of charge, from the ARRL communications Department, 225 Main St., Newington, Conn. 06111.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made May 14 at 0130 GMT. Identical tests will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted May 5 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 May 14 becomes 2130 EDST May 13.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Daily tape-sent code practice transmissions are available on an expanded basis this season. These start at 2330 and 0130 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed: 5, 7½, 10 and 13 w.p.m. on Sun. Mon. Wed. Fri. (GMT date) from 0130—0220; 15, 20, 25, 30, 35 w.p.m. on Tues. Thurs. Sat. (days in GMT) from 0130—0220, 10, 13 and 15 w.p.m. daily from 2330—2400 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. 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 list by sending *in step with W1AW* and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 1030—0220 GMT practice on those dates:

Date Subject of Practice Text March *QST*.
May 2: *It Seems to Us*, p. 9.
May 10: *Varactor Multipliers*, p. 11
May 13: *Novices — Are You Ready for 15-Meter Openings?*, p. 34

Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition

May 18: *Semiconductors*, p. 45
May 30: *Ratings*, p. 46

W1AW SCHEDULE, MAY 1966

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. The station will be closed Memorial Day, May 30.

*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]
0430-0500[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]	14.1	7.255	14.28	.....
2330	**Code Practice Daily 10, 13 and 15 w.p.m.**						

[1] CW, OBS (bulletins) 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 and 14.095 Mc.
[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.

Station Staff: W1NPG W1QIS W1WPR. *All times/days in GMT, general operating frequencies are approximate.

Strays

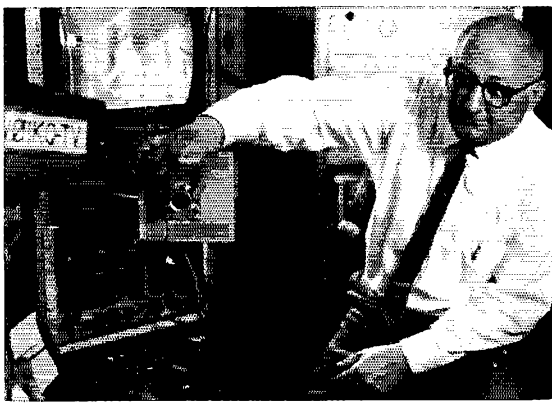
VE7KC, while on the train en route to Toronto from British Columbia, noticed that the push button beside the door to his daughter's roomette had a pretty good "note" for code. Just for fun he tried a "CQ" and signed with his call. The DX wasn't very good but it did raise VE5JZ who had the next compartment!

—...—

If you can't beat em, join em! I lived across the street from W8ZNH for four years. Next, we moved next door to KN8ULC. We moved again, this time next to W8SPV. We are moving soon across from W8HMK. I'm now the proud holder of WA8KME!

During their college carnival, the Palm Beach Junior College ARC set up this Field Day installation for the purpose of handling messages. Shown here is Russ, K1DEG/4 (left) and Warren, WA4EFA.

Capt. Kurt Carlsen, W2ZXM/MM and Alvara G. DeTejada Gayango, EA7JQ at a recent hamfest in Cordoba Senilla, Spain. W2ZXM, in addition to being a notable radio amateur, has now joined the ranks of inventors. Kurt perfected and patented a marine propulsion system which uses a jet turbine of the aircraft type. The engine is mounted vertically with the exhaust going up the stack of the vessel. The turbine rotates at a constant speed and in only one direction, but a differential mechanism makes propulsion possible either full forward or full astern. According to the patent detail, complete control of the propeller movement from full ahead to full astern can be effected directly from the bridge.



This is Bob Noyer, WØIKQ, with his ATV gear in Cedar Rapids (Iowa). Bob's homebrew TV station consists of a 6-foot rack, plus some spill-over equipment. A second TV transmitter, which runs about 1 watt, is used for demonstrations and club talks. The antenna is a 32-element Yagi about 50-feet high, and is fed with low-loss RG-218/U cable. Also visible in the photograph is the 17-inch monitor. *Photo courtesy* of Cedar Rapids Gazette.

The Scarborough Amateur Radio Club of Scarborough, Ontario, Canada, sponsored this fine display of equipment and kept three amateur radio stations in operation for fifteen days during the Canadian National Exhibition held annually in Toronto. All contacts made with the three stations were confirmed with distinctive red, white and blue QSL cards.

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE—SCM, Roy A. Belair, W3IYE—SEC: K3NYG. RM: W3EEB. V.H.F. PAM: K3OBU

Net	*Freq.*	*Local Time*	*Days*
DEPN	3905 kc.	1800	Sat.
DSMN	50.4 Mc.	2100	Tue.
Dover 6&2	50.4 Mc.	2000	Wed.
KCEN	3905 kc.	1300	Sun.

K3NYG worked 17 states on 160 meters during the contest. W3IYE still is operating portable 4 from Spartanburg, S.C. WA3BQT has a new Drake T-4X. Traffic: (Feb.) K3YHR 24, WA3BQT 22, K3YZF 22, W3HKS 5, W3IYE 2, K3NYG 1. (Jan.) W3YZF 52, K3UHU 7.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML, K3YVG, K3MVO. PAMs: WA3BYH, W3SAO. EPA C.W. Net reports 420 QNI with QTC of 385. PTTN Training Net had QNI of 356 with QTC of 199. EPA Emergency Phone & Traffic Net had QNI of 468 with QTC of 160. Feb. was a short month but in 7 years as SCM holds the record for the amount of traffic passed plus another record of 96 station activities and traffic reports received. K3PNY is now Wayne County EC, K3WEU is OO in the Philadelphia area. W3ID, W3DFY, W3KEK and K3SLP report antenna losses and storm damage. 3KXJ is engineer and disc jocky at station WBUX. Aside from being an active trafficker, W3RV also is a shutterbug and will show some of the gang's shack pix at the next EPA dinner meeting. W3ELI finds things pretty hectic at the bullet factory because of the Viet Nam situation. W3FAF, reinstated as an ORS, has activated W3AEQ, Lehigh U. station. New club officers of the Milton RC are WA3BZO, pres.; WA3BBI, vice-pres.; K3RCM, secy.; K3VRH, treas.; W3LXN, act. mgr. W3IMW is running code and theory classes for the R.F. Hill ARC. OT W3OML has returned to the traffic nets and is manager of the Penn. State Post Office Net. K3NZI moved to a new QTH on Route 663. W3RKP was snowbound a full week in Western Md. with no emergency gear. W3HTF, member of the Beacon Radio Amateurs, was presented the *QST* cover plaque award for the best *QST* article in Dec. 1965. New Gear Dept.: K3TLY, a RC-221 and Utica 650A, WA2PTU and W3KXR SBE34, W3BKF a Johnson Pacemaker, WA3CFU built a QRP 125 Mw. rig, W3KXJ a homebrew 10-meter converter K3FSV got CP-25.

New operators in the Susquehanna are: WA3FEF, WA3ETO, WA3ETP, WA3ETQ and WA3EFF. K3LTI and K3BIG are Asst. ECs. K3WEU and K3KTH both noticed the increase in traffic. June *QST* will carry the full 1966 Field Day rules. Traffic: W3CUL 7061, W3VR 1647, K3MYS 1389, W3EML 1010, K3PIE 747, K3MVO 314, WA3AIZ 229, W3ZRQ 190, K3YVG 137, K3FSV 101, K3SLP 100. W3AEQ 98, WA3BYH 81, W3JKX 78, K3WEU 65, K3ZSK 60, W3VAP 54, K3KTH 53, WA3ATQ 52, WA3CFU 52, K3RZE 52, K3TNL 52, K3KXJ 43, W3FGQ 41, W3RV 40, WA3ESV 37, K3RLO 35, W3OY 34, W3KJJ 32, WA3AFI 31, W3ELI 31, W3CBH 29, W3FAF 21, K3LPT 21, WA3CCC 19, K3WAJ 17, K3MDG 15, WA3BSV 12, K3IHJ 12, W3RKF 11, W3ADE 10, W3MPX 10, WA3BBI 8, W3BFF 6, W3BUR 5, K3KKO 4, W3OML 4, K3YQJ 3, WA3DBC 2, WA3BJQ 1, K3HNP 1, K3NZD 1, W3PVY 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Bruce Boyd, W3QA—SEC: W3CVE. RMs: K3JYZ, W3PRC, W3QCW, W3UE, W3ZNW. PAMs: W3JZY, K3LFD.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*Ave*
MDD	3643	0000Z	Daily	28	411	14.7
MEPN	3820	2200Z	M-W-F	23	48	2.2
MEPN	3820	1700Z	S-S			
MDDS	3643	0130Z	Daily	28	42	1.5
MSTN	50150	0100Z	Daily	28	138	4.6

New appointments: WA3BTA, WA3CFK, WA3CVM, K3FKY as ORs; K3EJF as OES. Congratulations to K3IPX/3 on making the Al Operator Club. Operating news: K3UXY found 15 meters best in the DX Contest. W3ZNW is looking for operators for the slow-speed net (MDDS). WN3EOP helped start the Cumberland Valley Two-Meter Net, which meets Sun. at 0000Z on 145.6 Mhz. W3QCW likes 160 meters for a change. W3RKK continues to be active on 6 meters helping with MSTN sessions. W3TN handled volume traffic for the (Tampa) Florida Fair. K3CYA logged intruders in the ham bands. Travel: W3CBC is in Florida and organized a 2-meter net. K3JYZ says his new job requires less traveling. W3WTW's travels help keep him off the air most of the time. W3QA visited the New Mexico SCM, WA5FLG, while in that state. Hardware: K3LFD has a new t.r. switch and a compressing speech amplifier. K3ZSX is building an EICO 753 transceiver. K3ZIX says his linear amplifier is only 5% efficient but it gets out OK. W3-MCG says the crops on his new antenna farm need lots of attention. K3NCM now has amplitude modulation on his 2-meter SET as well as frequency modulation. Emergencies: W3BAM sent in an annual EC report from St. Mary's County. K3GZK was on 2 days and 2 nights with Harford County during the Feb. Blizzard. W3CBW holds monthly RACES drills on 6 and 2 meters from Pikesville. Personal: W3ECP is recovering well from major surgery. W3EOV combines boating and radio by working with Coast Guard Auxiliary communications units. W3CDQ is on the air every day. W3JZY has worked lots of new counties. Many thanks to K3LFD for his help as temporary SCM. Traffic: (Feb.) K3IPX/3 333, W3TN 250, K3JYZ/3 227, K3FKY 128, K3UXY 119, K3GZK 94, K3TJE 90, K3ZIX 82, K3LFD 64, WA3CFK 50, K3ZSX 46, WA3BTA 35, W3PRC 35, K3OAE 27, W3ZNW 27, K3ZSL 27, W3QCW 25, K3EJF 24, W3EOV 22, W3RKK 22, K3VHS 21, W3CQS 14, W3UE 14, W3-ECP 13, K3LLR 13, WN3EOP 12, K3QDD 12, K3URZ 11, W3MCG 9, WA3CRA 8, K3NCM 6. (Dec.) W3PRC 33.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—I regret to report the passing of WA2 ARJ, of Millville. Your SCM recently returned from a month's trip through Florida, visiting the OTs and several friends en route. NJN, New Jersey's ever faithful c.w. net, reports 28 sessions, traffic 308, with 44 different stations reporting in. The Jan. report shows traffic handled as 275, with 52 different stations QNI and 31 sessions. N.J. Emergency Phone & Traffic Net reports 28 sessions, QNI 441 and a traffic total of 293. We need recruits for both nets, and are short on net controllers. NJN operates daily on 3695 kc. at 7 P.M. local time while NJPN operates on 3900 kc. daily Mon. through Sat. at 6 P.M. local time and 9 A.M. Sun. WB2SBD is working good DX with 25 watts. He needs Cape May County for WANJ. WB2SZK applied for EC appointment. WB2-RVE applied for OES. WB2VFX is a new station in this section, recently moved from Maryland. WB2MRA is a new station in Margate City. W2YPZ is putting up a new quad for 20-meter operation. W2BEI had his Advanced Class license renewed. WB2GTE participated in the DX Contest and QSOed ZD8AR. K2ARY is active as an OBS. WB2BTQ is the call of the Audubon Radio Club Net on 145.4 Mc. W2IU participated in the Annual 160-Meter QSO Party and still is looking for recruits for the formation of a 160-meter section net. WA2WLN applied for DXCC. Please mail reports before the 6th of the month, my deadline? Traffic: (Feb.) WA2UPC 169, WA2KIP 102, WB2BLV 76, W2RG 73, K2MBW 25, WB2MRO 24, WA2WLN 24, W2YPZ 24, K2SHE 23, W2-ORS 19, WA2KAP 10, W2BEI 6, W2EWR 6, W2GIW 6, WB2SBD 2. (Jan.) W2YPZ 11, W2GIW 9, K2SHE 8.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ZRC. PAM: W2PVI. RMs: W2RUF, W2EZB and W2FEB. NYS C.W. 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 kc. and 3993 (s.s.b.) 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. Sun. at 1000 and 3670 kc. at 1700 Sat. The GRAMS elected W2GIR, pres.; K2MDS, vice-pres.; WB2MXD, treas.; WB2MXB, secy.; W2CUY and WB2-MXO, dir. K2GUG spoke on V.H.F. horizons old and new at a recent GRAMS meeting. The Penn-York Hamfest Assn. is planning a hamfest to be held in Harris Hill June 18. Chenango Valley ARA elected WA2TFR, pres.; WB2PPN, vice-pres.; WA2LFI, secy.-treas.; W2RME, pub. coor.; WN2UAP, asst. p.c.; WA2RBN, dir. Don't torget the Western New York Hamfest sponsored by the RARA to be held at Vince's Fifty Acres, Route 15, South of Rochester Sat. May 14. RAWNY's Social night and RARA's Valentine Dance proved to be very successful. W2COB is back as NCS of NYSPTEN—sounds like old times. Hope W2BLP and W2HSI had an enjoyable recovery from surgery. Clara, W2RUF, will probably be back on the air by the time you read this. WA2GLA received a certificate of merit for assistance in a trawler rescue. Congratulations of W2OE and K2KQC on making the BPL in Jan. and Feb., respectively. Traffic: (Feb.) K2KQC 2142, W2SEI 261, WB2GAL 171, WA2IHP 161, WA2FOJ 131, WB2UCF 108, W2FEB 98, WA2HSB 92, WA2UFI 52, W2RQF 42, K2-QDT 32, K2IMI 19, W2MTA 14, K2RYH 13, K2BWK 12, K2DNN 12, W2UYE 12, W2PNW 9, WA2GLA 8, K2RYH 5, WB2NNA 4, W2EMW 3, WB2ERK 3. (Jan.) W2OE 457, K2RYH 14.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—Asst. SCM: Robert E. Gawryla, W3-NEM. SEC: K3ZMH. PAMs: W3TOC, K3VPI (v.h.f.). RMs: W3KUN, W3MFB, K3SOH, W3UHN. Traffic nets: WPA, 3585 kc. 0000 GMT Mon. through Sun., KSSN, 3585 kc. 2330 GMT Mon. through Fri. With deep regret we record the passing of K3NWG and WA3BMH. W3-FSB works RTTY on the lower frequencies. WA3DJI and WA3DJH won honorable mention for home-brew 432-Mc. transceivers at their high school science fair. WA3DUS is real proud of his new Swan 350. WN3FGK is a new Novice in Conaopolis. W3PUT, the father of W3SMV, is resting after a heart attack. K3TJO and K3PLQ have left for military service. K3BTF starts code classes for prospective Novices at the Coke Center ARC. W3UHN is adding on new DXCC totals. W3IDO is now a member of the Foothills Radio club. Those enjoying new gear are WA3DEE, Pacemaker; WA3AKH, 75A-1 receiver and Viking II transmitter; WA3CAS, Invader 2000; K3OYC, TR-4; W3TTV, an Invader 2000; W3GJY an HT-32A; W3RTB, an HT-32A. K3KMO does a fine job with the AREC in Centre county. WA3-CJW, a new technician lincenseo, is building a 500-watt transmitter, s.s.b., for SIX. W3HSW came home for a vacation from his satellite and missile-tracking chores off Ascension Island. YU3BH is the Yugoslav Counsel General at Pittsburgh. K3ISR and K3OOP are new members of the Nittany ARC. W3YLJ attends Carnegie Tech. K3KTP now signs EP2WJ in Iran. The Coke Center ARC purchased a new a.c. generator for emergency power. WA3DIS is a new General. WA3DGI and WA3CAS are pres./trustee and secy.-treas., respectively, for the Conaopolis High School ARC. WA3EWP. W3-HHY gave an interesting talk on Antenna Design and Feeders at the Two Rivers Amateur Radio Club. W3-NWB received the 7HK7 award. Sympathies are offered to the family of K3OFV, who passed away recently. K3QHM, WA3BLW, W3MIW and W3SYR are going mobile for the summer. A new Novice is WN3FDS in the McKeesport area. New appointments: WA3AKB and WA3EPQ as ORSs; WA3DJI as OBS. Endorsements: K3VPI as PAM,OES. Traffic: (Feb.) W3NEM 316, W3-KUN 307, K3SOH 213, W3LOS 133, W3MFB 94, WA3-AKH 90, W3BLZ 67, W3GJY 56, WA3AKB 36, K3EXE 29, WA3EPQ 13, W3OEO 8, W3AUD 7, WA3BGE 7, W3JHG 5, K3ZMH 5, WA3AWR 2, W3ELZ 2, W3TOC 1. (Jan.) K3ZMH 10, K3EDO 4.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: George J. Nesbed, W9LQF. SEC: W9RYU. RM: W9WVJ. PAMs: W9VWJ, WA9CCP and W9KLB (v.h.f.). Net reports:

Net	Freq.	Times Days	Traffic
IEN	3940	1100Z Sun.	No report
ILN	3760	0000Z Daily	325
NCPN	3915	1300Z Mon.-Sat.	— 246
NCPN	3915	1800Z Mon.-Sat.	— 430
Ill. PON	3925	1700 Mon.-Fri.	220
Ill. PON	3545	1830 M-W-F	
Ill. PON	50.28	2000 M&Thurs.	
Ill. PON	145.5	2000 M-W-F	

New appointees include W91ZF as OO, WA9GVW as ORS and WA9HQJ as OBS. W9YIX returned home after a short stay in the hospital and surprised his friends by going s.s.b. K9ZKN, K9YVK, WN9PLL, WA9MJW and K9-QPJ are the new officers of MARC (Chicago). W9SXL is back on 160 meters. The North Shore Amateur Radio Club had a light beam demonstration by Mr. Ed Udell of the Illinois Bell Telephone Co. at its Apr. 5 meeting. K9RNR has graduated from Peoria's Bradley University. W9LNQ received the British Commonwealth Award. This column's sympathy is extended to the family and friends of K9VMZ, who recently passed away. K9CYZ has built a new SB-400. K9CZA is the new president of the Kankakee Area Radio Society, Inc. K9DYW, K9ZAF, K9WMM, K9ULF and K9VQC are building an electronic digital and analog computer. WA9NFS is the new trustee of WA9RIP, the club station of the Carl Sandberg Amateur Radio Club. K9BZY is now mobiling on 146.94 f.m. W9EVJ would like to have additional check-ins on the nightly IEN. Please contact him for further details. The Chicago Suburban Radio Assn. has begun a 2-meter net at 1500 CST Sun. on 145.25 Mc. K9EWV, W9BOD, K9BDJ, K9ZOO, WA9KAW, K9USV and WA9AFO have formed the Skokie RTTY Net. K9HRC has a new Heath keyer and is working FB DX. W9ERU, of the H and H Electronics of Rockford, has retired from business and his signals will likely be coming in from the southwest. K9BQQ reports that the Interstate Single Sideband Net had a traffic count of 482 for February. Now is the time to make arrangements for Field Day and get that gear into shape for the annual affair. The Egyptian Radio Club (Granite City) celebrated its Ol Timers Nite Apr. 21. Your SCM was guest speaker at the Annual Dinner of the Kishwaukee Radio Club of DeKalb on Mar. 14. W9PVD is building a new kw. for s.s.b. operating. WA9CCP and WA9-NFS are the recipients of the BPL award for February traffic. Traffic: (Feb.) WA9CCP 1782, WA9NFS 537, K9AVQ 156, WA9GUM 133, W9DOQ 132, K9WMP 107, W9EET 92, WA9POZ 73, K9BTE 68, W9CGC 66, W9-HPG 66, W9HOT 61, K9CYZ 59, WA9AJF 51, W9NYG 41, W9ELL 31, K9HSK 30, K9RNQ 27, W9PRN 20, W9IDY 14, W9LNQ 10, W9HJM 7, W9MTO 5, WA9KLB 4, WA9FIH 3, WA9NSH 3. (Jan.) WA9CCP 1083, W9HPG 39.

INDIANA—SCM, M. Roberta Kroulik, K9IVG—Asst. SCM: Ernest Nichols, W9YYX. SEC: K9WET.

Net	Freq.	Time	Feb. Tfc.	Mgr.
IFN	3910	1330Z Daily, 2300 M-F	247	K9IVG
ISN	3910	0000Z Daily, 2130Z M-S	495	K9CRS
QIN	3656	0000Z Daily	234	WA9BWY

K9GLL, PAM of Hoosier v.h.f. nets reports Feb. traffic 85. WA9IZR, mgr. of RFN, reports Feb. traffic of 107. K9EFY, mgr. of PON, reports Feb. traffic of 20. W9-QLW, RM or 9RN reports that Indiana was represented 100% in Feb. QIN Honor Roll: K9VHY 27, WA9IQV 25, K9HYV 22, W9HRY 19, W9RGB, K9WWJ and K9RGR 18, WA9FDQ and W9HRB 17, K9KTL and K9DHC 16, W9QLW 15. Hoosier amateurs will be happy to know there will be an S.S.B. Dinner the night of Oct. 8 before the Hoosier Hills Hamfest. W9UC is building a new 100-10- and 1-kc. standard. WA9JWL is in Dallas, Tex., attending Microwave School. K9QAV, W9BYM and K9FUJ are conducting a code and theory class for an explorers post in scouting. New officers of the Cury Hall Radio Club are K9DHN, pres.; K4HSD, vice-pres.; WA8IHK, secy. W9YB now has new equipment operating on 6 and 2 meters. The Elkhart Red Cross Amateur Radio Club is now operational on all bands. The Delaware Co. Amateur Radio Club has a new trailer equipped for emergency operations. *Amateur radio exists because of the service it renders.* BPL certificates went to W9JOZ and K9IVG. Traffic: (Feb.) K9IVG 1320, W9JOZ 834, W9MM 452, K9HYV 200, WA9-IQV 187, WA9BWY 185, W9RGB 162, W9QLW 157, W9-HRY 137, WA9IZR 111, W9HRB 91, K9CRS 78, K9KTL 72, W9ZYK 64, K9VHY 61, WA9LUG 59, K9ZLB 58, K9-GLL 55, K9WET 51, WA9BWT 42, W9EJW 42, W9BUQ 35, WA9BGI 32, WA9BRD 31, W9FWH 29, K9RWQ 29, WA9GJZ 25, W9SNQ 25, W9CC 24, K9EFY 22, WA9-JHH 21, WA9FDQ 20, K9ILK 18, W9IZC 16, W9YYX 15, W9RTH 11, WA9BHG 10, K9FHQ 10, WA9BNX 9, K9FUJ 8, WA9JWL 8, WA9MYF 8, W9INL 7, WA9OYI 6, W9BDP 4, WA9DXY 4, W9PMT 4, WA9QXM 4, WA9-NGN 2, WA9CYG 1, W9JPX 1. (Jan.) W9BZI 7.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: K9ZPP. PAMs: W9NRP, K9IMR, K9HJS. RM: None.

Net	Freq.	Time	Days	Sess.	QNI	QTC	Manager
BEN	3985 kc.	1200Z	Mon.-Sat.	24	186	43	W9NRP
BEN	3985 kc.	1700Z	Daily	28	530	310	K9HJS
WSBN	3985 kc.	2215Z	Daily	28	951	368	K9IMR
WIN	3660 kc.	2345Z	Daily	28	337	125	W9KQB
SWRN	50.4 Mc.	0200Z	Mon.-Sat.	23	324	7	W9CTU

OUR HRO-500 receiver has been in production for just about a year now, and in that short period of time has made quite an impact on the receiver market. For example, the HRO-500 is in use by virtually every major U. S. government agency for point-to-point communications, monitoring, surveillance and intelligence work — and by hundreds of industrial concerns for instrumentation as well as communications applications. In addition, dozens of foreign countries already employ the HRO-500 for these services. The first production run was completely sold out many months ago, and we are already half way through the second.

THE POINT IS . . . the solid-state HRO-500 is the first receiver in 20 years which is equally suitable for *amateur* as well as critical commercial use. Unlike previous successful receivers sold to the government and commercial market, the HRO incorporates not only the features which appeal to the commercial user, but also every feature which the amateur demands. One kilocycle dial calibration and rock-solid stability — not only on the amateur bands but throughout its entire tuning range from five kilocycles to 30 megacycles . . . *Passband Tuning* of the filter in the 500 cps and 2.5 Kc bandwidths plus additional built-in bandwidths of 5.0 and 8.0 Kc . . . a selectable tuning ratio of either 50 Kc/turn for rapid band traverse or 10 Kc/turn for really easy SSB work . . . a 50 db *Notch Filter* to knock out heterodynes . . . *AGC Threshold Control* to reduce the effect of background QRM — and a big "intangible" — just plain *smooth* operation in all modes. And amateur owners of the HRO-500 agree with us. Here are a few comments from HRO amateur warranty cards . . .

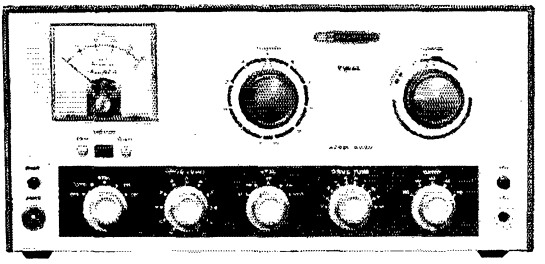
"THIS is what a receiver should be!" — "The finest receiver I have used after 31 years on the air." — "Best I've ever owned." — "I'm amazed at the performance of the equipment and the thought and engineering incorporated." — "Probably the best receiver manufactured in the world today." — "The ultimate." — "The best I have owned, including the top receivers made in the past 30 years." — "Most terrific receiver I've ever used." — "A showpiece of design and engineering." — "Alone in its class." — "Finest receiver in 40 years of radio." — "Tops. No other receiver can come near it." — Well . . . there are many more, but we've probably made our point. And the point is that these are comments from *amateur* owners. We get the same kind of response from our government and industrial customers, but probably, "that ain't news."

AT $1560.00 the HRO-500 is not exactly an inexpensive solution to the problem of a new receiver purchase. We don't believe, as a matter of fact, that more than a few hundred amateurs a year will decide to spend this kind of money — but those few hundred will have more fun with their new receiver than they ever thought possible. Why don't you try the HRO yourself? Just for chuckles . . .

MIKE FERBER, W1GKX

National Radio Company, Inc.

ONE, FOR THE MONEY!



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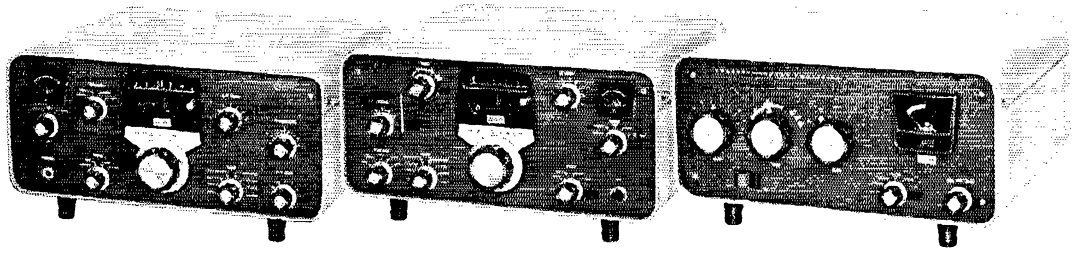
Kit DX-60A, 25 lbs. **$79.95**

THREE, TO GO STEADY!



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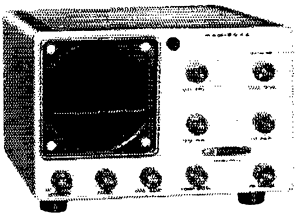

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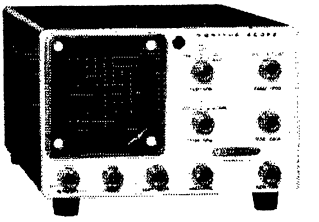
Kit HO-13, 13 lbs.....**$82.95**



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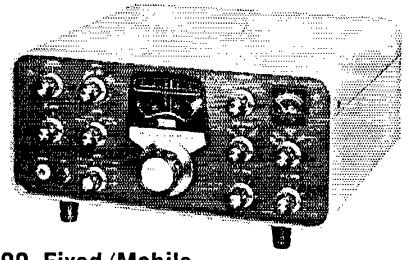

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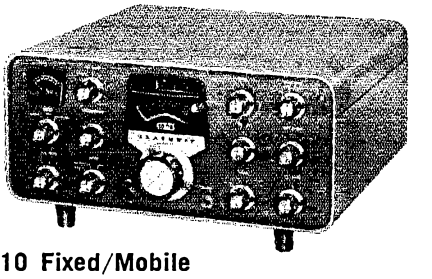

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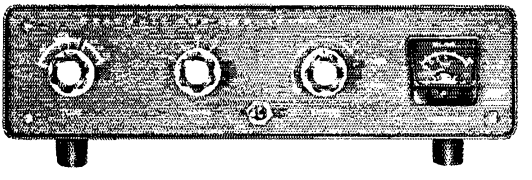
Kit HP-23, AC Power Supply, 19 lbs.....**$39.95**
Kit HP-13, DC (Mobile) Supply, 7 lbs.....**$59.95**



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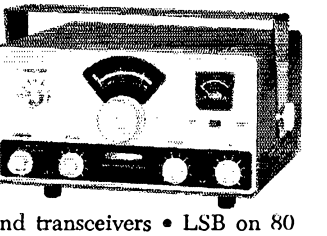
Kit HP-14, Mobile Supply, 10 lbs.....**$89.95**



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Kit HW-22, 40 meter, 15 lbs.....**$119.95**
Kit HW-32, 20 meter, 15 lbs.....**$119.95**

Note new frequency above for WIN. Net certificates were sent to WA9LCJ for BEN and WA9KGJ for WSBN. The WNA Picnic will be held at Iverson Park in Stevens Point July 10. The Milwaukee and Sauk County AREC groups assisted with the Frostbite 500-mile Auto Rally. WA9GJO received an award as outstanding science student. WA9OMO is starting a Novice net on 15 meters in Madison. K9GDF led the OOs in Feb. with 90 notices sent. W9HHX handled traffic at the engineering open house. WA9-GJU has a NCL2000 on the air. K9IMR has a 75A-4 receiver. The BPL in Feb. was made by WA9GJU. Traffic: W9DYG 238, WA9GJU 209, K9IMR 205, W9-CXY 192, WA9NPB 190, WA9LWJ 182, K9HJS 168, WA9MIO 134, W9HHX 115, WA9NFG 104, WA9NBU 57, WA9IVH 54, WA9GJH 53, W9CBE 37, K9GSC 25, W9-KQB 22, WA9MRG 22, W9HWQ 21, WA9LGJ 19, WAØ-IAW/9 17, W9AYK 16, W9BLQ 16, W9YT 16, K9FHI 13, K9DJY 11, K9RCK 7, K9QKU 5, W9RTP 4, W9GGN 2, WA9OMO 2, WN9QJL 1, WN9QWW 1.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke, Jr., WØTCK—SEC: WAØBZG. RMs: WØISJ, WAØEPX. PAMs: KØQBI, WAØJKT, WØHEN, WAØDWM. New EC appointees are KØZRD Wabasha Co., KØAYU Brown Co. and WØZSW Olmstead Co. Renewed were WØMEQ, WØLIG and KØICG as ECs: KØICG and WØTK as OPSs WAØKQU is enjoying his new Eico 753 receiver. I hope many of you were able to work WØQUU and WØIIC from Anguilla, British West Indies, during their stay there from March 10 through 14. They used the call VP2KY, operating a KWM2 and 75S-1. The St. Paul ARC now meets at the Cretin High School library the first Fri. of each month. KØUBK is building a 2-meter beam for WØMXW, the Rochester c.d. station. According to WØPHD, there is much v.h.f. interest in the Red River Valley area. Minnesota AREC membership totals 159 members. Six emergency nets conducted 16 drills during February. Would you like to join? Contact your EC or SEC. Minnesota nets handled 665 messages and had 3385 check-ins. WAØJKT, WAØKQU and WØYC received BPL awards for Feb. traffic work. Traffic: WAØKQU 383, WAØJKT 338, WØYC 127, WAØILX 84, WAØEPX 77, WØTCK 74, KØZZR 67, WAØLOB 55, KØPIZ 51, WAØKUD 38, KØFLT 37, KØQBI 35, WAØBZG 33, WAØDVH 29, WØISJ 29, WAØLOH 22, KØIGZ 21, WAØLVG 21, WØHEN 20, KØZRD 20, WAØLVK 18, WØMXC 18, WAØFUR 16, WAØKFJ 15, WAØDFT 14, WAØFFU 13, WØBUO 11, WAØETL 10, WAØEDN 8, WØUMX 8, WAØDWM 7, KØZKK 7, WAØEQZ 6, WAØLMK 6, WØFHO 5, KØSRK 5, WØENY 4, WAØHRM/Ø 4, WØATO 3, WØFKC 3, KØHJC 2, WAØIUJ 2, WØSZJ 2.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM —SEC: WAØAYL. The NDSU Amateur Radio Society is sponsoring its Fifth Annual Hamfest May 8 in connection with the SHARIVAR, the all Campus Open House held each spring. On May 14 and 15 the club is sponsoring a North Dakota QSO Party. WØAYA strung up a long wire away from the elevator and has been working out much better with it. After an absence of twenty years WØCBM, at Fargo, has returned to the air with a Swan 240 and is getting out well with it on 75 meters. WAØDVT helped get the antenna gang rounded up to help him get on the air. WNØLZD has an SX-101 and is waiting out his Conditional Class license. KØGGL is on 80 meters and handles Viet Nam traffic along with WØKTZ. KØATK is about ready to go on RTTY. WØSDN has been converting to tape gear for RTTY and also is handling Viet Nam traffic. The N.D. RACES Storm Net was on the job during the blizzard in early March with an average of 50 stations standing by. WØPQW, KØSPH, WØCAQ, WØEFJ, WAØAYL, WØRRW, WØWWL did most of the Net Control duties. Traffic: WAØKSB 109, KØGGL 91, WØDM 10.

North Dakota QSO Party

May 14-15, 1966

Need North Dakota for your awards? The North Dakota State University Amateur Radio Society hopes to help you by sponsoring a North Dakota QSO Party from Saturday May 14, 1966 at 2100 GMT to Sunday May 15, 1966 at 2100 GMT.

Rules: 1) All bands may be used and the same station may be worked for additional credit on different bands. 2) North Dakota stations score one point per contact and multiply by the total number of different states, U. S. Possessions, Canadian Provinces and foreign countries worked during the contest period. 3) Other stations count five points per North Dakota station worked and multiply by the number of different counties. 4) North Dakota stations send RS(T) and county and all others RS(T) and name of state, possession, province or country. 5) Copies of the log must be postmarked not later than May 22, 1966 and sent to QSO Party, NDSU Amateur Radio Society, NDSU E.E.E. Building, Fargo, North Dakota.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW —SEC: WØSCT. RM: WAØAOY. KØFQH motored to Chicago for a load of materials for MARS members. WØIGG is home recuperating from a neck operation. WØGWW, KØHHD, WAØLLG, KØFKK, KØFQH, WØSCT and WØWUU were among those attending the Sioux Falls auction Feb. 28. WØBUO attended the Sioux Falls Amateur Radio Club meeting on Feb. 21 in his capacity as Division Director. WØSCT still is adding to his collection of telephone directories of the state. If anyone needs a phone number, he has it. South Dakota S.S.B. Net reports for Feb.: 1170 QNI, 209 QTC. WAØDEM is acting net control. Traffic: KØGSY 579 KØVYY 150, WAØAOY 83, WAØLYO 51, WØSCT 37, KØTNM 32, WAØLLG 25, KØBSW 22, WØDJO 21, KØYGZ 20, WØIGG 12, WAØBZD 6, KØKOY 6, WØBQS 4, KØYJF 4, KØGCE 2, WØJCE 2, WØRWM 2, WØZAL 2.

