May 1965
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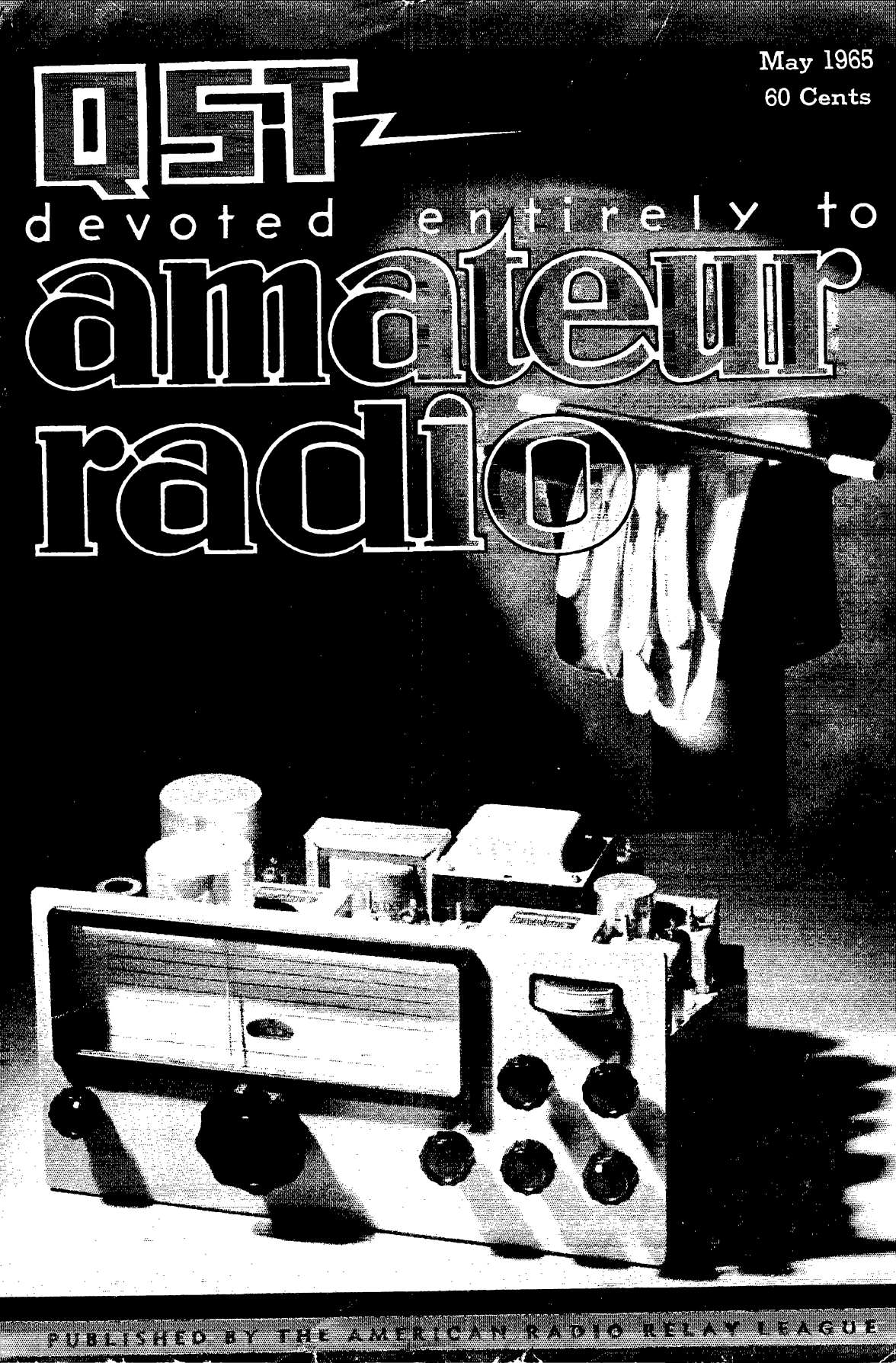

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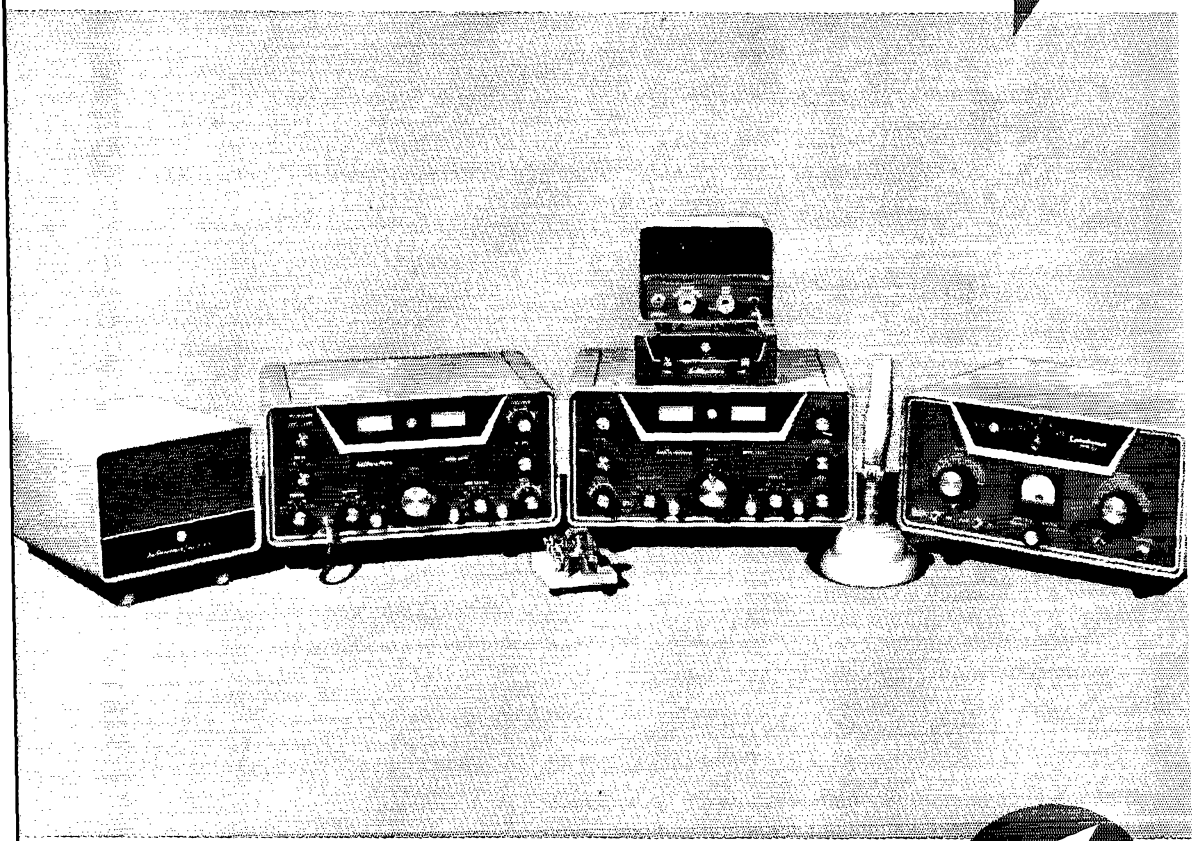

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Note: We thought this phrase should be a LOT bigger

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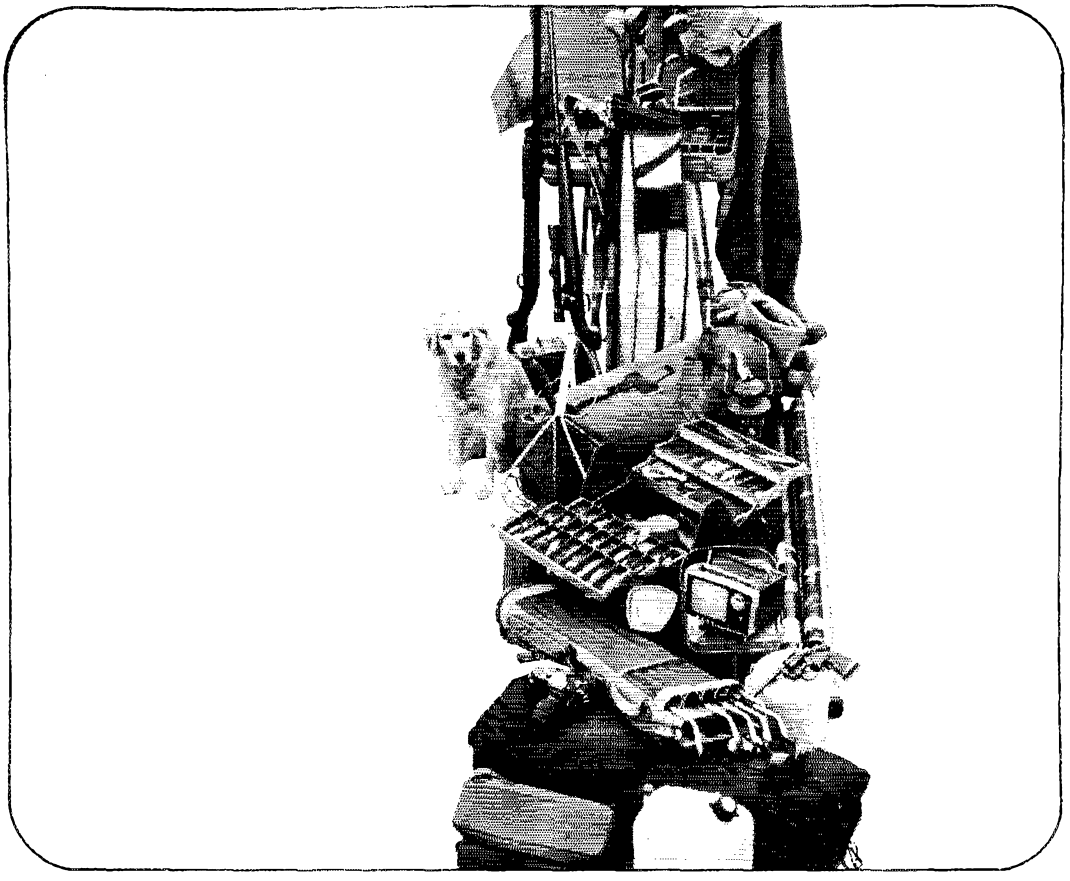

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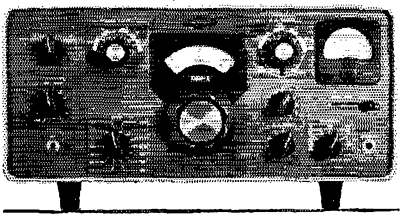

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QST

MAY 1965

VOLUME XLIX NUMBER 5

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—CONTENTS—

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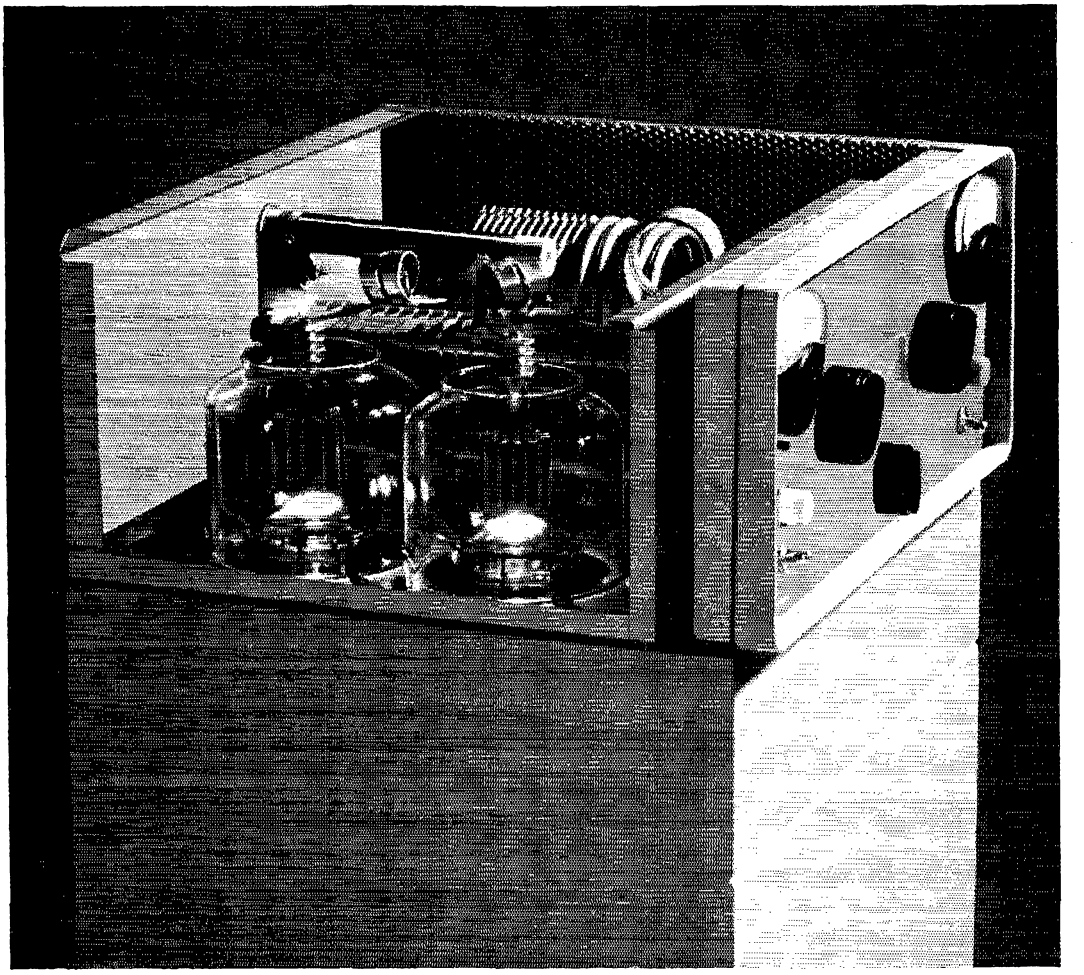
3-400Z triodes power new Henry Radio 2 K linear amplifier

Henry Radio Co.'s new 2 K linear amplifier is sure to become a classic in its field. With an ultimate simplicity of design, it covers the 80, 40, 20, 15 and 10 meter bands for SSB, AM, CW, FM or RTTY. It provides Pi-L plate tank output circuit for maximum attenuation of unwanted harmonic output and resonant cathode input circuit for finest linearity and minimum drive requirement. The best possible performance was demanded of this new linear amplifier. That's why Henry Radio chose two rugged, original design Eimac 3-400Z grounded grid triodes. Designed especially for zero-bias operation, these two Eimac 3-400Z's provide 800 watts of plate dissipation and make possible simplicity of equipment design with no screen or bias power supplies required. For complete information on an Eimac zero-bias triode to meet your needs contact Amateur Services Department. Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, California. In Europe, contact Eitel-McCullough, S.A., 15 rue du Jeu-de-l'Arc, Geneva, Switzerland.