DELTA DIVISION

ARKANSAS—SCM, Don W. Whitney, K5GKN—There is a noticeable lack of activity of W5YM, club station at the U. of Arkansas, because of construction in the shack. The special effort of K5JXF and K5TCK, along with the club, has made possible a new operations table. Now the principal project of the club is to acquire some new equipment. WA5AER reports that "Hangtown Net" has been changed to the "Fort Smith Area Amateur Radio Club Emergency Net" and meets Mon. nights on 28.6 Mc. It's a pleasure to endorse, for another year, the ORS appointment of W5NND and the RM and ORS of K5TWY. Congratulations to W5OBD on making the BPL. K5TWY reports that the Eureka Springs Hamfest will be held the first week end in May this year. Thanks to John for his very efficient operation of the OZK Net. Feb. net reports, 1966:

Net	*Freq.*	*Time*	*Day*	*Sess.*	*QTC*	*QNI*	*Time*
RN	3815 kc.	0001Z	Daily	28	75	544	638 min.
AFN	3885 kc.	1200Z	Mon.-Sat.	24	12	817	1606 min.
OZK	3790 kc.	0100Z	Daily	28	57	178	480 min.

APON 3825 kc. 2130Z Mon-Fri. 20 98 378 600 min. Traffic: (Feb.) W5OBD 606, W5NND 162, W5MJO 128, WA5IIS 80, K5TYW 64, WA5KJT 59, WA5GPO 40, WA5-HNN 23, WA5KEF 20, WA5KUB 10, K5GKN 6, W5YM 5. (Jan.) W5NND 190.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: K5KQG. RM: W5CEZ. V.H.F. PAMs: WA5HKE and W5UQR.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
LAN	3615 kc.	2330Z	Daily	28	26	6	WA5FND

W5CEZ plans to build a transmatch to improve his doublets. W5MXQ reports into six nets. K5WOD reports the Springhill ARC will be active for FD. K5ELJ and WH5FRU now are both mobile. WA5JOL has full break-in and recently checked into LAN with 1-watt v.f.o. W5IQH is active on 2 meters working into Houma, BR, Morgan city and Breaux Bridge. W5JYA works MARS. WA5OVX is active on 40, 20 and 15 c.w. K5OKR is busy with RN5 duties. K5ARH reports good progress in getting AREC rolling in Lafayette Parish. WA5HGX reports WA5LYP, East Jefferson HSC, operated from the school science fair. WA5KHE says 2-meter reception has been poor locally. W5MBC visited W5GHP for the Mardi Gras. WA5JVL passed the General Class exam. W5BBV, Rapides Parish EC, is organizing a local emergency net on 3897 kc. W5BUK has recovered from surgery. W5CEW and W5BV battle is out on 3900 kc. daily. K5KQG was most active in the La. QSO Party. W5PM and W5LDH spoke at the Slidell Ozone RC. WN5NHJ is having trouble putting his rig on the air. W5NOA is trying to locate a schematic on a transistorized high gain mike preamp. Any help? 145.3 Mc. has been declared the statewide v.h.f. emergency calling frequency. W5SDL and WA5NQR were the subjects of a

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1 kilowatt, **75 meter coil**.....8.95

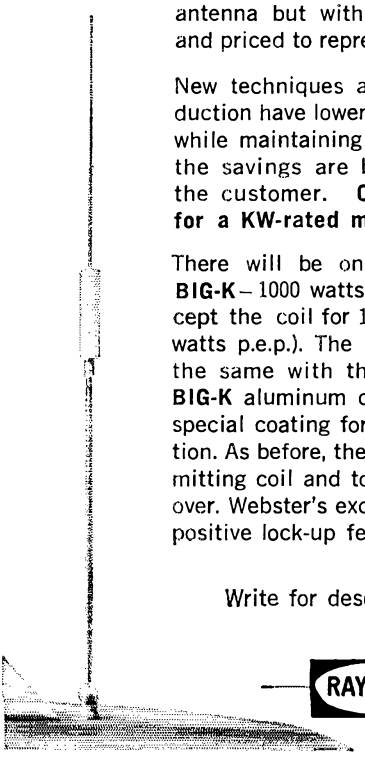
KW-40
1 kilowatt, **40 meter coil**.....8.95

KW-20
1 kilowatt, **20 meter coil**.....6.95

KW-15
1 kilowatt, **15 meter coil**.....6.25

KW-10
1 kilowatt, **10 meter coil**.....4.45

TW-160
300 watt, **160 meter coil**.....5.80



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nice press article. K5EYP is back on. K5JKR has completed a 2-meter exciter. K5PGV has been instructing a class in teletype operation in conjunction with civil defense. W5NQR says over 40 logs have been received from La. QSO Party participants. WA5IRI is heading up an emergency test drill for members of the GNORC. CENLA has announced the dates of July 16-17 for its hamfest. W5AJY made WAZ on s.s.b. WA5CRU was elected Ham of the Month by CENLA. Traffic: (Feb.) W5GHP 504, WA5JOL 353, W5CEZ 147, K5OKR 99, W5MXQ 68, WA5DES 56, W5NBC 52, WA5FNB 43, W5PM 37, WA5EID 28, W5FMO 21, W5IQH 18, W5EA 6, WA5HGX 4, WA5JVL 2. (Jan.) W5GHP 301.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. The Miss. Side Band Net has done a fine job in the few months it has been in operation. New NCSs are K5WUX, WA5LYX, WA5FCP, W5HTV, WA5GHF, W5BW, W5OYH. New appointments: K4UBR/5 and W5IAJ as ORSs; WA5FCP and W5OYH as OPSs, K5IAJ as OO. K5WUX has a fine signal with his kw. final now. W5BW has retired and is devoting most of his time to amateur radio. Sorry to lose WA5NPP to Tennessee. The Natchez ARC is going all out on Field Day plans. W5BW is a new member of the Old Timers Club. W5IDY really is set for emergencies now with power on 80-10 meters. W5JHS continues to do a fine job with the Gulf Coast S.S.B. Net. K5YGT is back on the air. W5OYH is very active mobile. Check into our nets: Gulf Coast S.S.B. Net, daily 1730 CST, 3925 kc.; Miss. Side Band Net, daily 1815 CST, 3898 kc.; Miss. C.W. daily 1845 CST, 3647 kc. Traffic: W5ODV 106, K4UBR/5 60, W5WZ 54, WA5CAM 7, K5WUX 6, W5BW 5, W5IAJ 3.

TENNESSEE—SCM, William A. Scott, W4UVP—RM: W4MXF. PAMs: WA4GQM, W4PFP, WA4EWW.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
TSSB	3980 kc.	Tue.-Sun.	0030Z	24	1057	200
ETPN	3980	M-F	1140Z	20	306	9
TPN	3980	M-Sat.	1245Z	28	985	311
		Sun.	1400Z			
TN	3635	Daily	0100Z	38	344	127
		Daily	0230Z			

W4FX and W4PQP were joined by WA4YDT and TPI club station WA4UCE in the BPL list. The Chattanooga Club, W4AM, wishes all amateurs would keep SASE envelopes on file. K4EJQ and K4LSP report QSOs on 432 Mc. W4HHK sends a very detailed report on Oscar 4 reception on 432 Mc. WA4GOL is elated over an EL2 QSO on 14 Mc. Oak Ridge reports the tentative date of the Annual Crossville Hamfest is July 16-17. Applications now are being taken of EC members by local groups or individuals. Send to your local EC, SCM or SEC. Coordinators are needed in some 70 counties. K4SXD returns to TPI after completing DXCC. Traffic: W4FX 655, W4OGG 336, W4PQP 235, WA4YDT 162, W4RUW 159, WA4IBZ 110, WA4UCE 106, W4UVP 80, W4SQE 76, K4SXD 65, K4UWH 63, W4TZJ 41, WA4GQM 40, WA4GOL 28, W4PFP 25, WA4CUQ 20, WA4CGK 19, W4TZB 16, WA4GLS 15, K4COT 14, W4WBK 14, W4YAU 13, W4KAT 12, K4UMW 12, WA4WYP 12, W4DMS 9, WA4EWW 8, WA1AFP/4 7, W4VTS 7, WA4NUJ 6, WA4BXH 4, W4VJ 3, W4SGI 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: K4URX. Appointments: WA4DYL as ORS, W4RHZ as OO, WA4TJS as EC Dist. 17. WA4WWT as ORS. Endorsements: WA4ROC as OES, K4CC as ORS/OPS/EC Dist. 19, K4NYO as ORS.

Net	*Freq.*	*Days*	*UST*	*Sess.*	*QNI*	*QTC*	*Mgr.*
EMKPN	3960	M-F	0630	20	323	31	W4BEJ
MKPN	3960	Daily	0830	27	351	67	WA4KFO
KTN	3960	Daily	1900	28	851	252	K4YZU
KYN/K8N	3600	Daily	1900/1700	64	533	413	W4BAZ
KPON	3945	Sat.	1300	No report			WA1AVV

WA4WWT has a new HT-37. W4CDA has a special transmitter on 40 for HBN net. W4ISF says the new antenna system is paying off. WB4CLF is the new du-Pont Manual Radio Club call in Louisville. Kentuckiana Radio Club officers are K1GUD, pres.; W4WZI, vice-pres.; WN4BKG, secy./treas.; K4ZZK, asst. secy.; W4YYX, K4GOU, K4FJK, dir. WA4GHQ reports no skip logged on 6 meters but ground-wave good. W4WNH still is copying Oscar. K4CC is active again on KYN and KTN. WA4LLZ is building a new final. The SCM attended a joint meeting of the Pioneer and Bluegrass Radio Clubs in Winchester. K4NYO is back on the air after rebuilding the shack. G3AYL/W4 is operating from Glasgow. WA3DKJ/4 is doing extra duty as NCS on KTN. W4EWL has moved to Syracuse, N.Y. Traffic: W4RCC 320, W4BAZ 297, WA4DYL 262, WA4WWT 163, WA4TPB 150, WA4KFO 145, WA4HJM 144, K4YZU 82, WA4TTE 78, W4CDA 64, WA3DKJ/4 58, WA4UIH 58, K4MAN 52, WA4GMA 44, K4DZM 42, WA4WQZ 39, WB4AIN 36, WA4ZIF 35, WA4IBG 31, WA4AGH/4 28, W4RHZ 28, WA4VCN 28, WA4DXA/4 25, WA4BZS 20, WA4GHQ 17, W4KJP 17, W4NBZ 15, WA4TJS 15, WA4RDE 14, K4HOE 13, W4OYI 13, WA4YDO 7.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8ELW, K8QKY, W8EU, K8KMQ. PAMs: W8CQU, K8LQA, K8JED. V.H.F. PAMs: W8CVQ, W8YAN. Appointments: WA8IAQ, K8KJL, W8QQO as ECs; K8BYX, WA8MQT, K8QKY, W8ZJE as ORSs; K8LNE, W8EJR as OPSs; W8VPC as OO. New officers: Saginaw Valley ARA—K8JLD, pres.; W8KNB, vice-pres.; WA8ORO, secy.; K8LNR, treas.; W8CAM, K8HB, W8LNE, board. Muskegon Area ARC—WA8IQZ, pres.; K8BGP, vice-pres.; WA8GVK, secy.; K8GMB, treas.; WA8DNM, board. Oak Park ARC—W8JAE, pres.; K8NKD, vice-pres.; K8PNZ, secy.; K8KUP, treas.; WA8ASQ, board. Salesian RAC—WA8KLF, pres.; WA8QWJ, vice-pres.; WN8SGQ, treas. Huron Valley ARA—K8PBA, pres.; K8YTB, vice-pres.; WA8CXF, secy.; WA8IAQ, treas.; K8JDM, board. Silent Keys: K8DVI, WA8HJP. The 6th Annual March of Dimes, Marquette/Ishpeming, netted $21,000 and amateurs handled pledges. Muskegon AARC has remodeled the club building and station and put up a 100-ft. tower. The GRARA will have a Swap 'N Shop at Grand Rapids this fall. WA8CTC has a Johnson 6N2, with an ARC-5 for v.f.o. K8TYK and WA8CXF are working on the "Tasyl" awards. WA8CTB made General. WA8DHB has a new HW-12. WA8IKL has new TR-4 and W8RWK finished his new ham shack. WA8RJL made General and an SB-100, both. WA8QHI is secy. of the Van Buren County ARC. W8RX is back on the board at "Semara." K8PNZ won a "Monitorscope" at Heath Detroit Open House. Motor City RC has W8MRM going at Henry Ford Museum, and is setting up an old-time c.w. station at Smith's Creek Station, Greenfield Village, for Old Timers' Night May 7. The Adrian Club monitors 145.35 every night 0200 to 0215Z. New Hazel Park RC meets Wed. at United Oaks Elementary school. K8PVC now is mobile with an NCX-3. K8IHY has a new Swan 350. W8EW has a new QTH with a 120 ft. tower. U of M ARC now is W8UM. WA8KME made the BPL. Traffic: (Feb.) K8KMQ 466, K8LNE 368, W8UFS 209, K2SIL/8 169, WA8KME 156, WA8PIM 150, K8HLR 135, K8GOU 131, WA8BQK 125, W8ELW 114, K8ZJU 111, WA8ENW 104, WA8TML 77, WA8MCQ 72, W8RTN 72, W8EU 68, W8CQB 67, WA8MQT 61, K8BYX 56, K8NJW 53, W8FX 46, WA8MGM 41, WA8LRC 40, WA8PII 38, W81UC 36, W8YAN 32, WA8LRB 28, W8SH 28, K8MFO 23, W8MRM 21, WA8CZJ 20, K8PVC 19, W8WVL 19, W8FWQ 17, K8QLL 14, WA8HGE 13, K8WQV 13, W8EJR 12, W8IWF 12, K9RHU/8 12, WA8CXF 11, W8UM 11, W8AUD 10, K8KBN 10, K8AQA 9, W8FGB 9, K8JED 8, W8TBP 8, K8LOS 4, WA8MKU 3, K8VDA 2, (Jan.) W8EJR 23, W8IUC 18, WA8GRI 12, K8TIG 9, WA8MEE 3.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX W8ADE, K8LGB. PAMs: W8VZ, K8BAP, K8UBK.

Net	*Freq.*	*Time*	*Sess.*	*QTC*	*Avg*
BN	3580 kc.	2100Z	28	307	11%
OSN	3580	2330Z			
OSSB	3972.5	1530&2300	52	1142	22

W8BMS, now VP7DR, was transferred to Grand Bahama Island and is at a missile-tracking station. He will be on 14,285 s.s.b. week ends. The Amateur Radio Editors Assn. elected W8BAH, pres.; W8BAH, exec. vice-pres.; K8ONA, 1st vice-pres.; W8BAH, secy.-treas.; VE3FXR, K6BX, W9BJH, K9BWJ, K4ZRA, W4NOK, dir. Your SCM attended Canton Chapter QCWA's Dinner along with K8ANA, W8AQ, W8AXR, W8DCI, W8DNC, W8DVM, W8ERR, W8EUK, W8HR, W8LYW, W8MEI, W8MND, W8MZV, W8NAL, W8NBK, W8OYV, W8PS, W8QAZ, W8RZ, K8PVI, W8SJC, W8SQW, K8UBK, W8UYL, W8WH, W8YAB and W8ZA. WA8GYT sent the results of the Ohio QSO Party held last Dec. The winner was W9OIJ/8, with W8ERD second and WA8DCQ third. The out-of-state winner was K2ZWI. New appointees are K8JPA and K8AFN as ECs. WA8MQE as ORS, WA8POE as OPS. W8PZS is building an RTTY. W8ERR reports that when the Ohio River went on a rampage the AREC of Jefferson County was alerted for possible service with W8BKP, W8CSD, W8DKM, W8DRW, W8ERR, W8IMX, W8QOB, K8APH, K8BYF, K8KVY, K8LQM, K8OZR, K8QEW, K8TVT, K8VBH, K8VBO, K8ZPR. WA8DRL, WA8FRO and WA8JTP taking part. Also the Queen City Emergency Net in Cincinnati coordinated with the Red Cross in the flood

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alert. Ohio Navy MARS is developing a statewide traffic net on 6 meters and is looking for licensed operators 16 years or older. Get information from James E. Weaver, 11652 *Hollingsworth Way, Forest Park*, Ohio 45240. K8EEQ has a new HQ-180. W8WEG reports that Lima Area ARCs 1966 officers are K8CEP, pres.; WA8AYS, vice-pres.; WA8BJT, secy.; W8WEG, treas.; WA8MIH, act. mgr. K8SUB reports that Scioto Valley ARC's 1966 officers are K8DIQ, pres.; WA8CLJ, vice-pres.; K8OUQ, secy.-treas. WN8SWG and WN8SYL are new Novices. Piqua RC's station, W8SWS, has been reactivated. WA8OWQ has a new Venus. WA8HDQ, trustee of Howland Junior Hams ARC, sent the school's newspaper with a picture of club station WA8ODB, Six Meter Nomads' *The Amateur Extra* tells us that K8PXR has a new baby girl. Greater Cleveland V.H.F. RC's 1966 officers are K8NQW, pres.; K8MBW, vice-pres.; K8QNK, secy.; K8JFX, treas. WN8QKH said the Marion ARC met in W8NSM's club room and heard W8JBY talk on Impedance Matching in Audio Circuits. Canton ARC's *Feedline* says K8JZN has been appointed trustee, K8DHJ has a baby boy, the club has started classes with code handled by K8DHJ and theory by WA8FIP. Kettering ARC's *A-O* reports that WA8LXS is back on 2 meters. WA8OFM has a new Drake R-4 receiver, WA8NCL has a new inverted Vee antenna and WA8KYX is back on the air. K8BXT reports that W8BXA is now principal of East Junior High School in Warren, W8HSP has a TR3, W8FYI is in the hospital, K8DAS moved to Florida and WN8IAS and WN8JWY moved to Shaker Heights. Queen City Emergency Net's *The Listening Post* says 1966 officers are W8QID, pres.; WA8GRR, vice-pres.; K8PMW, secy.; K8MXR, treas.; WA8GPQ, comm. mgr. Babcock & Wilcox ARC heard a discussion continued based on the *License Manual*. Newark ARA's *NARA News* relates that K8ZSZ is in the Air Force, K8LCV vacationed in Calif., W8EOG was in Calif. for additional training, WA8DSD is home from the Air Force. W8DAE, W8RYP, W8UPH, WA8FSX and WA8HVR made the BPL in Feb. South East ARC's 1966 officers are K8TSI, pres.; K8AXC, vice-pres.; K8AYT, treas.; W8TGX, corr. secy.; K8OLB, rec. secy.; K8SVN, editor; W8FFK, K8ZFD, WA8AHU, dir. Warren ARA's 1966 officers are W8HCL, pres.; WA8PTA, vice-pres.; K8BXT, secy.; Imogene Kalman, treas.; K8OZK, trustee. WA8ABE and WA8KIG editors of *Q-Match*. Columbus ARA's *Carascope* tells us W8UPB, our Great Lakes Division Director, spoke to the club. Springfield ARC's The *Q-5er* informs us that W8LAB is in the hospital. Kettering ARC toured radio and TV station WHIO. Massillon ARC saw W8LCA demonstrate radioteletype equipment. Traffic: (Feb.) W8UPH 975, W8RYP 515, W8DAE 383, WA8HVR 361, WA8CFJ 333, WA8GLT 271, WA8FSX 247, WA8CXY 246, WA8BUW 231, W8CHT 201, WA8PMN 158, K8YSO 146, K8UBK 132, W8FSM 118, WA8FKD 106, WA8AUZ 97, WA8JXM 91, W8BZX 90, W8DQD 83, K8EZJ 77, K8BYR 64, WA8MQE 56, W8OUU 55, W8WEM 55, W8LAG 44, W8IFC 37, K8DHJ 23, W8FGD 22, W8LZE 19, K8LGB 18, W8ETO 17, WA8MHO 17, W8WEG 17, W8TV 16, K8LFI 15, W8CEJ 13, W8MGA 12, W8NAL 12, K8DDG 11, W8RZM 8, WA8KPN 7, WA8HFI 3, W8PZS 2. (Jan.) WA8HVR 104, WA8MQE 103, K8HKB 14, WA8AJZ 5.

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. Appointment: WB2QYZ as ORS. Endorsements: W2SZ as ORS, OPS and OES. The Union College Club, W2UC, assisted Dudley Observatory with a project tracking meteor noise by radio signals and later compared with visual sightings. WB2HZY is a new net control for NYS. K2BKU/ON4 spoke of his amateur experiences in Belgium before the Schenectady Club. In New Rochelle the new club officers are WB2GMN, pres.; WB2NVJ, vice-pres.; WA2CFR, secy.; W2YLE, treas.; WB2MOG, sgt.-at-arms; WA2TEQ, K2MPK and K2SJN, directors. We are sorry to report K2KTH, of Valatie, as a Silent Key. New officers of the RPI Club are WA2PJL, pres.; ZS3BL, vice-pres.; WAØDEV, secy.; WA2KIZ, treas.; WB2BXP, equip. spvr. We also regretfully report WB2ICS/RLR, of White Plains, as a Silent Key. Both Hudson Division Director W2TUK and Vice-Director K2SJO were speakers at the Westchester Club. W2FEN described a power supply with a high degree of voltage control to the Albany Club. OES WB2PYZ reports an exceptional upswing in 6-meter activity. WB2HZY is converting some 2-meter a.f.s.k. RTTY units for use in Westchester RACES. A new Novice in West Tarrytown is WN2VUK. WB2TNB has completed a new 220-Mc. rig. Traffic: WA2VYS 318, WB2HZY 249, WB2TNB 110, K2SJN 72, W2ANV 57, WB2JYV 43, K2TXP 37, W2URP 32, WB2-

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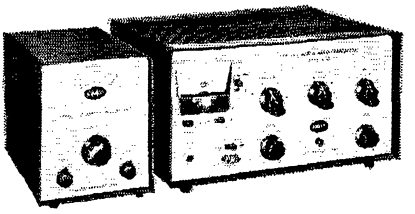

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SPECIFICATIONS AND FEATURES

- Power input to final: 75W. CW, 75W. peak on phone.
- Tube lineup: 6GK6—osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters) 7984-Final. 12AX7 and 6GK6 modulator.
- Crystal-controlled or external VFO. Crystals used are inexpensive 8 Mc type.
- Meter reads final cathode current, final grid current and RF output.
- Solid state power supply.
- Mike/key jack and crystal socket on front panel. Push-to-talk mike jack.
- Potentiometer type drive control. Audio gain control.
- Additional connections in rear for key and relay.

Model TX-62 Wired and Tested only $149.95

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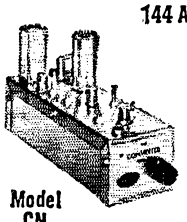
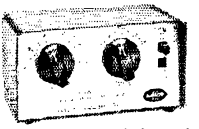
NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE



Model CN

Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. See PS-1 Power Supply. Model CN-50W, CN-144W or CN-220W wired. (specify IF.) $49.95. Model CN-50K, CN-144K or CN-220K in kit form. (specify IF.) $34.95

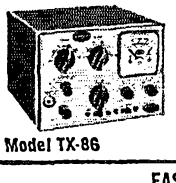
ALL BAND NUVISTOR PREAMP 6 THRU 160 METERS



MODEL PCL, Wired, $24.95
MODEL PCLP, with built-in power-supply, wired, $32.95

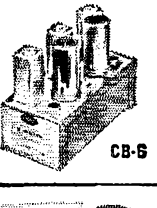
2 Nuvistors in cascode give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required—120 V. at 7 ma. and 6.3 V. at .27 A. —can be taken from receiver or Ameco PS-1 supply. Size: 3″x5″x3″.

COMPACT 6 THRU 80 METER TRANSMITTER



Model TX-86

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5″ x 7″ 7 7″ — ideal mobile or fixed. Can take crystal or VFO. **Model TX-86 Kit $89.95 — Wired Model TX-86W, $119.95. Model PS-3 Wired $44.95. Model W612A Mobile Supply wired $54.95.**



CB-6

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. $19.95
CB 6W — wired & tested ... $27.50
CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp/mix, 6J6 osc. $23.95
CB-2W — wired and tested. ... $33.95
Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. **PS-1K — Kit ... $10 50**
PS-1W — Wired $11.50

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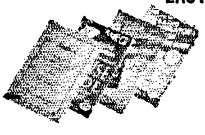

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Radio Operators' Lic. Guide, EL 1-2	.75
EL 3 ..... 1.75 EL 4	1.25
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QYZ 30, WA2JWL 29, K2AJA 22, W2UC 22, WB2HYA 20, W2ODC 17, WA2WGS 14, K2HNW 12, W2SZ 8, WA2-ZPD 7, WB2FVD 1.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. Section nets:

NLI	3630 kc.	1915 Nightly	WA2EXP	— RM
VHF Net	145.8 Mc.	2000 TWTh	W2EW	— PAM
VHF Net	146.25 Mc.	1900 FSSnM	W2EW	— PAM
NYCLIPN	3932 kc.	1600 Daily	WB2DXM	— PAM
NLS (Slo)	3630 kc.	1845 Nightly	WA2RUE	— RM

NYC-LI AREC Nets: *See Dec. 1965 column for schedules.* Many thanks to K2DGI for operating the column last month. New officers of the NYC Chapter of the YLRL are W2OWL, pres.; W2IGA, vice-pres.; ex-W2PZA, secy.; W2EEO, treas. WA2JKX has qualified for OO Class I. If there is ever an unsung hero of the amateur bands, the Official Observer is it. Won't you join that little band of unsungs today? New officers of the Mid-Island RC are WA2LJS, pres.; WA2EXP, vice-pres.; W2OUQ, secy.-treas.; W2OWP, trustee; K2LCK, SAA. Mid-Island now has 11 of its members active on RTTY. New appointments: WB2OUK, WB2QQZ WB2TRD and WN2UBE as OES. A net certificate was awarded WB2SIZ of the NYSPTEN. WA2KSP's son, WA2SAR, was home on furlough a while back. WN2-UGP passed his General, 3rd-class radiotelegraph and worked a whole buncha Novices in the Novice Round-up, all in one month! WB2POZ, faithful old OBS, broke a couple of ribs and missed two or three skeds. WA2-QJU still is grappling with Columbia-type studies. WA2-TKS, Asst. EC for Kings 6 AREC, is mobiling all over the place in a '62 Studebaker. W2HAE went back on 160 after a 26-year hiatus. WB2IGQ subs at WGSM. WA2PIA is home now and doing well after the scooter went one way and he went the other. W2MGO, from Kings Park, went f.m. WA2PJL and WA2YLL, who are up at RPI, get into Long Island from W2SZ. WB2DBW kicked the dickens out of one semester and only has 7 more to go! WA2JKX's son, WA2IMS, is in the Mediterranean with the Gyrenes. W2TUK and K2IDB visited the East Suffolk RC and met a lot of nice folks out there. WB2SRN, WA2UWA and K2IDB got into a spirited discussion of traffic problems. K2UBG and K2-MWN are both readying 2-meter equipment so they can move a midnight sked for Viet Nam traffic to that band from good old 20 meters. WB2RBA and K2UBG were the only ones to make BPL this month. WB2RBA also worked the SCM on 6 meters, which is another rare achievement! WB2NGZ's Swan 350, TA-33 and telephone-type pole are working some pretty good DX nowadays. WN2TCS is burning up 40 meters improving his code speed. WB2RQF is NCS for the V.H.F. Net Tue. nights. K2SYA has a second call, WB2MCT, which is used for Freeport C.D. Hq. W2PF worked many old friends in the recent QCWA QSO Party. WA2DTY has modified the rig for Navy MARS. WB2ASR has a new SX-115. K2IDB has a new Eico 710 GDO. K2KYS has been handling traffic from the *Bertha Ann* lying off the Bahamas. WN2UBE just finished the *Handbook* Single Element for 15 meters. *Listen*, the V.H.F. Net needs more stations capable of bridging between 75/80 and 2 meters. Also, how about you 6-meter guys getting into the 6-meter net being formed right now? Send me a message on six! Traffic: WA2UWA 429, K2UBG 353, WB2RBA 247, W2EW 226, WB2SLI 221, WB2DXM 218, WB2SRN 156, WB2FAJ 114, WB2NGZ 82, WB2AEK 76, WB2EMJ 72, W2GKZ 70, WN2TCS 66, WB2RQF 58, WB2MHT 48, WA2FTS 46, K2UAT 30, W2EC 28, WB2-GKX 28, W2DBQ 26, WB2EUH 25, WB2QKJ 24, WA2-LJS 23, K2YQK 16, WB2MCT 14, W2PF 9, WB2UIV 9, WA2DTY 8, WN2UGP 7, K2IDB 6, W2SEU 6, WB2-BKS 5, K2KYS 4, WN2UBE 3, WB2AWX 2, W2SKX 2.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM: Louis J. Amoroso, W2-LQP. SEC: K2ZFI. The big scoop at the end of February was the call for help by the American Leukemia Society for a donor for a new type of operation. Many hams in the Northern New Jersey section mobilized to spread the appeal throughout the nation. MARS and C.D./RACES were involved as well as ARRL-NTS and independent networks. Five donors were located. The donor chosen was from the Philadelphia area and at this writing the call of the ham who located him is not known. It is impossible to know the calls of all hams involved but here is a list of known participants from the Northern New Jersey section: WB2FLU, WB2FUW, WN2VDP, WN2VHZ, WA2ZWZ, WB2RTF (who located a donor in Erie, Pa., via QSO with a K3 call unknown), WB2QNP, WB2VHG, WN2THT, W2PZG, WB2OKL, K2AGJ, W2KPC, WB2AEJ, K2JJC, K2VNL, K2USA,

EIMAC offers new 1 kW PEP tetrode for SSB with highest linearity—at least -40 db in typical operation

EIMAC's new 4CX1500B power tetrode is the most linear tube on the market; intermodulation distortion characteristics under typical operating conditions are at least −40db at all drive power levels from zero to maximum. The new tube is ideal for advanced single sideband transmitters demanding high linearity to avoid channel-to-channel interference. The 4CX1500B is the product of a four-year development study which included optimization of internal tube geometry by computer techniques. Rated maximum plate dissipation of this radial beam tetrode is 1500 watts, and control grid dissipation rating is 1 watt maximum. Because the 4CX1500B has very low grid interception (typically less than 1.5 mA grid current), it is possible to drive the grid positive without adverse effects upon the distortion level; the tube is therefore recommended for Class AB_2 linear amplifier service. For further information, write Product Manager, Power Grid Tubes, or contact your nearest EIMAC distributor.

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DC Plate Voltage	2500	2750	2900 volts
DC Screen Voltage	225	225	225 volts
DC Grid Voltage	−34	−34	−34 volts
Zero-Signal DC Plate Current	300	300	300 mA
Single-Tone DC Plate Current	720	755	710 mA
Two-Tone DC Plate Current	530	555	542 mA
Driving Power	1.5	1.5	1.5 watts
Useful Output Power	900	1100	1100 watts
Intermodulation Distortion Products			
3rd Order	−38	−40	−40 db
5th Order	−47	−48	−48 db

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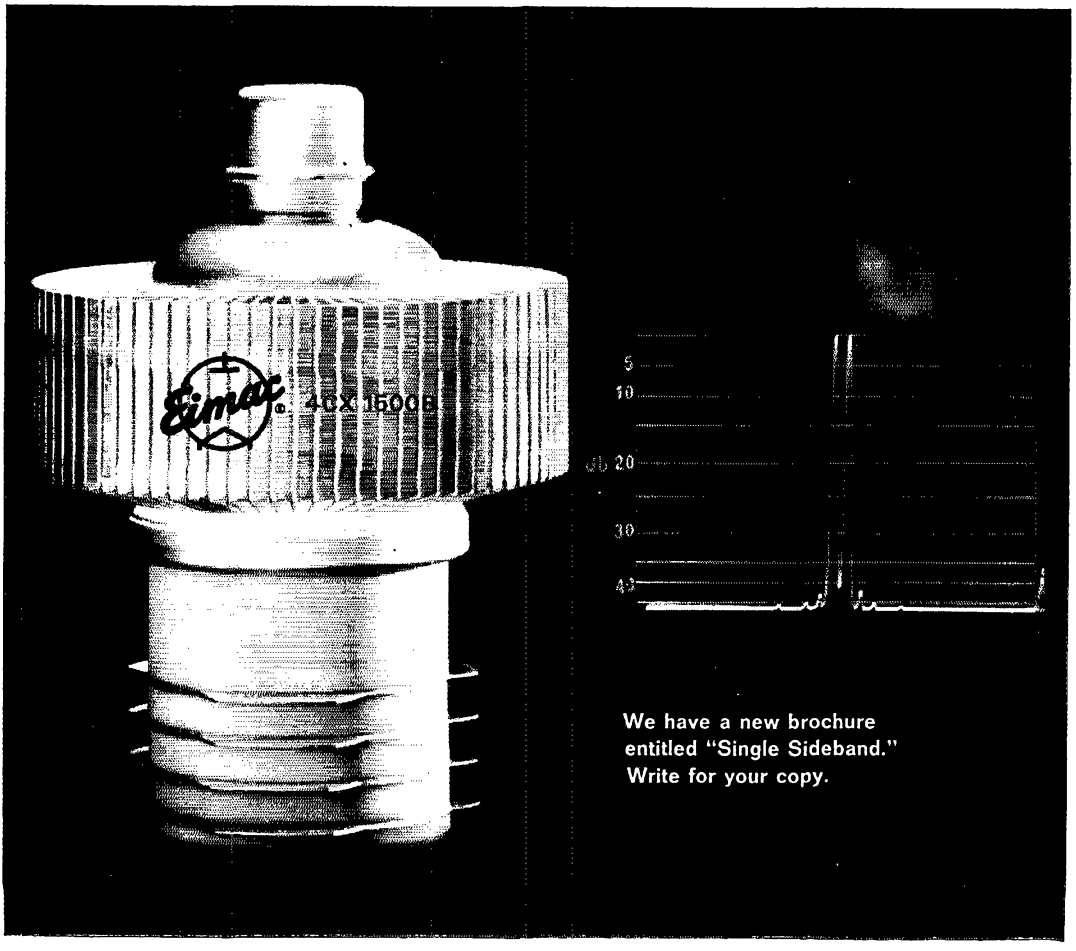


We have a new brochure entitled "Single Sideband." Write for your copy.

W2VQR, K2ZFI, W2CVW and W2LQP. All of the section nets were alerted as well as the CHC-FHC nets, MARS nets, the State C.D. Hospital Net (non-ham) and many independent nets too numerous to list here. Although the appeal was later authenticated by Red Cross, Tucson, Ariz., as near as can be determined it was all started by the appeal of ham operators on the Eastern seaboard. We can be proud of a job well done. New appointment: WB2QMP as OES. WB2KSG has received his 2RN certificate. WA2KHL is working at the Rutgers U. TV station. WA2SRQ is building a new antenna coupler. K2AGJ made 247 QSOs in the YL-OM Phone Contest. WB2KTO has made WAS. WA2YIN, WB2FWI and WB2ICH made the honors list at Rutgers U. College of Engineering. W2JDH and PSEGCo are working on a QRN problem in his area. WA2UDT is on s.s.b. with a Valiant and an SB-10. New officers of the Jersey City Radio Club are K2ONE, pres.; K2SST, vice-pres.; WB2MHQ, secy.; W2ZAL, treas. New members are wanted. New officers of the State Line RC are WB2OZW, pres.; WA2ZCT, vice-pres.; K2KBK, exec. secy.; WB2LDY, treas.; WA2UGT, trustee. WB2QNR has joined the Navy. WB2LDX has a new beam atop a 50-ft. tower. W2CVW showed a slide program on the new ARRL Hq. at the Central N.J. V.H.F. Society's Annual Dinner. W2ABL has a new home again, this time with space for antennas! The North Jersey DX Association will hold its Third Annual DX Round Up May 14. Contact W2VCZ for details. W2NAK has signed aboard the SS *Elaine*, call KVQD, as radio sparks. Ed will operate /MM. Official observations: Feb., W2BVE 60, W2TPJ 56. Jan., W2BVE 27. Traffic: (Feb.) K2VNL 340, WB2IYO 266, WB2AEJ 247, WB2KSG 130, WB2-JWB 117, WB2HLH 104, WB2FIT 86, W2CVW 81, W2-PEV 80, K2ZFI 49, WA2KHL 34, K2JTU 32, WB2OHK 25, WB2QLF 24, WN2THT/2 24, WA2IGQ 22, WB2VHG 16, WA2SRQ 15, K2MFX 10, W2DRV 8, WA2TAF 6, WA2ZQH 6, K2AGJ 4, K2EQP 4, WB2KTO 4, WB2BNK 3, K2RKG 3, W2EWZ 1, WB2ICH 1. (Jan.) WB2KSG 156.

MIDWEST DIVISION

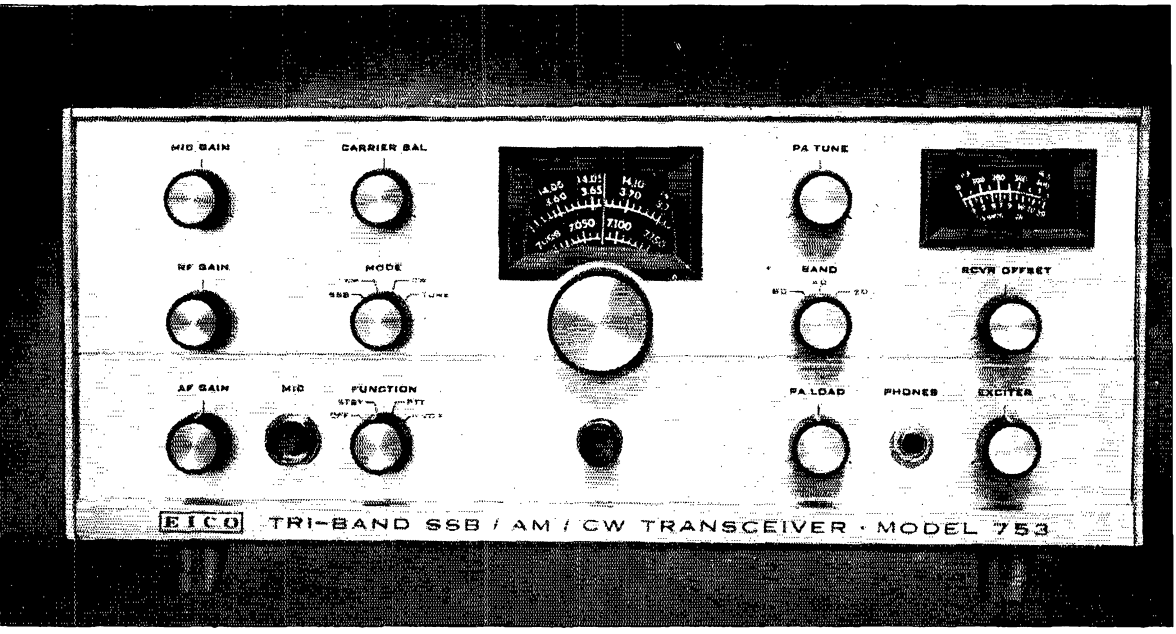
IOWA—SCM, Dennis Burke, WØNTB—SEC: KØ-BRE. One of the most important of our amateur activities sort of fell on its face last fall during the SET exercise. Look on page 29 Mar. *QST*. If your group is listed in the Iowa report you have my thanks and assurance of my appreciation for your efforts. I wish to congratulate Ohio and Alabama, who tied for first place; also Eastern Florida on a consistently good showing, likewise Missouri, Virginia and Tennessee. But to recapitulate the situation here in Iowa: Polk, Woodbury, Pottawattamie and Blackhawk Counties, four out of five of the most populous areas in the section, had no report at all. Net reports for Feb.

160 M. QNI 817 QTC 7 Sessions 28
75 M. QNI 1371 QTC 207 Sessions 24
Tailcorn QNI 151 QTC 6 Sessions 24 lost last month's report
Hamilton County QNI 189 QTC 7 Sessions 28

Traffic: (Feb.) WØLGG 2303, WAØDEM 363, WØNTB 97, WØUSL 88, KØASR 83, WAØDYV 39, WØJEG 39, KØEVC 9, KØTDO 9, WØBKR 7, WØNGS 7, WØPTI 7, WAØMHH 6, WØMMZ 6, KØQKD 5, WAØJYT 4, WØGPL 2, WØNWX 2. (Dec.) KØQKD 130.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. RM: WAØJII. PAM: KØJMF. V.H.F. PAM: WØHAJ. The Army recalled WØKBK to Germany. WAØMLE and WAØFCO have earned TEN net certificates. WAØJII attended a club meeting at Salina taking with him information of the Kansas C.W. Net. KØEMB reports that we now have 557 registered AREC members, also that there is a state-wide 2-meter net in operation, 145.350 Mc. Sat. 2100 CST. The Boot Hill Amateur Radio Club graduated 11 potential amateurs in the last code and theory class. Newton had 60% of those starting now sending in for the FCC Novice exam. There is now a new AREC net for Zone 13 (Western half) 1330 CST 3910 kc., KØYLV net mgr. The Tee-Ni-Chat Amateur Radio Club (Wichita) elected KØIFJ, pres.; WAØJOG, vice-pres.; WAØHJZ, secy.; WØDKU, WAØEHK, KØFBC, board members; KØWUI, net control. With the Wichita Amateur Radio Club, Inc. the project is 6 meters with several projects around this band in the undertaking. The Flint Hills Amateur Radio Club honored WØLUI as its Amateur of the Year Feb. 19 at the Annual Dinner Meeting. The Jayhawk Amateur Radio Society announces another award, the Greater Kansas City Award. For details contact any JARS member or WØAYL, the award custodian. Salina announces June 5 as the date of the Salina Hamfest. OESs reporting for Feb.: WØFII, WAØDZI.

NOW! A 3-BAND SSB TRANSCEIVER KIT FOR 189.95



NEW EICO 753 SSB/AM/CW 3-BAND TRANSCEIVER
WITH SILICON SOLID STATE VFO

Build the finest of SSB/AM/CW 3-band transceivers with 200 watts of SSB punch and every wanted operating facility, plus the extra reliability and maintenance ease inherent in kit design. Assembly is made faster and easier by VFO and IF circuit boards, plus preassembled crystal lattice filter. Rigid construction, compact size, and superb styling make this rig equally suited for mobile and fixed station use. The new EICO 753 is at your dealer now, in kit form and factory-wired. Compare, and you will find that **only the 753 has all these important features:**

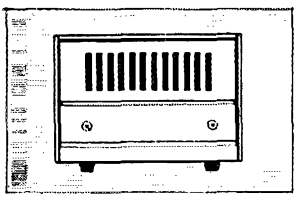
■ Full band coverage on 80, 40 and 20 meters. ■ Receiver offset tuning (up to ±10kc) without altering transmitter frequency. ■ SILICON SOLID-STATE VFO for drift-free and voltage stable operation in both fixed and mobile installations. ■ Built-in VOX. ■ Panel selected VOX, PTT & STANDBY. ■ High level dynamic ALC to prevent flat-topping or splatter and permit the use of a linear amplifier. ■ Automatic carrier level adjustment on CW and AM. ■ Dual ratio ball drive permits single knob 6:1 rapid tuning and 30:1 vernier bandspread (over 10 degrees of scale). ■ Position of hairline adjustable on panel. ■ Illuminated S-meter/PA Cathode Current Meter and tuning dial. ■ Fast attack, slow decay AGC. ■ Grid-block break-in CW keying. ■ Product detector for SSB and CW, triode detector for AM. ■ TR relay with auxiliary contacts for use with high power linear amplifier. ■ Includes mobile mounting bracket.

ADDITIONAL SPECIFICATIONS

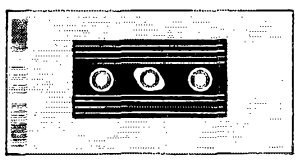
FREQUENCY COVERAGE: 3490-4010kc, 6990-7310kc, 13890-14410kc. SSB EMISSIONS: LSB 80 and 40 meters, USB 20 meters. RF POWER INPUT: 200 watts SSB PEP and CW, 100 watts AM. RF POWER OUTPUT: 120 watts SSB PEP and CW, 30 watts AM. OUTPUT PI NETWORK MATCHING RANGE: 40-80 ohms. SSB GENERATION: 5.2 Mc crystal lattice filter; bandwidth 2.7kc at 6db. STABILITY: 400 cps after warm-up. SUPPRESSION: Carrier-50db; unwanted sideband-40db. RECEIVER: Sensitivity 1uv for 10db S/N ratio: selectivity 2.7kc at 6db; audio output over 2 watts (3.2 ohms). PANEL CONTROLS & CONNECTORS: Tuning, Band Selector, AF Gain, RF Gain, MIC Gain with calibrator switch at extreme CCW rotation, Hairline Set (capped), Mode (SSB, AM, CW, Tune), Function (Off, Standby, PTT, VOX), Carrier Balance, Exciter Tune, PA Tune, PA Load, Receiver Offset Tune, MIC input, phone jack. REAR CONTROLS & CONNECTORS: VOX Threshold, VOX delay, VOX sensitivity, Anti-VOX sensitivity, PA Bias adjust, S-Meter zero adjust, power socket, external relay, antenna connector, key jack, accessory calibrator socket. METERING: PA cathode on transmit, S-Meter on receive. SIZE (HWD): 5 13/16" x 14 1/4" x 11 1/4". POWER REQUIREMENTS: 750 VDC at 300 ma, 250 VDC at 170 ma, -100 VDC at 5 ma, 12.6 VAC at 3.8 amps.

The Model 753 is an outstanding value factory-wired at $299.95.

Power Supplies Tailored for Optimum Performance of the 753.



Model 751 Solid State AC Supply/Speaker Console.
Matching table-top companion unit. Built-in PM speaker.
Kit $79.95 Wired $109.95



Model 752 Solid State Mobile Supply.
For use with 12 volt positive or negative ground systems. Fully protected against polarity reversal or overload.
Kit $79.95 Wired $109.95

EICO For FREE Catalog and 753 Spec. Sheet write to EICO Dept. OST-5 131-01 39th Ave., Flushing, N. Y. 11352

	Sessions	ONI	QTC	Net Mgr.
EC Net	3	52	25	WAØCCW
KWN (WX Net)	28	475	8	KØEMB
QKS (c.w.)	28	170	48	WAØJII
KPN reporting 50% check-ins				
KSBN " 50–75% check-ins			83	KØJMF

Traffic: WØOHJ 705, KØGH 161, WAØMLE 126, KØHGI 87, WAØJII 87, KØGZP 72, KØJMF 55, KØBXF 52, WØFRC 51, WAØCCW 49, WAØFCO 36, WAØEMQ 35, WØFDJ 4, KØVQC 4, WØTSR 3.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK —SEC: WØBUL. New appointees are KØGYK and WAØHQR as OPS, WØTDR as ORS WØJTD as OES. WAØCHH was appointed PAM as manager of MTTN replacing WAØEMX, who resigned. MTTN holds Sat. sessions on 3940 at 11 A.M. MNN meets on 3580 at 1 P.M. and then moves to 7063 at 1:10 P.M. WAØEMS received and A-1 Operator certificate. KØLGZ received the USA-CA 500 certificate. KØJPL is Asst. EC for St. Louis. New Novice Cl. are WNØOGB and WNØOGC. WAØKNW is testing a new cage antenna for 3.5 to 4.0 Mc. operation. QO reports were received from KØJPL, KØGSV, WØQWS, KØYIP. WØTPK has a new SB-100 and battery-operated keyer. HARC reports the Kansas City area call book is being distributed. A trophy will be awarded annually by the SCM to the affiliated club group reporting the highest single-band score for Field Day. The club winning the trophy 3 times gets to keep it. A certificate will be awarded to all club groups who report their highest single band score to the SCM by radiogram before the end of July. Net reports:

Net	Freq.	Time	Days	Sess.	ONI	QTC	Mgr.
MEN	3885	2330Z	M-W-F	12	213	14	WØBUL
MON	3580	0100Z	Daily	—	164	146	WØWYJ
SMN	3580	0400Z	Daily	22	82	76	KØAEM
MNN	3580	1900Z	M-Sat.	27	67	48	WØOUD
QMO	3580	2200Z	Sun.	4	16	7	WAØFKD
MSN	3715	0300Z	Daily	28	49	17	KØONK
MoSSB	3963	2400Z	M-Sat.	24	660	184	KØTCB
MoPON	3810	2100Z	M-F	19	271	97	WØHVJ
MTTN	3940	2300Z	M-F	22	242	136	WAØCHH
HBN	3880	1805Z	M-F	20	889	130	WAØHWJ
PHD	50.4	0130Z	Mon.	4	92	13	WAØFLL

Traffic: (Feb.) KØONK 1259, WØTDR 354, WØWYJ 281, WAØFKD 266, KØAEM 149, WAØFMD 131, WØEEE 124, WØOUD 114, WØZLN 89, WØHVJ 77, WØYO 75, WAØCMO 51, WAØHWJ 37, KØJPS 34, WAØHOQ 32, KØYGR 32, WØTPK 31, WAØBGU 24, KØTCB 24, WAØCHH 22, WAØFQL 20, WØBVL 17, KØIFL 15, KØJPL 15, KØLGZ 15, WØRTO 15, KØYIP 15, WAØ-

KANSAS QSO PARTY

May 21-22, 1966

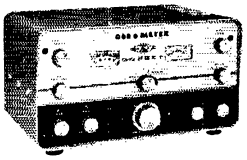
The Jayhawk Amateur Radio Society Inc. of Kansas City (Wyandotte County) Kansas invites all amateurs to participate in the Kansas QSO Party.

Rules: 1) The time will be the 30-hour period from 1800 GMT May 21 to 2400 GMT May 22, 1966. 2) No time limit and/or power restrictions. 3) Kansas stations score one point per contact and multiply by the number of ARRL sections worked during the contest period. Outside stations score 5 points for each Kansas contact and multiply by the total number of Kansas counties worked. *ANY* station working the club station of the J.A.R.S., WØLB, may multiply their total score by 1.5. 4) Stations may be worked once on each band and each mode. 5) A certificate will be awarded to the highest scoring station in each state, province and foreign country (with 100 or more points). 6) The general call will be CQ Kansas. Kansas stations should identify on c.w. "DE (call) Kans." Phone stations will say "Kansas calling." 7) Suggested frequencies are 5 kc. above the National Calling Frequencies and the Kansas net frequencies, 3610 and 3920 kc. 8) Kansas stations send QSO number, RS(T) and County; all others send QSO number, RS(T) and ARRL section or country. 9) Logs and scores must be postmarked no later than June 18 and sent to the Jayhawk Amateur Radio Society, Inc. c/o Bob Summers, KØBXF, SCM Kansas, 3045 North 72nd, Bethel, Kansas 66009. 10) No logs will be returned.

NEW GONSET EQUIPMENT

$5.00 DOWN—THREE YEARS TO PAY!

GSB 2m Transceiver



GSB 6m Transceiver

Here's a chance to pick up an entire 2 or 6 meter rig or improve your present system at minimum initial cost. Any item in the Gonset list for only $5 down and 3 year financing. And where else can you get top-dollar trade-in and a Stay-on-the-Air Plan, permitting you to use your old unit till your new Gonset equipment arrives—At Amateur Electronic Supply.

LOW, LOW MONTHLY PAYMENTS AFTER JUST $5.00 DOWN

GONSET MODEL NO.			
900A	GSB 2m Transceiver (SSB, AM, CW)	(14.26)	$399.50
901A	AC Power Supply for 900A	(2.25)	73.50
902A	DC Power Supply for 900A	(2.70)	79.50
903A	500 Watt 2m Linear	(12.65)	339.00
910A	GSB 6m Transceiver (SSB, AM, CW)	(14.26)	399.50
911A	AC Power Supply for 910A	(2.52)	73.50
912A	DC Power Supply for 910A	(2.70)	79.50
913A	500 Watt 6m Linear	(12.65)	339.00
3341	2m Communicator IV 12VDC+117VAC	(14.62)	409.95
3342	6m Communicator IV 12VDC+117VAC	(14.62)	409.95
3409	Civil Defense Kit for Comm. IV	(2.16)	64.95
3363	Canvas Carrying Bag		12.95
GA-138	108-138mc Xcvr Aircraft	(17.51)	489.95
3362	Civil Air Patrol Kit	(1.62)	29.11
3357	2, 6, + 1¼ meter VFO	(3.06)	89.95
3340	GSB-201 10-80m Linear	(12.27)	345.00
3221	G-50 6m Xcvr, 117VAC	(13.00)	367.30
3300CD	G-50 (CD Version)	(13.90)	389.95

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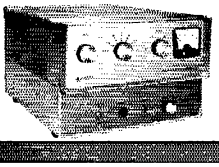

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LYE 11, WØBUL 9, WØECE 8, WAØELM 5, WAØKNW 5, KØFPC 4, WØGQR 4, WAØFLL 3, KØDEQ 2, WAØJLJ 2, WAØDKT 1. (Jan.) WØGQR 3, WAØJLJ 1.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØJXN. Net reports for Feb.: Nebr. Storm Net, KØJXN reporting, 1st session, QNI 1023, QTC 52; 2nd sessions, QNI 885, QTC 33. New net manager is WAØKGD. From Apr. 1 to Oct. 1 this net will meet one hour later. Nebr. AREC Net, WØIRZ, QNI 158, QTC 10. Nebr. Emergency Phone Net, WAØGHZ, QNI 1394, QTC 66. Nebr. C.W. Net, WAØGHZ, 1st sessions, QNI 196; 2nd sessions, QNI 84, QTC 68. 160-Meter Wx Net, WAØCBJ, QNI 772, QTC 48. Nebr. AREC C.W. Net (NACN), WAØEEI, QNI 15. The net now meets at 8:30 P.M. CST Sat. West Nebr. Net, WØNIK, QNI 447, QTC 62. Wx QTC 176. Nebr. Morning Net, KØUWK, QNI 656, QTC 32. Nebraska amateurs were called upon to give service during the blizzards of the first week of March. Traffic: (Feb.) WAØDOU 349, WAØGHZ 268, WØLOD 152 WØNIK 94, WØBFV 76, WAØGVJ 73, WAØCBJ 61, KØRRL 52, KØJFN 51, KØKJP 45, WAØIBL 40, WØYFR 39, WØGGP 37, WAØKGD 34, WØFQB 25, WAØEUM 23, WØVEA 23, WØEWZ 21, WAØIBB 17, WAØBOK 16, KØBRQ 13, WØWKP 13, KØQVN 11, KØHNT 10, WAØHSX 10, WAØHWR 10, WØGEQ 9, WAØIXF 8, WØWRY 8, KØDGW 7, WAØEEI 7, KØVTD 6, WAØERN 5, WAØFNY 5, WAØJTU 5, WØZAG 5, WAØIXD 3, KØUWK 3, WØDDT 2, KØFJT 2, WØHOP 1, WAØJZL 1. (Jan.) WØVEA 26.

NEW ENGLAND DIVISION

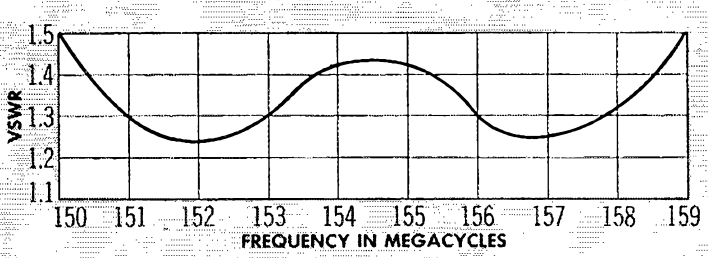
CONNECTICUT—Acting SCM, Milton E. Chaffee, W1EFW—SEC: W1PRT. RM: W1ZFM. PAM: W1YBH. V.H.F. PAM: K1RTS. Feb. net reports: CN (3640 daily 2345Z) 28 sessions, traffic 259 from 277 QNI, most regular: WA1APY, W1RFJ, K1LMS. CPN (3880 M-S 2300Z Sun. 1500Z) 28 sessions, traffic 194 from 475 QNI, high attendance: W1FVU, W1YBH, K1OJZ, W1MPW. The Annual CPN/CN Dinner held Mar. 26 at Yankee Silversmith, Wallingford, was much enjoyed by members of both nets. K1WKB is a student at Cornell, where he operates W2CXM to sked WA1APY. K1EIC/EIR rig troubles are keeping the gals off temporarily. W1QV, W1EFW and W1WHQ attended the installation of the following new Meriden ARC officers: K1QAH, pres.; K1RQO, vice-pres.; WA1DTE, secy.; W1FYG, treas. EC K1QPM reports an active AREC/RACES group in Bloomfield, plus FD plans for the club. W1CWA, K1GTZ is back on after a long absence. W1CNI is a new call in Bloomfield. W1BDI enjoyed the DX Contest. WA1AHQ is at U. Conn. W1BGD now boasts 182/153 in DXCC with 82 worked on 80, including WAC. Pete participated in PJ5ME with W1BIH and W1TCJ the second part of the DX Contest, and is CWA pres. W1QV lost his beam in a Feb. storm. K1TKS reprots from W.P.I., operating W1YK. CARA members K1FEM, W1ZKQ, K1SDF and W1ADW are all active on 2 meters. K1HJV was the first to QSO all 169 Connecticut towns. He did it on 2 from one of the highest points in the state. SEC W1PRT has been clearing the files of inactive ECs so that we have several openings. If interested, contact W1PRT or W1EFW. New ECs: K1OJZ, W1MGF and K1OQG. W1CHR is back on the air now that his antenna is fixed up. Hope you all attend the ARPSC Forum at the National ARRL Convention. Please check appointments and if due for renewal send certificates to W1EFW. If you're not holding one of the ARRL appointments, join the fun by getting yours now. Traffic: WA1APY 421, K1ZND 211, W1EFW 164, K1LMS 148, W1NJM 148, W1BGD 124, K1RQO 120, W1YBH 83, K1YXK 58, K1EYY 46, WA1CYB 45, K1GGG 45, W1GKF 45, W1ZFM 38, W1MPW 32, W1BDI 31, W1PRT 30, K1OQG 23, W1QV 18, K1SRF 18, K1NTR 13, W1FVU 11, K1TKS 11, W1OBR 9, W1BHV 8, W1BNB 8, W1PKQ 6, W1CUH 5, W1CHR 4,

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received reports from W1s STX, LVK, K1s WVW, PNB and DZG. W1ADL is the new Cambridge EC. WA1CBG is a new OES; W1KBN a new ORS. Sorry to report W1MLL and W1WJJ, the XYL of W1AJA, as Silent Keys. The 6-Meter Crossband Net had 20 sessions, 297 QNIs, 58 traffic. K1NDA has a new son. W1LEL is in the hospital. EM80MN had 23 sessions, QNIs 130, QTC 133. K1IMP and W1BPW showed pictures of their DX expeditions at the meeting of the South Shore ARC. The Bedford Club has a net on 29.12 Mc. at 8 P.M. Mon. W1QJB is NC. W1AUQ is very busy as an OO. WA1FRI is the call of the Roxbury Y Radio Club in Medford at W1AQV's QTH. W1BVP has a sked with G3POI on Sun. W1VAH built a 350-watt linear amplifier and worked DX on 80 c.w. W1EHS is on many bands. WA1FRU, ex-WN1DAX, worked 25 countries in a month with 50 watts. W1MSF helped him a lot. W1CT joined the QCWA. WA1CCM has a GSB-100. WA1DHQ has a Johnson Invader. W1AEC has a new Swan 350, a 75A-3

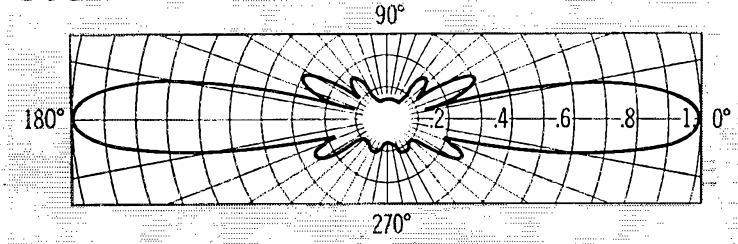
It's Here! The New CPC BROADBAND...

SUPER STATIONMASTER®

Base Station Antenna



9.0 Mc Bandwidth!



This new CPC antenna has all the qualities of its predecessor, plus new features not now available in any antenna made for the land mobile services

ONE WAY —to GREATER efficiency!

RIGHT TURN —to HIGHER performance!

SMOOTH ROAD AHEAD —SMOOTH OUT communication problems!

SHORT CUT —to BETTER communication!

CAT. No. 220-509
SUPER STATIONMASTER

is a second generation antenna growing out of 30,000 STATIONMASTERS and ten years of experience with this type array.

Because of its exceptional bandwidth, the SUPER STATIONMASTER is produced in three ranges which cover the VHF band, 150 to 159 Mc, 157 to 166 Mc, 165 to 174 Mc.

A 10 db—10 Mc wide version, CAT. No. 455-509, is available to cover 450 to 470 Mc in two ranges.

Electrical Specifications

Nominal input impedance	50 ohms
VSWR	1.5:1
Bandwidth	9.0 MC
Maximum power input	500 Watts
Flexible terminal extension	18" of RG 8A/U
Terminations	Type UHF female and Type N male
Vertical beam width (½ power points)	18°
Lightning protection	Direct ground

Mechanical Specifications

Radiating elements	Copper
Element housing material	Fiberglass
Element housing length	20'
Support pipe	2¾" dia. 6061-T6 aluminum pipe
Rated wind velocity	100 MPH
Lateral thrust at rated wind	79 lbs.
Bending moment 1" below ground plane at rated wind	521 ft. lbs.
Weight	30 lbs.

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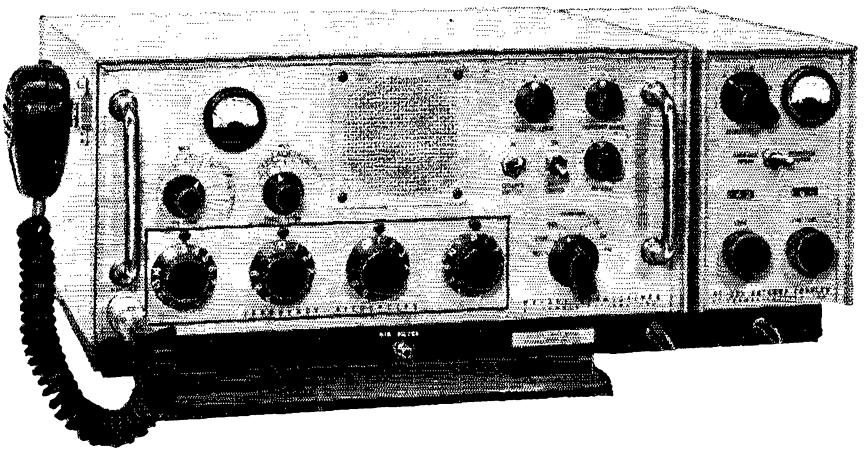
and a 32-V3. WN1s EQZ, EWE and FIN are active in the Novice bands. W1AQH was No. 2 in the world for 3.5 activity in the DX Contest. K1KTC is out of the hospital and back at U. Mass. W1s BYU and ZQQ are heard on 10-meter s.s.b. WN1EOT is DXing on 15 and has 41 states. New officers of the Massasoit ARC are K1CEZ, pres.; K1EQK, vice-pres.; W1KGU, secy.; W1LJH, treas. The club meets the 3rd Tue. of each month at the Grange Hall, Hanson, on Route 27 and on the air Tue. on 28.7 at 8 P.M. Visitors welcome. Our BPLers: W1PEX, W1CRX, K1CLM and K1GPH. W1DYV is DXing on 20-meter c.w. WA1EJN is on 75. EM2MN had 21 sessions 186 QNIs, 126 traffic. K1VOK will have all-band mobile in his car. WA1EYY has a Swan 350 and an El Toro antenna. K1ESG is back on the air. K1ETT is working DX on 20-meter c.w. WA1DECDED were down in the Bahamas. K1YUB says the YMCA Club still is going. WN1FHJ has a 'Twoer. W1AYG was in Seattle, Wash. K1WYF is in Arizona for 6 months. WN1EQU passed the General Class exam. Officers of the National Award Hunters Club: K1ZGII, pres.; K1WRO, vice-pres.; WA1EFN, secy.; K1ZKA, treas.; WA1DFL, awards custodian; K1s TZC and FRT, trustees. Meetings are held on 50.4 Mc. each Sun. at 10 A.M. W1NF says he has been an amateur for 64 years. K1BTF wants to know where the gang is on 2. W1ISI, K1DFJ, WN1EPV, W1IHL, WN1FFY is building a converter for 2 and a quad, also a Sixer. W6RVZ, chief op at K1KBO, says they have a TA-33 up on a 70-ft. tower and are on 20-80. The Framingham Club had a movie. KØPQP and WAØFMY will be operating at Fort Devens. Wellesley ARS had several movies. The T-9 Club met at Randy Spooner's QTH. The Capeway Club met at K1IPB's and W1YTB's. K1ROA is with the Navy at Pensecola, Fla. W1AQE is on c.w. EMNN had 12 sessions, 94 QNIs, 62 traffic, reports K1PNB, WA1FRU now is calling in. The Yankee Club had a speaker from Boston Air Route Traffic Control Center, K1ZJK is instructing a class for Novices. The Middlesex Club had a talk on RTTY by K1YVY, also a talk by Mr. Hallenstein, of FCC. Appointments endorsed: K1YKT, W1MRQ/CHA as ORSs, W1MRQ/CHA, W1AAR, W1AOG as OPSs, W1MRQ/CHA, W1HKG as ECs, W1OFK as OBS, W1NF as OO, W1AOG as OES. Traffic: (Feb.) W1PEX 2446, W1CRX 650, K1CLM 511, K1GPH 446, W1OFK 216, W1EMG 201, W1KBN 171, K1VOK 93, K1KBO 70, K1PNB 61. W1ZSS 51. WA1DLT 45, W1AOG 40, W1DOM 38, K1GKA 38, K1VPJ 37, W1EAE 36, WA1EAT 34, W1OJM 26, W1CTR 24, WA1EYY 23, K1LCQ 17, K1BGK 16, K1ESG 15, W1SIV 15, WA1FCI 11, WN1DZM 9, K1ETT 8, WA1DEC 5, K1ZBZ 5, K1YUB 4, W1AYG 2, WA1DED 2, WN1FHJ 2, K1YKT 2. WA1DJC 1. (Jan.) K1ESG 184, K1PNB 129, K1ZBZ 4.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1QIG. PAMs: K1WQI, K1ZVN. RM: K1TZH. V.H.F. PAM: K1OYB. Traffic nets: Sea Gull Net, 1700 to 1800 and 2000 to 2100 on 3940 kc. Mon. through Sat. Pine Tree Net C.W., daily at 1900 on 3596 kc. K1TMK is headed for a tour with the Navy and K1TZH is taking over as RM. Hope every one will give Les all the help possible. Trust Curt will be back with us soon and good luck to him. The v.h.f. news from K1MTJ is that there is not much in band openings but skeds are still being kept. K1TMJ has a 432-Mc. rig trying to work out on that band. With the coming of good weather there will be many mobiles around to check in the nets and help out in any of the emergencies. There will be quite a few s.s.b. mobiles this year, also. Have you heard W1JTT on the flea-power rig? What a nice job he is doing, too. Traffic: K1TMK 200, K1WQI 61, K1VUU 42, K1ZVN 24.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: W1ALE/W1TNO. PAM: K1APQ. RM: W1DYE. The GSPN meets on 3842 kc. Mon. through Fri. at 2330Z and Sun. at 1430Z. The VTNH Net meets on 3685 kc. Mon. through Fri. at 2330Z. Endorsements: W1JB/W1APK as OBS, OPS and OO; W1DYE as RM and ORS; W1PYM, K1AEG and W1SWX as OOs. Les Cushman, of Cushcraft, spoke at the Manchester Radio Club. Winners of the N.H. QSO Party were W1DYE, W1SWX and K1CXP. W1DYE has a new 75A-4 and keyer. K1IIK has an SB-33 mobile. K1APQ reports 655 check-ins and 66 traffic for GSPN. The Nashua Mike and Key Club held its 27th Annual Banquet with Director W1QV as guest speaker. K1APQ made a trip south to visit K1PCY and W1BXM. W1SWX just ran out of news. How about more information from you folks out there in radioland. Traffic: (Feb.) W1ALE 76, K1IIK 58, W1DYE 53, W1MHX 21, W1SWX 4. (Jan.) W1DYE 18. (Dec.) W1DYE 201.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE. PAM: W1TXL. RM: W1BTV, V.H.F. PAM: K1TPK. Endorsement: W1YKQ as ORS. The



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It is the RF Communications Model RF-301

Now nomenclatured AN/URC-58

The Model RF-301, SSB Transceiver was designed by RF Communications as a company product without government support. It was designed to be used by military customers in military applications. Now in production, it can be bought in quantities from one unit up with short delivery (averaging 30 to 90 days) at a very modest price. The RF-301 costs about one-third of that normally paid for military transceivers with similar characteristics.

RF-301, SSB TRANSCEIVER
Brief Specifications

Frequency Range: 2 to 15 Mc
Synthesizer: Can be tuned to 1 Kc increments. Provisions for unlocking synthesizer and tuning continuously.
Power Output: 100 watts p.e.p. and average
Stability: 1 part 10^6 standard, 5 parts 10^8 optional
Modes: USB, LSB, AM, CW. Also FSK with adapter.
Power Input: 115/230 volts, 50/60 cycles standard. 12 or 24 volt DC with additional built-in module.
Size: 7¾ x 17 x 14¾ inches • **Weight:** 59 pounds

Please contact us for further details.

R F COMMUNICATIONS, INC.
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NCRC Club of Newport, W1SYE, set up communications for the "End Measles Sunday." Those participating were WA1CSO, W1JFF and W1RDH. WA5BNH/1 was admitted to membership and WA1FTB received his Tech. Class ticket. The club will hold its Annual Spring Auction Mon. May 16. The W1AQ Club of Rumford issued WRI certificate No. 72 to WA9AJF and No. 73 to W4KA. Governor John H. Chafee of Rhode Island has proclaimed the week of June 4, 1966, as Amateur Radio Week for Rhode Island. Several clubs intend to put on displays in their towns and have several operating stations. Radio clubs taking part are W1AQ, W1OP, W1DDD, W1SYE, R.I. Mobileers, Roger Williams V.H.F. Society and Fidelity RC. K1TPK is receiving 432 Mc. W1VWR has a new harmonic and has started to handle traffic once more. Traffic: (Feb.) W1BTV 183, W1YKQ 108, W1TXL 88, K1TPK 82, K1VYC 63, K1YEV 52, W1VWR 34, K1YVN/1 33, K1VPK 17, WA1CSO 14, WA1FAV 13. (Jan.) W1VWR 4.

VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA. Feb. net reports:

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*NCS*
Gr. Mt.	3855	2130Z	DyxS	575	31	W1VMC
Vt. Fone	3855	1300Z	Sun.	174	0	W1UCL
VTNH	3685	2230Z	M-F	100	56	K1UZG
VTCD	3900½	1400Z	Sun.	92	33	W1AD
VTSB	3909	2230Z	M-S	459	6	W1CBW
		1230Z	Sun.			
CVARC	145.8	2400Z	Sun.	26	0	W1JLF

The above are summer times. Please note change for VTSB Net (6:30 P.M. EDT). The Vt. Trading Post Net had 72 check-ins for Feb. Sorry to lose W1YFL from Grand Isle County. W1AD and K1BQB now are on SB with an HW-12. WA1FTV is a new ham in the area with an HW-12. Our sincere thanks to those who helped make the Vt. QSO Party most outstanding this year. Traffic: (Feb.) K1BQB 190, K1UZG 26, K1LLJ 14, K1MPN 6, K1EQI 4, W1JKG 4. (Jan.) W1QZE 7.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: K1IJU. C.W. RM: K1IJV. W1MNG was the guest speaker at the February meeting of the Hampden County Radio Association, and its monthly bulletin sums up his talk with the one word, "tremendous." The first month's instructor in the club's theory class was club president K1RPB. WA1ELX is on all bands with a vertical. WA1BZQ is now on 10 and 40. The Valley Amateur Radio Club of Springfield held its annual Auction Night in February. The club's mailing address is WA1BRU, 92 Dwight Road, Springfield, and the club call is W1KWX. Cathedral High School in Springfield now has a beautiful ham layout: Apache with SB-10 sideband adaptor, Mohawk receiver, SX-101, DX-20 and mucho test equipment. The club advisor is Sr. Loretto Thomas, K1ZOH, who invites any and all to come and visit K1UHA anytime during regular school hours. The 1965-1966 officers of the Berkshire County Amateur Radio Association are K1TRZ, pres.; W1HRC, vice-pres.; K1SBW, secy.; W1MWE, treas. The editor of the club's *Random Scatter* is W1BKG, with K1WZY, W1UDT and W1FVT as reporters. K1CTL does the mailing. W5MDB is a newcomer to West. Mass. He is located at 64 Tower Drive, Dalton. Welcome to the section, Stan. K1GFT/4 is now P.O. Box 2322, New Smyrna Beach, Fla. 32069. W1FKN is busy on a MARS net. If you hear WA4VEP, it is none other than Bob Ralston. And, oh yes, WMN still is going strong on 3560 kc. nightly at 7 P.M. Traffic: K1IJV 120, W1BVR 80, K1SSH 71, K1WZY 38, K1LBB 31, W1YK 25, WA1ELX 12, W1DVW 7, W1ZPB 7.