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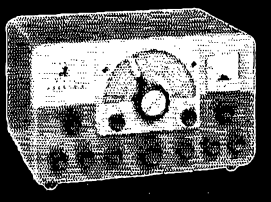

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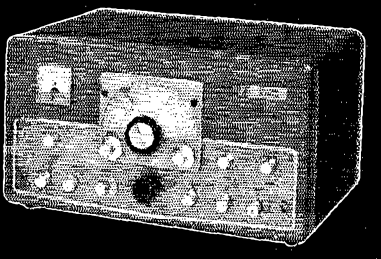

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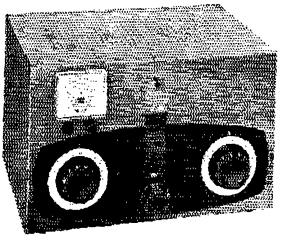

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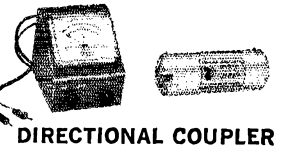

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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the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

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

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Vice-Director: Bigelow Green W1BAE
236 Marlboro St., Boston, Mass. 02116

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ROBERT B. THURSTON W7PQY
7700 31st Ave., N.E., Seattle, Wash. 98115

Vice-Director: R. Rex Roberts W7CPY
837 Park Hill Drive, Billings, Mont. 59102

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HARRY M. ENGWICHT W6HC
770 Chapman, San Jose, Calif. 95126

Vice-Director: Ronald G. Martin W6ZF
1573 Baywood Lane, Napa, Calif. 94558

Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
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Vice-Director: Joseph F. Abernethy W4AKC
764 Colonial Drive, Rock Hill, S.C. 29730

Rocky Mountain Division

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Vice-Director: John H. Sampson, Jr. W7OCX
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Vice-Director: John F. Martin W6ECP
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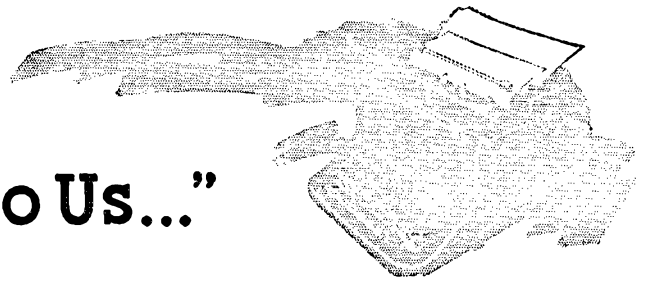
P.O. Box 1656, Corpus Christi, Texas 78403

Vice-Director: Ray K. Bryan W5UYQ
2117 S.W. 61st Terrace, Oklahoma City, Okla. 73159



"It Seems to Us..."

FCC INCENTIVE PROPOSALS

CERTAINLY the most-discussed subject in amateur ranks the past two years has been the question of appropriate methods to strengthen the licensing structure. But the near-unanimity on the principle of upgrading and more incentives has been almost equally balanced by disagreement on specific solutions.

Responsive to the League's Petition RM-499, and some ten others filed by individuals or groups on the same general subject — and after a year and a half of intensive study and internal appraisal — the Federal Communications Commission has now (see p. 44) come forth with its own views in a Docket 15928 proceeding.

One thing is clear: FCC has pretty definitely indicated that there *will be* an expansion of the incentive licensing system. The question now is not whether we shall have more incentive licensing, but rather what form it should take.

The opportunity now exists for all interested organizations and individuals to express their comments, pro or con, on the Commission's specific proposals. Copies of the Notice of Proposed Rule Making were immediately sent by the League to all affiliated clubs to provide as much time as possible for individual and group discussions prior to the May 21 meeting of the Board of Directors. It is our hope that every affiliated club and every member of the League will carefully appraise the proposals and register opinions with ARRL directors so they may be adequately informed on membership desires.

Responsive to the editorial in *QST* two years ago, as well as subsequent discussion, more than 15,000 amateurs expressed their views to the League. While this was the largest expression of membership opinion on any one subject in ARRL or amateur history, it is still far short of ideal. We hope the directors' mailboxes will be flooded with letters and the air filled with hamgrams to them during the next few weeks.

It is important for you to voice your opinion whether in favor or against. It is well known that those opposed to a proposal are normally much more vocal than those in favor. The member in favor is inclined to think, "well, this thing is going in the right direction so it's fine with me," and remain silent. The member opposed is inclined to sit right down to register his dissenting view. To avoid a lopsided and misleading result, therefore, please express your opinion *either* way.

The proposals are bound to cause extensive discussion at club meetings and on the air. This is as it should be. FCC has set July 15 as a comment deadline, so there is no need to jump to hasty conclusions. Let's try this time to make a calm and reasoned appraisal. There are certainly sound arguments, for and against, without having to resort to distortion and overstatement which unfortunately was all too prevalent during earlier discussions of the subject of incentive licensing.

It would be our guess that the matter of distinctive call signs will come in for at least as much debate among amateurs as the proposed frequency restrictions. The Commission has apparently attempted both to facilitate its monitoring responsibilities and to provide a prestige as well as a frequency incentive to move to a higher grade of license. Here — as in all phases of the Commission's proposals — we hope mightily that amateurs will give full consideration to the over-all effect on our amateur service, rather than solely any personal inconveniences which might result. However, knowing that both from sentimental and practical standpoints it is desirable to retain as much personal identification with presently-held calls as possible, the Executive Committee of the League has requested the Hq. and the General Counsel to seek an alternative system of distinctive call signs to present to the Board at its meeting, hoping that the impact of call changes can be reduced to a minimum.

Upgrading the stature of amateur radio cannot be accomplished without individual determination to put forth additional effort in the interests of the entire fraternity. Whether the specific procedures proposed by FCC are the most suitable is the question now to be answered. Your ARRL director will welcome your view. His address is on page 8. QST

COMING A.R.R.L. CONVENTIONS

June 5–6 — Georgia State, Atlanta
July 2–5 — ARRL National, San Jose, California
July 3–4 — West Virginia State, Jackson's Mill
July 9–11 — West Gulf Division, Oklahoma City, Oklahoma
July 17–18 — Rocky Mountain Division, Denver, Colorado
July 17–18 — Hawaii State, Honolulu
October 1–3 — Ontario Province, Sudbury

GEORGIA STATE CONVENTION

June 5 – 6 **Atlanta**

The Georgia State ARRL Convention and hamfest activities of the Atlanta Radio Club will be held on Saturday and Sunday, June 5 and 6 at the public auditorium of Lenox Square in Atlanta. Convention activities will include an ARRL meeting on Saturday afternoon, conducted by Tom Moss, W4HYW, Southeastern Division Director, and Howard L. Schonher, W4RZL, Georgia Section SCM; an equipment servicing clinic; an auction sale (bring your surplus equipment); and a banquet to follow in the evening. Sunday's program will begin with the League officials breakfast. Other activities will include MARS meetings, a homebrew equipment contest, entertainment, games and bingo for ladies and children, meetings for other organized statewide groups and an ARRL question and answer forum with ARRL headquarters staff participating. ARRL General Manager John Huntoon, W1LVQ, will be the banquet speaker.

Arrangements have also been made for FCC amateur examinations for the General and Extra Class to be given Sunday at the convention site.

Advance registration is $6 per person, which will include banquet and dance tickets, Wouff Hong ceremonies, and all other convention activities. Registration after June 1 will be $7.50. Advance registration and reservations for hotel and motel accommodations may be secured by contacting William A. (Bill) Clark, WA4CWU, 2013 Clairmont Terrace, NE., Atlanta, Georgia; telephone number 634-7578. No charges for registration for Sunday activities.

Lenox Square, located on Peachtree Road in northeast Atlanta, is one of the largest shopping centers in the Southeast. The XYLs will enjoy shopping on Saturday. Come early and enjoy all the activities.

FAMILY MEMBERSHIP

For families with two or more amateurs, ARRL By-Laws provide that, after one individual has become a Full Member of the League at the regular dues rate ($5 in the U.S.), additional amateur members of that family may join the League for a special dues rate of $1, with all rights and privileges except the receipt of additional copies of *QST*. Our correspondence indicates some misunderstanding of this arrangement. Please note.

1) All participants in the Family Membership plan must be Full Members — i.e., holders of amateur license. Unlicensed persons do not qualify.

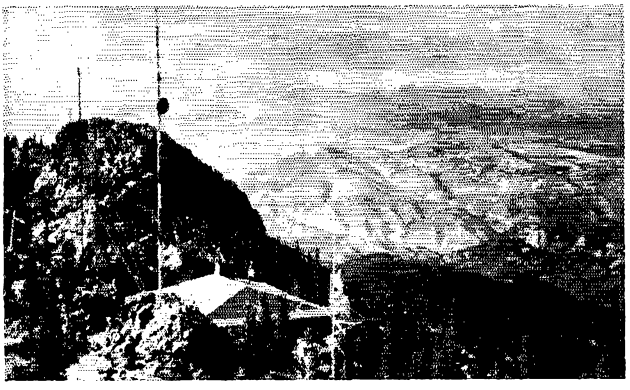
2) There must be an immediate family relationship — i.e., husband or wife, brother or sister, father or mother, son or daughter.

3) The rate for the initial membership is the standard $5 ($5.25 in Canada). The rate for additional amateur members of the family is $1 — not $2 as many seem to believe.

4) All Family Memberships must be concurrent — i.e., expire in the same month.

So if you are part of a ham family, slip in an extra dollar for each other ham in your clan next time you renew your League membership.

Strays



Not everyone can live atop an 11,500-foot mountain and regularly QSO stations hundreds of miles away on two meters, but WØWYX does. Bob Swanlund is married to a lady forest ranger, and they live just below the Forest Service lookout on Squaw Mountain, Colorado. He's on two and six meters regularly, has a 1296-Mc. rig in the works. Two generators can provide emergency power for the amateur gear as well as the relay equipment maintained there by commercial services, the FBI, and the Colorado State Patrol (whose Chief of Communications Bob was until his retirement).

Some Thoughts on Home Receiver Design

Including a Brief Description of "The Miser's Dream"

BY BYRON GOODMAN*, W1DX

OUR COVER

A classical effect in stage and night-club magic is "The Miser's Dream," in which the magician effortlessly plucks coins out of the air at will. Read "signals" for "coins" and you have a pretty fair description of what one would like a communications receiver to do.

MISER" denotes penny-pinching, so it seems reasonable that any "Miser's Dream" receiver should require a minimum expenditure of money, time and space. Our design is presented here in the hope that it will trigger off improved versions that will make this "Miser's Dream" look like it was conceived and financed by the Ford Foundation.

Some years ago we sounded off on the virtues of putting the receiver selectivity as close to the antenna as possible [1], but we didn't follow through with a complete design. Inspired by W2PUL's work[2] and the results obtained with a 7360 mixer in a 1965 *Handbook* receiver project, we recently started out on "The Miser's Dream."

Circuit Outline

The bare outline of the receiver circuit can be seen in Fig. 1. The antenna is coupled to the 7360 mixer through a single tuned circuit, and the tunable high-frequency oscillator is coupled to a deflection plate of the mixer tube. Gain and selectivity of the input circuit are boosted (when needed) by a simple "Q multiplier" circuit. On 7 Mc. the oscillator is above the signal frequency, and on 14, 21 and 28 Mc. it is below. (When 3.5-Mc. coils are wound, the oscillator will be put on the high-frequency side.) Since the lower sideband is generally used on 7 Mc. and upper sideband on the higher frequencies, one b.f.o.-i.f. amplifier relationship suffices for sideband reception on the four bands.

The mixer output is coupled to a crystal-lattice filter [3] that has a bandwidth of 2800 cycles at −6 db. and 12 kc at −60 db. The filter is at 2.215 Mc. A stage of i.f. amplification follows (6BA6), which in turn is followed by another crystal-lattice filter that is 250 cycles wide at −6 db and 1000 at −60. This filter can be switched out of the circuit.

Following the i.f. amplifier and its optional sharp filter is a 6KE8 converter stage to 500 kc. The pentode portion is used as the mixer; the triode-oscillator output is grid-injected through a 10-pf. capacitor. The oscillator frequency control is brought to the front panel, since it functions as the "pitch" control. Five-hundred kc. output of the mixer is transformer-coupled to a product detector (two 1N67A germanium diodes) which has a crystal-controlled b.f.o. driving it. The reason for the extra conversion *after* the selectivity will be discussed later.

Two stages of audio amplification follow the detector, and an audio-derived a.g.c. system is included. The a.g.c. is a simple fast-attack slow-decay system; the control voltage is applied to the 6BA6 i.f. and the 6KE8 mixer. There is a 12AX7 triode section left over that had originally been scheduled for use as a (diode-connected) envelope detector for a.m. However, with the selectivity of the i.f. the a.m. reception at best would be rather inferior, and we listen to one sideband of an a.m. signal and zero beat its carrier with our b.f.o.

* Assistant Technical Editor, *QST*.

[1] Goodman, "What's Wrong with our Present Receivers?", *QST*, January, 1957.

[2] Squires, "New Approach to Receiver Front-End Design", *QST*, September, 1963.

[3] The two filters used in the receiver were made by Hycon Eastern and are no longer available. However, Blackhawk Engineering Co., 14 North Parker Drive, Janesville, Wisc., 53546, makes similar ones. Their RS-2215-SA is 2500 cycles wide, and the RS-2215-SB is 250 cycles wide.

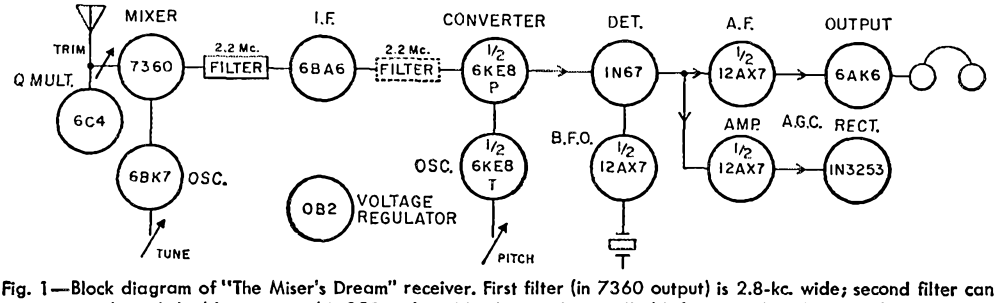


Fig. 1—Block diagram of "The Miser's Dream" receiver. First filter (in 7360 output) is 2.8-kc. wide; second filter can be switched in or out and is 250 cycles wide. A crystal-controlled b.f.o. is used at the second i.f. of 500 kc.; adjustable oscillator at 2.7 Mc. takes over the pitch control function.

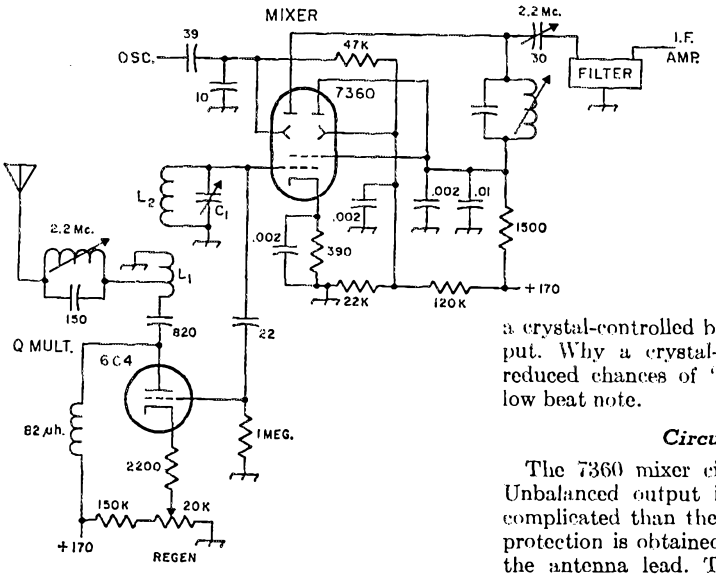


Fig. 2—Circuit details of the mixer and r.f. Q multiplier. Oscillator voltage at mixer deflection plate is about 2 volts peak. Antenna coil L_1 doubles as feedback winding for Q multiplier.

Why Multiple Conversion?