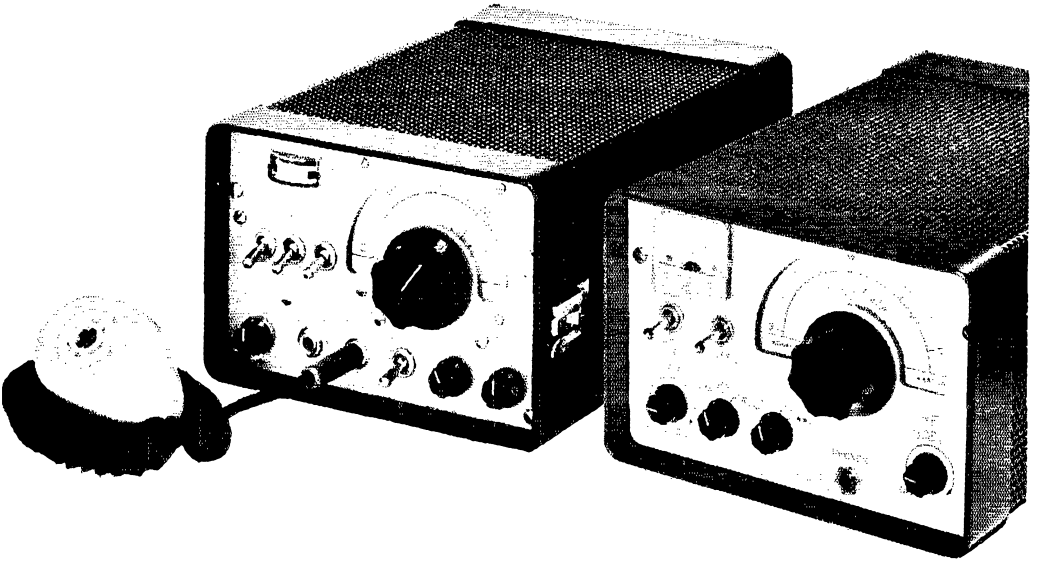
NORTHWESTERN DIVISION

ALASKA—Acting SCM, Daniel R. Wright, KL7ENT—The World Championship Sled Dog Races, held in Anchorage each year, was won this year by one of our native boys, Joe Reddington, of the United States Army and a native of Flathorn Lake. Our *amateur coverage* of this race along the trail (25 miles) has been a function for many years. There's a grand feeling between amateur radio and race fans that it fosters. The following stations participated: KL7CCI, KL7DRW, KL7DLA, KL7EQQ, KL7FCN, KL7CDG, KL7EAR, KL7EWD, KL7FDI, WL7FNG, KL7APN, KL7BDX, WL7FLS, KL7FCD, WL7FJJ, KL7BCH, KL7BJD, KL7GAH, KL7ALA, KL7DDM, KL7EKB, KL7PJ and KL7BTP provided equipment used by those above along the trail or were on the position board on Fourth Ave. KL7EKB kept Wayland, Mass., home of the defending champion Dor Lombard, informed of the progress of the races in all three heats.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. V.H.F. PAM: K7IOA. K7LZF received

DESIGNED FOR THE AMATEUR WHO IS

ACTIVE ON SIX



COMPLETE, SELF-CONTAINED STATION FOR FIXED, PORTABLE, OR MOBILE OPERATION.

LI'L LULU TRANSMITTER FOR 6

Special gang-tuned circuits in Li'l Lulu let you QSY instantly — there's no buffer tuning and final dipping needed when the frequency is changed. And the rig is really TVI proof! By keeping the VFO grid circuit in the 25mc range, TVI is eliminated.

• 117 vac, 12 vdc integral power supply. Class A high level modulation. Carbon dynamic or crystal mic input. Push-to-talk, or use panel switch • Built-in cw keying filter • VFO spotting switch • VFO control • 12 DQ7 final.

LI'L LULU RECEIVER FOR 6

Specially developed to complement the famous Li'l Lulu one-knob-controlled transmitter for 6 meters, the new Li'l Lulu receiver is unmatched for performance.

• AM, CW, SSB • Product detector for SSB • BFO crystal controlled • Delayed AGC operates on AM, CW, SSB • Integral front-end filter • Tunes 50-54 mc, and 10 mc for WWV and converter input • Critical components are temperature compensated • 10 mc crystal filter ahead of 3 IF amplifiers • Built-in CW monitor • ANL operates in all modes • S meter controlled by non-delayed AVC • Front panel control for companion transmitter — 80 to 1 drive reduction for precise tuning • Matches the Li'l Lulu transmitter.

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an ARRL Public Service Award for his efforts in conjunction with a traffic accident near Browning. Officers of the Billings Club are K7VCA, pres.; K7RGI, vice-pres.; K7YEM, secy-treas.; WA7BJV, editor; K7VSS, W7VLY and WA7ARA, executive board. If you wish to receive a copy of the Yellowstone Radio Club paper *Splatter* drop a line to P.O. Box 313, Billings 59103. Teen-agers in the state are reminded of the Billings Teen Age Net which meets on 3880, also the Montana Novice Net at 7:30 on 3710. WN7EXQ is a new call in the Billings area. More and more Billings stations are getting on 2 meters every day so if you are in the Billings area check 145.44 Mc. and 145.350 Mc. f.m. for a QSO. W7JRG now has 24 states on 2 meters and several DX QSOs on 432 Mc. W7FSP is on 2 meters in Butte. Lyodd puts a fine signal into the Anaconda Deer Lodge area. Check 144.450 for a QSO into the Butte area. The Helena Club's Dinner had a fine turnout of state hams. W7PF has a new SB-100 on the air as does the Bozeman Club group. The coming hamfest at Glacier Park includes a preregistration address of P.O. Box 1209, Anaconda 59711. This year's hamfest will include a homebrew equipment contest, mobile judging, hidden transmitter and the hamfest committee also is planning on a swap table. If interested in helping out with the hamfest, drop a line to P.O. Box 655, Anaconda.

OREGON—Everett H. France, W7AJN—SEC: W7AJN. RM: W7ZFH.

OSN	3585 kc.	0130	GMT	Mon. through Fri. (NTS)
AREC	3875 kc.	0230	GMT	Daily
OEN	3840 kc.	0200-0300	GMT	Daily

New appointment: WA7CAQ, ORS, also is active on OSN and RN7. K7IFG, OSN mgr., reports for Jan.: Sessions 21, attendance 113, traffic 29. W7AZD mgr. AREC, reports for Jan.: Sessions 11, counties 6, attendance 77, contacts 12. W7DEM reports the following from Grants Pass: WN7CGW now is WA7CGW, W7ADF is in Florida for the winter, K7CMV is on the air with an NCX-5. W7MEV is on with a Swan 350. WA7CAQ worked SP9, DL1, I1 and HK 3 in the recent DX Contest with 70 watts and a vertical antenna. W7LNG, as OO, has a new receiver and a signal calibrator for spotting band edges. W7KTG, also an OO, and W7LNG are on the TVI committee and have held a meeting with the City Manager. Traffic: K7IWD 207, K7IFG 148, W7ZB 108, WA7CAQ 58, W7ZFH 22, W7AJN 10, W7DEM 9.

WASHINGTON—SCM, Everett E. Young, W7HMQ—SEC: W7UWT. RM: W7OEB. PAM: W7LEC. V.H.F. PAM: W7PGY. NTS nets:

WSN	3535	Daily	0100Z	QNI	273	QTC	564	Sess.	28
NTN	3970	Daily	1930Z	QNI	1252	QTC	582	Sess.	28
WARTS	3970	X-Sun.	0100Z	QNI	668	QTC	54	Sess.	24

Director W7PGY would appreciate comments on League affairs from all members. The ARAB Hamfest is set for May 21. WA7CFY made WAS and also assists in the rare blood hunt for the Naval Hospital, Bremerton. K7JHA recommends WSN or NSN for code speed help. W7JVF is active on 21 Mc. W7OEB states that K7-VNV is troubled with TV "cable" interference. W7YFO is QRL with tri-band mobile. W7GYH is home in Walla Walla after some work in North country. K7YDZ's Feb. DX was HC1, LU8, JA1, PJ3, HK4, VR1, HI8, KX6, VP5, KP4 and HK3. K7ZVA has applied for ORS appointment. W7AIB tops the DXCC 200 mark. Clallam County ARC is thriving in its new club house. W7GYF, K7CNB and K7UWL are active on 146.16 Mc. W7ZEV experiments with counter-poise under beam W7AJV joins Navy MARS (NØEIX). W7PI thanks K7CTP and W7APS for WSN help. Check with K7KOT or W7IKG for information on Sun. hunts. The RC of T. plans code classes at 0300Z at DK Hq. with W7OS as host the 2nd and 4th Wed. W7AEA is now trustee for W7DK. K7-GPK is heard on TEN again. The Northwest Amateur Radio Communications System (NARCS) plans its Fourth Annual Picnic July 16-17 at White Pass, Indian Creek. W7IIG gave the Mount Baker ARC gang the works on solid state power supplies. Deepest sympathy is extended to W7JC on the loss of his XYL. W7AXT is trustee of ARAB station W7VE. K7YDM is mgr. of ESN. W7LEC reports WARTS members have received net certificates and work is progressing on issuing certificates to NTN members. WN7DXI is the new mgr. of the Code Practice Net Mon. through Fri., 3728 kc, 1700Z. W7LEC is available to clubs to discuss OPS certificates and their meaning to you and the league. K7WTG reports 32 members for Puget Sound Emerg Net, with 15 official mobiles meeting on 50.85 Mc. VARC Inc., elected W7SLB, pres.; K7LVS, vice-pres.; W7TYI, secy.; W7WHV, treas. W7JJK, with a new

ANTENNA BREAKTHROUGH

IN PERFORMANCE, VALUE, QUALITY, PRICE, AVAILABILITY

ALL-BAND VERTICALS

QUALITY MATERIAL

Brand new mill stock aluminum alloy tubing with Aluminite finish for protection against corrosion. Loading coils made by Barker & Williamson.

ALL-BAND OPERATION

Loading coil not required on 6, 10, 15 and 20 meters. For 40, 80, and 160 meters, loading coil taps are changed manually except if a wide-range pi-network output or an antenna tuner is used; in this case band changing can be done from the shack.

EASY ASSEMBLY

Less than two minutes is all you need to put your vertical together. No special tools or electronic equipment required. Full instructions given.

SIMPLE INSTALLATION

Goes almost anywhere. On the ground, on the roof, or outside your window.

AMAZING PERFORMANCE

Hundreds of reports of exceptional DX operation on both low and high power. You will work wonders with a Gotham vertical.

NO GUY WIRES

Our design eliminates unsightly guy wires. You save time, trouble, space and money by avoiding guy wires.

"All band vertical?" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, 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!

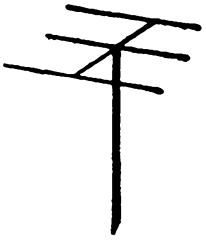
V40 vertical for 40, 20, 15, 10, 6 meters.....$14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters. $16.95

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

ALSO AVAILABLE AT
AIREX RADIO CORP., NEW YORK CITY
CANADA — ON REQUEST

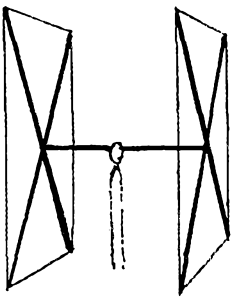
BEAMS



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.

3 EL-20 METER.....$22.00
2 EL-20 METER..... 16.00
3 EL-15 METER..... 16.00
2 EL-15 METER..... 12.00
4 EL-10 METER..... 18.00
4 EL-6 METER..... 15.00

QUADS



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

TWENTY METER CUBICAL QUAD. $25.00
FIFTEEN METER CUBICAL QUAD. 24.00

HOW TO ORDER: SEND CHECK OR MONEY ORDER. WE SHIP IMMEDIATEY UPON RECEIPT OF ORDER BY RAILWAY EXPRESS, SHIPPING CHARGES COLLECT.

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

antenna farm, is active on both h.f. and v.h.f. The Boeing Employees Amateur Radio Society (BEARS) announces a Washington Section QSO Party all modes-all frequency affair for Sept. 17-19. Contact K7NWS for information. The AREC nets for Pierce County meet Sun. at 0400Z, 29.51 and 145.65 Mc. and Wed. at 0330Z on 29.6 Mc. and 51.00 Mc. NW S.S.B. Net reports for Feb. QNI 1190, QTC 139, 31 sessions and 108 members. Traffic: (Feb.) W7BA 1404, W7HMA 711, W7DZX 707, K7TCY 679, WA7CFY 376, K7CTP 200, K7JHA 196, W7JEY 167, W7OEB 90, W7APS 82, W7BTB 70, W7PWA 61, W7PI 55, W7HMQ 53, K7YDZ 36, K7ZVA 26, W7-AIB 13, W7GYF 12, W7ZEV 8, W7AJV 5, W7EVW 4. (Jan.) W7PWA 99.

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—I have been reelected for another two-year term as SCM. WB6CSD is the new RACES Radio Officer for Napa County. Gordon also serves as assistant EC. K6TFT reports traffic is off because of his working the swing-shift. WA6ECF is /3 at Johns Hopkins University doing graduate studies and reports that although the school station was inoperative he was able to listen in on the Jan. CD Party. We welcome W6YKS, formerly of Fortuna, to Oakland and the East Bay section. John is ORS/OES and very active in c.w. traffic-handling. WB6ETY is working on a 2-meter ARC-5 receiver. WA6WNG has a model 15 RTTY machine. W6LDD, W6CMG, WB6ILH and K6LRN were heard during the first half of the DX Test. W6TYM made a trip back to the East Coast in Feb. But still turned in a nice Traffic count. WA6PTU handled 4 telephone relays. WA6-FBS has a new NCX-5 and a Hy-Gain 40/80 trap dipole. I see from the various club papers that there is a general lack of activity. I would be glad to talk to any group about participation in the ARRL Communications Dept. program.

NCN	0300Z	Dy. 3.635
NCTN	0200Z	Dy. 3.905
BAN	0245Z	Dy. 146.7

Traffic: (Feb.) K6LRN 506, WA6WNG 247, W6TYM 216, K6TFT 81, WB6ETY 67, WA6QZA 24, WA6PTU 18, W6YKS/6 13, WB6NUI 2. (Jan.) WA6FBS 2. (Dec.) WA6ECF 12.

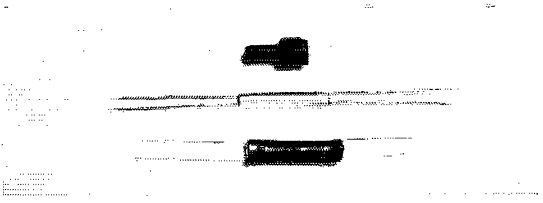
NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. The Las Vegas Radio Amateur Club is expanding the 2-meter f.m. public service in Southern Nevada with repeaters receiving on 146.94 Mc. and transmitting on 147.5 Mc. K7CMI, who was issued SNARC certificate No. 90, has been endorsed for 75 valid contacts. SNARC issues a certificate to any amateur who has 25 or more valid Nevada contacts. W7COL dropped the "N." W7HWL and WA7BEU have new wheels for their mobile rigs. K7NYU has a new tri-band transceiver. WA7EXG is a new call in Las Vegas. W7PRM is building a 432-Mc. rig. W7BIF provided communications for the Boys Scouts Camp out at Death Valley. K7ICW and WA7ECT were active in the Vt. QSO Party. The Southern Nevada Amateur Radio Club again is hosting the 1967 SAROC. Send a QSL card to P.O. Box 73, Boulder City, Nev. 89005 to get on the mailing list. Traffic: K7ZIL 109, WA7ECT 16, W7-PBV 2.

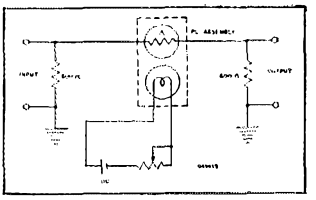
SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—RM: W6CMA. PAM: WA6YYK. ECs: WB6MXD, K6RHW, W6SMU, WA6TQJ.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
SVN	3690 kc.	0230Z	Daily	20	61	33	W6CMA
"	146.28 Mc.	0430Z	TThS	12	82	48	WA6YYK
SCEN	146.28 Mc.	0500Z	Wed.	4	151		WB6BWB
NCN	3635 kc.	0300Z	Daily	31	472	343	W6QMO
NCTN	3905 kc.	0130Z	Daily	No Report			

The report for NCN is for Jan., all others are for Feb. The Gold and Silver Net (GSN) meets on 3590 kc. at 0230Z and 0530Z Daily. This is a slow-speed net. Sacramento Valley traffic for 1965 was 4105 with 84 reports; 1964 showed only 1104 with 23 reports. Your SCM had the honor of giving a talk on NTS to the GEARS at Chico. WB6MXD is attempting to organize 2-meter activity in the Crescent City area. New officers of the Sacramento ARC are WA6YZD, pres.; W6GIA, vice-pres.; WB6RCR, secy.; WB6MZX, treas. W6PJB, of Esparto, became a Silent Key. UC Davis has established a club station in an old house on campus. WA6-DDO is faculty advisor. WB2OVB/6 is now 2-meter RTTY with WB6MZY. WA6CXB is an OES transferred from the Orange section. The Nevada County ARC conducts code and theory classes Tue. 7 to 9 P.M. The SCEN had a very successful SET coordinated with the

Inexpensive noiseless switching and control





Sylvania engineers have come up with a new line of PL or Photoconductor/Lamp Assemblies that opens up all sorts of possibilities in circuit design. And, since the unit price of the most popular types is only slightly over $2.00, the Ham can have as much fun with them as anyone else.

In case you're not up on these devices, each PL is made up of a glass-encapsulated cadmium sulfide photoconductor, optically coupled to a miniature long-life incandescent or neon lamp. The photoconductor and lamp are sealed in a small, metal or plastic lightproof housing. The resistance of the photoconductor can be varied over considerable values by varying the light level of the lamp.

The Sylvania PL's have important advantages over other methods of switching and control. For one thing, the photoconductors are noise-free. For another, the input and output of the PL are completely isolated electrically. Again, depending on type, cell resistance can be over 10 megohms at zero lamp voltage, and as low as 150 ohms at 60% of rated lamp voltage. And lamp current can be as low as 15 to 20 ma, which means that the lamp can be turned on and off or varied in brilliance by placing it in the plate (or cathode) circuit of an electron tube. Finally, because of their compact design, PL assemblies require a minimum of mounting space.

Sylvania PL's are now being used for the remote, noise-free switching or control of audio and video circuits. Only low voltage d-c circuits are necessary for the remote control. The accompanying circuit shows how this is accomplished in a "high-class" broadcast a-f amplifier line. In a somewhat similar fashion, Sylvania PL's are being used as swell controls in electronic organs and, by the application of a 6 Hz or an 8 Hz sinewave to the lamp, to provide tremolo and vibrato effects.

Many other applications will suggest themselves. For instance, how about variable RC networks, wobbulators, low-frequency choppers, volume expanders or compressors, remote depth control for T-notch filters, and variable-frequency a-f bridged-T filters? The possibilities are endless. Then there's the PL-1823P, containing a neon lamp and two photoconductors in a single housing that makes an excellent phase-shift oscillator when used in conjunction with a single triode with a 5-8 Hz signal to activate the lamp.

The Photoconductor/Lamp Assemblies you'll probably be most interested in are the PL-8212E and the PL-8224C. If you'd like spec sheets on them, send your request to Sylvania Electronic Components Group, Sylvania Electric Products Inc., 1100 Main Street, Buffalo, New York 14209.

You're bound to have fun with PL's. You may even invent a new circuit.

73,

Bob Lynch

K2RMN

SYLVANIA

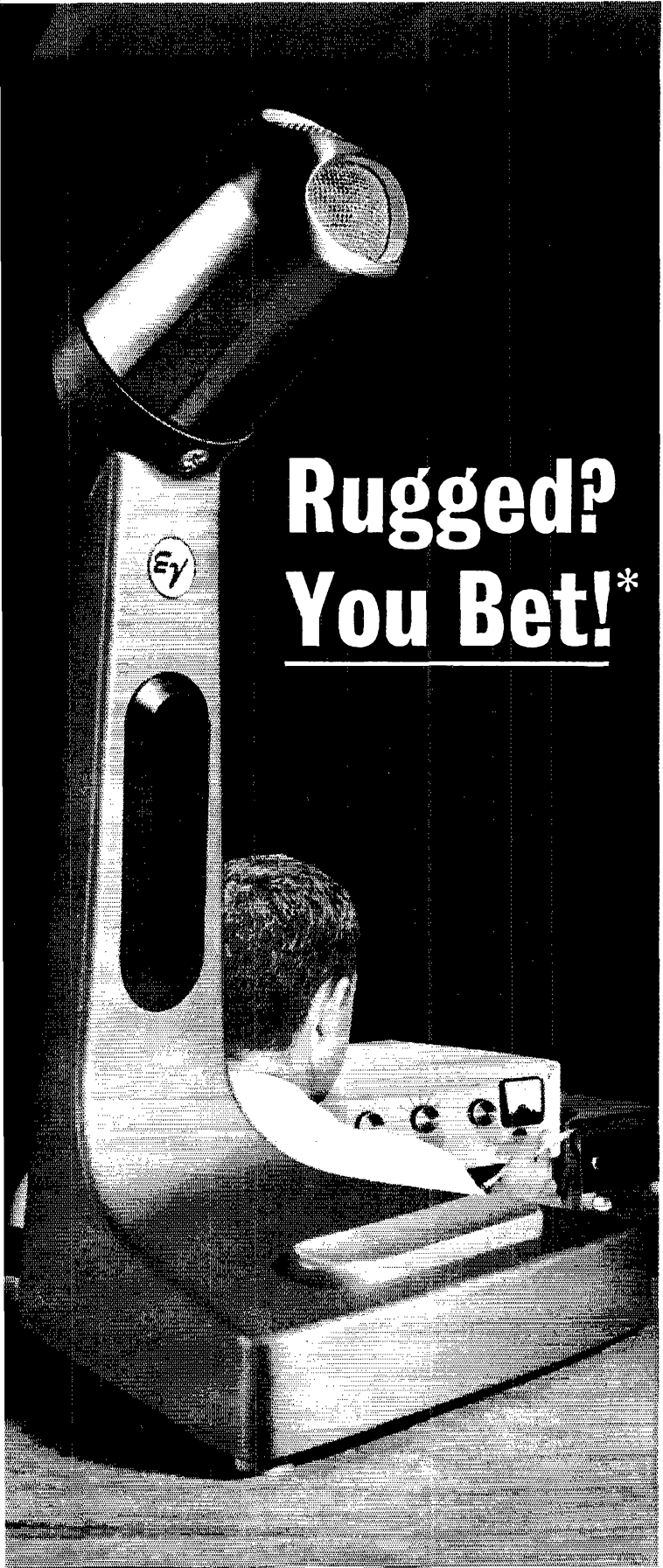
SUBSIDIARY OF GENERAL TELEPHONE & ELECTRONICS GT&E

RAMS. Sacramento Valley amateurs interested in joining the AREC may contact the following ECs in their area: Del Norte County, WB6MXD, Crescent; Nevada County, K6RHW, Grass Valley; Sacramento County, W6SMU, Rancho Cordova; Yolo County, WA6TQJ, Davis. If your area is not listed, contact your SCM. Traffic: (Feb.) WA6JDT 69, W6CMA 59, K6YBV 31, WB6MAE 16, WB6BWB 14, K6IKV 14, W6LNZ 8, WB2OVB/6 8, WB6EAG 6, WA6YYK 4, WB6MXD 1. (Jan.) W6CMA 49.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC: W6KZF reports that more ECs are reporting in than a year ago but still more are needed. New officers of the Sonoma County Radio Amateurs are W6BCC, pres.; WA6JNY, vice-pres.; K6KVW, secy.-treas.; W6BWA, K6ALI and W6IEN, dir. WA6SBA reports eight 2-meter mobiles available in the Novato area for emergency work. WB6AIS is home from the hospital after a two-month stay. W6BWV has been appointed an Asst. Director of the Pacific Division in the Eureka area. WA6SFB reports that stacked ten-element beams on a 60 ft. tower has extended the range of his 2-meter operation. WA6IVM had a high score in the first c.w. portion of the DX Contest. W6GQA is marking twelve complete years of FMT participation. W6YKS is on temporary duty in the Bay Area working for Western Union. K6TWJ is back on the Golden Bear Net after a serious illness. WB6GVI is looking for afternoon schedules on 160 meters. W6CYO is putting up a tower and beam to work on his DXCC after 45 years of preparatory work. The Sonoma County Radio Club meets the first Wed. at the Franklin Park Club House in Santa Rosa. The Marin and Tamalpais Radio Clubs will hold a joint picnic again this year. The San Francisco Section Net continues to meet Mon. and Fri. at 1830 local time on 3900 kc. WB6GVI is PAM and net control for the net. The Gold and Silver Net meets on 3590 kc. at 0230Z and 0530Z daily as a slow-speed net for the Northern California Net. The NCN meets at 0300Z at 3635 kc. W6CWR has received his Advanced Class license again. The Greater Bay Area Hamfest will be held in Oakland sometime in October. WB6OGF is a new EC in the Southern Marin area. The Marin Club held a simulated emergency test Mar. 4. The San Francisco Radio Club has been turning up with fine programs for its meetings. Anyone interested in a copy of the section *Currier* should write to the SCM. Traffic: (Feb.) WB6GLD 68, W6YKS 66, W6NL 30, W6WLV 30, K6SAA 29, W6MLK 24, WA6AUD 17, WB6IMO 14, W6BWV 11, WB6POP 11, W6KVQ 10, WB6GVI 9, WA6IVM 9, W6BIP 8, K6TWJ 7, W6CYO 4, W6GQA 4, WA6QXV 4, WA6SFB 4, K6TZN 4. (Jan.) K6TWJ 12.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—The new officers of the Trowel Radio Club are W6SVM, pres.; W6JMP, vice-pres.; W6PSQ, secy. W6SVM has a Galaxy 3 and is going mobile using a Swan antenna. W6JMP has his RTTY problems solved. K6SEY is active on Navy MARS. W6BJI, after much delay, got his tower and beam up and working. W6PSQ is trying to locate his 80-ft. crank-up tower he loaned out so he can get back on 20. The Turlock gang is on 146.94 Mc. with surplus f.m. equipment. W6TFD has moved back to Turlock. WA6MVL has a Swan 350. WB6MWY has joined the Coast Guard for a four-year term. The San Joaquin Valley Net had 767 check-ins, 106 contacts, traffic of 9 and 7 QST. WB6NCJ is active on c.w. with the GSN and the *NCN*. W6EHZ reports that his brother, *WN6QHC is located* in Visalia and is on 80-meter c.w. K6ROU is back in Visalia after 2 years in the Army. The GSN operates on 3590 at 0230 and 0530. WA6SCE is using the TZN linear on c.w. WB6KLL, WB6PCQ, WB6LUE, WB6KUO, WB6JGD, WA6MVL and WB6JQT are new stations on GSN. WA6TQL has a Swan 175. WB6GIT is on 6 meters. WA6KIV has moved to Washington State. The Central California Single Side-band Net convenes every Sun. on 3835 kc. at 10 A.M. WA6SZS is back in Stockton. WA6BTK is back at the U. of Neb. Traffic: WB6HVA 245, W6ADB 106, WA6TZN 38, WB6MZU 16, WB6NCJ 13.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM, Ed Turner, W6NVO. SEC: WA6HVN. RM: W6QMO. W6QMO has resigned as manager of NCN because of the press of other business. Jeri has done a great deal, both recently and in the past, to improve the operation of NCN. Our thanks to Jeri for a job well done. W6MMG has been working nights but has time for ragchewing and MARS. WB6IZF, King City EC, reports that WB6JYA, WB6MQB and WB6RYV are working 50 Mc. in the King City area. The Palo Alto and Foothills Clubs held a joint meeting Mar. 4 to hear Mr. Raymond Rees, of the National Investigations Committee on Aerial Phenomena, a group which studies phenomena of space. W6ACW installed a Hy-tower antenna. W6HC and W6ZRJ both underwent surgery during February, but in different hospitals. W6RFF has been working 80-meter DX. W6BVB handles traffic on NCN. K6-



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YKG is NCS on NCN. Annual EC reports have been received from K6TEH, W6DEF and W6VZE thus far. W6DEF has taken over the EC spot for Redwood City/Menlo Park again. K6IGV reports on 6-meter OES activity. The Santa Cruz Club viewed two NASA films at its March meeting. The group meets at Cabrillo College. W6OII works the Mission Trail Net. WA6JSA sports a new kw. linear and is now using autostart on his RTTY. K6GK works NCN and is active at SCCARA station W6UW. The SCCARA February meeting featured a film on the Alaska Earthquake with comments from WA6NSO, who was on the scene when it happened. W6AUC is active as OO. Russ says that one of the best ways of improving amateur operation is to set a good example with your own operation. W6PLS resigned as EC for Half Moon Bay because of ill health. Our thanks to Gene for a job well done. W6SAW is very active as OO and OBS. Part of his operation was contact with the U.S.S. *Bellatrix* and when the ship reached port Herb was invited on board for lunch and was presented with a plaque from the crew as thanks for his fine work. W6DEF is active on the California Weather Net. WA6CVU is NCS on RN6 and works NCN. K6DYX sports a new vertical antenna and is working high-speed code test with W1NJM. W6RSY made the BPL and is active on RN6 and PAN. Traffic: W6RSY 735, K6DYX 338, WA6CVU 177, W6YBV 146, W6DEF 72, W6QMO 61, W6SAW 40, W6PLS 36, W6AUC 21, K6GK 19, WA6JSA 17, W6OII 14, K6YKG 11, W6BVB 8, W6RFF 7, W6ZRJ 5. W6YHM 4, W6ACW 2.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK. RMs: K4CWZ and WA4ANH. PAMs: W4AJT and WA4LWE. V.H.F. PAM: W4HJZ. W8AAZ, chief op to W4LEV, has been transferred to San Diego, Calif. K4TTN has added a new TCU control unit to his Swan 240 and says it works fine. WA4ANH has a new 2-meter beam on his antenna farm. The Greensboro Radio Club, Inc., has started a club newsletter, and the first two issues look good. K4CWZ, WA4ANH and WA4FJM recently held an NCN SET, and WA4FJM says in part, "We were very happy with the performance of the individual net members, and we found some weak points in the net as a whole, so it was very successful."

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
NCN(E)	3573 kc.	2330Z	Daily	226	K4CWZ
SSBN	3938 kc.	2330Z	Daily	146	WA4LWE
NCN(L)	3573 kc.	0300Z	Daily	124	WA4ANH
THEN	3865 kc.	0030Z	Daily	42	K4ODX

Traffic: (Feb.) W4LEV 2690, W4EVN 194, W4LWZ 157, K4TTN 132, W4IRE 122, K4OXM 114, K4CWX 109, WØGXQ/74, K4IEX 74, WA4ANH 60, WA4UFQ 57, WA4FJM 56, W4UWS 54, WA4CFN 33, W4OTE 26, WA4ICU 25, W4BNU 23, K4EO 23, W4RWL 22, K4DJZ 21, WA4KWC 18, WA4UVH 8, K4ZKQ 6, WA4GMB 4, W4AJT 2, WA4NUO 2. (Jan.) W4AJT 8.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: WA4ECJ. Asst. SECs: W4WQM, WA4EFP. RM: K4LND. PAM: K4WQA.

SCN	3795 kc.	Daily	0000Z/0300Z	Feb. Tfc. 52
SCSSBN	3915 kc.	Daily	0000Z	Feb. Tfc. 283
SCSN	3795 kc.	Daily	2330Z	Feb. Tfc. 16

W4JA was made an honorary member of the Charleston Amateur Radio Club and has had one of his *QST* articles translated and published in Argentina. WA4HFA has a new T-4 and reports WB4CIL is a new General Class amateur in Anderson. The North Augusta Club is experimenting with low-power rigs. WB4AWP has QSOed Washington, D.C., with 80 milliwatts. W4PED reports weak reception of his 80-milliwatter in Virginia. W4NTO says he called SCN with a one-watter recently. What next? Two-watt linears, fellows? Don't forget the Roanoke Division Convention at Natural Bridge May 28 and 29. See you there? Traffic: K4LNJ 102, W4PED 86, W4WQM 78, K4LND 65, W4NTO 49, W4JA 25, WA4HFA 12, K4OCU 3, K4WJU 3.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: W5VZO/4. RMs: W4SHJ and WA4EUL. PAM: K4SCL. This is a final notice that the Roanoke Division Convention will be held May 27-28 at Natural Bridge. Annual division LO meetings held in Danville were attended by the following Virginians: W4DVT, W4MWH, W4SHJ, W5VZO/4, W4WG, WA4EUL, WA4UXL and WA4YSE. The new EC for Arlington is WA4TDQ. K4LJK is now manager of VSN. SEC W5VZO was snowed in at the office for two and one-half days, but VARPSC members performed well during the blizzard and freeze. K4SCL now is enjoying retirement after a long Navy career. W4QDY is starting a new training program in code and

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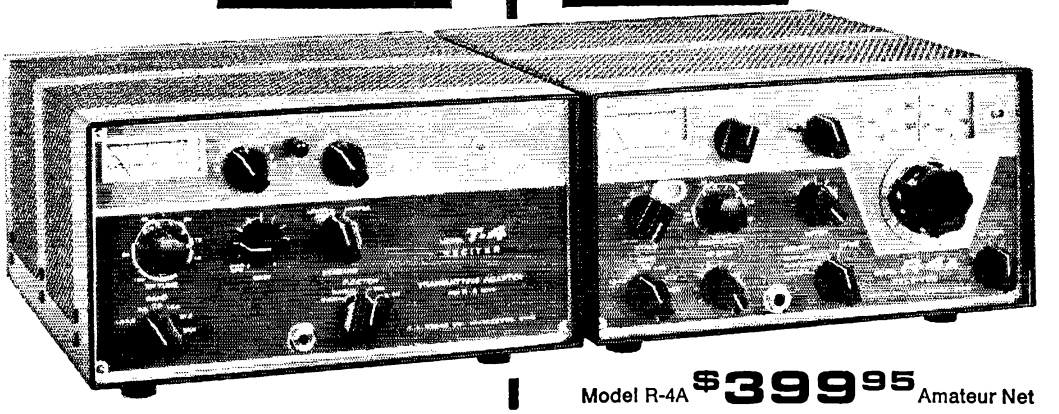

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Any ten 500 Kc ranges between 1.5 and 30 Mc can be covered with accessory crystals... (160 meters, MARS, etc 5.0-6.0 Mc not recommended).

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theory for the local club. Seems like W4JUJ makes all the contests and QSO parties, big and small. Several stations reported superb results on 80 meters during the ARRL DX Contest. Traffic: (Feb.) W4RHA 528, W4DVT 212, WA4UMX 196, W4NLC 171, WA4EUL 152, W5VZO/4 120, K4LJK 117, W4BZE 107, K4SCL 98, WA4YSE 62, K4FSS 55, W4OKN 53, WA4DAI 51, K4ASU 48, WA4URN 44, W4BWF 34, K4ITV 34, W4ZAU 31, W4SHJ 29, W4TE 21, W2UZN/4 20, WA4QCC 20, K4VCY 20, WA4NJG 19, W4JUJ 15, K4SDS 15, K4MXF 14, WA4OXG 14, W4GPD 11, K4YCH 10, WA4JJW 9, W4MK 8, W4PTR 7, W4KN 6, K4MLC 5, WA4PUI 5, W4ZMT 5, W4WG 4, W4WBC 2. (Jan.) W4PFC 182, W4NLC 97 ,W4ZM 37, W4ZMT 22. W4BWF 19, WA4FCS 14, WA4STC 10, W4LK 2, K4-MLC-2.