Years ago when experimenting with two crystal-lattice filters in cascade [1] and a product detector on the same frequency, we twisted the b.f.o. control and heard a low-frequency audio signal. Repeating the experiment a number of times, we found that the pitch was higher if the b.f.o. control was twisted faster. It finally dawned on us that we had a built-in measure of how much b.f.o. voltage was getting into the i.f. amplifier *ahead* of the filters. The filters provided enough time delay so that the b.f.o. was at a different frequency by the time its signal had come back to the detector. Using this audio output as a measure we were able to reduce the b.f.o. leakage somewhat but we were never able to eliminate it completely. Obviously an i.f. amplifier with b.f.o. signal riding through it all the time doesn't have as much signal-handling ability as one that is free of the steady signal, and it certainly precludes the use of a high-output b.f.o.

The product detector used in "The Miser's Dream" has a 6-volt b.f.o. signal applied to it. This is a lot of signal to keep out of the front end of an i.f. amplifier tuned to the same frequency, but the solution is simple: Have *no* i.f. amplifier at the b.f.o. frequency. Hence the conversion to 500 kc. *after* the selectivity. It permits the use of a crystal-controlled b.f.o. of relatively high output. Why a crystal-controlled b.f.o.? Greatly reduced chances of "pulling," even at a very low beat note.

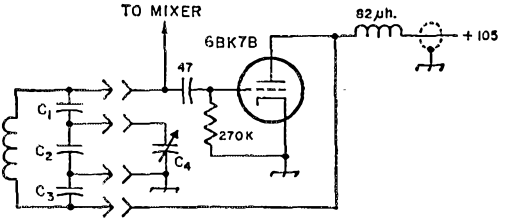


Fig. 3—High-frequency oscillator is high-C Colpitts. Tuning range can be juggled by choice of C_1 and C_2. C_4—100-pf. variable (Miller 2101).

Circuit Details

The 7360 mixer circuit is shown in Fig. 2. Unbalanced output is used because it is less complicated than the balanced version, and i.f. protection is obtained from the 2.2-Mc. trap in the antenna lead. The impedance of the i.f. filter is 4000 ohms, and a 30-pf. adjustable capacitor is used in series to permit an impedance match. The filter is terminated in a capacitance divider across a tuned circuit, in exactly the same manner used previously.[1]

The Q multiplier circuit uses the antenna coil as a plate feedback winding, and regeneration is controlled by the cathode bias. On 7 Mc. the 6C4 plate connection and the antenna connection are the same, but on 14, 21 and 28 Mc. more turns are required in the feedback winding than for antenna coupling. Advancing the regeneration control arm toward the ground end will eventually throw the stage into oscillation, but control is very smooth and the regeneration is usually not touched after being set for a given band. The gain can be increased by the regeneration up to about 10 times. While image rejection through 21 Mc. is not bad (40 db. on 14 and 28 db. on 21 Mc.), it is really not good enough, and occasional images can be found in these bands. An additional tuned circuit (antenna coupler) is enough to cure the condition. (While regeneration will increase the image *ratio*, it does so only by boosting the desired signal. What we want is *rejection* of the unwanted, so to take advantage of an increased image ratio we must simultaneously decrease the receiver gain. At present this is a two-handed operation; we didn't dope out a circuit to take care of it automatically.)

I.f. feedthrough at 2.215 Mc. was rather discouraging until the trap was put in the antenna lead, but now a 25,000-μv. signal is just audible.

This is an "idea" article, not a construction story. Consequently some obvious circuit details will be glossed over or ignored altogether. However, as mentioned at the end, the complete circuit diagram is available.

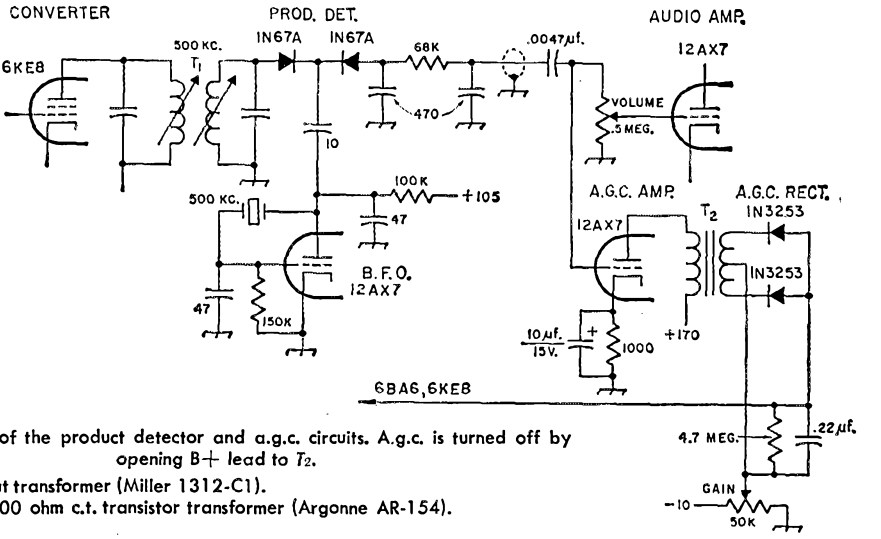


Fig. 4—Details of the product detector and a.g.c. circuits. A.g.c. is turned off by opening B+ lead to T_2.

T_1—455-kc. input transformer (Miller 1312-C1).
T_2—5000 to 7500 ohm c.t. transistor transformer (Argonne AR-154).

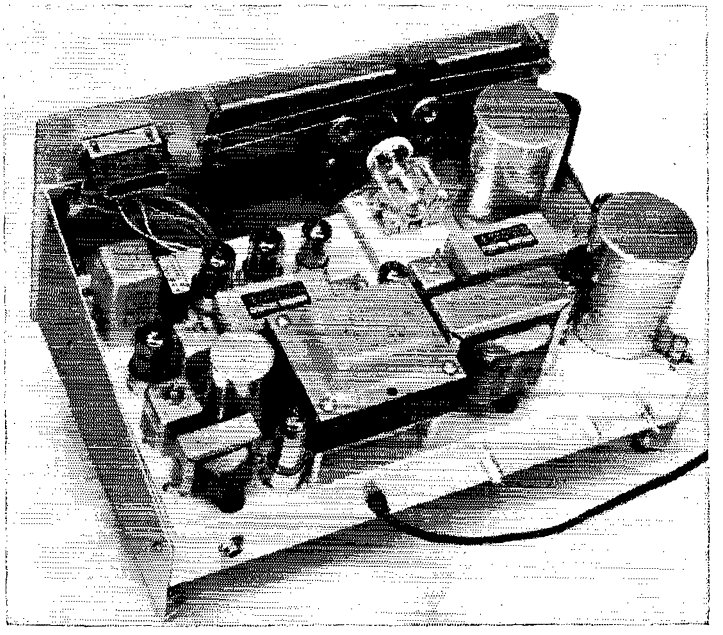
This simple solution would have been impossible with a tunable i.f. amplifier, and makes another argument for the fixed i.f. (as opposed to the tunable).

The oscillator circuit (Fig. 3) is not unusual, and is presented merely to show how the tuning range is controlled on each band. Capacitors C_1, C_2 and C_3 are part of the plug-in assembly; in some instances C_1 is replaced by a jumper connection. The tuning range is reduced by making C_1 smaller or C_2 larger. Tuning capacitor C_4 is a British import (Polar) with ball bearings and low torque requirements, driven by an Eddystone dial.

The 6KE8 converter stage uses the pentode mixer with 1500 ohms cathode bias. The product-detector circuit (Fig. 4) is an adaptation of one devised by Don Norgaard[4]. In the original with 6H6 twin diodes it looked complicated, but with two germanium diodes (and their finite back resistance used for d.c. returns) it becomes quite simple. With about 6 volts peak b.f.o. voltage and a maximum signal of about 0.1 volt, low-distortion demodulation is assured.

(In a subsequent article[5], Norgaard mentioned that the semiconductor version would be noisy, and that is indeed the case. However, at this point in the circuit the noise is of no consequence, since amplified it only comes up to about the hum level of the set. Hum and detector noise are both masked by amplified background noise.)

[4] "Single Sideband Reception," *G.E. Ham News*, November, 1948.
[5] "Signal Slicer," *G.E. Ham News*, July-August, 1951.



Top view of "The Miser's Dream" shows economy of components. Mounting the power transformer entirely above the chassis makes room underneath. The 7 × 13 × 2-inch chassis is raised above table level to bring main tuning knob (see cover) to comfortable height. Shield can (Millen 80011) near panel encloses oscillator coil; the other shield can covers mixer coil.

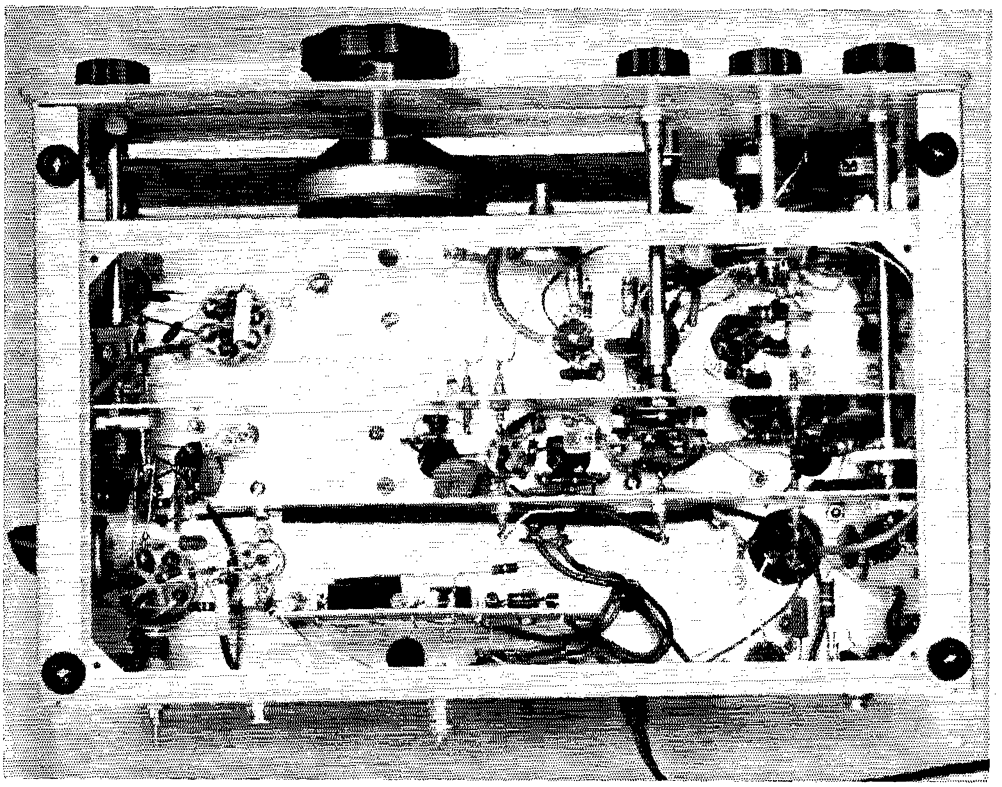
The a.g.c. circuit is simple but effective. Detector audio output is amplified by a 12AX7 triode and then rectified by a pair of silicon diodes. The load (4.7 megohm and 0.22 μf.) has a long time constant that works well on either sideband or c.w. A small negative supply (heater voltage used with voltage-tripler rectifier circuit) is used for i.f. gain control. The a.g.c. voltage is applied in series with this voltage. In operation listening to c.w. signals, the a.g.c. is used more often than not, signalling the defeat of a long-standing personal prejudice against a.g.c. for c.w. It should be pointed out, however, that it is the *combination* of a.g.c. plus good selectivity that does the job; the same a.g.c. with no selectivity would lead to the screaming meemies.

A tuning meter is included in the receiver to monitor the a.g.c. action. It is a 0-1 milliammeter connected as a voltmeter between the 6BA6 cathode and the arm of a 500-ohm potentiometer that is the 6AK6 cathode resistor. The arm of the pot is set so that the meter reads zero with maximum cathode bias on the 6BA6. As the a.g.c. or manual bias reduces the cathode current, the meter reading increases. On 14 Mc. with no input Q multiplication, a 0.5-μv. signal moves the meter to 0.1 and a 350-μv. signal drives it to 0.7. Gain from input Q multiplication will of course modify this calibration.

Construction

In keeping with the "miser" concept of the receiver (and undoubtedly a certain amount of laziness!), we made it a prime rule to do a minimum amount of physical work on the receiver. This worked out to be an advantage, since the easiest way is often the best way. A good example is in the mounting of the Eddystone dial. Most designs call for mounting a chassis directly to a panel. This then calls for mounting the Eddystone dial entirely above the chassis (so that the flywheel will clear) or for cutting out and then reinforcing the chassis. The first brings the tuning knob too high for our personal taste, and the second is too much work. By building a pair of simple brackets we mounted the chassis far enough behind the panel to be able to place controls where we wanted them.

The oscillator section was built on a piece of ¼-inch thick aluminum alloy piled on top of a scrap of ⅛-aluminum left over from the 7-inch high panel. This makes the oscillator almost impervious to change through shock or vibration, although just a bit can be detected. It probably comes from not being able to reference the entire



Mounting chassis away from panel on two brackets makes room for dial flywheel. Input tuning capacitor (left) is mounted on reinforcing partition that also supports crystal-filter switch. Variable capacitor (right) mounted on other reinforcing partition is "pitch" control. Perforated insulating board (bottom center) supports four diodes of power supply bridge rectifier and three diodes of voltage-tripling bias supply. Control on left side of chassis is Q multiplier gain control; short-shafted control at top center is zero set for tuning indicator.

dial assembly to the thick aluminum plate.

Coils for the oscillator and mixer are made of B&W Miniductor stock. They are mounted, along with any associated fixed capacitors, in polystyrene plug-in coil forms (Allied Radio 24-5P and 24-6P). No trimmers are included in the plug-in coil assemblies, although they would have made the job of "finding the bands" a little easier.

The power transformer was mounted entirely above the chassis to make room underneath. Two brackets of aluminum under the chassis serve three purposes. They provide additional reinforcement of the chassis and a mounting place for several components. They also shield the i.f. section, so that one end of the i.f. amplifier has a difficult job "seeing" the other end. Thus anything passing through the if. amplifier must also pass *through* the filter(s).

Performance

The outstanding characteristic of "The Miser's Dream" is that the signals sound "clean" and seem to stand out from the noise. It is a hard thing to describe in print, but it has been noted by too many listeners (*without* prompting) not to be true. We attribute it to the overload and cross-modulation characteristics and the distribution of gain. In a test with the i.f. gain at maximum and the a.g.c. off, when the signal input is gradually increased the audio output stage is the first to overload and distort. It does this at about 350 milliwatts output, which can best be described as something "above comfortable headphone volume"! At this level the r.f. signal input is about 1 μv. (no Q multiplication, 14 Mc.). With a.g.c., the input can be run up to 350 μv. before distortion starts (this with manual gain control at maximum). This point represents failure of the a.g.c., since the signal-handling ability can be increased by backing off on the i.f. gain control. This is also noticeable on the air; some of the strongest 14-Mc. sideband signals sound a mite better with the manual i.f. gain backed off slightly, with a.g.c. We thought at first the distortion was the result of slow attack in the a.g.c. system, but increasing the gain of the a.g.c. amplifier without changing anything else improved (but didn't completely cure) the situation. What is probably needed is another stage controlled by the a.g.c.

On the debit side, there are several small points that could be improved. Many operators would consider the plug-in coils archaic and would sacrifice compactness for convenience and go to bandswitching. Bandswitching would permit close calibration of the tuning dial; the plug-in oscillator coil (or, more properly, the position of the shield can with respect to the coil) accounts for a small calibration error. A panel trimmer could correct it also in our case, but we use a crystal-controlled standard for band-edge identification and don't miss the trimmer at all.

Several possible variations immediately suggest themselves. If one were building a 75-meter sideband-only receiver, he might get by with a 455-kc. i.f. and a single mechanical filter. The r.f. image ratio might be marginal, but an additional tuned input circuit could cure that problem. A two-band sideband-only receiver might be based on one of the 9-Mc. sideband filters, with a 5-Mc. tunable oscillator and an input circuit switching between 4 and 14 Mc.

Ultimately a receiver like the "Miser's Dream" is only as good as the oscillator. Without compensation, ours drifted about 8 kc. at 21 Mc. during the hour it took to stabilize at less than 25° F rise above ambient. After a few passes with negative-temperature-coefficient capacitors, the drift was reduced to less than 2½ kc.

(If anyone is interested in a complete schematic of the receiver, it is available for 25 cents from Technical Department, American Radio Relay League, 225 Main Street, Newington, Conn. 06111). QST

Strays

William D. Terrell, "Mr. Radio Regulations" from 1915 until he retired in August 1943, died on March 23, 1965 at the age of 93 in Washington, D. C. Mr. Terrell was the first U. S. radio inspector, appointed in 1911. He served as Chief, Radio Division, Department of Commerce from 1915 to 1932; Chief, Field Operations Division, Federal Radio Commission, 1932–1934; and Chief, Field Engineering Division, FCC from its creation in 1934 until his retirement. He was a Fellow of IRE (now IEEE) and an honorary life member of the Veteran Wireless Operators Association. He represented the U. S. at the first real international radio conference, London 1912, and participated in the "Hoover Conferences" which governed radio on a gentlemen's agreement basis in the twenties.

Alexander Volta RTTY DX Contest

The RTTY & SSB Club, Box 144, Como, Italy, announces their first test, in an effort to increase the interest of all amateurs in RTTY to honor the Italian discoverer of electricity, Alexander Volta.

The test will be held from 0200 GMT May 22 until 0200 GMT May 24, with rules exactly the same as in the "Annual World-Wide RTTY SS" sponsored by the RTTY Society of Southern California (See page 63, October, 1964, *QST*). This Spring affair should permit a comparison of two different seasonal periods under the same rules.

Although not required, the club will furnish free log forms at the address shown above. All logs must be received by them no later than June 27, 1965, to qualify for special awards.

Transmitting Radioteletype

Frequency-Shift Keying by the Carrier-Shift Method

BY IRVIN M. HOFF,* K8DKC

In this fifth article in the series on RTTY, K8DKC reviews carrier-shift keying methods in common use, and gives complete circuit information on his "Mainline" keyer. Both v.f.o. and crystal-oscillator keying are discussed. Audio f.s.k. will be the subject of article No. 6, to follow in a subsequent issue; at that time its application to low-frequency transmitters will be given a critical examination.

Few experiences quite equal the thrill an amateur gets the first time another station answers his CQ. The first time a teletype machine prints an answer to an RTTY CQ will probably at least equal that initial thrill — even if the operator has had his amateur license for 30 years.

Putting a transmitter on RTTY can be a frustrating experience if a few basic principles are not first learned. In this article we shall look at the various methods in use and try to evaluate them so the reader can choose the one best suited to his equipment.

Transmitters can roughly be divided into two basic groups, those intended primarily for single-sideband operation and those usually referred to as "a.m. and c.w." types. As far as the RTTY enthusiast is concerned, the difference is principally in the type of v.f.o. used. The s.s.b. transmitter normally uses a "heterodyne" v.f.o. and the c.w.-a.m. types normally use a "multiplying" v.f.o.

Transmitters with heterodyne v.f.o. units are invariably much more simple to use on RTTY, and usually offer superior stability. Transmitters using frequency-multiplication v.f.o. units pose inherent problems for RTTY, and are seldom comparable to the heterodyne type in stability, especially at the higher frequencies. In general, then, transmitters intended principally for s.s.b. operation make superior units for RTTY operation.

Frequency-Shift Keying

Frequency-shift keying in amateur RTTY can be accomplished in a number of ways. For example, if a small capacitor — say, 10 pf. — is connected from the cathode of the usual v.f.o. to ground, the frequency will be lowered a small amount, usually about one kilocycle.

Since carrier stability becomes an acute problem with higher frequencies, FCC regulations allow audio frequency-shift modulation (F2) on v.h.f. On 6 and 2 meters it is customary to use audio modulation of 2125 cycles for mark and 2975 cycles for space.

On the lower frequencies F2 is not allowed, and carrier shift is utilized. However, the receiving demodulator is quite often the same unit used on the higher frequencies, and thus beat tones of 2125 mark and 2975 space are used from the receiver to operate the RTTY demodulator.

When carrier shift is used, it is called "f.s.k." and is used on 10 through 80 meters. When audio shift is used, as on 6 and 2 meters, it is called "a.f.s.k."

It is *possible* to use a.f.s.k. on s.s.b. transmitters and thus transmit what would appear to be normal f.s.k. in the process. A number of amateurs use a.f.s.k. with their s.s.b. transmitters, but little is gained and there are many hidden problems that the average amateur has no means to detect. This will be considered in detail in a subsequent article.

Another method of f.s.k. involves frequency-shifting a crystal oscillator rather than audio or v.f.o. shift. As is true of any other system, there are advantages and disadvantages which the reader will have to evaluate for his type of equipment.

The Heterodyning V.F.O.

In the heterodyne v.f.o. system a basic v.f.o. range is beat against different fixed frequencies to obtain the various amateur bands. The neophyte can recognize this type of unit by its tuning dial, since all bands have the same bandspread. In the more advanced types the dial calibration is the same for all bands and the dial runs in the same direction on all bands. A transmitter having such a system is usually the easiest to use on RTTY, as it adapts quickly and satisfactorily to f.s.k.

Some s.s.b. transmitters use heterodyne v.f.o.s that convert up for one group of bands and convert down for the remainder. On this type of transmitter there are dual dial calibrations, identical except that they run in opposite directions. Such units present minor difficulties in adapting to RTTY, but should not discourage the owner. The author of this series uses such a transmitter with excellent results.

In a transmitter of this latter type, where the c.w. portion of the band is at one end of the dial for 80 meters, and at the other end for 20 meters, two problems exist: (1) the shift will be normal on 20 with a normal circuit, but will be upside down on 80 if there is no provision for inverting the shift; (2) the fact the 80- and 20-meter frequencies are so far apart on the v.f.o. dial will

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cause a substantial variation in the shift — if set for 850 c.p.s. on 20, the same keying unit would provide perhaps only 750-c.p.s. shift on 80. Conversely, if set correctly for 850-c.p.s. shift on 80, it would then be in excess of the legal limit of 900 c.p.s. on 20.

In this case the best solution is to incorporate two little keyers in the v.f.o. instead of one. The first would be set for normal operation on 20 meters at 850-c.p.s. shift, and the second would then be set for inverse operation on 80 meters, also adjusted for 850-c.p.s. shift. The operator would then merely select the correct keyer for the band in use.

The Multiplying-Type V.F.O.

The older a.m.-c.w. transmitters normally use v.f.o.s. that have one, or at the most, two basic ranges, and then use harmonics for the higher bands. These units are quickly recognized by their elaborate dials having a different set of figures for each band to be used. The bandspread on each band is thus different, the bandspread on 10 meters normally is a fraction of that on 40 meters, for example.

When using this type of transmitter, a shift set correctly for 850 c.p.s. on 40 meters would become 1700 c.p.s. on 20, 2550 c.p.s. on 15, and 3400 c.p.s. on 10. At the same time it will be obvious to the reader that drift becomes a much more serious problem on the higher bands.

Transmitters with multiplying v.f.o.s therefore need some method by which the shift can be radically changed as the transmitter is switched from band to band. Separate pre-set keyers for each band offer one solution.

It can be stated that at this time little or no RTTY activity exists on 10 meters, little or no activity on 15, and very little activity on 40. Thus a keyer for 80 meters and another for 20 will provide the average station with adequate capability for at least 90 per cent of the time.

Frequency-Shift Circuits

It was pointed out earlier that addition of a small amount of capacitance will lower the frequency of a v.f.o. The problem then becomes how to add this capacitance when needed and take it away when not. Various switching circuits have been used in the past, even including small relays inside the v.f.o., but the semiconductor diode is now universally used. The diode does not require filament voltage or special sockets, is very small, and has excellent life expectancy. The cost is negligible.

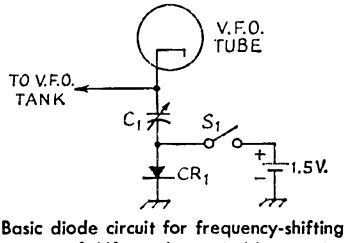


Fig. 1—Basic diode circuit for frequency-shifting a v.f.o. The amount of shift can be varied by varying C_1.

In the elementary circuit of Fig. 1, when the switch S_1 is closed the diode CR_1 conducts and grounds C_1, thus lowering the frequency of the v.f.o. The circuit has been much simplified, as normally an r.f. choke would be used to keep r.f. off the leads to the switch. Also, in this case, the diode would pull approximately 25 ma., which would damage many germanium diodes. It illustrates the principle, however.

When the switch is open, the frequency is not exactly the same as when C_1 is disconnected completely from the oscillator cathode. This is caused by the fact that the diode is slightly conducting as a result of rectification of the r.f. voltage appearing on C_1. The effective resistance of the diode is quite high in comparison to its resistance when the switching voltage is applied, but must not be completely overlooked. This rectification makes it difficult to set the correct shift, since with different settings of C_1 the frequency changes at a different rate for both key up and key down. (The "Mainline" f.s.k. system, which will be shown later, circumvents this by applying reverse bias to attain complete cutoff while the key is open.)

As it is customary to lower the transmitted frequency for space, substituting the RTTY keyboard for the switch in Fig. 1 would result in upside-down keying (also called reverse keying) because the keyboard is normally closed for mark. The circuit shown in Fig. 2 will give

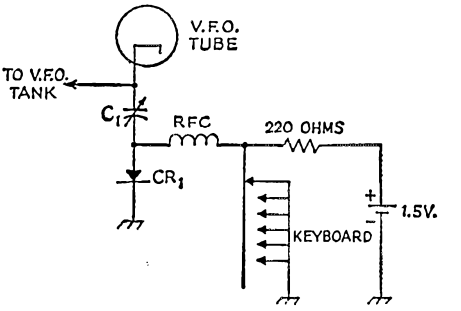


Fig. 2—Using the keyboard to transmit a "right-side-up" RTTY signal.

correct keying. The 220-ohm resistor not only limits the current through the diode to about 4 ma., which is quite satisfactory, but also keeps the battery from being short-circuited during mark. However, such a circuit is not recommended for various reasons, the principal one being that insufficient voltage is placed on the keyboard to keep the contacts clear of the oil film that builds up. The rotating mechanism of the Teletype machine throws off small oil droplets which invariably get on the keyboard contacts.

Shift-Pot Circuits

If a multiplying v.f.o. is used, some means must be provided for quickly and easily changing the shift when the transmitter is moved from band to band. Simple "shift-pot" f.s.k. circuits

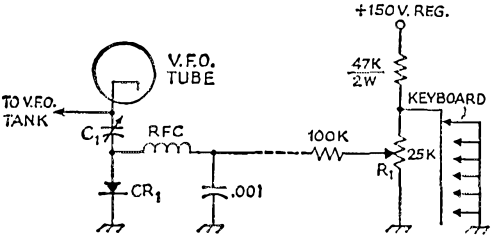


Fig. 3—The "shift-pot" circuit. Frequency shift depends on the voltage applied to the diode through R_1 and the 100K limiting resistor. The part of the circuit to the left of the dotted connection should be installed close to the v.f.o. tube; that to the right can be in any convenient location. R_1 is a linear composition control.

have been generally used. (Most RTTY enthusiasts are not even aware that more satisfactory circuits have been worked out for transmitters not specifically requiring the shift-pot circuit with its inherent limitations.)

Fig. 3 shows a suitable shift-pot circuit. It works on the "partial conduction" method, the shift being changed in a rather uniform and linear manner as the potentiometer setting is varied.

A typical voltage-*vs.*-frequency characteristic is shown in Fig. 4. Changing the d.c. voltage on the diode changes its ability to conduct and hence the shift is varied. However, since the d.c. voltage on the diode now controls the basic frequency shift rather than the adjustment of C_1, it should be obvious that exceptional voltage stability is required in such a circuit. This in turn means that the keyboard must be separated from the printer's selector magnets. To get "local copy," then, it becomes necessary to tune the receiver to the transmitter's frequency and copy the signal as though it were coming in from another station. This has the advantage of demonstrating that the transmitter is working normally, since if you can copy your own signal with your own receiver-demodulator combination, you can assume the station at the other end is getting a suitable signal. However, it places an awkward restriction on versatility.

The primary disadvantage of the shift-pot circuit is that each time the band is changed, the shift usually must be varied, since this type of circuit is most normally used with transmitters having multiplying v.f.o. units. Few amateurs have adequate means for accurately setting the shift to 850 c.p.s., so any system which would allow convenient selection of a preset shift has much merit. The circuit shown in Fig. 5, thought to be original with the author, offers this selection.

Use of Keying Relays

In an effort to overcome the disadvantage of separating the keyboard from the printer magnets, many stations have used relays to key the transmitter. This solves one problem but substitutes others which are probably of more concern, such as distortion, keying transients, r.f. generation by arcing contacts (hash), need for bias voltages if polar relays are used, and so on. In well-engineered circuits keying relays will be unnecessary.

In fact, the modern RTTY station has no need for polar or other types of relays, whether in the RTTY machine itself, in the demodulator, or in the transmitter keying circuit. If relays are used it merely indicates, in a majority of instances, a lack of understanding of current practice. These articles are designed to bring such concepts to the attention of the reader.

Saturated Diodes

Once sufficient voltage has been placed on the diode to make it conduct completely (about 0.6 volt in the illustration shown in Fig. 4), the shift becomes primarily a function of the value of the capacitor used. Although circuits using the saturated diode have many inherent advantages, they are relatively unknown since they were developed primarily for use on s.s.b. or other transmitters where the shift need not be changed at frequent intervals.

The author has specialized in this type of circuit and has named his version the "Mainline" f.s.k. system. A diagram of the Mainline f.s.k. system currently in use is shown in Fig. 6. It is combined with the receiving demodulator, the 6GW6 being the keyer tube in the demodulator (corresponding to the 6Y6G in the circuit shown on page 31 of March 1965 *QST*, for example). The keyboard and the printer remain together, which means that "local copy" need not be received from the receiver-demodulator combination. When the switch, S_1, on the grid of the keyer tube is closed, the tube draws current

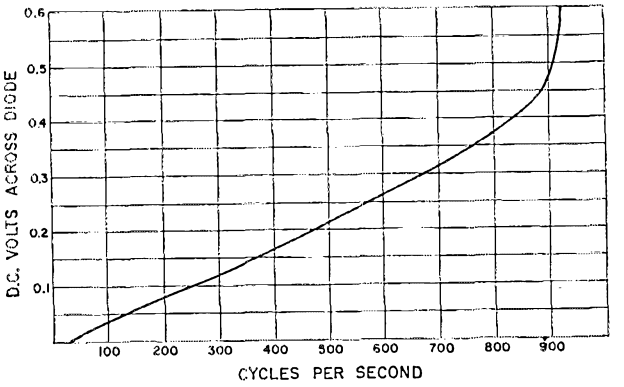


Fig. 4—A representative frequency-shift *vs.* voltage characteristic of a diode (1N270) in a circuit such as Fig. 3 operating on 3.5 Mc., when C_1 is appropriately adjusted.

and the printer can then respond normally to its own keyboard. This switch also provides a standby condition so the printer motor need not be turned off while the receiver is being tuned. A fringe benefit is that the receiver can be operated while transmitting without affecting the printer as the operator is typing.