WEST VIRGINIA—SCM, Donald B. Morris, W8-JM—SEC: W8SSA. RMs: W8LMF, K8TPF. PAMs: K8-CHW, W8IYD. S.S.B. Mgr.: K8SHP. C.W. Mgr.: W8-GRE. Nets are on 3570, 3890, 3903 and 3905 kc. New officers of the Tri-State ARC of Huntington are K8GJY, pres.; WA8JYR, vice-pres.; WA8OMF, sec.; WA8CGR, treas.; W8SDU, trustee. The club's Annual Picnic will be held June 19 at Camden Park. WA8QND, WN8PXB and WA8NDY made the BPL. A nurse aboard the S.S. *Hope* keeps in touch with the family through WA8BUM. Black Diamond ARC officers are K8ZDY, pres.; W8OEN, vice-pres.; W8SSA, secy.-treas. The Gratton Radio Club sponsors Mother's Day certificates. Information may be obtained from K8MYU. K8ZPR and K8QEW report 27 hours operation by area amateurs during the flooding of the Ohio River. West Va. PON reports 14 sessions, 218 stations and 59 messages. WVN (c.w.) reports 29 sessions, 125 stations and 112 messages. K8VQG has new 29.6 Mc. f.m. hilltop base stations with remote control. W8TVO transferred to Louisiana. WA8PXF has a new HW-12 s.s.b. rig. Don't forget the Roanoke Division Convention, Natural Bridge, Va., May 28-29 and the West Virginia State Convention, Jackson's Mill, July 2 and 3. Traffic: K8TPF 146, WA8QND 136, WN8PXB 108, WA8NDY 104, WA8-MRK 75, K8BIT 51, WA8GRE 46, WA8KMZ 42, WA8POS 31, W8HZA 30, W8CKX 27, WA8PXF 24, W8AY 10, WA8-IMY 9, K8MQB 7, K8MYU 7, WA8BUM 2, K8ZPR 2.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØTTB—Asst. SCM: A. E. Hankinson, WAØNQL. SEC: WØSIN. PAM: KØFDH. WAØNQL is subbing this month for the SCM. Section members are reminded that June 18 and 19 are the dates of the Rocky Mountain Division Convention at Colorado Springs. In recognition of the Colorado Weather Net by the Colorado Broadcasters Assn., Wx Net members were presented with a special certificate of Meritorious Public Service. WØFA held an AREC meeting in the South Denver area. Regular 1st Mon. meetings are planned with air check-ins on alternate Mon. A big AREC recruiting drive is under way in Littleton, Englewood and Aurora. C.w. men, CCN meets nightly on 3750 at 7:15 MST. Traffic is taken at 10 w.p.m. or your choice. The Colorado Call Book is available through the Denver Radio Club, price $2. WØHEP sends Official Bulletins on 10, 6 and 2, v.h.f. nets. The Hamsters Club, v.h.f./u.h.f., is expanding rapidly. Field Day is being planned. It looks like there will be about 5 entries in the Denver area. Net traffic: 184. Traffic: KØZSQ 101, KØDCW 83, KØLCE 3.

NEW MEXICO—SCM, Bill Farley, WA5FLG—SEC: K5HTT. W3QA, SCM of Maryland-D.C., visited our SCM. It was a very enjoyable eyeball QSO. W5ALL is back on the air from Cloudcroft with a new Swan 350. He boasts the highest antenna in the state at 9200 feet. The Alamogordo and Las Cruces amateurs provided communications for the El Paso Telethon. Alamogordo used 2-meter f.m. through two repeaters while the others used 75 meters. Roswell now has a functioning 2-meter repeater so activity in his area should pick up. WA5KUI has moved into his new ham shack. WA5BLI has his new s.s.b. rig going and it sounds like a real kw. W5-HVR is now mobile on 2 meters. The Las Alamos Radio Club elected K5EJW, pres.; Bob Cowin, vice-pres.; W5-NDW, secy.-treas. The Mesilla Valley Radio Club expects a good turnout for its Bean Feed. Chief Chili Cook K5ECQ is anticipating the event; his recipe for green chili stew can't be beat. K5ONE is expected to be his favorite customer. W8BZY/5 is sporting a new station composed of an SB-200, an SB-300 and an SB-400. Traffic: WA5DUH 63, W5DMG 42, WA5FFL 42, WA5FJK 34, W5UBW 23, W5WZK 18, K5VXJ 15, K5HTS 10, K5HTT 6, WA5OMY 2.

UTAH—SCM, Marvin C. Zitting, W7MWR/W7-OAD—Asst. SCM: Richard E. Carman, W7APY. SEC: W7WKF. Section nets: BUN meets daily on 7272 kc. at 1930Z. UARN meets each Sat. and Sun. on 3987.5 kc. at 1500Z. W7OCX reports that BUN had another good month with almost twice as much traffic handled this

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117-X Basic 117v. AC Supply only	(2.16)	65.00
230-X Basic 230v. AC Supply only	(1.52)	75.00
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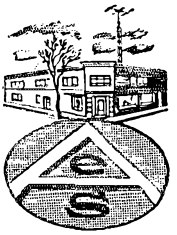

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month as last month. K7CLS left the state Feb. 27 for schooling in Camden, N.J., and will be back in June. WA7AUW has a new three-band beam and an Apache on the air. W7RQT presented a talk on antennas at the UARC's monthly meeting. By next month I hope to be able to have something to report on the legal matter involving W7YEO. The many amateurs in this area who have contributed to defend amateur radio in this suit are deserving of a special word of thanks. Traffic: W7OCX 143, K7CLS 131, W7MWR 8.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: W7BHH. PAMs: W7TZK, K7SLM. OBSs: W7TZK, K7SLM, K7ZHT. Nets: Pony Express, Sun. at 0830 on 3920; YO, Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1230 on 3920. New appointment: WA7CLF as ORS. W7EDO has been released from the hospital and is now in the Casper Nursing Home. K7ITH, with his 4-wheel drive mobile, rescued his son and co-worker in early Mar. when they became stranded west of Casper at night in sub-zero weather. Assisting were K7CSW and WA7BFV with K7IVK, K7SLM and W7DYJ acting as relay and keeping in contact. W7WYX has a new rig on the air. The students at Wyoming U. are attempting to reactivate the Laramie Club and the University Club station. Anyone interested in assisting, contact K7SAL. Traffic: WA7CLF 83, W7DXV 46, K7HHW 18, K7POX 15, WA7BPO 12, K7LOH 10, W7ONZ 8, K7YPT 8, W7BHH 6, K7ITH 6, K7MGM 6, K7AHO 4, K7MAT 4, W7YWE 4, W7TZK 3, W7AEC 2, K7OWT 2, K7SAL 2, K7SAR 2, W7VJI 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: W4NML. RM: WA4EXA. PAM: K4WHW. The SEC and I wish to thank all who helped make Alabama No. 1 in the 1965 SET. Since W4NML has been SEC we have been No. 5, 2 and 1 in that order, a truly outstanding record. Our congrats to Ohio on its tie for 1st. February net reports (times GMT):

Net	*Freq.*	*Time*	*Days*	*Sess.*	*Ave.Tfc.*	*Ave.QN*
AENB	3675	0100	Daily	31	2	4.8
AENH	50.7	0200	Sun./Tue.	8	1.75	19
AENM	3965	0030	Daily	28	3.5	44
AENP	3955	1230	Mon.-Sat.	22	1.1	10.9
AENR	50.55	0115	Wed./Fri.	8	0	21
AENT	3970	2230	Daily	34	1.3	5.7

WA4TID made the BPL. WB4BNN and K4KJD now are Generals. WA4TID has a new HA1 keyer and W4HPE a new beam. The HARC is sponsoring the Alabama QSO Party the first week end in July. Montgomery has a 6-meter net Thurs. at 1930. Macon Co. AREC is working on a v.h.f. net. K4WHW has a 4-65A linear. Traffic: (Feb.) WA4TID 584, W4ZJY 270, K4BSK 58, WA4EXA 52, W4NML 52, K4NUW 30, K4GHX 29, WA4FYO 25, WA4LQN 24, K4CZZ 22, K4KJD 22, WA4MTG 22, K4WHW 20, WA4UXC 16, K4NSU 13, K4WOP 11, K5RSI/4 11, WA4RMY 9, WA4HUO 8, WA4OCL 7, WN4BMO 6, W4DGH 6, W4DS 6, WA4YTK 6, W4HON 4, (Jan.) WØHXB/4 58, W4YRM 42, K4HJX 22, WN4AYL 4, K4CZZ 3.

EASTERN FLORIDA—SCM, Albert L Hamel, K4SJH—SEC: W4IYT. RM C.W.: W4LUV. RM RTTY: W4RWM. PAM S.S.B.: W4OGX. PAMs: W4SDR, W4TUB. PAM V.H.F.: WA4BMC. W4EXM, who expected to retire in Clearwater, is out of the service but staying in harness—Hawaii, no less. W1MGX, Connecticut Yankee, dropped in on W4DFG, ex-W1PQU, former ditto Yankee for an eyeball. W4BKC says the gang at Orlando is all wrapped up with always-excellent Annual Hamfest preparations. WA4MKE finally got herself off the sick list. K4YOQ now is reading you RTTY guys, so be careful what you say. K4BNE had to hurry to reapply for his license renewal the day after it expired. *It can happen to you, so look at yours now.* Let us know how many of you besides W4KRC are handling Viet Nam traffic: How come some fellows get sore when told that their report was not received or when reminded that their certificate needs endorsement? Some have even resigned their appointments in spite of the fact that their applications stressed the reporting and endorsement requirement *over their signatures.* Traffic: (Feb.) WA4BMC 1504, WA4SCK 1384, WA4IJH 1053, WB4AIW 776, WA4NEV 527, W4DFU 358, W4KRC 356, WA4NBT 173, WA4DEL 146, K4EVY 136, K4SJH 119, K4BY 102, W4SDR 86, W4OGX 83, WA4AKB 67, WA4FGH 63, W4TUB 63, W4EHW 50, K4BNE 48, K4YOQ 44, K4ILB 31, WA4OHO 31, W4VDC 30, K4KDN 29, W4NUH 28, WA4CIQ 27, W4IYT 26, K4DAX 25, WA4MOL 24, W4BNE 21, W4SMK 20, WA4MKE 19, W4LUV 18, W4FP 17, WA4PDM 17, WB4AJV 16, K4EBE 16, W4SCY 16, W4TJM 13, W4AYD 12, WA4RXG 12, WA4WZZ 12, W4IE 10, W4BKC 9, WA4HXY 7, W4DFZ 5, W4LMT 4, WA4SHJ 4, W4CWI 3, W4DVO 2.

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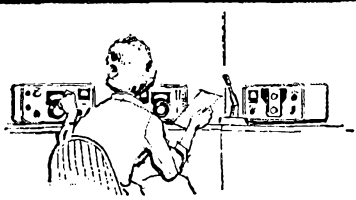

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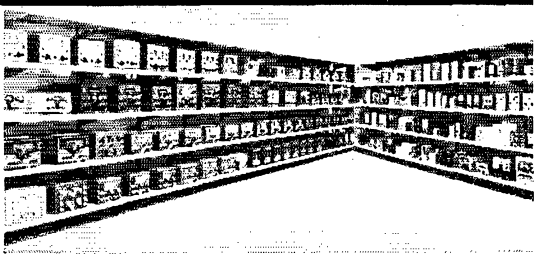

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75A2	179	AC SUPPLY	69	HOW1 SCOPE	67	SUPER 12CONV	47
32V3	199	DC SUPPLY	115	MATCHBOX/Wswr	67	NCX3	199
75S1	269	DRAKE R4	299	TR SWITCH	19	NCX5	439
32S1	379	THOR 66AC	239	6N2 CONV 26mc.if	47	NCX AC SUPPLY	77
KWM2	699	EICO 723	34	CHALLENGER	67	NC155	117
PM2 SUPPLY	87	EICO 730	47	RANGER	99	NC300	147
SM2 MIKE	27	HE45B	79	RANGER II FM	179	HR060 AD COIL	32
SWAN120	117	POLYCOMM PC6	149	VALIANT	147	DX20	24
SWAN240	227	S40B	49	VALIANT II	249	DX35	32
SWAN350	339	S85	49	KNIGHT VFO	32	DX40	37
AC SUPPLY	59	S86	49	KNIGHT T60	39	DX60	67
DC SUPPLY	99	SX99	77	HO100AC	127	HR10	69
SBE33	189	SX111	139	HO145C	157	HR20	99
SBE34	339	SX117	259	HO170	199	SENECA	177
SB2LA LINEAR	209	CRX2A 152-174mc.	67	HO170AC &N.B.	279	SR300	257
CENTRAL 100V	379	SR46	139	HX50	187	DX100	79
DRAKE 2A	147	HT33	147	CONSET G50	199	TX1	127
2B SPEAKER	14	HT37	209	G76 TRSCVR	147	HW12	99
2BQ SPKR Qmult	24	HT40	67	G76 DC SUPPLY	49	HW22	99

QF1 Q MULT	$ 9		
VF1 VFO	17		
UT1 SUPPLY	22		
HP10 SUPPLY	27		
HP20 SUPPLY	24		
GLOBE V10 VFO	39		
SCOUT DELUXE	59		
P&H DD1 SCOPE/W tone osc	67		
HICKOK 539A	67		
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TRIPLETT 3414	47		
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(Jan.) K4YSN 117, W4AKB 48, W4FWZ 37, K4QAY 31, WB4AJV 8, WA4IYG 8, W4VWL 7, WA4YRU 1.

GEORGIA—SCM, Howard L. Schonher, W4RZL—Asst. SCM: James W. Parker, Sr., W4KGP. SEC: W4DDY. RM: W4CZN. PAMs: K4PKK, WA4JSU. K4TXK had receiver problems on Oscar reception. The new HA-350 solves the problem. K4BAI should be active during summer. W4LRR is working 2-meter a.f.s.k. K4YZE completed a 2-meter matchbox and RTTY. WA4JSU is busy with duties as secy. of the Atlanta Radio Club and net mgr. of GSSN. W4GZU pleads for a power boost for 160. WA4UYT made CP-30. K7PVO QRD Germany in April. WN4ARB is looking for General and a new QRO rig. WA4JES continues to be old reliable for Columbus on GSN. All AREC members, please reregister with W4DDY. New registrations also will be welcomed. Congratulations to K4FLR on a fine job as editor of the Ga. S.S.B. Assn. bulletin. W4YTP is active with a new Swan 350. WB4BPP missed only one session ot GTN.

Net	*Freq.*	*Time(GMT)*	*Sess.*	*QNI*	*QTC*	*Mgr.*
GSN	3595	0000 & 0300 Dy.	56	532	260	W4CZN
GSSN	3975	2300 Dy.	28	1021	141	WA4JSU
GTN	3718	2200 Dy.	27	123	29	K4NFP
G Teenage Net	3855	1600 Sat.				
		2130 Wed.	8	67	22	WA4GAY

Traffic: K4FLR 261, W4RZL 236, W4DDY 186, W4PIM 127, W4CZN 93, K4NFP 76, WA4GAY 50, K4YZE 47, WA4LLI 43, WA4UPE 39, WA4JSU 29, W4TFL 29, K4UUM 26, W4GXU 25,WA4UYT 18, WA4WKZ 12, K7PVO/4 12, WN4ARB 11, WA4JES 8, WA4BVD 7, W2TPV/4 5, K4SES 2, WN4AIU 1.

GEORGIA QSO PARTY

May 14-16

All amateurs are invited to participate in the 5th Georgia QSO Party, sponsored by the Columbus Amateur Radio Club.

Rules: (1) *Time:* 2300 GMT Saturday, May 14 to 0500 GMT Monday May 16. Any or all of the 30 hour period may be utilized. (2) All emissions and bands may be used. A station may be contacted on C.W. and phone on each band. C.W. and phone contacts count together for one score. (3) *General Call:* "CQ GA" on c.w. and Ga. stations will identify by signing "DE Ga (call) K." (4) *Exchange:* QSO number, RS(T), and county, state, or province. (5) *Scoring:* Count two points for each completed contact, one for each report received and sent. For final score, Ga. Stations multiply QSO points by the total number of different states or provinces. Ga-to-Ga. contacts count for QSO points and the Ga. multiplier. Outside stations multiply QSO points by different Ga. counties. (6) *Awards:* Certificates to the highest scoring station in each state, province, country and Ga. county. 2nd and 3rd place awards will be issued if in the opinion of the contest committee the number of entries warrants it. Special plaques will be awarded to the Georgia stations submitting the highest SSB score and the highest aggregate score. Plaques will be presented also to the highest scoring non-Georgia entry and to the Georgia club submitting the highest aggregate score. (7) *Suggested frequencies:* 1810 3590 3995 7060 7260 14060 14230 21060 21310 28060 28600 kc. SSB 3975 7220 14290 21410 and 28600. Novices try 3735 7175 and 21110. (8) Logs should show dates, times, stations worked, exchanges, frequency, type emission, and a signed statement that all contest rules have been observed. Contest logs postmarked no later than June 15, 1966, and should be sent to CARC, John T. Laney III, K4BAI, 3500 14th Avenue, Columbus, Georgia 31904.

WEST INDIES—SCM, Albert R. Crumley, Jr., KP4DV—This is the first report from this SCM. KP4WT, active in MARS, CAP, Antilles Weather Nets, has the highest reported traffic. KP4BBN, with a kw. Collins, works the world on c.w. and has been prexy of PRARC for the past year. KP4TL spent Christmas in San Salvador and now is on a world cruise. KP4BJU and KP4BJD are in stateside colleges. KP4TIN now is chief engr. of WAPA-radio at San Juan. KP4CK-KP4CL recently visited Radio Club Venezolano in Caracas. KP4ES and his son are active in Ponce. KP4BL manages some hamming aside from FAA duty. KP4FAC is MARS base at Ramey AFB. The San Juan Chapter of the Armed Forces Communications & Electronics Association invites all

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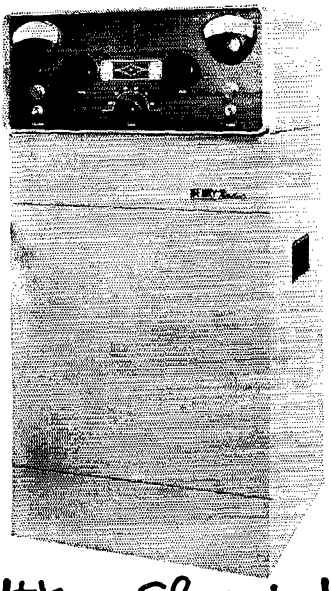

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hams to participate in meetings held the 3rd Thurs. of each month. Contact KP4DV for details. KP4JM returned from Argentina for good. KP4UW is San Juan FCC Engineer in Charge and now has a full monitoring staff. Traffic: KP4WT 466, KP4BBN 216, KP4DV 5.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: K4NMZ. RM: W4BVE. Section net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3950 kc.	2300Z	Daily	28	593	203
QFN	3651 kc.	2300/0300Z	Daily	56	594	521

Pensacola: K4BSS/4 is NCS of CAN Sat. night. KA4WKL received a certificate tor handling traffic with WQFPA/mm. Milton: WA2HEC/4 visited his son, K4NMZ, for a month. Fort Walton/Eglin AFB: W4JM and W4NN were hospitalized recently. The Playground Amateur Radio Club is being organized and will meet the last Thurs. of each month at the FWB Police Station. EARS members are sporting new plastic name badges. W4RKH is working on 2-meter f.m. gear to join the state net on 146.94 Mc. Panama City: WA4FIJ/FJF put out an FB edition of *QRVT*, newsletter of WFPN. K2SBV/4 has a 2-meter transverter on the air. WA4NRP has a new 2-meter beam with selectable vertical/horizontal polarity. WA4IMC will be on 2-meter s.s.b. soon. OBS WA4FIJ copies W1AW Bulletins by RTTY. Tallahassee: Jim Lovette, of DAVCO Electronics, spoke on field-effect transistors at a recent meeting of the TARC. Out-of-town visitors included W4IKB, W4KCA, WA4SIB, WA4SRR and W5GVE/4. The TARC Novice class has 23 members, and the General Class 5. Don't forget the Spring SET planned for May 7. Traffic: (Feb.) WA4IMC 272, W4BVE 109, K4VND 102, K4NMZ 100, WA4EOQ 82, K4VWE 66, WA4FIJ 29, WA4JIM 17, WA4NRP 9. (Jan.) K4VFY 275, K4BSS/4 76, K4VND 53.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—SEC: K7NIY. PAM: W7CAF. RMs: K7NHL, K7TNW. The Arizona Amateur Radio Club now meets at the Red Cross Building, 1510 East Flower, Phoenix, the 1st and 3rd Thurs. of each month at 0300 GMT. K7ZQI has completed a Heath electronic organ. W7AYY is home recuperating after a siege in the hospital. From all reports the following Copperstate Roadrunners had a good time at the Snow Bowl: K7HFP, K7UJU, K7UJV, K7UJT, K7BIE, K7VOR, K7YDJ, K7UTX, W7GNP, K7ZWI. K7AWB has a Galaxy V. OO reports were received from K7OIX and K7RUR. Plans are in the making for a 6-meter repeater on Towers Mountain. Interested persons should contact W7GNP. W7VKO is busy with overseas RTTY traffic. K7AL, K7TNW, W7ZMD, K4VVE, K7NHL, W7COC and K7QNI were operators of XE0AL during the recent ARRL C.W. DX Contest. Finished planning that vacation? We hope you haven't forgotten to include the Southwestern Division Convention at Disneyland. Many thanks to the club secretaries who are sending me monthly reports. Also thanks to the editors of club papers. Traffic: (Feb.) K7NHL 182, K7RWI/7 77, W7FKK 29, K7RUR 15. (Jan.) K7RWI/7 67.

LOS ANGELES—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC, J. A. Vaideau, W6BNX, RMs; W6BHG, WB6BBO, W6QAE. PAMs: K6MDD, W6MLZ, W6ORS. ECs: W1KUX/6, W6LVQ, W6MLZ, W6OI, WA6WJT. BPLers: K6EPT, K6MDD, K6WAH, WB6BBO, WB6QXY. K6WAH is running about 5 days behind in Viet Nam traffic. WB6BBO says still 100% c.w. no more s.s.b. WB6QXY is too busy handling traffic for comments. W6GYH was in the hospital for a check-up. W6WPF has conflicting schedules on MARS and traffic nets. K6IOV QNIs four nets. K6ASK was awarded the W7FIX Master Traffic Handlers certificate. WA6WPX is revamping the shack for easier working conditions. WB6KGK still is under construction. W6MLZ attended 5 ham club and 3 service club meetings PR for amateur radio. W1KUX/6 reports much activity on 2-meter f.m. and also the ASTRONET is very active. WB6GGL comments that the flu made traffic very slow. WB6AEL intends to extend traffic "arteries" on 2 meters. W6NKR worked 20 countries on 80, 36 on 40 and 44 on 20 meters during the ARRL DX Contest in less than 20 hours of operating time. K6UMV has been working lots of overtime so hamming has been slow. WB6GXI is finally in the new QTH. W6HUJ says hamming is slow because of working hours. WB6BBH has one son in the Navy as BM3 and another in the Army. WA6GAG says the traffic net is great and he also is doing PR work for AREC/NTS. K2PHF/6 is now W6DGH. K6KUQ still is building. WB6MEQ says his score in the DX Contest was better than last year; he also worked 6 new countries. WA6OKZ is instructing classes in Los Angeles and also demonstrating disaster

communications for the Red Cross in Englewood. W6PUZ lost his 432-Mc. antenna during a windstorm. WB6GAG/WB6SFU repeater is on 146.100 input and 146.700 out on the f.m. repeater. WA6WJT has 46 active members in the AREC group. After many months of house hunting W6BNX finally found the "ideal home" but it was in another section so it is with regret that we are losing W6BNX to Orange section, and the new SEC is now W1KUX/6. Don't forget the traffic nets, SCN at 0300Z daily on 3600 kc.; EBN Mon. through Fri. at 1515Z and Tue. through Sat. at 0130Z on 50.5 Mc. Traffic: (Feb.) K6WAH 2566, K6EPT 1428, WB6BBO 683, WB6QXY 641, W6GYH 352, W6MLF 345, K6MDD 300, K7YVN 293, W6WPF 280, W6BVK 242, W6QAE 215, K6IOV 163, K6IWV 158, W6TXJ 118, K6ASK 106, WA6WKF 80, WA6WPX 77, WP6KGK 62, W6MLZ 57, K6LDM 54, W6FD 53, W1KUX/6 33, WB6GGL 30, W6BHG 27, WB6AEL 24, K6GIL 24, W6NKR 17, W6OI 9, K6UMV 9, W6PCP 8, W6USY 8, WB6KVA 5, WB6GXI 4, W6HUJ 3, W6JNX 3, WB6BBH 2, K9ELT/6 2, WA6GAG 2, K2PHF/6 1. (Jan.) WA6WPX 20.

ORANGE—SCM, Roy R. Maxson, W6DEY—WA6OQM and WA6ROF have furnished information on the new Gold and Silver Net. This is a c.w. training/slow speed net which meets daily at 0230 and 0530 GMT on 3590 KHz. WA6YWS, of Independence, skeds W6TN, of San Pedro, each week and has been performing some 10-meter ground-wave tests in the valley. WA6CXB has moved to 4204 Marconi Ave., Sacramento, Calif. 95821. W6FB, of 29 Palms, advises he is busy with RTTY and the Desert RATS had a picnic and transmitter hunt recently. W6CJM, of Sun City, informs us that W9LXL/6, pres. of the Professional Loafers Club, composed of disabled and/or retired licensed amateur radio operators, recently moved to 4220 Lively St., Apt. 1B, Riverside. New AREC member WA6OQM hopes to be on 2 and 6 meters. WA6TAG, W6DEY and many other local hams have had bouts with the flu bug. See you all at the Southwestern Division Convention at Disneyland May 27, 28 and 29. Traffic: (Feb.) K6MCA 2488, W6ZJB 620, WB6JFO 255, WA6ROF 171, K6IME 65, KØYVN/6 58, WB6ODU 57, WA6OQM 57, W6WRJ 19, WA6IDN 17, WØRIQ/6 11, W6PQA 10, WB6MVU 9, WA6TAG 8, WB6NGE 7. (Jan.) WB6LCO 1.

SAN DIEGO—SCM, Don Stansifer, W6LRU—W2OE again vacationed in San Diego during the winter and was active handling traffic. W6JVA and his XYL, K6HUT, vacationed in Canada last fall. K6ORH again is active on 6 meters. Fifteen stations were active on the 2-meter f.m. net during the SET in Feb. New OESs include WA6UEL in San Marcos and WA6OSB in San Diego. A new OBS is WA6TAD. Winds damaged the beams of both W6CAE and W6LRU in the Pt. Loma area. A Science Fair winner was WB6OHZ, who made a study of radio waves and propagation of signals. W6JZK is active on SCN from La Jolla. Your SCM visited both the San Diego V.H.F. and the Palomar Radio Clubs in Feb. Remember the big Division Convention at Disneyland the last week end in May. EC W6VNM was instrumental in aiding an ailing Chilean in a radio hook-up in March to speed mercy medical supplies to our southern neighbor. Both K6EC and K6BPI retired from the Naval Electronics Lab at the first of the year. Traffic: W6IAB 7505, K6BPI 6733, W6YDK 6181, WB6JUH 940, WB6GMM 458, W6VNQ 384, W6EOT 358, W6BGF 330, W2OE/6 153, W6LRU 2.

SANTA BARBARA—SCM: Cecil D. Hinson, WA6OKN—The SCM, in the east on business, visited W1AW; look for the reports he missed seeing in next *QST*.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. *RM*: W5LR. News of activities for this month seems to be almost nil. I can understand reporting falling off around the various holidays and in the summer vacation periods but for this time of the year it is beyond my comprehension. It seems that holders of the various appointments such as OPS, ORS, OES and EC should review their obligation of holding these appointments. New subject; I would like to call your attention to one of the rules for holders of amateur licenses. You are prohibited from putting a carrier on the air without identification. Recently I have observed many carriers coming on the air for as long as 60 seconds then go off for a few minutes then back on again without any identification. Another complaint has been that of a carrier being switched back and forward across some frequency that was being used for a QSO. Some Army MARS members have complained that amateur stations have come on the air between the 4025-kc. frequency and the 4000-kc. frequency with no identification being made. This is a violation of amateur regulation. It is a good idea for all

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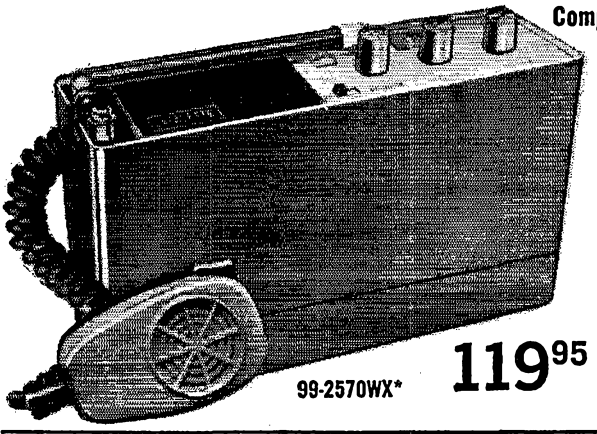

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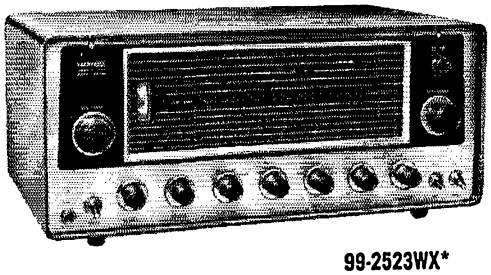

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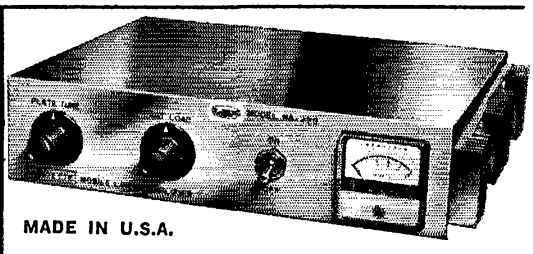

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LAFAYETTE 100-Watt PEP Mobile Linear Amplifier

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- No External Switching Required
- Will Work On Any Signal of 1 Watt or More — AM, FM, SSB or DSB, CW
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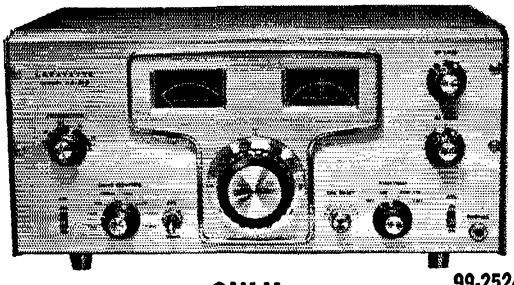

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amateurs to keep a copy of amateur regulations on hand and review them from time to time. Traffic: K5DBJ 66, K2GKK/5 44, K3EIU/5 17, K5WXW 14.

OKLAHOMA—SCM, Daniel B. Prater, K5CAY—Asst. SCM: Sam Whitley, W5WAX. SEC: K5DLP. RM: W5QMJ. PAM—75:W5BTQ. K5LUJ, who is secy.-treas. of

Net	*Freq.*	*Times*	*Days*	*RM-PAM*	*QNI*	*QTC*
OPEN	3850	0800 CST	Sun.	W5PML	180	4
STFC	3850	1745 CST	M-Sat.	WA5BTQ	488	98
OLZ	3682.5	1900 CST	M-Fri.	W5QMJ	97	87
SSZ	3682.5	2145 CST	M-Fri.	W5QMJ	109	94

the Shawnee Amateur Radio Club, reports the club's membership has grown considerably. The Aeronautical Center Amateur Radio Club has its new T-4X and R-4 in operation at the club station now. WA5NYC, of Enid, has his new T-4X and R-4A on the air. W5NBI reports that he is back on the air at his new location and will start activities as OO again. K5VWQ, of Oklahoma City, has a new tri-band beam up and is working choice DX. K5HMI is the proud owner of a new SB-34. W5FFW turns in a very FB report as OO each month. WA5FVJ has a new 2-meter beam up and has been doing very well with his ten watts. K5INC and K5KHA are proud owners of R-4As. WA5MDN is getting his feet wet on the traffic nets. He is a regular check-in in the Sooner Traffic Net. The Enid Amateur Radio Club holds theory classes every Mon. night under the direction of WA5CHD. Traffic: (Feb.) K5TEY 1011. K5MBK 199. W5NBI 100, W5QMJ 86, W5MFX 47, K5DLP 25, WA5BTQ 15. W5CBA 7, WA5DZP 4. WA5MDN 4. W4SKI/5 4, W5EHC 3, W5FKL 2, WA5FVJ 1. (Jan.) W5UYQ 6.

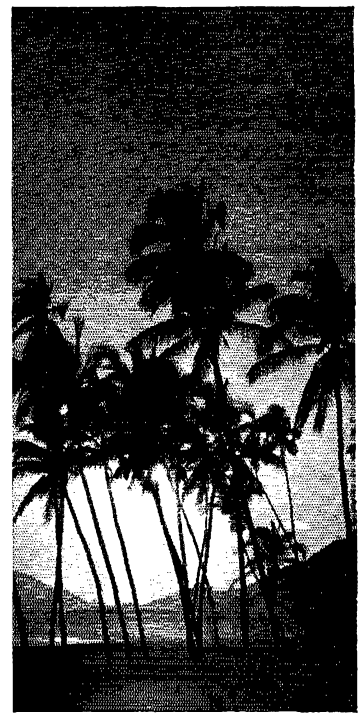
SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5ZPD. RM: K5ANS. New appointments include K5GDH as OPS and Travis County EC and WA5NIU as V.H.F. OBS. Watch for WA5NIU on 50.4 Mc. Mon., Wed. and Fri. at 1930S and on 145.080 Mc. Tue. and Thurs. same time with Bulletins. OO W5NGW is on the ball. New officers of the Corpus Christi ARC are W5LVC, pres.; WA5BEY, vice-pres.; WA5HEP, secy.; WA5KQI, treas.; K5GJX, act.; W5HQR, pub.; W5LRQ and WA5AUB, dir. Newly-elected officers of the 7290 Traffic Net are K5HZR, net mgr.; W5EMW, asst.; K5TEY, secy. WA5KRJ, is chairman of the Houston ARC Field Day. WA5HZY plans to return to Honduras after graduation. W5ZPD reports the OM, W5ITA, and W5IOO renewed acquaintances after 20 years, both QSOs on 160 meters, and several 160-meter mobiles in the area. W5WXS has given up radio for flying. K5HZR reports the San Antonio ARC, W5SC, had an antenna-raising party on a 65-ft. pole. He will operate 2- and 6-meter f.m. and have an HT-37 with a pair of 813s on other bands. SEC K5QQG organized communications for the Annual Channel Derby over a 50-mile course. ECs K5EFH Galveston County, K5HMF Brazoria County and K5HXR Harris County had land and marine mobiles, portables and 2 aircraft covering the RACES operating on 3900 kc. and 2-meter f.m. W5FQQ, marine mobile, served as turn-around boat at the Houston end of the course. K5EJL/5 is back on the air in Austin. WØRAW and WØFXW wintered in Corpus Christi. W5WR is now retired. W5NF is back at work after recent surgery. W5HWY reports the 7290 Traffic Net handled 7598 pieces of traffic in 1965. WA5OLN is the new Rice University club station. K5VIX, Brazoria County ARC pres., has been appointed as AEC for the Angleton area by EC K5HMF. W5ABQ reports that K5MXH is conducting theory and code classes for beginners for San Antonio C. D. WA5BTO advises beginners' classes are held Mon. at 1930S at 1500 Hillendahl Blvd., Houston. WA5GNP will pass Bulletins in case WA5BTO is unable to make the schedule. Traffic: (Feb.) WA5AUZ 361, K5GDH 271. K5HZR 261, WA5CZR 48, K5ANS 44, W5ABQ 23, W5AIR 7. (Jan. & Feb.) W5ZPD 86, W5HWY 46.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—PAM APN: VE6ADS. PAM S.S.B.: VE6FK. SEC: VE6FK. ECs: VE6SA, VE6SS, VE6AFJ, VE6HB, VE6ALL, VE6XO. ORS: VE6BR. OPSs: VE6CA, VE6HM, VE6SS, VE6BA, VE6ADS. OOs: VE6HM, VE6NX, VE6TY, VE6AKV. OBSs: VE6HM, VE6AKV. OESs: VE6DB, VE6AKV. PAMs report that since the change of times on the nets check-ins have improved. Our SEC reports that those monitoring the AREC nets are doing a fine job, but he has a hard time getting a monthly report from most of them. Say, fellows, help your SEC by sending your monthly reports. Watch for the AREC test sometime in April. VE6AGO is not heard too much any more from his mountain roost. VE6UL is busy building an s.s.b. rig. VE6AFQ is trying to bounce my speaker from the desk with his c.w. VE6ABS does not have time to be on the air much anymore as he now travels the south country

CQ . . . CQ . . . CQ . . .

FIELD SERVICE ENGINEERS



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for the provincial government. VE6UK is trying to decide what s.s.b. rig to get. VE6AFJ is trying to get his class of new hams ready for spring. The Inter-Provincial S.S.B. Net had 213 check-ins in February. Traffic: VE6HM 84, VE6FK 36, VE6SX 17, VE6XC 17, VE6SS 11, VE6TG 9, VE6ALQ 6, VE6ADS 4, VE6AOO 4, VE6-ARO/6 3.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB—The Burnaby Amateur Radio Club and Chairman VE7-BIS wish to report on amateur radio license plates. They took over this assignment on very short notice to supply the Motor Vehicle Branch with names of amateurs who wish license plates with their calls on them. They also had to mail to each amateur a form card from the Motor Vehicle Branch. With his mailing they requested financial help for mailing. Stan wishes to thank the 47 for their contribution of $23.80. The new call of the editor of *Zero Beat* is VE7WS. VE7BQB is showing off his new antenna by upping his traffic count. VE7BJV has completed an Eico s.s.b. kit which is working well. East Kootenay ARC is really increasing in size and talking Field Day. The Chilliwack ARC reports on the club members' 2-meter mobile and fixed activity. Terrace ARA's new president is VE7QQ, our hard-working RM. VE7BLO reports his traffic count is away down because DX and contests are away up. VE7AHD is trying hard for his Class A ticket. S and H are his downfall in code. B.C. Slow Speed Net 3650 kc. time 0300 GMT: B.C.E.N., 3650 kc. time 0400 GMT. Traffic: (Feb.) VE7BJV 184, VE7BQB 168, VE7ASY 105, VE7BRE 75, VE7QQ 48, VE7BLS 33, VE7AC 15, VE7BHW 6, VE7BLO 3. (Jan.) VE7BQB 169, VE7ASY 119. (Dec.) VE7ASY 112.

MANITOBA—SCM, John Thomas Stacey, VE4JT—VE4JF has returned to Brandon and VE4GN leaves Thompson for Winnipeg. VE4NV is enjoying a new thrill in DX-hunting with his conical monopole. VE4AO received his Old Timer's Club certificate from ARRL. VE4-CI is checking the tube charts for a pair of bottles for a linear on the drawing board. VE4LG now is operating 80, 40 and 20. RM VE4QX will be more active now pending a Winnipeg appointment by the telephone company. FD fever must have struck VE4TM as he is operating on 80 with a gas generator. New calls: VE4GX at Morden and VE4BK at Steinbach. 1966 executives for the WARA are VE4SD, pres.; VE4ED, vice-pres.; VE4UX, secy.; Cliff Weiss, treas. Net summaries for Feb.: Noon Phone, sessions 28, QNI 336, QTC 2. Evening, Phone sessions 26, QNI 383, QTC 5. MTN (c.w.), sessions 28, QNI 199, QTC 138. The phone net operates on 3760 kc. at 1845Z and 0100Z. The c.w. net is on 3635 kc. at 0100Z. Traffic: VE4JT 117, VE4EI 107, VE4LG 89, VE4SC 55, VE4NE 44, VE4QX 14, VE4QJ 10, VE4QD 8, VE4GN 7, VE4LQ 7, VE4SW 7, VE4TM 6, VE4XN 6, VE4AN 2, VE4JQ 2, VE4OL 1.

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK and R. P. Thorne, VO1-EI. SEC: VE1HJ. New appointments include VE1HE as RM. VO1AW finally got his WAS after 3 years trying for a Nevada station! VE1DB, VE1EK and their XYLs have returned home after a very pleasant vacation in VP9-Land. VE1LT has his A-5 endorsement. Others interested in amateur TV, please take note. EX-GM3NQV is now VO2AI. VO1CA is busy collecting information for "The Story of Amateur Radio in Canada." Welcome to newcomers VO1CW, VO1IM and VO1IO. What? You have a new amateur in your area and his call is not included here?! Well, fellow amateur, that's partially your fault if you could not take the time to pass the information along to this office! You club secretaries could help by sending along a bit of information on what is happening in *your* club. VE1HE announces the formation of the AP Net (Atlantic Provinces) on 3640 Khz, 2000 AST nightly. An appeal is issued to all to help support this net. SONRA Club station VO1CU recently put on a demonstration at the Memorial University. Traffic: (Jan.) VE1-HE 44, VO1FX 34, VE1OM 21, VE1MX 17, VE1ABS 13, VE1WB 11, VO1AW 1. (Dec.) VE1MX 4.

ONTARIO—SCM, Richard W. Roberts, VE3NG—The Niagara Penn. ARC elected VE3BTI, pres.; VE3-BVD, vice-pres.; VE3CBG, secy.; VE3FTZ, treas. VE3-NK visited Ottawa recently. QSL cards for Ottawa may be mailed to Box 6161. This is for the Ottawa area only. After 25 years on c.w. VE3SH came through and achieved his Class AA. VE3CIX is in France to visit some hams. At the time of writing VE3DJK was in Jamaica with possibly the call 6Y5RP. The Peel ARC has a fine bulletin and will exchange with other clubs. QTH is c/o E.M.O. R.R. #2, Brampton. From a blurb in the Scarboro ARC bulletin we note that the unsigned writer wonders if there are any OOs in the Toronto area who check harmonics in the 5-Mc. region. I can only say this, make sure that *you* are not caught there or elsewhere for that

(Continued on page 150)

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Silent Keys

It is with deep regret that we record the passing of these amateurs:

K1CPX, Michael P. George, Lexington, Mass.
K1LXA, Herbert S. Willcox, Cambridge, Mass.
W1MB, Arthur F. Sylvester, Jr., Scituate, Mass.
W1MLL, Thomas H. Benard, East Natick, Mass.
W1WJJ, Mary P. Etter, Stoughton, Mass.
K2BA, Harry M. Ash, Wyckoff, N. J.
W2BDK, Lloyd W. Matteson, Gloversville, N. Y.
K2BNK, Herman A. Herr, Maplewood, N. J.
W2CMR, George Hunrath, Shrewsbury, N. J.
W2FSM, Edwin M. Swanson, Lynbrook, L. I., N. Y.
W2IT, Kenneth F. Crombie, Montclair, N. J.
W2JEU, Paul H. Bellingham, Closter, N. J.
K2KTH, George W. Jimpson, Valatie, N. Y.
W2KUU, Edmond Y. Gakeler, Jr., Burlington, N. J.
W3CPT, R. Kenneth Harrison, Hatboro, Penn.
W3JRZ, Raymond J. Staub, York, Penn.
W3LNQ, Frank A. Travers, Bryn Mawr, Penn.
W3PKC, John J. Campodonico, Baltimore, Md.
K3WVX, Benito LaMartina, Baltimore, Md.
W4HFL, Percy E. Sexton, Northport, Ala.
W4IFR, Lyndal T. Bell, Clinton, N. C.
K4SLY, Floyd W. Frew, Decatur, Ga.
WA4ZFO, J. Crawford Holcomb, Jackson, Tenn.
W5AMA, Ralph H. Bailey, Brownfield, Texas
K5AUM, Reginald C. Martin, Irving, Texas
WA5BBZ, Thomas G. Parker, Baton Rouge, La.
W5BHU, Furl Halsell II, Crowell, Texas
K5LIB, Marvin A. Truelock, Southland, Texas
W5QHI, Frank J. Haahn, Houston, Texas
ex-W5ROP, Ephrem Z. Champion, Brownsville, Texas
W5SPP, J. Roy Meador, Lamesa, Texas
K5USW, Humberto Negron, Carville, La.
ex-W6AMD, Leroy S. Cormack, Santa Barbara, Calif.
K6CRA, Philip J. Faulkner, Hollywood, Calif.
WA6HPW, Luther M. Raine, Los Angeles, Calif.
W6IN, George T. Droste, Canoga Park, Calif.
W6UPV, John R. Brennan, Menlo Park, Calif.
K7AYD, F. M. Nace, Tacoma, Wash.
W7EVJ, Frank R. Jones, Lacrosse, Wash.
W8AIR, Carlton F. Schupp, Cleveland, Ohio
WA8HJP, Edward H. Hayes, Eaton Rapids, Mich.
K8NSU, Edwin C. Klotzburger, Birmingham, Mich.
W9DK, Alfred F. Christiansen, Two Rivers, Wisc.
W9RON, Stanley G. Chadwick, North Chicago, Ill.
WØCKQ, Charles A. Paddock, Kingsville, Mo.
WØCMA, Karl E. Emerson, St. Paul, Minn.
WAØDKL, Stephen Carruthers, Denver, Colo.
KØLJS, Lyman R. Henderson, Morrill, Nebr.
WØNH, Julius B. Abercrombie, St. Joseph, Mo.
G3NMQ/9L1BC, P. J. "Bing" Crosbie, Surrey, Eng.
VE7APS, G. J. L. Desaulniers, Vancouver, B. C.

Because of the need for accuracy in our "Silent Keys" listing, please send all notices to the ARRL and include both name and call of the deceased.

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(Continued from page 140)

error or any other. I regret to record the passing of VE3APP, of Moosonee, who was very popular and well known in Northern Ontario. The Metro ARC, Toronto, has a fine bulletin and will exchange. QTH is 42 Annedale Dr., Willowdale. The Skywide ARC of Toronto is to be congratulated on the very excellent display put on at the Sportsman Show. The London ARC is celebrating its 46th year of operation. VE3BBQ reports he had a swimming pool in his basement. The Ontario Division ARRL Convention will be held in the Sheraton-Brock Hotel, Niagara Falls, Sept. 16 and 17. Host is the Niagara Penn. ARC. VE3BII will be the first YL to win the BPL Bronze Medallion in the VE3 section. New operators are urged to join one of the c.w. nets. Traffic: VE3BII 320, VE3EBH 132, VE3CYR 119, VE3NG 119, VE3BTV 112, VE3GI 74, VE3DPO 68, VE3EBC 67, VE3NO 60, VE3AWE 51, VE3TT 43, VE3FGV 34, VE3EHL 33, VE3BJR 25, VE3HW 24, VE3BLZ 22, VE3AUU 17, VE3ETM 15, VE3VD 9, VE3ATI 8, VE3DU 7, VE3FHV 5.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—SEC: VE2ABV. RM: VE2OJ. VE2ALH is unable to carry on as Asst. SCM. We wish to thank him for his assistance while holding the appointment. VE2TA talked to his son, VE2BN, who operates from VK4PJ. VE2UQ's 160-meter sigs were reported S-5 in Singapore. VE2BGJ got his WAC. Those attending the South Shore Club annual affair enjoyed a pleasant evening. W1VSA, SEC for Vermont, guested the Techn. Group of the MARC and gave an enlightening discourse on repeaters in the northern states. Two new 2-meter nets have been launched. One meets Sun. at 1700 GMT, working through VE2MT; the other Mon. and Fri. at 2100 EST on 144.4 Mc. VE2RR is NCS on Mon., while VE2BZH or VE2ALE take charge on Fri. VE2AGD, La Tuque, is Asst. EC. VE2ALR is very active on 2 meters and VE2BJZ's mobile is heard frequently. VE2ALW now is an OPS. VE2YU enjoyed operating from Montserrat as VP2MU during the ARRL C.W. DX Test, and VE2BK also was busy from Cayman I. with a ZF call. On the home front VE2NV appeared to be the leader. Any information re the person who is illegally using VE2BHN's call will be appreciated. The Baie Comeau Club elected VE2AFJ, pres.; VE2BMU secy.; VE2BLS, organizer. VE2WM made a tour of stations from Quebec City to Gaspe and reports great interest in emergency work. Traffic: VE2DR 145, VE2OJ 60, VE2EC 55, VE2BRD 30, VE2CP 26, VE2CK 20, VE2BG 19, VE2BVY 14, VE2UN 13, VE2BLL 9, VE2BRT 7, VE2BZH 7, VE2ALE 6, VE2WM 6, VE2AT 2, VE2BTS 1, VE2BYS 1.

SASKATCHEWAN—Acting SCM, Mel Mils, VE5QC—Come one, come all to "Hamfest '66" at Regina July 1, 2, 3, 1966. The Regina boys have been working on this one for quite a while and promise bigger and better things for 1966. Congratulations to the Moose Jaw and district AREC gang on a very good AREC exercise effort. The publicity was most welcome and well done. A reminder, chaps, the traffic count has to be into the SCM by the 5th or 6th of the month. Traffic: VE5HP 94, VE5OB 23, VE5DS 9, VE5PZ 7, VE5BO 5, VE5PU 5, VE5CB 2, VE5CI 2, VE5GX 2, VE5IL 2, VE5IR 2, VE5YR 2.

Is One of These Your Problem?

(Continued from page 27)

You can string such a wire out of a window or from the roof down to your window, end-feed it using a transmatch, and no one is likely to be the wiser. Ham ingenuity can come up with some fairly weird antenna systems using invisible wires. One ham we know lived on the 15th floor and he would hang a 120-foot long wire out the window and reel it in when he got through operating. There are probably others, but he is the only one we've heard of that had a vertical fed from the top!

If you plan on such an antenna, the wire should have Formvar or Nylclad coating, which is extremely rugged and isn't likely to wear through as quickly as plain enamel wire. You can get an awful lot of antennas out of a one-pound roll of No. 28 wire, so don't get too concerned if you lose an antenna from the birds breaking it as they fly by! QST

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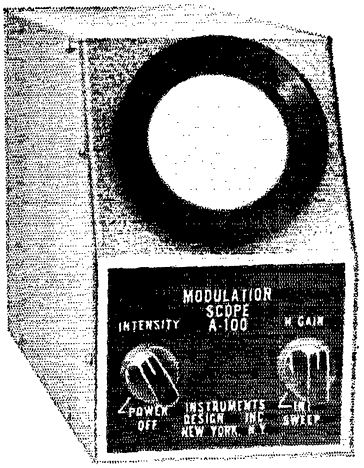

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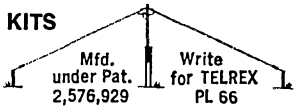

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The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All *you* have to do is send your QSL 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. **Changes are shown in heavy type.**

W1, K1, WA1 — Providence Radio Ass'n., W1OP, Box 2903, Providence, Rhode Island 02908.
W2, K2, WA2, WB2 — **North Jersey DX Assn., P.O. Box 505, Ridgewood, New Jersey 07451**
W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 204, Chalfont, Pennsylvania 18914.
W4, K4, WA4, WB4 — F.A.R.C. — W4AM, P.O. Box 13, Chattanooga, Tennessee, 37401.
W5, K5, WA5 — H. L. Parrish Jr., W5PSB, P.O. Box 9915, El Paso, Texas 79989.
W6, K6, WA6, WB6 — San Diego DX Club, Box 6029, San Diego, California 92106.
W7, K7, WA7 — Willamette Valley DX Club, Inc., P.O. Box 555, Portland, Oregon 97207.
W8, K8, WA8 — Paul R. Hubbard, WA8CXY, 921 Market St., Zanesville, Ohio 43701.
W9, K9, WA9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois 60126.
WØ, KØ, WAØ — 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, 135 Thorncrest Ave., Dorval, Quebec.
VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ontario
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Saskatchewan
VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia
VE8 — George T. Kondo, VE8RX, c/o Dept. of Transport, P.O. Box 339, Fort Smith, 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.
KG6 — Guam QSL Bureau, P.O. Box 445, Agana, Guam.
KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701
KL7 — Alaska QSL Bureau, **Star Route C, Wasilla, Alaska**
KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, Puerto Rico 00902
KV4 — Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, Virgin Islands 00820
KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.
SWL — Leroy Waite, 39 Hanum St., Ballston Spa, New York 12020

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YL News and Views

(*Continued from page 95*)

Operation Goodwill

Operation Goodwill was once again responsible for increasing the warmth in the hearts of many people at the conclusion of their sixth successful year of functioning. This service, originated by "Uncle Dave," W2APF, of Albany, N. Y., provides and mails without charge, recorded tapes of holiday

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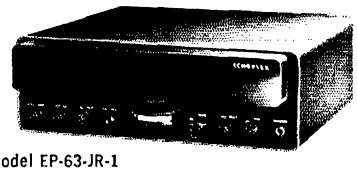

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greetings during the Christmas season each year. Families and friends can send messages using the tapes to men and women in any of the military services and also to those serving in the government service throughout the world.

The program is manned by nearly 100 volunteers from the Army, Air Force, Navy, Coast Guard, and the Red Cross, who work in conjunction with radio amateurs throughout the world for the success of this project. Many volunteer because they know what it can mean to have been far away from home and receive one of the tapes. To quote one of the Army volunteers this year: "It was the most wonderful and joyous Christmas present I could have received." Three years ago, he had spent Christmas on Okinawa.

Clara Hoffman, K2TXP, of Troy, N. Y. ably assisted the entire operation by being one of the area's amateur radio operators who handled Operation Goodwill's radio network at the Goodwill headquarters in Albany. Another YL who was very active during the entire operation was Bea Dietz, WA2GPT, of Valley Stream, N. Y. Both Clara and Bea are well-known for their proficiency as fine traffic handlers and readily accept further public service as a very natural thing.

For their assistance during Operation Goodwill, both YLs received certificates of merit and appreciation from the U. S. Navy. What was just a natural thing for them to do, was outstanding public service in the eyes of many.

YL Club News

The Buckeye Belles announce the following new officers were installed on March 13: President, WA8GPO, Shirley Reistenburg; V. Pres., K8CEN, Louise Gambill; Secy., WA8FSX, Ruth Garrison; Treas., K8UKM, Elizabeth "Zip" Isham.

The NYC YLRL Club recently elected the following new officers: Pres., W2OWL, Ruth Siegelman; V. Pres., W2IGA, Ruth Kalish; Secy., ex-W2PZA; Treas., W2EEO, Madeline Greenberg. QST

ARPSC

(Continued from page 61)

statistics for 9RN were up, too. WØLGG praises the fine performance of TEN. She issued certificates to WA0s MLE FCO NZA KQU BWH. VE3BZB thinks he should go to Arizona more often. He did in Feb. and ECN hit the 100% representation figure for the first time. There is a possibility of a regular Maritime traffic net, and this will help distribution. WB6JUH informs us that effective immediately, his new address is 1418 Hemlock Avenue, Imperial Beach.

Transcontinental Corps: W3EML is pleased with the performance of the Station B and D functions. Bill is in the process of getting another bulletin together and hopes to have it in the mail shortly. W4ZJY reports another good month for the Central Area. W7DZX sez he had 100% reporting after a little digging.

February report:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	112	96.4	2046	772
Central	84	92.9	1669	818
Pacific	112	96.4	2112	1056
Summary	308	95.6	5827	2646

Net reports:

Net	*Sessions*	*Check-ins*	*Traffic*
20 Meter SSB	20	1463	3245
Mike Farad	24	508	1055
HBN	28	432	1025
Interstate SSB	28	941	482
North American SSB	24	560	456
IMO	25		51

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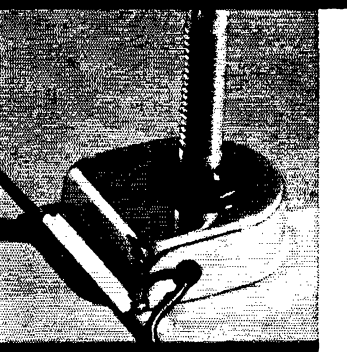

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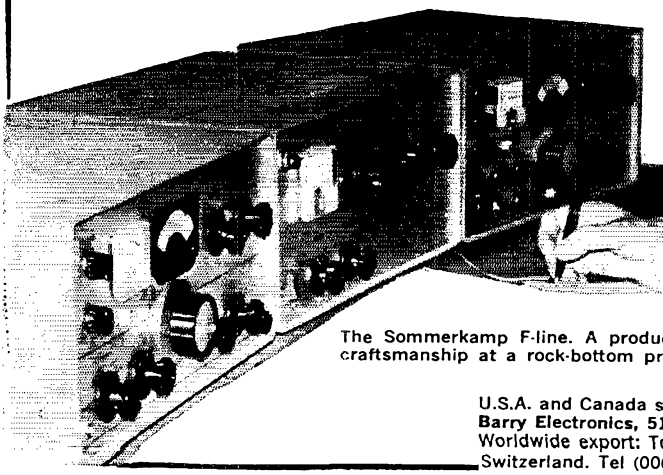
FL-1000 1 k.w. grounded grid ampl. Same bands and size as other equipments. 115/230 vac, 60 cps. Price later



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17th Armed Forces Day

(*Continued from page 65*)

C.w. Receiving Contest

A c.w. receiving contest will be conducted for any person capable of copying International Morse Code at 25 words per minute. The c.w. broadcast will consist of a special Armed Forces Day message from the Secretary of Defense addressed to all radio amateurs and other participants. The schedule for this broadcast is as follows:

Time	*Transmitting Station*	*Frequencies (kc.)*
21 May 1966	WAR — Army	3347, 6992.5, 14405
220300 GMT	NSS — Navy	3269, 4015, 7301,
(212300		13992
EDST)	AIR — Air Force	3397.5, 7315
(211900	A6USA — Army Radio,	6997.5
PST)	San Francisco, Calif.	
	NPG — Navy Radio,	4001.5, 4016.5
	San Francisco, Calif.	7301.5

RTTY Receiving Contest

A RTTY receiving contest will be conducted for any individual amateur or station possessing the required equipment. This is a test of the operator's technical skill in aligning and adjusting his equipment, and serves to demonstrate the growing number of amateurs becoming skilled in this method of rapid communications. The RTTY broadcast will consist of a special Armed Forces Day message from the Secretary of Defense to all radioteletypewriter enthusiasts. The message will be transmitted at 60 words per minute in accordance with the following schedule:

Time	*Transmitting Station*	*Frequencies (Kc.)*
21 May 1966	WAR — Army	3347, 6992.5, 14105
220335 GMT	NSS — Navy	4012.5, 7380, 14180
(212335	AIR — Air Force	7315
EDST)	A6USA — Army Radio,	6997.5
(212135 CST)	San Francisco, Calif.	

Time	*Transmitting Station*	*Frequencies (Kc.)*
	A5USA — Army Radio, Fort Sam Houston, Texas	4025
	NPG — Navy Radio, San Francisco, Calif.	4001.5
	AG6EA — McClellan AFB, Calif.	4580, 7332
	AG3HQ — (Scot AFB, Ill.)	4590, 7540

Submission of Competition Entries

Transcriptions should be submitted "as received." No attempt should be made to correct possible transmission errors.

Time, frequency and call sign of the station copies as well as the name, call sign (if any) and address of the individual submitting the entry must be indicated on the page containing the text. Each year a large number of perfect copies are received with insufficient information, thereby precluding the issuance of a certificate.

Completed entries should be submitted to the Armed Forces Day Contest Room 5B960, the Pentagon, Washington, D. C. 20315 and postmarked not later than 31 May, 1966. QST

How's DX?

(Continued from page 89)

summer target for peripatetic 6O1AU, lately 6O6AU/5R8 on Madagascar. Smitty wants to repeat his Jordan junket, too.

AFRICA — 9L1BC's sudden passing costs hamdom an outstanding DXponent of the art. G5GH tells W2CTN that Bing succumbed to malaria in late February. His QSLs bearing such calls as MP1s DAH QBG, TA3BC, ZC4BC and 5A3BC will be collectors' items for years to come. Bing operated from the home islands as ET2AT, G3NMQ and GW3NMQ . . . . . K1QHP, leaving Ft. Devens for Vietnam, delegates ET3USA-award tasks temporarily to W7TDK. Seven certifications have been issued so far. By the way, ARRL's W1ECH says that's K4YFE, not K1QHP, shown banging away on the bug in our March ET3USA photo. [*Now* he tells us! — *Jerres*] . . . . . 9Q5ID, visiting K4KSY, expects to have a Heath transceiver on 20 sideband from the Congo next month. Chuck also hits 10 and 15 with straight a.m. . . . . W8GIU suggests a check with LARA, P.O. Box 838, Benguela, Angola, concerning that society's new DCB certification based on contacts with any four of Benguela CR6s AR EC EI EO FU FW HG HH and JS since 1965, all on phone or all c.w. Those guys show up in our "What" listings regularly, so this should be a live one . . . . . VQ9EF will resume activity next month with his own gear after much fun in the ARRL Test with borrowed apparatus. "Conditions in the Indian Ocean have been spotty on 14 Mc. One recent evening I observed two W3s conversing across town, both with 50-over signals, then a completely dead band twenty minutes later. Forty seems hopeless here. Many megawatts of talk and noise cover it fairly solidly every night." . . . . . ZS6XP must be one of those sleepless wonders. W4NJF says he's a musician by night (drums), does air-conditioning work by day, and hits 14 and 21 Mc. almost any time . . . . . ZD7s IP and RH joined 160-meter forces in February with the latter's rig and came up with a surprising batch of 1822-kc. W/K QSOs. W2KQT apparently scored a St. Helena 1.8-Mc. first . . . . . Africa addenda via the clubs press: Influenza shakes our DX grapevine in endemic proportions these days, and the bug delayed VQ9-HB's springtime Desroches assault. . . . ZD8HL has juicy skeds with ZD9s BC at 1830 GMT, 14,125 kc., BE at 1900 on 14,161, after which the lads usually listen for W/K phones. . . . ST2BSS (5N2JWC) offered a spring 20-s.s.b. Sudan encore. . . . TR8s AD, French-only on sideband, and AG with slow 14,060-kc. c.w., keep Gabon graspable on 20.

HEREABOUTS — 9Y4MM tells us that W/K-9Y4 operating reciprocity is under earnest negotiation. "Generally, conditions will be made as simple as possible for U.S. applicants. Tobago is an especially good DX location powered from Trinidad by 115-volt 60-cycle submarine cable with good regulation. Maximum 9Y4 input power is one kilowatt on all ham frequencies from 3.5 Mc. through u.h.f." . . . . . WA5AER finds that VP1TC likes to QSO the gang back in Arkansas where he's licensed as WN5MAQ . . . . . This year's ARRL DX Test first c.w. week end was a wow for the lower-frequency gang. W1SWX cornered 53 countries on 3.5 Mc., and K5JVF knocked off 46 forty-meter countries all the way from Oklahoma. Furthermore, in January K1OYB, assisted by K1s MTJ and RQE, captured nine countries and 34 states in just one 160-meter week end. WØRJF, who doesn't consider himself much of a DX hound, surprised himself with a fast 80-meter WAC from Wichita — CR7CI, HH1ARM, JA1LCU, K1CHZ/KM6, PY1BTX and YU3CDE . . . . . "Been hamming with the same call for thirty years," comments W6OAQ, "but always as an a.m. phone rag-chewer. Last May the DX bug bit me, but good. Since then I've slapped the key for 177 c.w. countries." Similar story from W6BNK: "I'm normally an old phone man, s.s.b., but in January I absent-mindedly took a listen on c.w. Worked 27 new countries!" VE1DB enjoys these fine 1966 DX conditions, too: "After being off the air for seven years it's great to be back in the rat race." Ex-WN2PFD, who made 15-meter DX news as a Novice, joins the comeback crowd as WB2VWW . . . . . W1ECH had to work 100 countries on 80 c.w. before finally confirming his 3.5-Mc. WAC, so Gary wonders if this means that nailing six continents on 80 is just as hard as working the Century on that band . . . . . According to W1YQF, OX5CF (K1IXT) should be available on 20 c.w. for another six months or so . . . . . "WA7BOA was shocked to see himself mentioned as working phone on 28 Mc.," pens WA7BOB. Could have been worse, fellows, like maybe 27-Mc. phone . . . . . W4MVB inherits W4LVV's Florida DX Club *DX Report* editorial chores . . . . . VP8s HO and IE *reportedly hold out on* So. Georgia, the latter on 14-Mc. a.m. . . . . K8MYU, WAs 2WGI 3APO/4, OK3KAG and UA2AC recently qualified for DX Club of Puerto Rico 8X8X8 certifications . . . . . As you may have surmised, K8ICA of Swan is former WØYKD/K8I. QST

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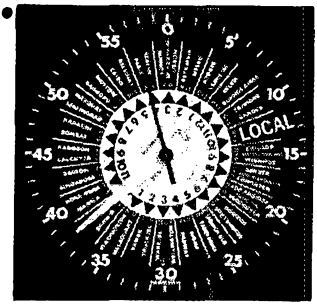

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THE FARMERIE CORPORATION
114 Spencer Lane ■ Glenshaw, Penna. 15116

INSTANT SHACK NEATNESS!!

3 thumb tacks, or 6" scotch tape and $1.00 will frame and display 60 QSLS in plastic. Each holder has 20 compartments. Tried, proven, and accepted as the modern successor to all previous methods of displaying and protecting QSLS. 3 holders, $1.00, or 10 for $3.00 PPD and Guaranteed

Free sample available to dealers or clubs

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CONVERTER SALE

New series 300 with 3 VHF-UHF transistors, crystal-controlled oscillator, tuned R.F. stage and low noise mixer. One microvolt sensitivity. More than 30 high quality parts carefully assembled and tested. Measures only 3" x 2¼" x 2". Operates at 12 volts DC 4-5 ma. Available in the following models:

	Model	Input mc.	Output mc.	Price
2M	300-D	144-148	50-54	$12.95 ppd.
	300-E	144-145	.6-1.6	$12.95 ppd.
	300-F	144-146	28-30	$12.95 ppd.
	300-Q	144-148	14-18	$12.95 ppd.
6M	300-B	50-51	.6-1.6	$12.95 ppd.
	300-C	50-54	14-18	$12.95 ppd.
	300-J	50-52	28-30	$12.95 ppd.
20M	300-G	14.0-14.35	1.0-1.35	$11.95 ppd.
CB	300-A	26.965-27.255	1.0-1.29	$11.95 ppd.
WWV	300-H	5.0	1.0	$11.95 ppd.
Int'l.	300-I	9.0-10.0	.6-1.6	$11.95 ppd.
CHU	300-K	7.3	1.0	$11.95 ppd.
CHU	300-L	3.35	1.0	$11.95 ppd.
Marine	300-M	2-3	.6-1.6	$11.95 ppd.
Aircraft	300-N4	121-122	.6-1.6	$13.95 ppd.
	300-N5	122-123	.6-1.6	$13.95 ppd.
Fire, Police etc.	300-P	155-156	.6-1.6	$13.95 ppd.
Custom Made 4-6 weeks delivery on custom-made converters	300-X	Choice of 1 input freq. and 1 output freq. between .6 mc. and 160 mc.		$14.95 ppd.

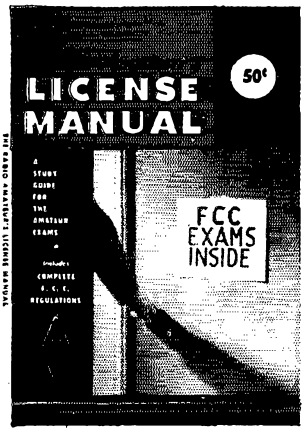
All above converters are supplied with Motorola type connectors. For two SO-239 connectors instead, add 75¢

For prompt shipment of stock models include postal money order or cashier's check. Special models shipped within six weeks. Personal checks must clear before shipment. For C.O.D.'s include 20% deposit. New York City Residents add 5% sales tax. New York State residents add 2% sales tax.

VANGUARD ELECTRONIC LABS **Dept. S-5**
196-23 Jamaica Ave. **Hollis, N. Y. 11423**

UP TO DATE . . .

THE 55th edition of the Radio Amateur's LICENSE MANUAL is complete, up to date and revised to include latest information on amateur licensing. Contains information on questions included in FCC amateur exams, all the dope on frequency privileges for the various classes of amateur licenses, the full text of RACES regs, details of the U.S.-Canada Reciprocal Operating Agreement, code-practice schedules, and the current FCC examination schedule. A useful manual for all, newcomer and oldtimer alike. **Always up to date.**



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The AMERICAN RADIO RELAY LEAGUE, Inc.

NEWINGTON, CONN. 06111

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.
(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.
(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.
(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.
(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.
(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in; nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. **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.

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.

SPRING Auction of the Rockaway Amateur Radio Club will be held Friday evening May 13th, at 8:00 P.M. at the American Irish Hall, Beach Channel Drive (at Beach 81st Street) Rockaway Beach. Come to the best Auction in the New York area. For detailed directions, write to P.O. Box 203, Rockaway Park, N.Y. 11694.

PRE-STARVED ROCK Hamfest Dinner-Dance. Streator, Illinois. June 4—7:00 P.M. Tickets, $3.50. Must have reservations by May 21. Contact: WN9OMG, Myles Van Duzer, Rte. 1, Streator, Illinois 61364.

ROCHESTER, N.Y. is again Headquarters for one of the largest Hamfests in the East on May 14. See Hamfest Calendar on page 62 this issue. Rochester Amateur Radio Association, P.O. Box 1388, Rochester, N.Y. 14603.

LANCASTER Ohio Hamfest Swap and Shop Sunday June 19th Fairfield County Fairgrounds. Good food. Bring your gear, sell or trade. Meet your friends.

AUCTION, Flatbush Radio Club, Sunday, May 15th from noon-6 PM, at the Sgt. Meyer Levin Hall, 1628 East 14th St., Brooklyn, N.Y. For more information, call 282-4737.

HAMFEST Seven Springs Resort, June 19, 1966. Advance Registration, $1.50. For more information, write Somerset County Amateur Radio Club, Box 17, Ursina, Penna.

15TH MIDWEST YL Convention, May 13, 14, 15, 1966. The Flying Carpet Motor Inn, 6465 N. Mannheim Road, Rosemont, Ill. 60018, near O'Hare Field in Chicago. Program starts with noon registration May 13 until Sunday Brunch May 15, includes free Welcome Supper Friday May 13. Registration $2.50. Saturday Luncheon, $3.50. Saturday Banquet, $6.50. Write: Larks, c/o Diane Price, K9TRP, 6123 N. Rockwell St., Chicago, Ill. 60645.

HAMFESTERS Radio Club, Chicago, Illinois, proudly announces its 32nd Annual Midwestern Hamfest, Sunday, August 14th at Santa Fe Park, 91st Wolf Road near Chicago. The Hamfest features manufacturer and distributor exhibits, swappers row, contests, 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 8-14th" by proclamation of Governor Otto Kerner. For complete details and a map of the location, write: Gregory Purteck, WA9MRE, 2916 West Marquette Road, Chicago, Illinois 60629.

ROANOKE Division Convention, Natural Bridge, Va. May 28 and 29, 1966. Varied program includes Home-brew Contest. Enjoy the Convention and see Natural Bridge, too! Special Advance Registration package, $6.50. Reservations handled. Inquries to Box 2002, Roanoke, Va. J. M. Evans, K4RDT, Program Chairman.

TRI STATE Sideband Dinner for the Pittsburgh area will be held May 7, Saturday, at Johnny Garneau's Smorgasbord, Monroeville, Penn. Activities begin at 7 p.m. Joseph Soroka, Jr. W3LGD R.D. #1, Box 475, West Newton, Penna. 15089

HAMFEST: Annual SRRC hamfest, June 5. 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.

HAM Auction: May 2, 1966. Check gear in at 6 P.M. Auction at 8 P.M. River Park Amateur Radio Club, 5100 North Francisco Ave., Chicago, Ill.