The circuit develops d.c. voltage of one polarity for mark and a reversed polarity for space. This is accomplished by the unique method of providing the ground return for the loop supply that drives the keyer tube. Resistor R_3 is the heart of this system. When the keyboard distributor is closed by the keyer tube, current flowing through R_3 (approximately 60 ma.) causes a voltage drop in R_3 which is of negative polarity with respect to chassis ground. The voltage drop across R_2, in series with R_1 across the loop supply, is positive with respect to chassis. The *difference* between these two voltage drops is applied to the diode keyer circuit through R_4, a current-limiting resistor, and since the drop across R_3 is greater than that across R_2, the net voltage on the diode is negative. When the keyboard circuit is opened by the distributor, current ceases to flow through R_3 and the positive voltage across R_2 is applied to the diode keyer. With these reversing voltages, the polarity of the diode as wired in the keyer controls whether it conducts on space (normal) or on mark (non-standard). Some transmitters require both methods.

The Mainline f.s.k. system is readily adapted to nearly any existing transmitter in a matter of moments, with no permanent changes in the transmitter itself. The components of the basic keyer, also shown in Fig. 6, can be mounted on a small terminal strip with any convenient length of wire (dotted section) to the basic f.s.k. driver. The keyer should be connected to the v.f.o. tube by a short length of wire hooked around its cathode pin. That is the only transmitter connection needed. The terminal strip is then attached to some screw or bolt in the vicinity of the v.f.o. tube, to provide both mechanical mounting and a chassis ground. Once the little keyer is constructed, it can normally be installed in the transmitter in a minute or so, with no permanent connection or alteration of any type.

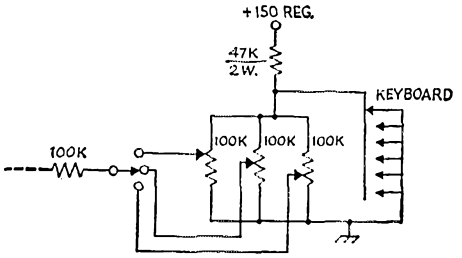


Fig. 5—Substituting this circuit for the part to the right of the dotted connection in Fig. 3 will permit selection of three pre-set values of frequency shift. Any desired number of pots can be used provided the total resistance of all in parallel is kept in the 25K to 50K region.

Should the keying be upside-down, the diode can be reversed and then normal operation will result. For certain s.s.b. transmitters, such as the Hallicrafters HT-37 and HT-32, two such keyers should be constructed and placed in the v.f.o. area. The diodes in the two keyers should be connected in opposite polarity so one will conduct on space and the other will conduct on mark. A switch can then select the correct keyer for the band in use.

Narrow-Shift C.W. Identification

The Mainline f.s.k. unit includes a c.w. key for narrow-shift identification. The FCC requires that c.w. identification be sent in addition to the normal RTTY identification. (The current regulations require only the sending station to identify itself by c.w.; the call of the station being worked need not be included.)

Many stations use types of c.w. identification that cause the machine at the receiving station to run wild unless the operator can quickly activate the standby or mute switch on the demodulator. Some of the methods in use even "sound like" RTTY, and the receiving operator is not sure whether he should allow the printer to operate or not. With the narrow-shift feature, the adjusting pot. R_5, can be set for a 100–200-c.p.s. shift for hand keying. This causes the printer to lock up automatically, and at the same

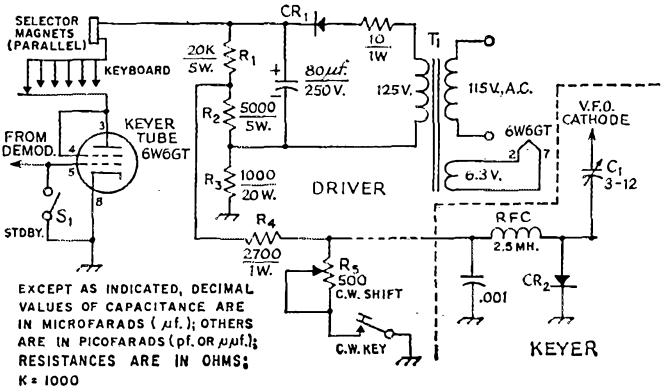


Fig. 6—The "Mainline" f.s.k. driver and keyer circuits. The keyer, shown boxed at the right by dashed lines, should be as close as possible to the v.f.o. tube. The driver section can be installed anywhere; dotted connection between the driver and keyer can be any desired length, preferably of shielded wire (a common ground connection between the two units is assumed).

C_1—3–12-pf. ceramic trimmer.
CR_1—Silicon diode, minimum ratings 100 ma., 400 p.i.v.
CR_2, CR_3—Germanium diode, 1N270 or similar.
R_5—500-ohm linear control.
S_1—S.p.s.t. toggle (or integral with transmitter control switch; see text).
T_1—Power; 125 volts, 50 ma.; 6.3 volts, 2 amp.

time indicates to the other operator that it is Morse and not RTTY code being sent. Few ordinary f.s.k. system using shift pots can or do offer such a simple and effective auxiliary system for c.w. identification.

Selecting Components

We suggest that you do not substitute other parts for those specified in the Mainline f.s.k. driver section, since these have been carefully selected to give optimum results. The circuit was designed for 60 ma. (parallel selector magnets) operation.

However, there is considerable latitude in the selection of components for the keyers. We have suggested 1N270 diodes, which are high-speed computer switching diodes that are quite easy to obtain and are quite cheap compared with some. They give excellent results, but nearly any type of germanium diode will give satisfactory results. Even silicon diodes will no doubt work adequately. The only requirement is that they should be able to conduct at least 10 ma. and have the ability to withstand at least 50 volts reverse bias.

The size and type of the trimmer capacitor, C_1, will vary with the reader's preference and type of equipment. For 170-c.p.s. shift, usually a 1.5–7-pf. trimmer is best. For normal 850-c.p.s. shift, a 3–12-pf. capacitor is quite satisfactory. The r.f. choke can be quite miniature, since only 4–5 ma. of current at the most will be passed.

To summarize, the Mainline f.s.k. system offers the following features:

1) Once the shift is correctly set, it will hold for that part of the v.f.o. dial indefinitely.

2) With reversing voltages, the effect on the v.f.o. dial calibration after installation is minimum — usually less than 1 kc. change.

3) It is much easier to set to the correct shift, since the back bias keeps the change in frequency to a minimum during nonconduction.

4) Optimum keying is achieved because reversing the voltages forces the diode to switch instantly from cutoff to full saturation.

5) The keyboard and printer are kept together without resorting to a keying relay for local copy.

6) "Retransmit" is automatically offered; the transmitter can be keyed directly from an incoming signal, if desired.

7) Conduction on either mark or space can be selected merely by reversing the polarity of the diode.

8) The keyer unit uses very few parts and can be mounted easily and quickly in nearly any v.f.o., with no modifications or alterations.

Adding Keyers

Although a shift pot readily can be added if needed, by putting a 1-megohm pot in series with the f.s.k. line to the keyer or keyers involved, this is not particularly recommended. Normally, one would instead add an extra keyer pre-set for the required shift.

For instance, in the author's HT-32A Hallicrafters s.s.b. unit, four keyers are in use. Two of these conduct on space, for 15 and 20 meters, and two conduct on mark at the other end of the v.f.o. dial for 40 and 80 meters. One keyer for each of these two groups of bands is set for 850-c.p.s. shift and the other two are set for 170-c.p.s. shift. The d.c. leads from all four plug into a little box (external) with a selector switch. A 1-megohm pot with plug-in leads can be quickly used for making any one of the four keyers into a shift-pot circuit if desired. The ability to go immediately from 170 shift to 850 shift, or from 80 to 20 meters without having to fuss with shift-setting pots, are practical features not to be overlooked by the serious operator.

Crystal-Shift F.S.K.

Another method of f.s.k. that provides outstanding results is crystal shift. In the past, some shift-pot-type circuits that have been added to crystal oscillators have given such poor results that many of the advanced enthusiasts still shy away from crystal shift. The Mainline f.s.k. driver shown in Fig. 6 provides excellent results when used in conjunction with the circuit shown in Fig. 7.

In this case the standby switch, S_2, would be operated simultaneously with the external control switch that puts the transmitter on the air. If S_2 were not automatically thrown, the crystal oscillator would run continuously, blocking the incoming signal from the receiver.

By carefully juggling the two variable capacitors, C_2 and C_3, any legal shift can be preset within the part of the crystal's activity range that provides equal output voltages for both mark and space. This circuit was developed for the Mainline system primarily by W8SDZ from work previously done by W6NRM. Other circuits were tried but rejected in favor of the one shown.

The advantages of crystal shift are numerous and should not be overlooked. Once the shift is set, it will hold indefinitely. Warm-up time is virtually nonexistent. For any type of day-to-day recurrent operation, such as autostart, no other system can compare for reliability. Drift is inappreciable, and this feature alone is reason enough for its use by those owning older transmitters. It does, of course, have the limitation of holding the operator to one frequency. However, RTTY operating practice is such that most operators normally use approximately the same frequency day after day, anyway. Two or three crystals would be more than adequate for the typical operator.

Crystal shift can also be used in s.s.b. transmitters in various ways. The advantage is a constant f.s.k. shift regardless of the setting of the v.f.o. dial. However, with some transmitters there is the disadvantage that mark and space must be turned upside down on certain bands. In general, the amateur will find it difficult to attempt to shift an existing crystal oscillator in an s.s.b. transmitter, as compared with applying the very simple keyer shown in Fig. 6 to the transmitter's v.f.o.

So far, only a few amateurs are using the

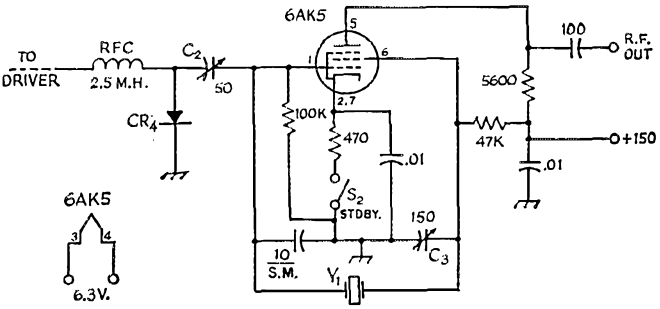


Fig. 7—Crystal-oscillator frequency-shift circuit for use with Mainline driver (Fig. 6). Resistors are ½-watt; fixed capacitors are disk ceramic except SM indicates silver mica. Values are suitable for 3.5- and 7-Mc. crystals.

C_2—50-pf. air trimmer.
C_3—150-pf. variable.
CR_4—Germanium diode; 1N270 or similar.
S_2—S.p.s.t. toggle.
Y_1—Crystal at desired frequency, HC-6/U type (not FT-243).

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

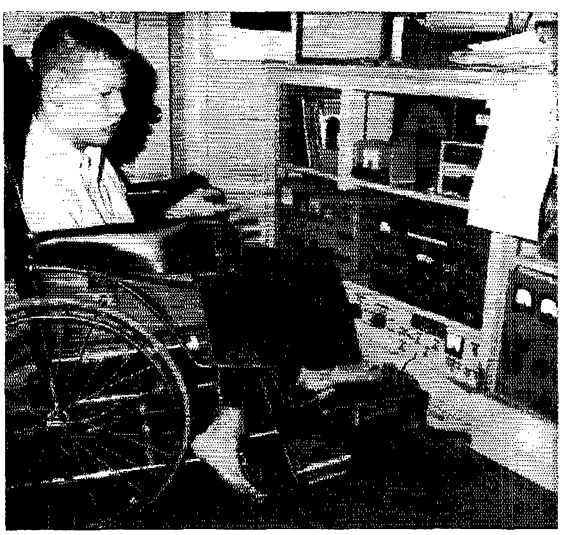
saturated-diode system outlined earlier, the outmoded shift-pot circuits still being widely used. However, those using the newer concepts find that the advantages of having a pre-set shift far outweigh any minor disadvantages the circuit might offer.

Setting the Frequency Shift

To ensure that the transmitted signal will match receivers having demodulators using sharp filters at the standard audio tones of 2125 and 2975 c.p.s., the frequency shift should be set to 850 c.p.s. with as much accuracy as possible. A calibrated audio generator is probably the most readily-available source of an 850-c.p.s. tone for comparison.

Using the audio generator for setting the keying shift is a simple matter. First tune the signal from the v.f.o. (or crystal oscillator) to zero beat in the receiver with the keying circuit open. Then close the keyer circuit and compare the beat tone with the 850-c.p.s. tone from the audio generator. Adjust the f.s.k. shift control so that the beat tone and the a.f. generator tone are the same, then open the keyer circuit and make sure that the oscillator signal is still in zero beat. If it is not, a little back-and-forth jockeying of the frequency control will eventually result in a frequency difference that matches the audio generator tone. QST

Strays



Wheelchair operation—Bill, K3KTH, a victim of cerebral palsy performs all operations with his feet while regularly participating in the EPA Net traffic functions.

Congratulations to W6VH, who was robed as a judge of the Los Angeles Municipal Court early in February. Judge Brown has been a City Councilman from 1959 until his appointment to the bench.

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W7JKU's neighbors registered all sorts of emotion from solemn prayer to downright shock as they watched him shinny up a tree recently to adjust his antenna. The neighbors are residents of a huge retirement project, and as senior citizens may be forgiven for their nervousness. Of course, part of their concern may stem from W7JKU himself, a spry and agile 80-year-old!

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K8BIT reports that an envelope bearing a set of examination papers received from FCC around the first of the year bore a cheerful mailing sticker bearing the words "Season's Greetings" — cold, hyper-efficient bureaucrats? No, indeed!

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The Pasadena City College will hold its All-School Stations QSO Field Day again this year. Time: the week end of May 21, 22, and 23. For contest rules and further information contact Ken Johnson, W6VEB, Pasadena City College, 1570 Colorado Blvd., Pasadena, California, 91106.

The SHRIMP Transceiver

BY JOSEPH S. GALESKI, JR.,* W4IMP

W4IMP is a man who builds for the sheer pleasure and satisfaction of making his own equipment. Furthermore, he belongs to the breed that counts no mere copying job sufficient; there has to be at least a dash of his own ideas in the gear, no matter where the bulk of the design originated. If your tastes are similar, this article may inspire you to tackle something you'd like to do. That is its intention.

"IMITATION is the sincerest form of flattery" is an old saying, and I hope that Swan will accept my larceny as a compliment to their fine line of transceivers.

A group of us hams from different cities have regularly convened on Cape Hatteras, N. C., for surf fishing. We had a need for communications between the vehicles, and the desire to do a little hamming when time allowed. We each decided to obtain an 80-meter single-band Swan transceiver, so that all units and their power supplies could be used interchangeably.