MOTOROLA used FM communication equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

QSLS?? Made-to-order? Rainbow-maps? State-maps? Flags? Cartoons? Space-age? Religious? Samples 25¢. DeLuxe, 35¢ (refunded). Sakkers, W8DED, Holland, Michigan 49423.

QSLS, samples 20¢. QSL Press Box 281, Oak Park, Illinois 60303.

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

C. FRITZ For better QSLS! Bringing hams greater returns for over a quarter-century. Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85252 (formerly Joliet, Ill.).

QSLS: Quality with service. Samples free. R. A. Larson Press, Box 45, Fairport, N.Y.

QSLS-SMS. Samples 10¢. Malgo Press, Box 373 M.O., Toledo 1, Ohio 43601.

DELUXE QSLS Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 07638. Samples, 10¢.

QSLS. See our new "Eye-Binder" cards. Extra high visibility. Samples, 5¢. Dick, W8VXK, 1994 N. M.-18, Gladwin, Mich.

10¢ Brings free samples. Sims Advertising Service, 32227 Missouri Ave. St. Louis, Mo. 63118.

DON'T Buy QSL cards until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

DAZZLING QSLS. Samples 10¢ (ex-W2QCC) Ted Besesparis, WA4WVK, Box 1275, Lake Worth, Fla.

QSL Specialists. Distinctive Samples, 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago, Illinois, 60639.

SUPERIOR QSLS, samples 10¢ Ham Specialties Co., 108 East Palace, Hobbs, New Mexico.

QSLS, SWLs, XYL-OMS (sample assortment approximately 96) covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fabulous, DX-attracting, prototypal, snazy, unparagoned cards (Wow!) Rogers KØAAB, 961 Arcade St., St. Paul 6, Minn.

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

QSL, SWLS, WPE, Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLS 300 for $4.35. Samples 10¢. W9SKR, George Vescly, Rte. #1, 100 Wilson Road, Inglesside, Ill. 60041.

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

QSLS Kromekote 2 & 3 colors attractive, distinctive different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Call decals K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

QSLS $2.50 per 100. Free samples and catalog. Garth, Box 510, Jutland, N.J.

3-D QSL Cards have that prestige look, with glittering colors and metallic in raised space-age designs fused to brilliant plastic finishes. Cost so little more than mere mediocrity! Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass.

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

QSLS, Finest YLRLs, OM's, samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

AT Last! Something new in Qsl cards! All original designs. Send 25¢ for samples to Yarsco, Box 307, Yorktown Heights 1, N.Y.

QUALITY Rubber stamps: Complete QSL 3"x5" $5.00. Call, name, address $1.50 "Wes's, W1FP, RFD No. 1, Amesbury, Mass. 01913 (Sry, OMs, Price typo in last ad!).

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

DX-QSL, The original plastic display for ur cards. Holds 20 cards, 3 for $1; ten for $3. Satisfaction guaranteed. Dealers inquiries invited. DX-QSL, Box 19033, Houston, Texas 77024.

FINE Embossed QSL cards. Ace Printing Service, 3298 Fulton Road, Cleveland, Ohio 44109.

HUNDRED QSLS: $1.00 Samples, dime. Holland, R3, Box 649, Duluth, Minn. 55803 (formerly Menlinger, Jesup, Iowa).

RUBBER STAMPS $1.00. Call and address. Clint's Radio W2UDO, 32 Cumberland Ave., Verona, N.J.

QSLS: 100 4-color, $3.99 Free Samples. Ed's Press, 3232 Le Moyne, Chicago, Ill. 60651

QSLS, Cartoons, colors, something different, samples 10¢. Chris, W9PPA, Route 1, Box 31, Crystal Lake, Ill.

QSLS—Free samples. Attractive designs. Quick Service. W7IIZ Press, Box 183, Springfield, Ore.

ORIGINAL EZ-IN double holders display 20 cards each in plastic, 3 for $1.00 or 10 for $3.00 prepaid and guaranteed. Free samole to dealers or clubs. Tepabco, John K4NMT, Box 198T, Gallatin, Tenn. 37066.

SMART Ham operators buy their QSL cards from the Ham Wholesale Card Club. See ½ p. ad (p. 159) in this magazine.

QSL Cards. Quality printing. Samples 15¢. Sargent Press, 19 Glenn Ave., Lynn, Mass.

PICTURE QSL Cards of your shack, etc. Made from your photograph, 1000, $14.50. Also unusual non-picture designs. Samples 20¢. Raum's 4154 Fifth St., Philadelphia, Penna. 19140.

PICTURE QSL Cards of your shack, etc. Made from your photograph, 1000 $14.50. Also unusual non-picture designs. Samples 20¢. Raum's, 4154 Fifth St., Philadelphia, Penna. 19140.

QSLS. 18 samples, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

HUNDRED QSLS. $1.00. Samples, dime. Holland, R3, Box 649, Duluth 3, Minn.

QSLS. Radio Press, Rex Jule, WA6QAY, P.O. Box 17112, San Diego, Calif. 92117.

QSLS: Moyers Printing, 846 Rising Sun, Telford, Penna. Samples, stamped envelope.

SAMCO QSLS presents "Proto-Call" for '66; samples, 10¢. Rubber Stamp owners: Stamp-Ett Multi-Purpose cards only $1.00. Hundred, ppd. Samco, Box 203, Wynantskill, N.Y. 12198.

QSLS. Large selection, including photos, rainbows, glossy stocks, cuts, etc. Fast service. Samples 25¢. Ray, K7HLR, Box 1176, Twin Falls, Idaho 83301.

CANADIANS: Best offer A-1 Eico 720 and/or home brew 90 W amp. VE3EMP, G. Hamilton, 70 Raymond Ave., Toronto 1, Ont. 769-7579 evenings.

CANADIANS Selling 30L1, serial 13591, SM-2 microphone. New 153B, 15-meter beam. VE8RX, Box 339, Fort Smith, NWT, Canada.

SELLING HT-37 SSB transmitter good shape, $325.00; C-2 frequency meter like new, $30.00. VE5VL, Box 1654, Saskatoon, Sask., Canada.

WANT Callbooks, catalogs, magazine, pre-1920 for historical library. W4AA Wayne Nelson, Concord, N.C. 28025

WANTED: all types of aircraft on ground radios. 17L 618F or 388, 390, GRC, PRC, 51 JRVX. Collins linear amplifier. Type 294; Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames W2KUW, 308 Hickory, Arlington, N.Y.

SELL, swap and buy ancient radio set and parts magazines. Laverty, 118 N. Wycomb, Landsdowne, Penna.

WANTED: Military and commercial laboratory text equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts; 617-598-2530 for the gear u want at the price u want to pay.

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

304TL tubes wanted. Also other xmtg and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARG, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

WANTED For personal collection; WE 1A mike mounting case with or without 387 carbon mike. Also WE 618-A dynamic, Gardner, WØJJD, 223 Welch, Ames, Iowa 55010.

WANTED: BC-348 receivers. State price c.o.d. N.Y. Sell: 1625 radio tubes in cartons at lot of 1500 pcs at garage Pasadena, Calif. 15¢ each or highest offer or Swap above receivers. V. Z. Lee, 202 Elizabeth St., Apt. 13, N.Y., N.Y. 10012.

OLD Old Timers Club now over 600 members with verified 2-way contacts before 1925. Life membership, $15 Bi-monthly "Spark-Gap Times", $2.50 annually; also available to non-members, $3.00. Write Secretary W1MPP, Lovell, Maine 04051.

SELL: Eimac 4X250B tubes. Guaranteed gnd condx. $6.50 each, $10.00 pair prepaid in U.S.A. Send check or m.o. Everett Stidham, Jr., W5JLQ, 722 So. 30th Muskogee, Okla.

MANUALS for surplus electronics. List, 10¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

WANTED: Teletype equipment, R-388, R-390A. Cash or trade for new amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: (617-742-0048).

SALE: One Viking Invader, new condition, no scratches, $385.00. No trades. W2STW, Frank Andrews, Harding Highway, Newfield, N.J. 08344.

DETROIT Area Swap n' Shop: Sunday, May 1st, 10 to 4 at K of C Hall, Grand River Ave. at Lesure. No dealers, just hams! Detroit Amateur Radio Assn. George Goldstone, W8MGQ.

CASH For Collins gear. For offer state condition and serial number. Elvin Miller, 3845 Kipling Avenue So., Minneapolis, Minn.

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, Tel. NOrmandy 8-8262.

TOOOOBES: 6146B, $4.00; 6CW4, $1.40; 417A, $3.95; 6360, $3.45; 6146, $2.25; 5894, $15.50. All new, boxed guaranteed. No pulls, seconds or JAN. Catalog of many other types, free. Vanbar Distr., Box 444Z, Stirling, N.J. 07980.

6-12-115V G66B, G77A, perfect condx, $159.00. K6EWM, Gordon, 2820 Benvenue, Berkeley, Calif.

FOR Sale from the estate of Hal Woods, WA2OUE: Hallicrafters HT-33B, $425.00 and SX-101A, $225.00. Mrs. Zadie L. Woods, 150 E. Valleybrook Rd., Cherry Hill, N.J.

BIRD Thru Line wattmeter, model 43 wanted. Super Pro SP600 series or BC 778-779 wanted. Revrs must have instruction books and schematics. Wilber Cox, 810 Pendleton Ave., Anderson, Indiana 46014.

SALES: Clegg Zeus xmitter and interceptor receiver, 150 hours in use, like new, must see to appreciate. Reasonable. Edward Pardocchi, 117 Woodbine Street, Brooklyn 11221, New York. Tel: GL-5-0922 between 8-10 P.M.

WANTED: CV253/ALR, TN-17 tuners; Mercury (Quicksilver); standard meters; electronic counters; test equipment. Engineering Associates, Dayton, Ohio 45419.

WANTED: Antique transmitting and receiving tubes made prior to 1920. W2EZM, 431 Oakland Ave., Maple Shade, N.J.

HALLICRAFTERS SX-117 receiver, $285.00; Johnson Viking kilowatt amplifiers, $1095.00. W. Bruring, Route 2, Box 313, Onalaska, Wis.

SELL: QST, CQ, Radio, Modern Electrics and Handbooks, any quantity. Buy; old radio gear and publications. Erv Rasmussen, 164 Lowell, Redwood City, Calif.

RTTY Gear for sale. List issued monthly. 88 or 44 mhy toroids, five for $1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

TELETYPES, parts. Fast service. Schmidt, W4NYF.

TELEVISION Camera: Sylvania yoke, new 7038 vidicon, lens, RF converter. Garv Steinbaugh, WA8MZD, 564 North Warpole Street, Upper Sandusky, Ohio 43351.

HAM Paradise for sale on beautiful Maine lake. Fully equipped station with Telrex Xmas Tree, 300 ft. lake frontage, 10 acres, boating, fishing, swimming. W1AUR, H. G. Riley, Fayette, Maine.

FM Equipment Schematic Digest: A comprehensive collection of Motorola schematic diagrams covering low-band, high band and 450 Mc equipment, manufactured between 1949 and 1954. Crystal formulas, alignment instructions and a wealth of technical data included in 92 pages. Price, $3.95 ppd. Two-Way Engineers, Inc., 1100 Tremont St., Roxbury 20, Mass.

RTTY Channel Filters, octal mounted, 2125/2975 cps, $5.95 pair 88 mh toroids, uncased, 5 for $2.50. WA61GI, 3232 Selby Avenue, Los Angeles, Calif. 90034.

HOUSE. Custom-built estate home, ideal ham location. 400 ft. high point in Stamford ridges 35 miles from NYC, 3 bedrooms, den, 2 full baths, solarium, terrace, 2-car garage, sundeck, large kitchen, privacy. On landscaped acre: $46,000. Two adjoining acres available. Financing arranged. 60' telescoping attached tower included. WITXZ Erich Quast, Skymeadow Drive, Stamford, Conn. 06903.

WANTED: BC-610 transmitter. W5PIN, 5744 Argonne, New Orleans, Louisiana.

WANTED: Collins Parts. BC-610, GRC-27, Antodyne, Bethpage, L.I., N.Y.

WE Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, N.Y.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-Walker-5-7000.

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

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J., Tel GArfield Area code 201-471-2020.

4000 Ham words German-English, $1.25 bill, stamps or 11 IRCs. Christian Zangerl, OE9CZI, Dornbirn, Austria.

WANTED: Teletype equipment, R-388, R-390A. Cash or trade for new amateur equipment, Alltronics-Howard Co., Box 19, Boston, Mass. 02101, Tel: (617-752-0048).

TROPICAL Holiday: Swap your SSB TX/RX excellent condition for two/three weeks' holiday in sunny Trinidad. Now, or next year for our unique carnival. QSO D. Gittens, "Carty Drive", Gordon Street, Curepe, Trinidad, B.W.I.

FOR Sale: Plate transformers, 3600-0-3600 VAC @ 1000 ma. CCS, with 120/240 VAC primary. Commercial-quality units carry one year unconditional guarantee. Price $39.95 Peter W. Dahl Co., 401 4th St. S.E., Minneapolis, Minn. 55414. Tel: 338-9077.

WANTED: For personal collection: QST, May 1916, W1CUT, 18 Mohawk Dr., Unionville, Conn.

NOVICE Crystals 80-40M, $1.05 each. Also other freqs. Free list Nat Stinnette, W4AYU, Umatilla, Fla. 32784.

SELL: QST 1915-51 (Vol. 1: photocopy). Best offer. Landa, Clayton, Ga. 30525.

HAM Radio Counselor, male, for co-ed camp in the Berkshires, Mass. Able to instruct campers in fundamentals of ham radio. Fully equipped ham radio station. Write to Robert Kinoy, Camp Taconic, 451 West End Ave., N.Y.C., N.Y. 10024.

WANTED: 75S1 or 75A4 with noise blanker. Call or write W9AW (Tel: RO 3-2265) 7239 North Oconto, Chicago, Ill. 60648.

6-Meter Gonset IV, $150, also 6M sideband transmitter with 829B Final and power supplies, custom-built and rack-mounted, $150.00. Code machine, TG10 with 15 tapes, $50.00 W3ABF, Harrisburg, Penna. Tel: 599-5122.

HQ-145XC receiver, exceptional, $190.00. SBE-33 transceiver, $225.00. Homebrew 12VDC to 115 VAC inverter 115 W. $10.00. Will give inverter to eager buyer of SBE-33. Fox, WA5LI, 5212 Danny Drive, El Paso, Texas.

SUPER Mint condx: PTT Ranger in Ranger II case $100. HQ-170C unscathed, $210.00. College pauper. Paul Mitchell, Box 11181, UCSB, Santa Barbara, Calif.

SELL: QSTs: 19 issues 1933-1937, all 1938-1945, $85.00; CQs, 14 issues 1945-1946, all 1947-1965, $60.00. 73s, all 1960-1965, $20.00. Popular Electronics all 1954-1965, $25.00; Electronics Illustrated, all 1958-1965, $15.00. 16 QST Binders, $24.00. Bill Charin, W4TPX.

4000 Ham words German-English, $1.25 bill, stamps or 11 IRCs. Christian Zangerl, OE9CZI, Dornbirn, Austria.

INTERESTING Offers galore! Ham's trading paper. Next 12 big issues $1. Sample copy free. "Equipment Exchange—Ham Trader", Sycamore, Ill.

TRADE: Want Swan 120/SW-240/NCX-3 W/AC. Have 99'er w/VFO plus other gear, some cash. Stephen Clifton, WA2TYF, 800 West End Ave., N.Y., N.Y. 10025.

FOR Sale: Complete amateur station consisting of the following: Marauder SSB exciter; grounded grid linear amp, 1 KW, pr. 4-400s, Pye 50-70 ohms w/solid state HV rect., 3000V at 500 mils variac controlled. Low-pass B&W filter, El Toro antenna 80-40 sloper, 2-el. Telrex beam with mechanical gear box (20 mtrs) HQ-170 receiver; Heathkit best scope (7 yrs. old); Eldico EE8 electronic keyer. Excellent condition. Complete station sale only. Best offer. A. Girard, 3305 Custer Ct., Hampton, Va. 23366.

GLOBE HG-303 transmitter and matching V-10, VFO. Excellent condition. Both $60.00. WA2OBT, 11 Montrose, Allendale, N.J.

SELL Complete AM station mobile 12V or 110v. $225.00 takes all: Gonset Super 12 converter: Motorola auto radio with noise clipper: Johnson Viking Mobile TX 10-80 M with VFO: Elmac M-1071 12V or 110V supply. K2DJR, Ralph J. Carito, 43-17 54th St., Woodside, L.I., N.Y. 11377.

GALAXY 300, AC supply, mike, two coax dipoles. College, must sell. Best offer over $290.00. KØJZQ, 2331 Sheridan, Evanston, Ill.

SWAN 350 with AC speaker supply mint condition, original box. Warranty, manual, org. cost $480.00. First certified check for $395.00 takes both. K9KGJ, RR #2, Box 213, Marion, Indiana. Tel: 317-664-6046.

SACRIFICE: 6 meter, 150 watts to 829B in Millen final in new Bud rack, $75.00. SX-101A plus matching speaker, plus Johnson 6N2 converter all in like new condx. $200. Ben Sherman, K2ZEX, Tel: DE 2-2339.

WANTED: Heath 2'er, state condition. J. Vick, RD#1, Freehold, N.J.

FOR Sale: SB-100, SB-200, SB-300. Wanted: Any kit to wire and repair, preferably Heakthkit. Most Heathkits in stock. Business ref. on request. Lan Richter, 131 Florence Dr., Harrisburg, Penna. 17112.

SELL: HQ-170, matching S-200 speaker, excellent, unmarked $185.00; HT-37, excellent, $240.00; Johnson Navigator VFO/Crystal 40W CW exciter-transmitter, $85.00; 1625 GG linear, needs rewiring, $30.00; D-104 mike, stand, $13.00; Heath reflected power/SWR bridge, $10.00; Johnson 250-39 T-R switch, $15.00; Eldico all-band antenna tuner, 3 coils, $14.00; Mosley 75/80 meter short dipole loading coil, never used, $4.00. All with manuals, cartons (except linear). F.o.b. Tucson, K7ZYK, 5815 Alexander, Tucson, Ariz. 85708.

SELLING Out ham shack: audio converted per 200v Specs $350; rcvr and Johnson 6 and 2m converter, both $195.00: Rohn fold-over 50 ft. tower w/rotator, 3-band Thunderbird and 6 and 2 beam all $375.00: 11m conversion to 6m, $60.00; pair 4-400As G.G. Final air system vacuum condenser w/1 amp. power supply and rack, variac both $125.00. Multiple 'scope analyser Central Electronics, $45.00. Manuals included. Dale C. Bell, W7NRU, 2260 Sunrise Dr., Reno, Nevada.

WANT G-E Pyranol 100 mfd filter capacitors at 3.5 KV or equiv. WØAIH, 814 4th St. S., Virginia, Minn.

FOR Sale: Viking KW desk $500; Gonset Twins $150; ten meter beam, $10, 20 meter beam, $30; Vibroplex $5.00. Doug Ryan, 58-23 185 St., Flush.ng 65 L.I., N.Y. Tel: FL 7-8144.

SELL: SX-100, excellent condx and Gonset 500 watt linear amp. $250.00 takes 'em both. K2MYR. Tel: 212-584-1545 evenings.

KTV Tower, Tilt-over, $50.00. W2MHL, 147 Farview Ave., Paramus, N.J.

WANTED: Antenna tuning unit for BC-610 transmitter type BC-729-C. Machlett 6C21, VFO. Chandler, WØOKM, 825 First Street S.E. Minot, N.D.

MUST Sell latest model Hallicrafters SX-101A with matching speaker. In factory fresh condx. $225.00, K1DYT, Mackenzie, 85 Lawler Lane, Norwich, Conn. Tel: 887-8392.

QUITTING: SX-100, $150.00. Bargains, list. Ed Taggart, Nashville, Ind ana.

SR-150 DC power supply, mobile rack. Hustler bumper mast and resonators tor 10, 20, 40, 75 m. B&W low-pass filter, Model 425. Ameco SWR bridge and indicator, all in perfect condition. Make offer. John Norton, 40 Sherman Bridge Road, Wayland, Mass.

CLEGG Zeus, low price, excellent condition. WB2CUD, Tel: 201-756-8340.

WANTED: An HBR type receiver, Johnson 6 and 2 Thunderbolt or Amplex 2 meter linear. Joe Szabat, 228 Plummer, Oil City, Penna.

FANTASTIC Sale! Drake 2B receiver, 2BQ speaker, Q-Multiplier, and 2AC calibrator, $200.00. Can't break up. Steve Berman, 915 North 30th St., Allentown, Penna. Tel: 437-5451 (215).

COLLEGE: Drake 2B and 2BQ, $225.00; Eico 720 90W f/w xmtr, $50; Eico 730 modulator, $40; Hallicrafters HA-5 VFO, $50; Johnson SWR bridge, $25.00; Heath IP-32 regulated power supply, $40; Shure 440S1 mike, $15.00; EV-664 mike, $20.00; Vibroplex Original bug, $15. Garry L. Lysiak, 26-4 Harris Pl., Paterson, N.J.

GONSET GSB-100 SSB Xmtr, $170.00; NC-300 rcvr with xtal calibrator and spkr, $160.00. Both in excellent condx. with manuals. 1/LT S. McAulay, W7ESU/3, 277 Gunning Bedford Dr., Dover, Delaware.

SELL: HR-10, $60; CN144 Nuvistor convertor, $35.00; QF-1, $9. All excellent condition. Alfred Rudolph, WA2RWU, Deckert Boulevard, Lagrangeville, N.Y.

HQ-170, $100. Kuhn 353B VHF AM/FM receiver, $30.00. Joe Engressia, 9050 SW 117 Ave., Miami, Florida 33156.

SELL: Thunderbolt with complete spare tubes, $300: B&W 5100, $100; 51SB, $90 (both for $175); HW12 with AC and DC supplies, $150; RME 6900, $200; special combination offer. Want: TR-3 or TR-4, WA4RGL, 701 Vanoke Drive, Madison, Tenn. Phone 895-2592.

TOP Cash paid for electronic test equipment as Hewlett-Packard, Tektronix, General Radio, Dumont, Boonton. All types of tubes, special purpose and receiving, transistors, Allen-Bradley resistors. Bring your gear. Plenty of free parking. Open 6 days weekly 9-5:30. Rex Industrial Electronics, 759 10th Ave. (nr. 51st St.) New York, N.Y. 10019. Telephone 757-1361.

KWM-1 w/blanker DXadapt ACPS DCPS, newly re-tubed, $450.00; 75S-1 w/500 cps filter, $320.00; Model 15 teletype, desk, converter, $90; 3 Wilcox fixed-freq. receivers, new open desk rack, $85. W1RAN, 207 Thames St., New London, Conn. 06320.

SELLING Transmitters. Knight T-150A, mint, $90.00: Globe Scout 65, good, $35.00. With manuals. Ken Nordlie, Route 2, Litchfield, Minn.

NEW Penta PL-172A with socket, no chimney, $35.00. B&W 832, $25.00. F.o.b. K5YYL.

75S-3, 32S-3, 516F-2, 312B-4, SB-200, HO-10 (scope), SM-1 (mike), TA-33 Sr., TR-44 rotor, 6 meter converter with power supply, etc. Will sked; only serious offers acknowledged. Prefer package deal. K1VCB, Fern Belanger, 61 Lafayette Street, Fall River, Mass. 02723.

WANTED: Burned out tubes. Types 212, 204, others 200 to 450 watts dissipation. Sam Diaz, Pine Grove Mills, Penna. 16868.

VIKING Ranger, $100: HA-T01 keyer, $55; D-104 mike w/G stand, $24.00; HQ-145 receiver L/N. $145.00; Mohican receiver, $60; Communicator II, $125.00. Send SASE for list of others. W2FNT, 18 Hillcrest Terrace, Linden, N.J. 07036. Tel: 201-486-6917.

WANTED: Heath SB-10 Adapter and manual. State price. K8OXI, 24131 St. Marys Court, Farmington, Mich.

WANTED: Military, Commercial, Surplus: Airborne, Ground, Transmitters, Receivers, Test sets, Accessories. Especially Collins. We pay cash and freight. Ritco P.O. Box 156, Annandale, Virginia. Area code (703)-506-5480 Collect.

FOR Sale: Viking 500 transmitter, factory-wired 4-400 in final, mint condition. 183-D receiver, very clean both with manuals. First $500 takes both. Would sell separately. Homebrew PP 813 fone rig, 62 inch cabinet, some parts missing, $50.00. Also, spare tubes for Command transmitters. Can operate 500 and 183-D. WA2OBW, 25 Meadowlark Road, Port Chester, N.Y.

HEATH, Cheyenne. Multi-Elmac M 10500 power supply, mike, cables, manuals, $70.00. You pay freight. W8FRM.

JOHNSON Valiant II transmitter, excellent condition, $285.00: Johnson 250-23 Matchbox, very good, $30.00: Triplett Model 660 wattmeter and line voltage meter with carrying case, $25.00. Will ship freight collect upon receipt of certified check or money order. No trades. Elmer H. Seale, Jr., KØQIH, 307 W. Washington, Brainerd, Minnesota 56401.

E-Z Way RBS40-G ground mount, plus TPS6P roof mount, $400 one year ago (have unreasonable neighbors). Best offer over $225.00. Must be picked up. K3MNJ, 8361 Langdon St., Philadelphia, Penna. 19152.

COMPLETE Rig of ex-EP2AU for sale. KWM-2 w/AC supply, TA-33SR, Ham-M rotor, D-104 mike, Johnson TR-switch, 2 KW (DC) linear, home brew but highest quality parts throughout. Many spares including six 4-400As, 4-1000A, 6146s. $950.00. Will consider trade for camping trailer, sportscar. Phone 201-532-1963. Ed Privette, 32 Vaughn Court, Eatontown, N.J.

WANTED: 2-element 20M shortbeam. Excellent condition, reasonable price. Galitzer, 1645 East Street, Pittsfield, Mass.

SELL: Best offer! Rare QSTs: 3 in 1917; 4 in 1919; 8 in 1920; 11 in 1921 and 10 in 1922. Complete run 1923 through 1959. All in good condition. Will sell as a lot or separately. First reasonable offer gets them. E. L. Treadwell, 1 Hills Terrace, Poughkeepsie, N.Y. 12603

CERTIFICATE Hunters: Work five members, get free award. Tu-Boro Radio Club, Inc. W2BMW, 104-19 127 St., Richmond Hill, N.Y. 11419.

FOR Sale: Like-new Drake 2B, 2BQ Q-Multiplier/speaker, 2AC calibrator in original cartons, $225.00; like new HX-10 recently factory aligned, extras, $295; Heath PTT desk mike, $20. J. H. Gordon, W5GXH, Box 329, Bedford, Mass. 01730. Phone 617-274-8128 (home); 617-271-3250 (office).

SELL: RME VHF-126 converter, $85; Gonset 3156 VHF aircraft band receiver, $65.00: Philco S8200 'scope, built by Waterman, $35.00. All items in excellent condition. WA6IWZ, 442 Alpine Rd., Orange, Calif. 92668.

ATWATER-Kent antique model 35, still plays, minus speaker and battery cable. Make offer. D. Mathieux, W4LSY, Rt. 5, Winchester, Va.

VALIANT I F/W, $150.00; Mosley 6 element "Fifteen Twenty" KW beam, $40.00; both $175.00. WA3EMX, 929 High Street, Bethlehem, Penna. 18018.

HALLICRAFTERS SX-62, $115.00: Monitoradio Police-PR-9, $15.00. Shipping c.o.d. H. L. Danner, 840 So. 29th St., Omaha, Nebr.

FOR Sale: Collins KWM-1 and matching AC supply; SBE 500 watt linear. Ameco preamp, Waters compreamp, exc. condx, $425. Write Buddy Kimmel, WA2CHK, 1053 East 13 St., Brooklyyn 30, N.Y.

APACHE: Good condition, $110. Graduating senior. Must sell. Ed Guida, 556 VMI, Lexington, Va. Tel: 463-3343.

SR-500 P-500 DC supply, MR-160 mobile kit cable brackets R-49 mobile speaker, $450.00. "Otts", K8CIR, Rte. 1, Grand Haven, Mich.

COLLINS 75A4, 3.1 kc, 500 cps filters, vernier knob. Excellent condition. DXers top choice. $425.00 firm. Ron Richardson, W1YIS, 3 School St., Boothbay Harbor, Maine.

SELL: SR-46 6-meter transceiver, $140.00: 6-element 6-meter Telrex beam, 24-foot boom, $35.00. 8-element Telrex 2-meter beam, $18.00; Vibroplex Blue Racer Speedkey, $10; Turner ceramic 254-C SSB-PTT mike, $10.00; Heathkit FM radio in walnut cabinet, $30.00. Duke Flannagan, W4JEY, Box 293, Aiken, S.C. Phone MI-9-2730.

HA-5 VFO $35.00; HQ-110C, matching speaker, and six meter preamp, $135.00. John Caulfield, 1916 Sandusky, K.C.K. 66102.

GUARANTEED Reconditioned equipment on approval. Terms. Collins KWM-1 $229.00; 75S-1, $299.00; 30L-1, $349.00; 75A-4, $395.00; 32S-1, $439.00, KWM-2, $795.00; Drake 2-B, $199.00; T-4X, $329.00; TR-4, $495.00; Hallicrafters SX-140, $59.00; SX-101A, $219.00; HT-37, $269.00; Johnson Ranger, $99.00; Valiant, $159.00; Swan SW-240, $219.00. Other equipment. Write for lists. Henry Radio, Butler, Mo.

BRAND New SR-150, new AC supply, $525.00. Used MR-150 mount, $20.00. Clark Hatch, KØKED, Rte 3, Salina, Kans.

WRL Blue Book prices save money. Take 10% off these prices without trades. Apollo 700, $199.00; Zeus, $329.95; 75A4, $409.00; GSB100, $179.95; Communicator III, 6M, $159.00; SX101A, $209.00; SR-150, $389.00; Apache, $139.95; HW-32, $119.00; DX-100, $99.00; HQ-100, $99.00; NCX-3, $219.00. Hundreds more. Free list. Leo, WØGFQ, Box 919, Council Bluffs, Iowa.

SELL: QSTs 1929 thru 1965, complete, mint condition, most in binders. Make offer for lot. W3OP, RD #1, Slatington, Penna.

QST Back copies from Estate of W9ZA. In mint condition. Full set from December, 1916, to date. Only first 12 copies (Dec. 1915—Nov. 1916) missing. Buyer takes all. No splits. Highest cash offer for quick sale. Frank Hughes, W9KJ, Administrator, 314 S. Cumberland Ave., Park Ridge, Ill. 60068. Phone AC-312-823-1274.

NATIONAL Receiver collection: ACSW3 with six sets of coils, ACSW5 with five sets of coils; 5880 Velvet AB supply for either ACSW3 or ACSW5, FB7 with six sets of coils and 697 power supply, HRO with six coil drawers in rack container, plus speaker and 697 power supply. Spare tubes for all. Sell as a lot for $250.00. W1PEG, Cornish, New Hampshire, RFD 2, Windsor, Vermont 05089.

SSB Mobile for sale: HW-22, custom built power supply 6 or 12 volts, Hustler antenna, mike, speaker, all cables, etc. Perfect A-1 condition, $180.00. W3ANX, George Anestis, 75 Wynnecliffe Dr., Carnegie, Penna. Call 279-3747.

T-R Switch B&W 381B, $40.00; small electric welding outfit (transformer) $18.00 for ham lab work; Hohner folding organ, worth $40. (Trade?). J. Gillson, 109 Mullin Rd., Wilmington, Del. 19809.

WANTED: 160-meter band kit for modifying Central Electronics 200-V transmitter to operate in the 1.7-2.5 Mc band. Highest price paid. WAØIOE, Francis Budavary, 285 Summit Avenue, Saint Paul, Minnesota 55102.

GOING SSB DX-40 with xtals, $45.00; VF-1, $15.00; gud HQ-110 with m.s. $115.00, mint 2B with manual, $200.00; BC312 plus AC p/s, $75.00. WB2UHH, Lee Stewart, RFD 2, Canisteo, N.Y.

HEATHKITS, SB-300 with A.M. and S.S.B. filters, $240.00 Perfect condition. DX-60 in good condition, $40.00. Going transceiver route. Bryce Jessup, W6LAB, 44124 Elm, Lancaster, Calif.

TOWERS. Foundations designed for building permits. Registered Civil Engineer, multi-state registration. Jesse Ball, W6BFO, 7112 Deveron, Canoga Park, Calif.

20A and VFO, good condition. General Radio 1175B freq. monitor, new, $110.00 each. Robert P. Snider, RD #3 WA3BNB/3, Lewistown, Penna. 17044.

HALLICRAFTERS SX-71 with speaker, excellent condition: $100. K2EXP, Brooklyn, N.Y. Tel: JA 2-0345.

TAPE Recorder: Sony 905-A "Voice Command" battery—AC portable, good condition, complete with mike, ear plug, case, manual, $90. K9KTL, 3514 N. Riley, Indianapolis, Ind. 46218.

GLOBE H.G. 303 transmitter with crystals, $50.00; HQ-105 TR-C ham transceiver with many accessories $120.00; Mosley NS-3 antenna with coax, $10. Don Perlstein, WN2TBP, 90-08 153rd Ave., Howard Beach, NYC 11414.

CURRENT Expenses force sale of HT-44, SX-117, PS-150AC, TR-44, HA-101F, Ameco PCL, Eico 425 'scope, SB-200, Johnson T-R switch, TA-33, Hy-Gain balun, audio compressor, Simpson 260, Millen GDO, Heath RF Generator, coax and rotor cable. All or separate. May be seen or heard on 14.260 at 0400Z daily. K3RSW, Bern, 6632 Akron St., Philadelphia, Penna. 19149. Tel: DE-2-5430.

CD 40-75, Cliff-Dweller antenna for sale. Never used, can ship, in factory carton, $90.00. K7AAB, 3702 W. Puget Ave., Phoenix, Ariz. 85021.

SELL: RME 4350-A, w/spkr, $110.00; Knight T-150A, $65.00. Both very clean. Twoer, one year old, $45.00. WB6PME, Chuck Evans, 2014 Ensien Ave., Modesto, Calif. 95350.

HAM'S Market Newspaper, nothing like it before! Send today for your free copy. Ham's Market Newspaper, Box 13934, Atlanta 9, Georgia.

GENERATOR, Field Day or Emergency, 110V a.c., 2500 watt, 6 h.p. engine, $125.00 cash and carry. Dr. James Martin, WIKIB, 95 High St., Shrewsbury, Mass. Telephone 844-8551 night.

NCX-3, $229.00; NCX-5, $585; 4-400, $20.00; 4-125, $120.0; 3.1 Khz filter for 75A-4, $35.00. Elmer Grabb, W2DOD, 335 Grantham Rd., Rochester, N.Y. 14609.

SELL: Hammarlund HQ-170AC receiver with matching S-200 speaker, $210.00; Hallicrafters HT-44 SSB transmitter with matching PS-150-120 AC power supply/speaker combination, $250.00; Astatic D-104 microphone with UG8 stand, $12.00. All equipment less than a year old and in perfect operating condition. WB2LBW, Harvey Silberstein, 49-17 Cloverdale Blvd., Bayside, N.Y. 11364. Tel: 212-BA-5-7014.

HEATH FM-3A tuner, $17.50; Knight stereo control, $5.00; Amateur's Handbook, 1942, 1946, 1947, 1953, 1959, 1963, $2.00 each. K3LZD, 413 Bliss Drive, Pittsburgh 36, Penna.

HT-32B used but two hours, $325.00, and SX-101 A, new condx, $200.00. Tel: (914) WI-1-6158 evenings. Bobian, WA2ECA, 8 Minkel Rd., Ossining, N.Y.

COLLINS 75S-3B, 32S-3, 516F2, 62S-1, all in mint condx, postage and factory cartons included. First $1425 takes all. K9OPC, RR #4, Huntington, Indiana.

PLATE Transformer 117 v. 60 cy. pri. Tapped sec. 1200v C.T. @ 200 Ma. and 740v C.T. @ 235 Ma. Sealed. Mtg studs. Wt 12 lbs. $4.25. A.R.C. Sales, P.O. Box 12, Worthington, Ohio 43085.