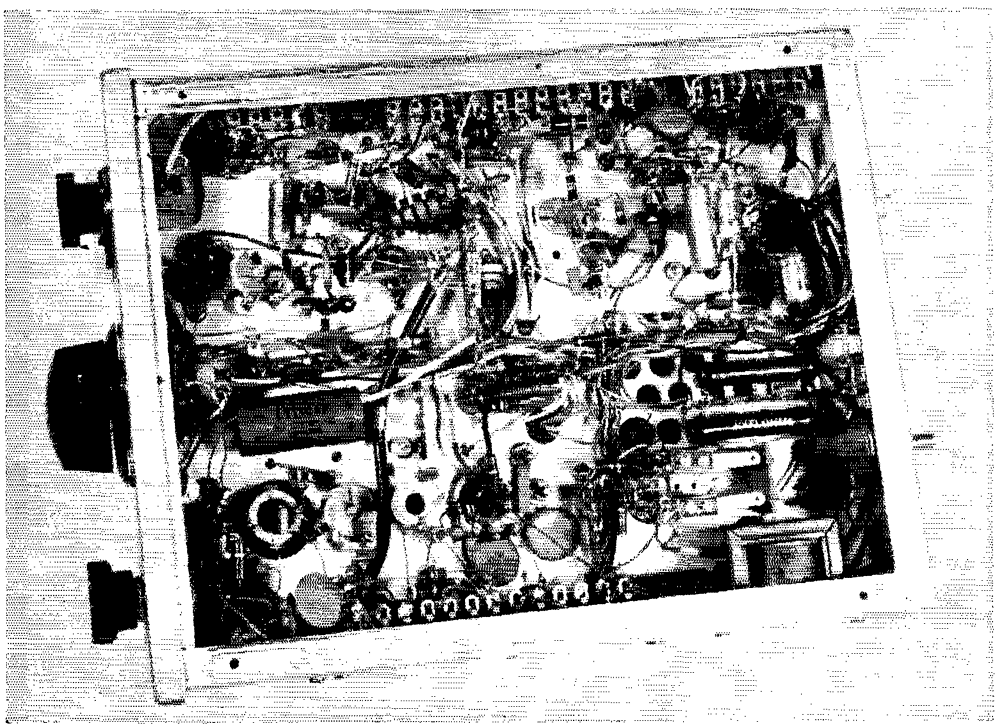
* 4318 Hanover Avenue, Richmond, Virginia 23221

My inspection of the circuit diagram showed this transceiver to be a masterpiece of engineering performance with accent on simplicity of design. There were no secret sealed boxes of components.

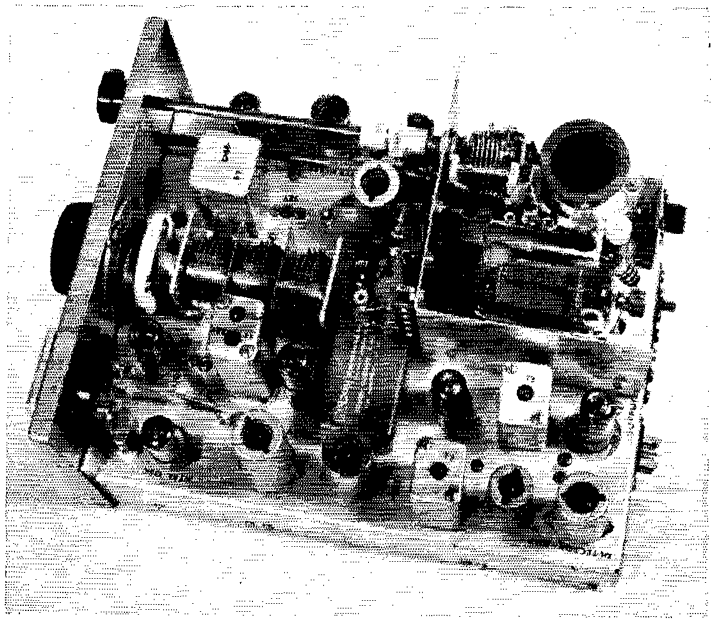
I had an 8½ × 11 × 6-inch California Chassis Company perforated cabinet which had been purchased earlier for just such a project, and a McCoy Golden Guardian 9-Mc. crystal filter. The temptation was too much to resist; I had to build a Swan.

My junk box yielded most of the parts. For example, the tuning dial was from a TU-10B tuning unit. The 9-Mc. i.f. cans were modified from those I had purchased from a surplus store for fifteen cents per pound. The final tank coil was wound on an old ribbed Hammarlund form born to ham radio about 30 years ago. The plate choke was a single-layer affair wound on an insulator from the same TU-10B.

The chassis space available in my cabinet was about two-thirds that of the Swan. A cardboard cutout was made to represent each tube socket, i.f. can, and other major components. I placed them on the uncut chassis and began my game of checkers to determine the best possible layout. The block diagram was consulted for the signal paths. Since the Swan had been generous with



Rows of tie points provide anchors for wiring. The audio transformer is at the lower right in this bottom view. The bottom of the v.f.o. coil can be seen through the hole in the chassis at the lower left.



Top view shows a clean layout without crowding, although the space is small. The crystal filter is in the center of the chassis.

(Editor's Note: W4IMP has prepared a set of notes on the construction of the SHRIMP and will forward them, together with a circuit diagram, to those interested in building a similar unit, provided the request is accompanied by a stamped, self-addressed envelope, No. 9 size, 8¾ by 3¾ inches, or larger.)

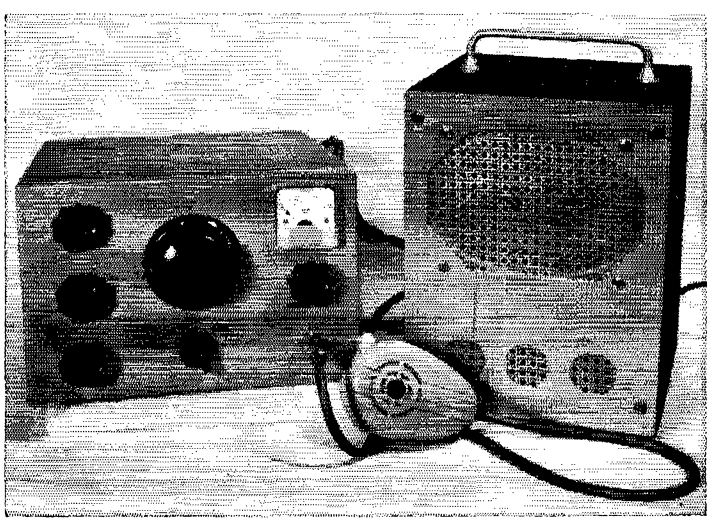
space in its design, I did not have an overcrowding problem on my smaller chassis.

The rest of the construction was not routine, since I tried to improve on the Swan's excellent design. I used a three-gang tuning capacitor for tracking both v.f.o. and mixer/driver tuning, to eliminate one bothersome front panel control. I had forgotten just one important point: Tracking was impossible due to the fact that the output frequency was increased as the v.f.o. frequency was decreased! However, my design covers only the top 200 kilocycles of the band so that stagger tuning of the mixer/driver coils was effective.

The transceiver was checked and aligned stage by stage. It has been in use for over a year and has given me much pleasure. It gets on well with the other Swans, and is by no means an ugly duckling. Almost 500 contacts were attributed to it on our last Field Day, and it was operated the full period by a number of operators.

A Heathkit HP-10 transistorized supply powers the transceiver in the automobile. For a.c. use, an "economy" supply made from an old TV transformer and a silicon-diode bridge rectifier supplies enough power for 150 watts p.e.p. input.

A project such as this should not be undertaken by the inexperienced builder. My formal education and training was for the optical business. Any electronic skill was acquired over the years by reading and building. Expert, no. Experienced, yes. I am convinced that a contact on home-brew equipment gives one a tremendous sense of accomplishment and satisfaction. In addition, shipping expenses are nil when it has to go back to the "factory." Half SWAN, half IMP, thus the SHRIMP. QST



The SHRIMP, measuring only 8½ by 6 inches in front and 11 inches deep, usually sits on the transmission hump in the car, leaning against the front seat. It is a single-band s.s.b. job for 3.8–4 Mc. When the switch is in the "tune" position a tone generated by an audio oscillator (level controlled by the mike gain control at the right) provides a tune-up signal. The power supply, right, is contained in a surplus box fitted with a homemade aluminum panel. The box also includes the speaker.

QST has had a number of articles recently dealing with noise figure and its measurement, but the related subject of signal-to-noise ratio has been treated only indirectly for the most part. This two-part article surveys the noise problem from both angles and discusses the necessary precautions to be taken in measurement.

Noise Considerations in Receiver Design

In Two Parts — Part I

BY JAMES K. BOOMER,* WØVDC/8

Noise in one form or another is the limiting factor in our ability to communicate. Most radio amateurs have obviously been made aware of this by such phenomena as automobile ignition and lightning. Noise combined with a signal reduces its intelligibility.

Noise generated outside the receiver is referred to as "external" noise and that generated inside the receiver is called "internal" noise. External and internal noise can each be conveniently divided into three classes: synchronous, random, and pulse.

Synchronous noise is repetitive at regular intervals; examples are diathermy and other types of r.f. interference, and power-supply hum.

Random noise, as the name suggests, occurs with no recognizable pattern or repetition rate. Examples of internal random noise are shot noise, due to random motions of electrons in vacuum tubes and transistors, and thermal-agitation noise, due to random motions of electrons in resistors and other conductors. External random noise is generally considered to be caused by random motions of charges in space, appearing as thermal-agitation noise induced in the radiation resistance of the receiving antenna.

Impulse noise occurs at regular or irregular intervals and, in general, takes the form of narrow spikes or pulses. Examples are automotive ignition, electric shavers and other appliances, arcs in faulty components, lightning and other atmospheric disturbances.

Significance of Noise at Various Frequencies

In communications below 50 Mc., external noise is generally the factor which determines whether a signal from a sending station can be effectively detected, assuming one possesses a reasonably well-designed receiver. Below 50 Mc. a relatively noisy receiver will probably be able to detect many of the same signals that a relatively quiet receiver can detect (all other factors equal), because the signals arriving at the receiver have combined with external noise.

Above 50 Mc. the amplitude of external noise decreases and internal noise begins to assume greater significance. When all other external noise sources are quiet — that is, when conditions are ideal — the only external noise is the thermal-agitation noise generated in the antenna radiation resistance. Consequently, above 50 Mc. a relatively quiet receiver will usually detect signals which cannot be detected by a relatively noisy receiver. Thus reduction of internal noise becomes more important at v.h.f.

When internal noise has been reduced as much as possible, the remaining noise usually consists primarily of thermal-agitation and shot noise.

Thermal-Agitation Noise

Thermal-agitation noise occurs in equal intensity at all frequencies and is often called "white" noise, since by analogy the white color consists of all colors. As was mentioned earlier, white noise results from the random motion of electrons in conductors. If one were to measure the polarity and magnitude of each of these little currents and average them out over a long period of time, he would find that they average out to zero. However, over a *short* period of time the average current is either positive or negative and will develop a resulting noise voltage in a circuit. The noise power and noise voltage are uniformly distributed over any given bandwith.

White-noise power generated in a circuit is directly proportional to temperature and the bandwidth of the circuit. The higher the temperature and the wider the bandwidth, the more noise power. The noise *voltage* generated in a circuit is proportional to the square root of temperature, bandwidth, and resistance. A resistor of 400 ohms will generate a noise voltage which is twice that generated in a resistor of 100 ohms. However, the noise *power* in both resistors will be the same if the bandwidth and temperature remain constant.

Shot Noise

Shot effect results from the emission of electrons in a vacuum tube or motions of charges in a semiconductor. Shot noise is similar to white noise in that the shot-noise power in a circuit is proportional to bandwidth.

The shot-noise power supplied to a circuit by a vacuum diode is proportional to the diode current and bandwidth; hence reduction of bandwidth and diode current reduces shot-noise power.

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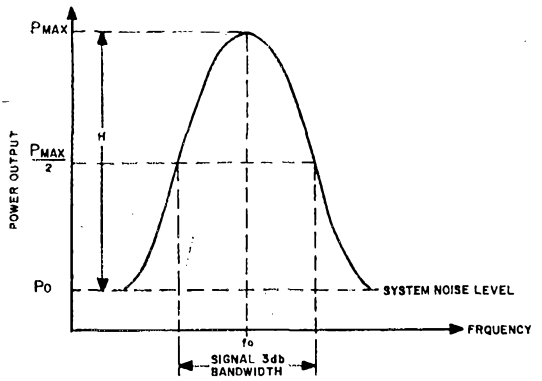

Fig. 1—Representative signal-bandwidth curve.

Transistors generate a shot noise current which is due primarily to fluctuations in diffusion in the base-emitter junction.

The important point in both cases is the recognition of the proportionality of the above noise currents to direct current and bandwidth.

Signal and Noise Bandwidth

One can obtain the so-called "signal bandwidth" of a system by measuring its signal-output power *vs.* frequency, with the signal input held constant. The resulting bandwidth characteristic might be similar in shape to that in Fig. 1. Of course, the signal input must be kept low enough to prevent saturation in the system.

White noise and shot noise are uniformly distributed over a given bandwidth. Thus for calculations, the noise power out of a linear device must be expressed as a constant over a certain band of frequencies. This means that a "noise bandwidth" characteristic is necessarily rectangular in shape.

Since the area under a power curve represents total energy, one can derive a rectangular noise bandwidth corresponding to the signal bandwidth by determining the area under the signal-bandwidth curve and constructing a rectangle of equal area and height. The width of the rectangle is the noise bandwidth. The area under the signal bandwidth characteristic can be found by a mathematical integration provided a relationship for the selectivity characteristic can be found. Alternatively, one can plot the signal-bandwidth characteristic on cross-section paper and compute the area under the curve by counting squares and portions of squares.

Fig. 2 shows the relationship of the half-power (3-db.) signal bandwidth and the noise bandwidth for systems with wide- and narrow-skirt selectivity. Note that the wide-skirt characteristic of Fig. 2A has a wider noise bandwidth than the narrow-skirt chracteristic of Fig. 2B. It can therefore be concluded that with a given input circuit, the circuit of Fig. 2A is noisier than that of Fig. 2B.

Signal-to-Noise Ratio (S/N)

Signal-to-noise ratio is defined as the ratio of average signal power to average noise power at a specified point in a circuit. Expressed mathematically,

$$\frac{S}{N} = \frac{P_s}{P_n} \tag{1}$$

where P_s = Average signal power
P_n = Average noise power

Equation (1) can be expressed in decibels as

$$\frac{S}{N} = 10 \log_{10} \frac{P_s}{P_n} \text{ db.} \tag{2}$$

To illustrate the effect of bandwidth upon signal-to-noise ratio, consider an ideal case where the only external noise present in a receiving system is the thermal-agitation noise generated in the antenna radiation resistance. Further, assume that internal noise has been minimized to the point where white noise and shot noise are the only sources of internal noise remaining in the receiver. Let it be required that the receiver detect a keyed c.w. carrier signal and suppose,

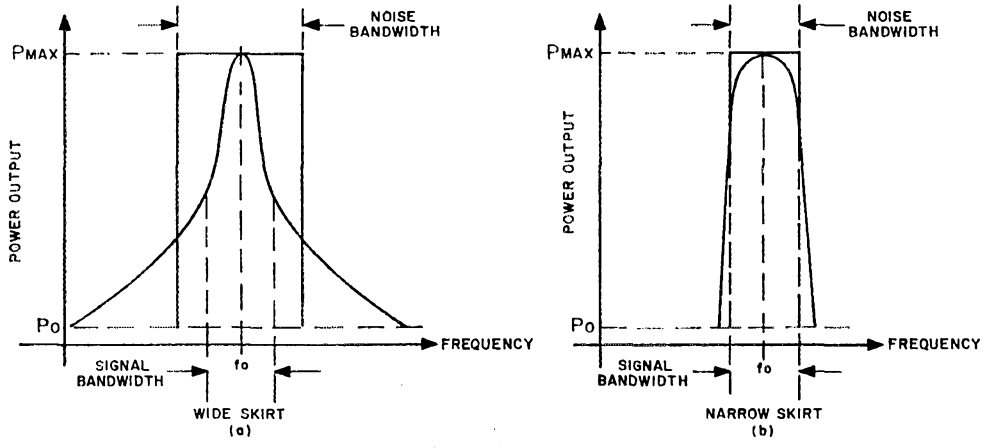

Fig. 2—Comparison of noise bandwidths for two types of signal-bandwidth curves.

further, that the receiver possesses a bandwidth characteristic similar to Fig. 2B, the 3-db. bandwidth of which can be varied from 250 to 2500 c.p.s. One can then assume with very little error that the noise bandwidth is equal to the 3-db. signal bandwidth. With this in mind, it is observed that with a given input signal at the antenna, the signal-to-noise ratio will be 10 db. greater with the 250-c.p.s. bandwidth than with the 2500-c.p.s. bandwidth, since the noise power is directly proportional to noise bandwidth.