REDUCED: Hammarlund SP-600, $275; Heath SB-300, $239.95; Apache, $140.00; HR-20, $99; HW-32, $110.00; Mohawk, $160.00; HW-12, $125.00; HW-22, $125.00; SAWN SW-240, $225.00; SW-117 P/S, $65.00. Write Grice Electronics, Inc., P.O. Box 1911, Pensacola, Fla. 32501.

CRYSTALS Airmailed: Nets, SSB, Marine, MARS, Novice, etc. Custom finished etch stabilized FT-243. .01% any kilocycle 3500 to 8600 $1.90. (Five or more same or mixed frequencies $1.70) (Ten or more same frequency $1.35) (1700 to 3499 and 8601 to 20,000 $2.50). Overtones supplied above 10,000. Add 50¢ each for .005%. HC-6/u metal miniatures above 2000 add 25¢ each. ARRL kits: FT-243; "DCS-500," "IMP" $9.95. Many other filter and oscillator crystals and kits including 370 to 540 Kilocycles. Write for bulletin stating needs. Add 10¢/crystal airmail. 5¢ surface. Crystals since 1933. C-W Crystals, Rt. #2, Box 22-B, Marshfield, Missouri 65706.

HAMMARLUND HQ-145-X general coverage receiver, new in every respect; used approximately 2 hours; in original carton with instructions. Sell $180.00 or trade for Hi-Fi FM receiver and components in new condition. R. E. Lane, 280 East Queen's Drive, Williamsburg, Virginia. Telephone: 229-3737.

FOR Sale: HQ-160, $175.00; Heath HX-10, $275.00. Both for $425.00 and both in excellent condition. R. W. Mowery, 3591 Clearview Ave., Columbus, Ohio 43221.

TR-4, $480.00; AC-3, $68.00; DC-3, $108.00; factory sealed boxes. Warranty, naturally, sell separately. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C.

SELL: SX-117, HT-44, P-150, $575.00. Less than year old. Perfect condition. Will sell together or in part. John Burwell, K5UEY, 2325 Palmer Ave., New Orleans, La.

SELL: Clegg Thor VI transceiver and 12v supply/modulator, $250.00; Johnson 250-23-3 Matchbox, $50.00; Electro-Voice 664 mike, $30.00; Sony TC-102 tape recorder, $65.00; Heath HO-11, $6.00; HD-20, $6.00; Nikon 7 x 50 lightweight binoculars, $45 (trade?). All above equipment brand new. Fred Salzman, WB2EHS, 72 Johnson Road, Somerset, N.J. Tel: 201-846-4719.

ELMAC, AF 67/A, PMR8, 1070 AC-DC, broadcast thru 6 mtrs., Ameco preamp, halo's, 3 el. Hilltopper, good condition: $195.00. WA2SVY, F. Abbey, tel: 914-CE2-4411; 212-OX7-1414.

SWAN 350, has dial set control, 117C power supply, VX-1 VOX unit, extra pair 6HF5 finals, Petersen PR-106 xtal calibrator. Purchased May, 1965 and used very little, $430.00 cash. Cliff Hill, W8ICY, 114 Shore Lane, Cadillac, Mich.

NCL-2000, with brand new, factory matched 8122's. Unmodified, perfect condition inside and out; original owner. $400. Will not ship, sry. WB2CAD, 2851 Sutton St., Yorktown Heights, N.Y.

E-Z WAY RBS-40P ground post and head for CDE rotor, painted, good condition. Handles Tribander, crank-up, tilt-over, 41 feet. Can arrange local delivery or installation. 360 pounds: $150.00 F.o.b. Don Vaughan, W4MTY, 4607 Briarcliff Road, Atlanta, Georgia 30329.

SELL Or trade: Heath SR-20 receiver and SX-20 xmtr. In top condition. With fixed and mobile power supplies, mike and speaker. Would like good mobile transceiver or other usable equipment of approximate value. W8FXS, Fred Hofferth, 771 Dunwoodie Drive, Cincinnati, Ohio.

NEW Galaxy V with D.C. supply. Like new NCX-3 with both supplies. Best offer. Lots of other gear. SASE for list. R. P. H., 9600 S.W. Highway, Oaklawn, Ill. 60453.

NCX-3 with AC and DC supplies, mike, Hustler, 20-meter ant., bumper mount, universal, Hallicrafters SX-100 receiver. All equipment FB condx. Bargain. W2BAA, Tel: FL 9-4009.

SELL: Heath "Marauder" with HO-10 'scope. Drake 2-B, Johnson Matchbox with SWR meter. 14AVS vertical. Leon, W2EVV. Call (212)-282-4737.

NCL 2000 linear, in mint condx, purchased January 1965 to replace ailing regular final for DX Contest, no longer needed, very little usage, $450.00. Will pay shipping. Brand new Hy-Gain Hy-Tower vertical in original sealed carton, cannot use, only $99.00! National Select-O-Ject audio notch filter, new, in sealed carton, $19.00! New Eldico Antennascope impedance bridge, $12.00. Collins coax relay, 100 DC, as supplied with KWS-1, new in sealed bag, $8.00. K2GXI, 120 Yorktown Road, Buffalo 14226.

SWAN 350, latest model, and 117XC supply, immaculate, only $350.00. Swan 240 and HP-23 supply, very good, $200.00. Heath HX-30 six-meter sideband transmitter, very good, $150.00. Philip Schwebler, Jr., W9GCG, 4536 N. 50th St., Milwaukee, Wis. 53218.

CIRCUITS constructed from ARRL Handbook, OST, etc. Free information. (New address). George Whitmore, WA6IKV/9, 430 W. Elliott, Springfield, Illinois 62702.

JOHNSON Valiant factory-wired, $140.00; Hammarlund HQ-110 with speaker, $75.00; Heathkit SB-10, $30.00; Heathkit GD-1B, $7.00. Alan Saeger, W2FGK, 26 Alpine Lane, Hicksville, L.I., N.Y. 1180. Tel: 516-WE-1-5663.

VALIANT, factory-wired, with manual: $150.00. Dow-Key relay, $10.00. Traps and instructions from Hy-Gain 80-10 meter doublet, $15.00. Will ship. Gordon Roget, WB6DOR, 300 La Vida Drive, Lodi, California 95240.

DRAKE TR-3 (new 12JB6A's), RV-3 and AC/ps, $550.00. Robert Vann, WA4HUT, 1928 Virginia Road, Winston-Salem, N.C. 27104.

RACING Sports Car. Not the fastest but prettiest H-Modified car in States. Custom-built, over $3000 component investment not including labor. Currently insured and licensed for street use. Hundreds of dollars in spare parts. 8 wheels and new tires included 4 racing Pirelli and 2 racing Firestones. Price includes female body molds. Trade for high-class commercial ham gear, or first check for $1500 takes. W4NDE, 200 West Fairview Rd., Oak Ridge, Tennessee.

SENECA Excellent condition. $125.00. W5OFP, 2623 Marilee Lane, Houston, Texas.

NCX-3 Plus AC power supply, 18 months old. Extras, $300. Heath Monitor 'scope (HO-10), $25.00. Must see this equipment WB2GXI, Gil Bassak, 829 Schenck Ave., Brooklyn, N.Y.

32S-1, $359; 516F-2, $59.00. Both excellent. K3JZH.

JOHNSON Viking KW Model No. 240-1000, brand new, tubes still in boxes, best acceptable cash offer. Sorry, no trade. W4IKM, P.O. Box 9187, Mobile, Ala.

4-400A's slightly used. $16.00 postpaid. K6SGO, 1870 Petaluma, Long Beach, Calif. 90815.

COMPLETE Collins S/Line station, like new condition, 75S-1, 32S-1, 312B4 and 516F-2, P/S, price: $875.00. Barnes, W9CKF, 765 Lincoln, Evansville, Ind.

WANTED: National NC-80-X receiver (prewar). Charles Burson, W7VZ, 6525 N.E. 81st, Portland, Oregon 97211.

SO. CALIF. Area, Instructograph and tapes 10-35 wpm, $40.00; Drake 2A, 2AQ, xtal calibr., $145.00; Cheyenne, AC supply, mike and SWR meter, $65.00; grid dip meter, $20.00; operating 40 ft. crank-up Tri-Ex, Ham-M rotor, Hy-Gain 40-meter beam, $165.00. Want: Millen 92200 Transmatch or equivalent to $70.00. Ralph, WB6PCZ, 4717 Oakwood L.A. Tel: HO-7-4412. HO-4-6935.

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

VIKING Kilowatt with *righthand* desk, $750.00 or will consider trade for KWM-2 with power supplies. Collins 32V-2, $150.00; 2 new 4-400s, $45.00. Rebuilt Gonset 3220 Tri-band beam with spare insulators, etc., $100.00. *Ham-M* rotator and homemade control unit, $65.00. Prefer not to ship. W4TDW, P.O. Box 3144, Oak Ridge, Tennessee 37830.

MUST Sell: SX-101A, Apache, all accessories. Mint condx: $275.00. Stu, WA2MHF, 446 East Shore Road, Great Neck, L.I., N.Y. Tel: 516-HU-2-4556.

NEVER Used: Lafayette HE-61A 6-meter VFO, $15.00. Gud AC Instructograph; tapes, $45.00. WA4RWO, 5500 Davallia Lane, Louisville, Ky., 40258.

COMMUNICATOR IV for 2 meters. CD Model. In mint condition. First $219.00 gets it. M. Blank, 280 East 16 Street, Brooklyn, New York.

RANGER, $115.00; RME 6900, $260.00. Mike Bellinger, 2110 Lincoln Way, Ames, Iowa.

WANTED: National NC-57M AC-DC receiver in gud working condition. L. G. Frierson, 108 East 86th St., New York, N.Y. 10028.

"HOSS-Trader", Ed Moory, says if you can pay cash and no trade involved, you can purchase the following Demonstrator Equipment with factory Warranty: SB-2 Linear, $199.95; SB-34, $339.00; SWAN-350, $339.00; Drake, TR-4, $479.00; HAM-M Rotor, $89.95; NCX-5, $529.00; R-4A, $329.00; New Galaxie 2000 Watt Linear, $329.00; Galaxy V, $329.00; NCL-2000, $499.00; Hallicrafter New Mobile Package, New SR-160, P-150 D.C. Supply and MR-160 Mobile Mount; Regular new Price, $473.95—Special Price $273.95; Reconditioned & Guaranteed: SB-33, $198.00; Swan 240, $199.00; HT-37, $239.00; 2-B, $195.00; SX-111, $129.00; HQ-145, $119.00; 32S-1, $399.00; 75S-1, $298.00; KWM-2, $695.00; T4-X, $289.00; TR-3, $389.00. No Reasonable "Cash offers Refused. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone WHitney 6-2820.

FOR Sale: One ten-foot section Rohn steel tower, $15.00. Wanted: linear amplifier, 1 kw. P.E.P. WA4KCT, tel: 703-536-7712.

POSI-CHECK Extra Class. Amateur Extra and General Class FCC type exams complete in detail and style even to the IBM type answer sheets! A must for checking before taking an exam. General Pos-Check consists of 297 questions and explained answers for only $2.98—Extra Class, 115 questions and diagrams with explained answers, $2.00 . . . a very good aid to learning and a must in preparation for FCC exams. 138 questions of the 297 in the General Posi-Check apply directly to Extra Class also. Get both for only $4.50 postpaid. Posi-Check, P.O.Box 3564, Urbandale Station, Des Moines, Iowa 50322.

SELL: Complete Novice station! Heath HX-11 50 watt transmitter, Hallicrafters SX-99 receiver, crystals, 3-band antenna, excellent condition, $98.50. WA0KOY, Steve Shirley, 1310 So. 41, St. Joseph, Missouri.

COLLINS 32S-1 transmitter, 75S-1 receiver, AC power supply and station console with watt meter, $925.00. Also 20-40 meter beam, $90. 15-element 2 meter beam, $20.00. Hy-Gain 80-10 vertical tower, $90.00. Bob Winter, WA8LNQ, 5392 Antoinette Dr., Flint, Mich. Tel: 313-694-6777.

SELL: Ranger I, in excellent condition, factory-wired, $100.00. Also NC-300 with calibrator and matching speaker, crystal-controlled second oscillator, $150.00. Instruction manuals. R. Markel, W2IVS, 1435 Lexington Ave., New York 10028.

FOR Sale: NCX-3, NCX-A, also complete mobile set up, Adcom 250, cables, antenna, Turner 350C. All very good condition. Make offer for all or any. WA5DXR, Thoma, 6627 Sewanee, Houston, Texas.

$200/Best offer takes: Collins 32V-1 transmitter; homebrew kilowatt; National NC-88, Heath Q-multiplier; Gonset G66B receiver, G77A transmitter, modular, mobile/fixed P/S; Hallicrafters S-36 receiver; BC639A 2 meter receiver. WBRS, Baird, Brandeis University, Waltham, Mass.

DRAKE 2-B, like new, $175.00; 250-watt homebrew linear with 500-watt power supply, $35.00. John Vergne, K2KGU, 420 Riverside Drive, New York N.Y. 666-8513.

PAWNEE Heath 2 mtr. xcvr, perfect condition. Built-in PV-144 preamp, $150.00, ppd. Tom Holland, WA0JHH, 4252 Toledo Ave. So., Mpls, Minn. 55416.

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TUNER Gonset 3-30 Mc with subchassis tube BFO and P/S. $12.00. WØBHA, Bird Island, Minn. 55310.

5100B one owner, late factory run, excellent. W3KJ, 50 Shelburne Rd., Springfield, Delaware Co., Penna. 19064.

POWER Supply, perfect for surplus, PP63A/MPN-1A (ARC-1): 110 VAC In. 300-360 VDC at 0-300 Ma. and 24-28 VDC @ 8 amps. out. Transformers are 855 V @ 1 amp, center-tapped, and 0-32-34-36-38-40 V at 12 amps. 5 VDC @ 5A, 6.3 VDC @ 1A. Brand new, unused, schematic included. F.o.b. N.Y. $35.00. John Reilly, 35-19 167th St., Flushing, L.I. N.Y. 11358.

KWM-2, 516F-2, and mobile supply. $700.00: KWS-1, $675.00, both in excellent condition. Inquiries answered, offers considered. Will ship. C. Jacobsen, 2001 W. Cone, Greensboro, N. C. Tel: 288-1471.

WANTED: Surplus AN/FGC-1. State price, condition and shipping terms. K1AFC, 228 Hickory Hill Lane, Newington, Conn. 06111.

COLLINS 30L-1, new condition $325.00 shipped prepaid. Richard Fenwick, W5KTR, 1601 Provincetown Lane, Richardson, Texas.

WANTED: Heavy duty antenna rotator or brake. Clark, W2-MJI, 724 Locksley Road, Yorktown Heights, N.Y.

ATTENTION Hams! The new Evansville Amateur Radio Supply is open. Drake, Swan, SBE, Galaxy, Hy-Gain, etc. In stock. We have the best prices available. Come see. 1306 Division, Evansville, Indiana.

HEATH HW-32 20M transceiver and HP23 110V power supply, $149.50. HP-13 12V DC power supply, $49.50. All 4 months old, and never used mobile. Gene Ruff, 3856 Oak Ave., Northbrook, Ill.

CAN You tempt me? For sale: NCX-3 with modified Heathkit p/s (runs 220 watts P.E.P.). Best offer around $300 takes it. Looking for Collins receiver. Russel L. Applehard, WA2MHY, 16 Coolidge St., Larchmont, N.Y. Tel: 914-TE-4-3470.

VHF-UHF Parks 432 Mc. converter, $45.00; preamps 144, 220, 432 Mc., $17.50, postpaid. List VHF gear. W4API, Box 4095, Arlington, Virginia 22204.

FOR Sale: SX-101A rcvr and HT-32A xmtr, with Vibroplex key, now on air, lot, $475.00, you pay shipping. Abramson, 522 S. Dearborn St., Chicago 5, Ill.

COLLEGE Bills: Viking II, SB-10, and VF-1, together only, $125.00. Hornet TB-500, $30.00, AR-22, $20.00. WA6ZGN, 4320 Winding Way, Sacramento, Calif.

MUST Sell: SBE-34, excint condx, with warranty, in original carton: $285.00 with matching SBE mike. W1IFX, Copeland, 407 Central, East Bridgewater, Mass. 02333.

4X250B, $10.00 pair; XX150A, $5.00 pair; 4CX250B, $12.00 pair used; new $20.00 pp, guaranteed. Homebrew kilowatt linear amplifier for SSB, $49.00. Telefunken Magnetophone 77 stereo tape recorder, needs motor, $30.00. C. M. Pruett, Star Rte C, Flamingo Bay, Ft. Meyers, Fla. 33901.

WANTED: Crank-up tower, beam and rotator. W4FKA, 339 Sierra Dr., Lexington, Ky.

SELLING: Collins 455-J filters. National NPW-Ø dial, $15. 4-400A KW amplifier, $100. 4-125A AB1 modulator, $65.00. Wattage regulated screen supply, $25.00. 2500-3000v. HV power supply, $75.00. Many other parts, tubes, cheap. Send stamped envelope for list and give-away prices. Frank Wilson, Jr., W5-DML, Box 158, Gonzales, Texas 78629.

HAMMARLUND HQ-145AC with clock, speaker, and calibrator, less than one year old. Best offer over $230.00 gets all. Handbook T-R switch, $15.00. Rick Masters, 1750 Schuman, Garden City, Michigan 48135.

COLLINS KW-1 deluxe 1000 watt phone/cw transmitter, $1200. Cost $3850.00. Want Collins 312B-4 or 312B-5 station control. George Norton, W4EEE, Georgia University Station, Athens, Ga. 30601.

UTICA 650A with VFO. Like-new: $125.00. Might trade for 80-M, SSB mobile transceiver. W5OPW, 1224 Carrol, Pasadena, Texas. Tel: GR 7-1005.

ELECTRONICS Teacher, ham radio operator. Two positions open in boys' camp in Berkshires (Massachusetts) for electronics counselor and for ham radio operator. Camp has full equipment and going program. Long established camp, rich opportunity to work with highly talented staff. Camp Mah-Kee-Nac, 377 Irving Avenue, South Orange, N.J. 07079.

HT 44, $210.00; PS150AC, $70; SX-117, $250.00. All power and transceive cabling, manuals, and original shipping cartons. Guaranteed like-new condition. Photo and or sked on request. Shahan, 4110 Knotty Oaks, Houston, Texas 77045.

POLYCOM 62B (6 and 2 mtr. transceiver) 115 VAC, 12VDC perfect condition, $195.00; Heath DX-60 professionally wired, new condition, $60.00. Lafayette HA-63 receiver 550 Kc-30 Mc. $45.00 (used one week). K3IBQ, Nagler, 1239 Wheatsheaf, Abington, Penna. 19001.

HQ-110 with clock and speaker, FB condition: $130.00. Quinn, 88 Woodrow Court, Sharon, Penna. 16146.

COLLINS 32S-3 with 516F-2 power supply, mint condition, original cartons, $600. WØHRQ, 333 N. Rengstorff #26, Mountain View, Calif.

VIKING II and 122 VFO, FW and PTT, with TM's. Excellent mechanical and elec. condition: $125.00 S. Krevsky, W2-JBI, 69 Judith Road, Little Silver, N.J. 07739.

CHECK My two-meter standing (16 St.)! For sale: Johnson 6 & 2, Eico modulator, Heath supply, Viking VFO, $200. NC-303, $250. Ameco 2M Nuvistor converter, $30.00 and Ameco 6 M converter, $20.00, both 30,5-35 Mc. I. F. Johnson 6 & 2 converter, $40. WA2RAT, 3110 Kingsbridge Terrace, Bronx, N.Y. 212-543-5716.

SR-150 AC and DC supply, microphone 15-20-75, $550.00. Dr. R. M. Adelman, Wauconda, Ill.

FOR Sale: Must sell in this order: Apache TX-1, $125.00; SB-10, $75; Drake 2B and 2BQ, $200. All in good condition. Call or write Gerard Scola, 191 West St., Closter, N.J. Tel: 201-768-5299.

SELL DX-60 and HG-10 VFO. Write WB6PCV, 3022 Wynwood, Los Angeles, Calif. 90023.

HEATH HP20 regulated DC power supplies. Used, like new, only $50 each. Less than kit price. John Deetjen, Box 109, St. Joseph, Michigan 49085.

FOR Sale: DX-100; SX-100, both in superior operating condx and appearance: $175.00. Edwin Carpenter, 300 S. 3rd Ave., Cleveland, Miss.

EICO 720, 730, 722. Excellent condition. $110.00. Dicke, WB2-PAA, 11 Woodview Rd., W. Hempstead, N.Y. 11552.

CLEGG Apollo Six in spectacular shape: $185.00, and Clegg SS Booster in tremendous shape, $55.00. WA2VRM, Todd Canvasser, 93 Captains Road, North Woodmere, L.I., N.Y. Tel. 516-PY1-2119.

COLLINS S/Line: 32S-3, 516-F-2 AC supply, $650.00; 75S-3, $475.00; HW12, HP13-DC supply, GH12 mike, speaker, Hustler 80 resonator, all cables, $165.00; DX-35, VF1, VFO, $50.00. R. Levine, 19 Jackson Ave., Washington, New Jersey.

FOR Sale: HT-37 in excellent condition, $245.00; new Heath HP-13 mobile power supply for transceivers, $50.00. Doug Blakeslee, W1KLK, 114 Shelley Rd., Meriden, Conn.

DRAKE TR-3 transceiver, AC and DC power supplies, mobile mount and microphone. Excellent condition. James E. Farner, 501 Cactus Dr., Hurst, Texas 76053.

GALAXY III and Globe Champ 300A. Make offer. L. C. Funk, 3 Waugh Ave., Glyndon, Md. 21071. Phone 833-1340. W3WIC.

SELL: DX-100B, HQ-100, DX-40, VF-1. W8BLP, V. Jackson, 7153 Uncle Henry, R #3, Saginaw, Michigan 48601.

WANTED: R-390A Receiver. Will pay cash. Please state condition, price, your phone number. L. R. Newsome, K8TJP, 2670 Pinetree, Trenton, Michigan 48183.

SWAN 350, AC power supply. Like new. First certified check for $350 00 gets it. W4JGA, Rte. 10, Box 916, Greensboro, N.C.

STATION For Sale: DX-40 and HG-10, VFO, SX-99 and R-46B, DPDT Dow coaxial relay, JT-30 mic, key, $180.00. Pick up deal only, sry. Tom Hull, WA2DQV, RX-36486.

EICO 720, excellent for Novice but can put out 90 watts. One year old with 10 crystals, $90. Bill Mor, 7516 Bergenline Ave., North Bergen, N.J. WN2SHC. Tel: UNion 9-9460.

SELL: SX-110, $90.00; HP-13, $45.00. WA8NJD, James Fields, 3263 Mary Ave., Columbus, Ohio.

SELL Eico 753 SSB transceiver, wired, tested: $169.95. WA4-TKK, Shannon Griffin, Rte 1, Box 427, Williamston, N.C.

SELL: Globe King 500B with 500C powersupply and VFO, new plate transformer 4-400 final, $250.00; complete KW AM/CW station: Johnson Ranger driving pr 250TH push/pull 304th mods, Separate power supplies, HQ-140X rcvr DB 23 Preselector, $300. Mel Duke, W4MBE, 2510 Dowd Lane, Richmond, Virginia 23235.

SIX Meters Heath HW-10, complete, factory reconditioned, 1 year old. $175.00. F.o.b. Bloomingburg, N.Y. 12721. WB2-ODM.

SALE: Drake 2B, crystal calibrator, $175.00; Central Electronics 100V, completely factory reconditioned. Not out of crate: $375.00. Reese Clawson, W4PTW, 1202 Huntington Bldg., Miami, Fla. 33131.

DX100, $100 and Astatic mike, $5.00, in excint condx. Miss Mickie Micka, WA9LYS, 522 Parkside Drive, Elgin, Illinois 60120.

HEATH HW-32, 20 meter SSB transceiver, excellent condition, $110, or will swap for Heath HW-22 40-meter transceiver. K2POA, 29 Boone St., Bethpage, N.Y.

GROUNDED Grid filament chokes, 10-amp rating $2.95, 30-amp., $3.65 ppd cont. USA. Deane, W6RET, 8831 Sovereign, San Diego, Calif.

FOR Sale: Collins KWM-2, 516F2 A.C. 516E-1 D.C. supplies, 312B-5 console, 351-D-2 mount: $1400, one package deal. Not a scratch, perfect! W2TG.

FOR Sale: Like new NCX-5, used only five hours. AC power supply, crystal calibrator, PTT mike. Heath SWR meter, multiband dipole, $585. Robert A. Reynolds, W1CUM, 76 Smith St., Chelmsford, Mass. Phone 617-256-6023 (home); 617-271-2318 (office).

KITS: Wired and tested by professional technician and holder of First Class Commercial License. Approximately 25% kit price. Write Kollar, K3JML, 142 W. South, Nanticoke, Penna.

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.

WANTED: Gordon Rotator, working condition or suitable for replacement parts. W9EWB, 818 Oakley, Elgin, Ill.

SELL: HW-12, excellent condition, $110.00, getting SB-100. W2NNJ, 4758 Cleveland Rd., Syracuse, N.Y. 13215.

HELP! We need a receiver. Who can sell us a 2B or equal, to us low price as possible? Write: Skelleftea Amateur Radio Club, Furtenbachsgr., 6, Skelleftea, Sweden.

COLLINS: 75A4 with reduction knob and 2 filters, in mint condition: $400.00. 75A4 speaker, $15.00; 32V3, excellent, $250.00. W6RW, 8600 Skyline Drive, Los Angeles, Calif.

NCL-2000, SN 71B-3881, perfect, original carton, $450.00. Also Heath Ham-Scan 455 kc. I. F., little used. $60.00. WA2EOQ, 25 Castlebar Road, Rochester, N.Y. 14610.

NORTHERN Radio Master Frequency Oscillator. Excellent condition. Will sell to best cash offer. Write to WA6SLU.

SELL: Best offer, Radio 1936, 1937, 1941; CQ 1947 through 1949; QST 1928, 1931 through 1938, 1946 through 1959. W. Pippen, 852 Marion St., Nappanee, Indiana.

SELL: Heath Mohawk Receiver and Apache Transmitter. Both in excellent condition. Plus extras, to best offer. Mort Rosen, 716 E. 83rd St., Brooklyn, N.Y. 11236.

SELL: Complete station W4DML, or individual components: Apache, $160.00; SX-111 with matching speaker, $165.00; GD-104 mike, $15.00; Johnson Matchbox, $35.00; Heath SWR Bridge, $12.00; CDR rotator, $15.00; Mosley TA-33, $65.00; Bud lo-pass filter, $12.00. 70 ft. Rohn tower, $75.00; Eico VTVM, $20.00. QST in binders: 1957 through 1965. Make offer. R. E. Faucett, 2218 Harden Circle, Hendersonville, N.C.

FOR Sale: KWM-2 noise blanker, $75.00; 30S-1, $750.00; KWM-2, 516F2, or PM-2 (your choice) $775; 312B-5, $225.00; Loudenboomer Mark II amplifier, $150.00; 32V-3, $150.00. James Craig, 172 White Birch, Portsmouth, N.H. 03801. Tel: 603-436-9062.

COLLINS S/Line, 32S-1, 75S-1, 516F-2. Perfect, $700. U pay shpng. No time to operate. W4MMK, 5822 Jones Valley Dr., Huntsville, Ala. 35802.

KWM-1 modified as KWM-2, both w/supplies, rack, $375.00. Leece-Neville alternator, 100A, $40. K6PDR.

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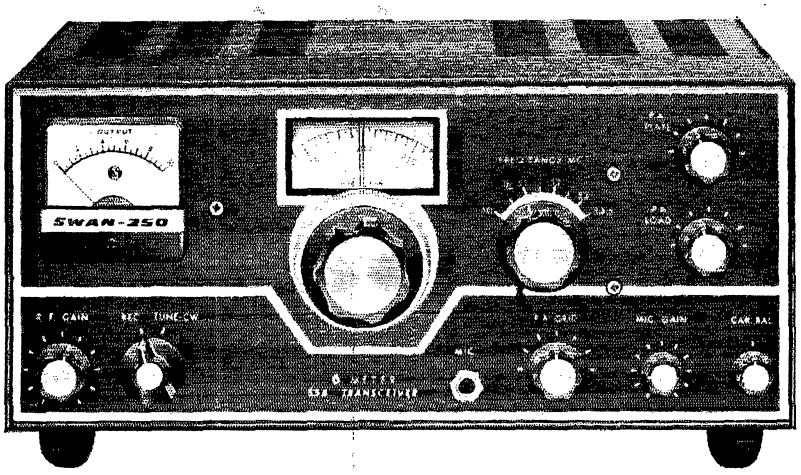

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117-XC matching AC supply with speaker as illustrated . $85
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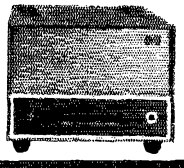

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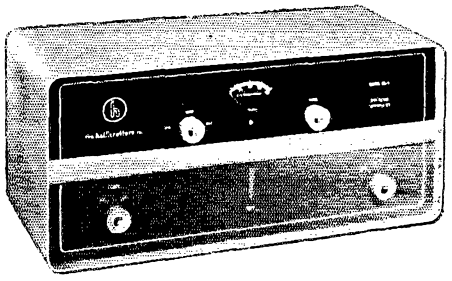

If your present transmitter and receiver, or transceiver, will work on ten meters — just connect this sensational Hallicrafters HA-6 "Transverter" to their antenna coax receptacles. Presto! You're on SIX METERS with a most sensitive receiver and a powerful transmitter!

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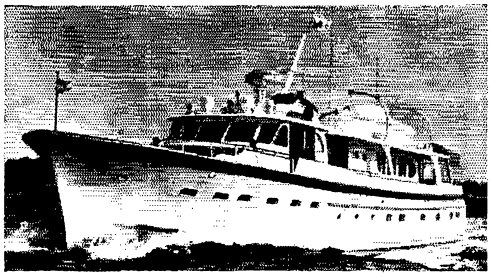

Compromise . . . One of the largest welded aluminum hull cruisers ever built in the U. S. . . . powered by twin diesels that develop 525 HP each . . . with three double staterooms plus quarters for the crew of four.

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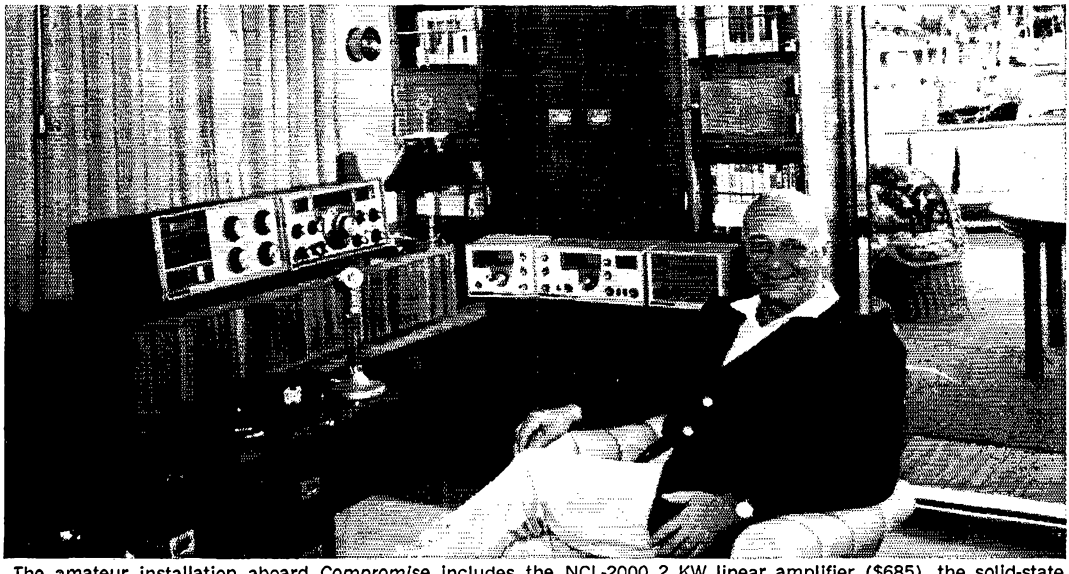
Whether intended for use aboard one of the largest and most luxurious yachts in the country or for use in home or auto installations, for over half a century National gear has been the choice of critical amateurs demanding maximum performance and craftsmanship. If, like W2MDQ, you can be satisfied with only the best, then your equipment selection must also be National.



The amateur installation aboard *Compromise* includes the NCL-2000 2 KW linear amplifier ($685), the solid-state HRO-500 5KC-30MC general coverage receiver ($1560), the NCX-5 SSB transceiver with one-KC digital dial ($685), the VX-501 VFO console ($249.95), and the NCX-A AC supply/speaker console ($110).

National, of course.

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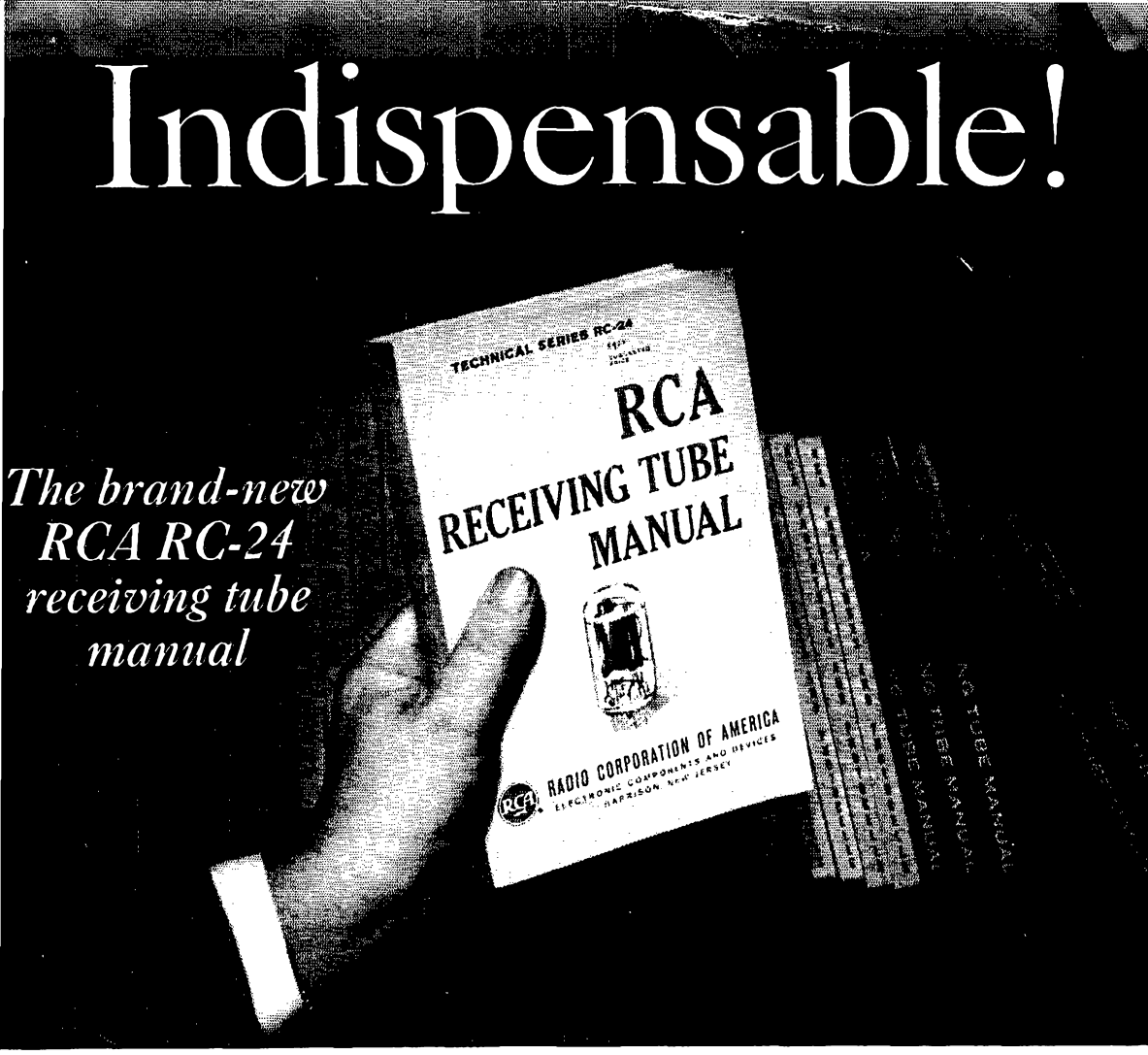

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