It can be concluded that the signal-to-noise ratio improves with decreasing bandwidth. Of course, it is also obvious that the bandwidth cannot be narrowed indefinitely, or it becomes too narrow to pass the required sideband information.

Signal-Plus-Noise-to-Noise Ratio

Signal-plus-noise-to-noise ratio $\left(\frac{S+N}{N}\right)$ is defined as the ratio of the average signal power plus the average noise power, to the average noise power at a specified point in a circuit. Expressed mathematically:

$$\frac{S+N}{N} = \frac{P_s + P_n}{P_n} = \frac{P_s}{P_n} + 1 \qquad (3)$$

$$\frac{S+N}{N} = 10 \log_{10}\left(\frac{P_s + P_n}{P_n}\right) \text{db.} \qquad (4)$$

If the signal power is much greater than the noise power, the signal-plus-noise-to-noise ratio and the signal-to-noise ratio approach the same value.

The earlier example of the dependence of signal-to-noise ratio upon bandwidth holds true for signal-plus-noise-to-noise ratio; however, the improvement at 250 c.p.s. depends upon the initial signal-plus-noise-to-noise ratio at 2500 c.p.s.

The concept of signal-plus-noise-to-noise ratio arises principally because of the difficulty encountered in measuring the signal-to-noise ratio in a receiver.

Measurement of S/N and (S + N)/N Ratios

One must be able to measure the amplitudes of the signal and noise separately in order to find the signal-to-noise ratio. This cannot be readily done in a receiver without an extremely narrow notch filter to tune out the signal while measuring the noise, and an extremely narrow bandpass filter to filter out the noise while measuring the signal. Hence the measurement of signal-to-noise ratio is rarely attempted.

The measurement of signal-plus-noise-to-noise ratio is relatively simple, and the signal-to-noise ratio can be obtained from Eq. (3) after finding the signal-plus-noise-to-noise ratio.

A.M. Receivers. To measure the signal-plus-noise-to-noise ratio of an a.m. receiver, a sine-wave modulated (usually 30 per cent modulation with a 400- or 1000-c.p.s. signal) carrier from an r.f. signal generator is fed into the receiver antenna input. Since the detector in an a.m. receiver detects the modulation on the carrier, the signal-plus-noise will be represented by the audio output reading taken with modulation present. The audio output reading taken with modulation removed will represent the noise. Many audio output meters contain a decibel scale from which the signal-plus-noise-to-noise ratio can be read directly.

If an a.m. receiver incorporates audio-derived automatic gain control, the a.g.c. circuit should be disabled and replaced by an equivalent fixed d.c. voltage so that the receiver gain will remain constant when modulation is removed. Of course, if the input level is below that required for the audio a.g.c., the a.g.c. circuit need not be disabled. It should be noted that the signal-plus-noise-to-noise ratio increases with per cent modulation.

S.S.B. and C.W. Receivers. Signal-plus-noise-to-noise ratio is measured in c.w. and s.s.b. receivers by first applying an unmodulated carrier of given level to the antenna input terminals. The receiver is then tuned to give the beat note which gives maximum audio output. The audio-output reading under these conditions represents the signal-plus-noise output. The r.f. signal is then removed, the receiver gain is held constant, and the audio output is again noted. The ratio of the first reading to the second reading is the signal-plus-noise-to-noise ratio. Again, the ratio in decibels can be read from the audio-output meter or calculated from Eq. (4).

It is extremely important to keep the receiver antenna input termination and receiver gain constant for meaningful results, since these two factors affect the receiver noise output. If the r.f. input level is sufficient to produce a.g.c., a fixed d.c. voltage equal to the a.g.c. voltage must be applied to the a.g.c. bus when the r.f. signal is removed for the noise output reading. If the r.f. input level is below the value required to produce a.g.c., and the receiver has reasonably constant gain over a small frequency range, the receiver can be tuned off the r.f. signal input frequency to obtain the noise reading. One must tune off far enough to ensure that the audio output reading is from receiver noise only and not from the r.f. signal a few kilocycles away.

If the r.f. input level is sufficient to produce a.g.c., a d.c. voltage equal to the a.g.c. voltage can be applied to the a.g.c. bus and the receiver tuned off the r.f. signal input frequency for the noise reading as described above. The important point is to keep the receiver gain and input termination constant while reading the signal-plus-noise and the noise.

Signal Generators and Antenna Circuits

Most r.f. signal generators have an adjustable output attenuator and some type of output-amplitude indicator which is usually calibrated in microvolts or millivolts. The output-amplitude indicator is usually accurate only when the generator is terminated in an impedance equal to its internal output impedance. Therefore, if a signal generator is connected to a receiver antenna input circuit for a sensitivity measurement,

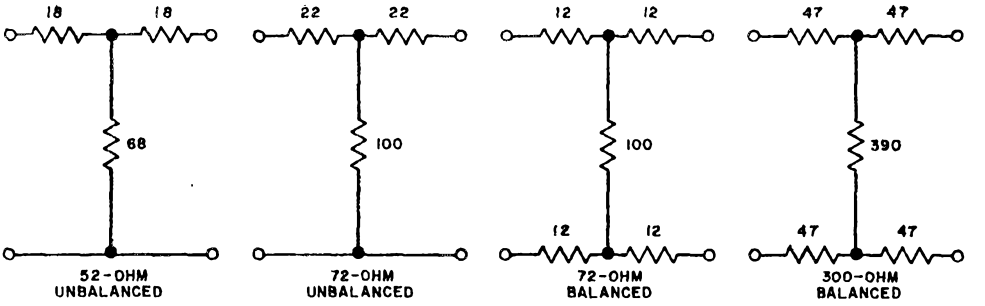

Fig. 3—Typical 6-db. matching pads. All resistance values are in ohms.

accurate results will be obtained only when the input impedance of the receiver equals the output impedance of the generator. The chances that the input impedance of a receiver will be resistive and equal to the generator output impedance over even a small frequency range are very remote, since this implies exact resonance in the antenna input circuit and a constant L/C ratio in the input tuned circuit (assuming constant input impedance to the first stage of the receiver).

It can be concluded that connecting a signal generator directly to the input circuit of a receiver is very likely to produce erroneous results. Since a transmission line is used to connect the signal generator to a receiver, standing waves will be present on the line if the receiver input impedance is not resistive and equal to the characteristic impedance of the line. Under these conditions the load on the generator will vary with line length to the receiver.

A reasonably constant load can be provided for the signal generator by the use of a 6-db. pad, several types of which are illustrated in Fig. 3. When the pad, generator and receiver impedances are all resistive and equal, the receiver and the generator are both terminated in the proper impedances and the voltage appearing at the receiver input terminals is one-half (6 db. below) that applied at the input to the pad. When a receiver is connected to an antenna whose impedance equals the receiver input impedance, the voltage appearing at the receiver input terminals is one-half that induced in the antenna. Hence, it is seen that the 6-db. pad is actually a simulated antenna; in fact, it is often referred to as such.

Of course, when the receiver input impedance, pad impedance, and the characteristic impedance of the line from the pad to the receiver are not equal, standing waves exist and the load presented to the generator depends upon line length. However, the standing-wave ratio from the generator to the pad never exceeds about 1.5 to 1, even when the input impedance of the receiver varies from a short circuit to an open circuit. In practical cases, the receiver input impedance does not vary over these wide limits, and sensitivity measurements taken using a 6-db. pad can be relied upon. (Part II, which discusses audio noise measurements, noise figure, and the correlation of noise figure with S/N and $(S + N)/N$ ratios, will appear in a subsequent issue.—*Editor*) QST

Strays

Fifty years of organized amateur radio culminates in the issuance of a commemorative postage stamp honoring hams. See page 96 for details on how to get your "first-day cover" as a memento.

—•••—

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

—•••—

General Joseph Stilwell, W4FPE, is recovering from serious injuries sustained in a recent parachute jump. Why not send him a get well QSL card at the Womack Army Hospital at Fort Bragg, North Carolina.

—•••—

League Headquarters is in need of an instruction book and maintenance manual for the DAS-4 Loran receiver. If you have one and are willing to sell or lend it for a period of a few weeks, please contact the Technical Director, A.R.R.L., Newington, Conn. 06111.

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The Stray on page 25 in April *QST* reported the problem that K9BRI was having with bugs congregating around the main tuning dial of his receiver. Several solutions have been sent in by readers. Howard Pyle, W7OE, suggested painting the dial light yellow or using an amber jewel pilot light. His solution is based on the fact that insects are not attracted to yellow light. WA6FPB suggests that K9BRI can cure his problem by refraining from eating while tuning his receiver! Dick Smith, W1FTX, thinks he could help K9BRI if he knew whether the bugs were trying to get *in* or *out!*

Feedback

In the circuit of K6YRQ's squaring amplifier for his binary frequency counter, Fig. 2 page 52 of the April issue, the cathode resistor for V_{1B} should be 2200 ohms instead of 22K. Also, the heater terminals for the 6BQ7A are incorrectly numbered. These terminals should be numbered 4 and 5. W8WVM reports that he was able to improve the drive from the time divider to the gating flip-flop by simply increasing the coupling capacitance between these two sections from 50 pf. to 0.001 μf.

One reason Larry DeMilner, W8NRB, volunteered for the USIA's Communications USA *exhibit was to improve his Russian-language capability — and he was quite fluent in the language by the time he returned. For many hours each day he manned the amateur radio booth and answered questions of thousands and thousands of Soviet citizens who filed by. They wanted to know about amateur radio and about the United States. Larry was able to talk with them in their language and, from what he told us during a recent visit to League Hq., the six months were well spent.*

W8NRB in the Soviet Union

Operating Permission Granted in Kiev, Leningrad, and Moscow

BY LAWRENCE DeMILNER,* W8NRB/1

I THINK I should begin this account by answering the question I've heard most frequently in the last six months — "What are you doing in UA-land?" The answer is I was one of the 40 Americans who staffed the U. S. Information Agency's exhibit *Communications USA* on its six-month tour in the Soviet Union. Besides telephones, TVs, satellites and data transmission equipment, the exhibit included a section on amateur radio. Being the only one there with a license, I was assigned to this section.

The exhibit (all 10,000 square feet of it) and the staff arrived in Leningrad early in July of last year and the two-week task of setting up the exhibit began immediately. The amateur radio section consisted of an SX-117, HT-44, HT-45, HA-2, and HA-6. There was also a model of Oscar I with a short history written in Russian. The antenna included with the station was a reel tape doublet which I adjust to 20 meters and put up on the roof of the building the exhibit occupied. The exhibit opened July 26 for a 28-day showing but I had not yet received permission to operate.

Unfortunately I had very little to do with the actual process of obtaining the permission. As is the practice in government-sponsored affairs, such matters are discussed on higher levels to which I was not privileged. My only role was that of the initiator. Briefly, the sequence was the following: I formulated a request and passed it up to our exhibit administrator, who introduced it into one of the regular meetings they held with our sponsoring Soviet institution, the All-Union Chamber of Commerce — who in turn referred it to the proper Soviet agency. Involving the red tape and procedures of not one but two countries, this understandably took more than just a day or two. One day in the early part of August I was called in for an interview with two representatives from the Leningrad Inspectorate of Electrical Communications, which is a division of the Ministry of Communications. After a short conversation I was asked to write a letter to the Inspectorate describing my equipment and stating my request. At this time it was indicated a favorable reply would be forth coming.

* 147 Austin, Cambridge, Mass.

W8NRB/UA1

Within two weeks and the time it took to purge a gremlin from the station control unit, W8NRB/UA1 was on the air. The date was August 22 and the first QSOs were with DL1CX, UA1CK, UA1ZF, and DL9OH. The next day contact was made with W-land with W1JFG, W1BAN, W1ONK, K1BRE and WA2SFP in rapid order. These, by the way, were all on s.s.b. — as were 98% of our contacts.

I was allowed to use only 200 watts, which meant the linear would just have to sit and collect dust, and I could operate only during the hours the exhibit was open, or in other words

L. to r.—Mr. Demyanov, head of the Central Radio Club; Ernst Krenkel, RAEM, President of the All-Union Radio Sport Federation; Larry DeMilner, W8NRB/UA3; and UA3AF, also of the Central Radio Club.

only as an exponent of the exhibit which meant from 10 A.M. to 7 P.M. Moscow Time (0700–1600 GMT) six days a week. The so-called "shack" was open on two sides and was visited by an average of 12,000 people a day, which made for quite a high room noise level. Since our job was to answer questions as well as give demonstrations of the equipment, I found that trying to divide my time between thousands of visitors and the 20-meter phone band was no easy task!

I was on the air for only 4 days in Leningrad when the exhibit ended its month-long showing. In that time I managed about 50 QSOs in 20 different countries. This low number was due to the hectic operating conditions rather than propagation. Band conditions were actullly quite good throughout August. The W/K gang would start to break through about 1100 GMT and stay into the evening hours long after we pulled the switch. Very interesting were the long openings allowed

Larry answering questions in Leningrad.

by being so far north during the summer time. We arrived in Leningrad only shortly after their White Nights had ended. There were good openings to most other parts of the world as well and a lot of juicy DX was heard in the weeks before I went on the air.

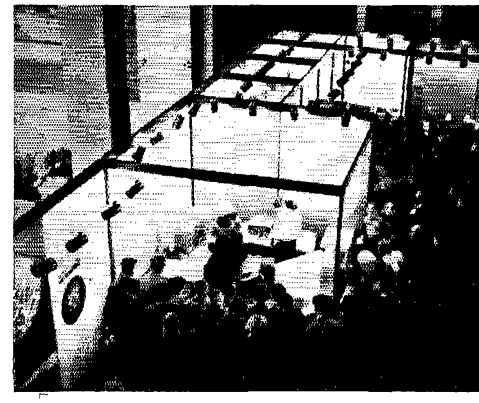
A week of hard labor and the whole exhibit was taken down and packed in boxes and on its way to Kiev. By this time the Leningrad weather had become damp and rainy so a few of us decided to take advantage of a little bit of free time we had between cities and take a trip to the sunny beaches of Yalta in the Crimea. Lying there in the sun for about a week, I spent most of the time worrying whether the beam, rotor and tower we requested from Stateside would arrive in time to be used in Kiev.

W8NRB/UB5

Before we ran out of suntan lotion we were back on the job in Kiev mantling the exhibit again. For the time being I had to make do with the doublet antenna as the beam had not arrived. The problem with the antenna was getting it strung up in the air. While we were allowed access to the roof of our building, it proved difficult (as in Leningrad) to hang the antenna more than 10 feet above the metal covered roof, blocked on one

W8NRB at the communications exhibit, photographed by UA1GZ.

side by a huge skylight. But we put it up as best we could and when a hefty wind or storm came we crawled back up on the roof and put it back up again. On the air our activity was picking up momentum. The antenna put out a pretty good signal to Europe but brought mediocre results with DX. In three weeks a few hundred QSOs had been made and about 50 countries worked. Then one day the beam arrived — a shiny new TH-33Jr none the worse for shipping. I had it on the roof and put together in no time — but alas, the rotor and tower were not in the same shipment. There then followed a few hectic days of running around trying to get a mast and some guy wire. There were pledges of support from the Kiev hams but I got the thing up about 15 feet in the air before an antenna party could be arranged. Immediate results were noticed in signal reports and I managed to work quite a few new stations and countries in the *CQ* DX contest late in October. As it happened, weekends brought the biggest crowds and consequently I was able to spend only a small amount of time on the air during the contest. In addition I had the task of running up to the roof to turn the beam everytime paths changed. This was accomplished by going up to the second floor, through the office of the Plenipotentiary of the All Union Chamber of Commerce, climbing a ladder up the wall of his office to a trap door, through a 4-ft.-high passage to the attic traversing planks and ducking girders to another ladder and onto



A bird's-eye view of the amateur radio exhibit.

One of the evening "hamfests," this one at the apartment of UA3FE. L. to r.—UA3BT, W8NRB/UA3, UA3CR, UA3CA (JT1CA), UA3DV, UA3CN, UA3AVD, and UA3FE.

the roof. This went on 4 to 5 times a day and usually brought me a bumped head or skinned knee for my effort. One day I was accidentally locked up up there for 20 minutes while I was pointing the beam towards W9WNV/XU who was doing a heavy business on 20 meters.

By the end of October for all of my roof climbing I had around 500 contacts with 68 countries notched. The first Ws were W1QAK, W1JFG, WA2SFP and W2ONV in order. Just before leaving Kiev the rotor arrived but without the 8-wire control cable.

W8NRB/UA3

I knew it would be cold in Moscow and it was. Therefore I wanted everything to be planned and executed correctly so as to avoid a lot of roof climbing during the Moscow wintertime. The tower and the rotor cable caught up to us in Moscow thus completing the antenna system. The location was a good one in Sokolniky Park on the outskirts of Moscow — a quiet wooded area with only a few low buildings around. Our pavilion was about 35 feet high and had a perfectly flat roof. Getting onto this roof, however, turned out to be twice as hard as it was in Kiev and would take too long to describe here. Once up on the roof with all the equipment I found there was nothing to which guys could be tied and permission to put anchors in the roof were denied. So, a bore was constructed and several hundred pounds of short steel girder sections were hauled up by rope to weight it down.

With our fingers crossed and everything ready we opened December first for the last leg of our tour. That first day's opening was for officially invited guests and lasted only for a couple of hours during the afternoon. Between talking to those officials I managed about 20 QSOs that afternoon starting with DL4UL, SM7AYB, and SM4YU. Then the Ws broke through led by K4HNA, W4AXE, W1YLB, W1HN, W1RQU, WA2SFP, W2BXA and W2TP. Jim WA2SFP was the first to make triple, in all three QTHs. Willard, W1JFG, is the only other one that made it.

In spite of the poor conditions offered by short daylight hours and low sunspot activity, the operation in Moscow was a relative success. Just to keep me in climbing shape high winds blew the beam and tower over twice and each time I had to spend a chilly day and a half on the roof straightening elements and putting it back up. In spite of all this and with the limited time I could spend on the air I made about 1000 contacts, including 101 countries and a good number of W/Ks.

By count of those who signed the visitors log over 500 Soviet hams visited the exhibit. As interesting as it was to be operating from the Soviet Union, it was no less an opportunity to meet and talk with these hams.

One day we enjoyed a visit from the Central Radio Club in the persons of Mr. Demyanov, UA3AF, and Ernst Krenkl, RAEM. On another occasion I was invited to speak before a meeting of the Moscow City Radio Club. Although while working with the exhibit there was not too much free time left over, most of it was spent inspecting individual and club stations and meeting Soviet hams for round-table get-togethers. In this number were many who are well known in this country such as UA1CC, UA1KBW, UA1AB, UA1BB, UB5YN, UB5UG, UT5BW, UA3BA, UA3FG, UA3EG, UA3CR (ex-UA3CR/UA1) UA3FE (ex-UA3FE/Ø) UW3AO, and UW3BV.

Soviet Ham Stations

Most of the stations I saw were quite well equipped. Many had test equipment such as volt-ohmmeters and grid-dip meters and several had signal generators and scopes as well. Much of their operating equipment is military surplus which is converted or modified where necessary. Occasionally I saw familiar pieces of equipment such as BC-348, 312, 454, 455 and 610 — not to

UA3FG, in Moscow.

mention the ubiquitous AR-11. For receiving, the majority used an AR-88 or a rather high-quality all-band military surplus receiver. Their transmitters are invariably home brewed items. Most of them include such features as band switching, spotting and VOX or break-in and often have a very professional appearance. Those who have sideband rigs usually employ a mechanical filter when one can be obtained. When these are not available phasing type exciters are used with all their concomitant problems of alignment.

The antenna problems they encounter are not unlike those faced by the cliff dwellers in some of our big cities. Getting permission to put an antenna on the top of an apartment building is not always an easy matter nor is finding room up there among the maze of TV antennas.

Tubing suitable for building Yagi-type antennas is not always readily available. But wire and bamboo are and as a consequence the quad antenna enjoys widespread popularity among the Soviets. Two-element affairs are the most common but versions of the 3-element quad are gaining in use due to excellent results obtained by experimenters such as UB5UN.

After the quad the ground plane is next in popularity. There are a few beams in use and more being built. One 4-element yagi which never collects any moss belongs to Alex, UA1-KBW. For 40- and 80-meter work a dipole or 130 feet off-center feed wire is used. This latter is called the "AMERIKANKA" antenna.

Bugs or semi-automatic keys are relatively rare among Soviet hams. However, the advent of the electronic key built with transistors has been a boon to Soviet c.w. men. Completely home-built all the way down to the lever for making the contacts, these are sometimes interesting for their design, such as the one shown to me by UA1LL, which was no bigger than a jackknife.

TVI continues to be one of the big problems facing Soviet hams. Unless a ham has proven his rig TVI-free he cannot operate after 6 P.M. weekdays or after noon Sundays until TV stations go off the air about midnight. Aside from transmitter design and construction much of the difficulty lies with the Soviet TV sets which have no high-pass filter and reportedly used to have a 28-Mc. i.f. Biggest problem, of course, lies with those who live out of the cities in areas of fringe reception.

There are approximately 20,000 licensed Soviet hams. Roughly half this number hold the equivalent of our Technician class license. Called u.h.f.ers, these hams are identified by having 3 letters after the numeral in their call instead of the usual two (except those 3 letter calls which begin with K which are club stations). For more detailed information on licensing and formalities see Ted Hannah's informative articles in *QST*, November 1958 and August 1962.

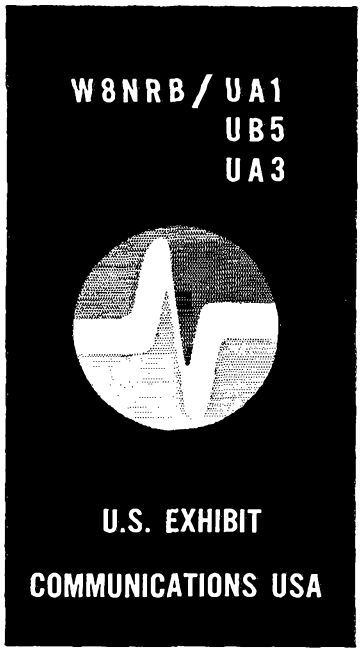
They can operate phone or c.w. on 28-29.6, 144–146, and 420–435 Mc. Regular class licenses hold these privileges as well. However power on the two v.h.f. bands is limited to 5 watts for all classes. Exceptions to this are granted in a very few cases to those demonstrating considerable activity and potential on the v.h.f. bands. Examples of this latter case are UA1DZ, UB5WN, and UR2BU, who are allowed up to 100 watts. Requirements for this license are more lenient — no code test and a minimum age of 16 (as compared with 18 for the regular license. Interestingly this class is allowed operation outside of the v.h.f. bands not only on 10 meters but also on 80 meters with s.s.b. operation.

This is the station of UB5UN.

The large numbers holding this class of license are due primarily to the encouragement and training provided to youths in pioneer clubs and hobby centers to become u.h.f.ers. Many go on to get their regular license when they can qualify but larger numbers will lapse into activity after a period of time.

There are considerable numbers of u.h.f.ers in the Moscow area but proportionately the major activity is found in the Leningrad area and the Baltic Republics where there is considerable aurora display. However, as far south as Kiev there are enthusiasts like Karl, UB5WN, who with his 36-element beam has picked up 2-meter moonbounce signals from KP4-land.

Club stations can be divided into two categories. First there are those attached to universities, institutes and enterprises — these in function most closely approach our club stations in similar circumstances. The other kinds are equiv-



dent to training centers for new hams. These are usually attached to Pioneer clubs or hobby centers and nearly every city of any size has at least one. An example of one of the largest is UA3KAS which is attached to the Moscow Palace of Pioneers and School children. The head of the station is Alexander, UA3BA. Housed in a large complex of modern attractive buildings not far from Moscow State University, the station contains several separate military surplus rigs in addition to rooms for code and theory classes. Anyone who has made a regular or contest contact with this station on c.w. will probably testify to the proficiency of the operators working there, most of whom are between 16 and 18 years old.

In the Soviet Union the term radio amateur has a much broader meaning than it does here. It includes anyone who does any building or experimenting or even tinkering with radios, TVs, tape recorders, phonographs etc. One activity enjoying quite a bit of popularity is SWLing with a TV set. Often working with special antennas, some of these enthusiasts have logged broadcast transmissions from as far away as Italy and England.

Another more popular activity is the foxhunt or hidden transmitter hunt. This has the status of a very legitimate and serious sport in the Soviet Union. The hunt is always carried out on foot, so that physical fitness is as important as the direction finding equipment they carry on their backs. (Many were left aghast when I told them that it's only a summer-time activity with us and, it was invariably done while in an automobile.) Most of these foxhunters are almost fanatical in their devotion to the sport and this is evidenced by their monopoly of the European championships for the last several years.

Talking with Soviet hams I learned that there is increasing concern about the quality of operators and their signals. With the growing number of hams in the Soviet Union they have become more aware of the disadvantages of poor quality and spectrum-wasting signals and bad operating practice. While many of the club stations in large cities are producing hams with excellent technique and good technical knowledge, these standards are not everywhere universal. At present the examination for different classes of license are administered by an elected panel of 2 to 5 hams of the local radio club. They advise the Inspectorate of Electrical Communications if the candidate qualifies and the license is issued. The problem is that these examinations are almost always oral examinations and not very standardized throughout the country. Many feel that it is time to switch to a standardized written exam to insure the quality of their growing numbers. I was able to supply them with a couple copies of the ARRL *License Manual*, in which they expressed a great deal of interest. (I was told the requirements for our General Class license is compared closely to their 1st class license).

Regarding magazines, manuals and other publications, the situation there is a little difficult. Their monthly journal *Radio* is more like some of our electronics and experimenters magazines than like *QST*. It contains some operating news and articles on construction but much of its information does not directly concern amateurs. There is a "Radio Amateur's Handbook" but it is not as extensive or as helpful as the ARRL job. This situation may be improving somewhat — for example Serge, UB5UN, co-authored a book on single sideband techniques which appeared just last December. In addition, *QST* is reprinted in small quantities with the cover and table of contents translated into Russian. Although it appears 6 to 9 months later, it is very helpful and welcomed information. Due to difficulties in obtaining foreign exchange, the only way Soviet hams obtain any amateur publications from abroad is if someone subscribes for them in trade for Soviet publications or if someone just mails them publications after they are through reading them.

As cold as the Moscow winter was, I was kind of sorry to leave. The fellowship and hospitality of the Soviet hams were little short of overwhelming and the experience of meeting and making friends with many of them will not be forgotten. Although it was a little bent-up, we made a present of the beam, rotor & tower to UA3KAS, the radio station of the Palace of Pioneers & School children, as a gesture of appreciation & friendship.

Meanwhile, back in the States there's the job of getting out those QSLs. I am back in graduate school so free time is in short supply, but you should be getting them by the time you read this. W/K cards will go to QSL managers unless you sent me an envelope. QST

The KH6EGL Frequency Standard

Markers at 100-, 10- and 1-Kc. Intervals

BY GERALD L. HALL,* K1PLP, EX-KH6EGL

THE unit described in this article is a secondary frequency standard which generates precision harmonic markers at 1-kc. intervals. These markers provide a means of making quite accurate frequency measurements, with no additional equipment other than a receiver. Many amateurs already possess a 100-kc. crystal calibrator, either built into a receiver, or as an accessory unit. Also, a good number of amateurs desiring frequency markers at intervals closer than 100 kc. are already using a multivibrator stage following the oscillator, usually operating at 50 kc.,[1] or at 10 kc.,[2] to provide markers at these intervals.

The KH6EGL frequency standard uses two multivibrators in cascade, and is capable of providing frequency markers at either 100-kc., 10-kc., or 1-kc. intervals. Imagine having precision frequency markers *every* kilocycle across a receiver dial! With the newer-type receivers having 2.1-kc. or similar i.f. bandwidths, the usual 10-kc. markers cannot generally be used for making frequency measurements by the beat-frequency technique, because of the high skirt selectivity in the receiver. The use of markers at 1-kc. intervals overcomes this problem, although the measurement technique is slightly different. Granted, a receiver must possess some degree of bandspread to separate these markers, and some degree of stability is desired, but sharp i.f. selectivity is not a receiver requirement for satisfactory use of this unit. With the b.f.o. in the receiver turned on, the markers can be separated with relative ease and, by tuning the receiver between adjacent 1-kc. markers, 500-cycle interpolated steps are obtainable with little difficulty. The author has used this unit in conjunction with nothing but a medium-priced receiver for making frequency measurements with sufficient accuracy to satisfy the ARRL requirements for a Class I Official Observer.[3]

* Hopkins St., Wilmington, Mass. 01887.

[1] McCoy, "A 50-Kc. Marker Generator," *QST*, March, 1962.

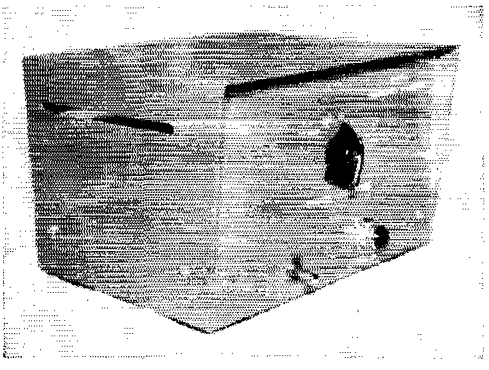
[2] Campbell, "A Junk-Box Frequency Standard," *QST*, January, 1964

[3] Handy, "The ARRL's Official Observers," *QST*, November, 1963.

Circuit Details

Fig. 1 is a circuit diagram of the frequency standard. V_1, a 6AU6, is in a 100-kc. crystal-oscillator stage using the basic circuit of the W1ICP 50-kc. marker generator.[1] A 0.01-μf. blocking capacitor has been added between the crystal and the screen grid of the tube to remove the d.c. potential from the crystal. An oven-mounted 100-kc. crystal was available to the author, but this is a refinement which is not required for satisfactory operation. The 6.3-volt oven circuitry and the associated indicator lamp, which glows only when the oven thermostat is closed, will be eliminated if a crystal without an oven is used.

The circuit includes a frequency-adjusting network. With the circuit adjusted initially for proper range of operation, C_1 provides a means or precise frequency adjustment of the 100-kc. oscillator. The range covered by C_1 is determined



The KH6EGL frequency standard provides markers at 100-, 10-, and 1-kc. intervals according to the position of the interval switch at the center of the panel. Along the bottom are the power switch and the crystal-oven thermostat lamp.

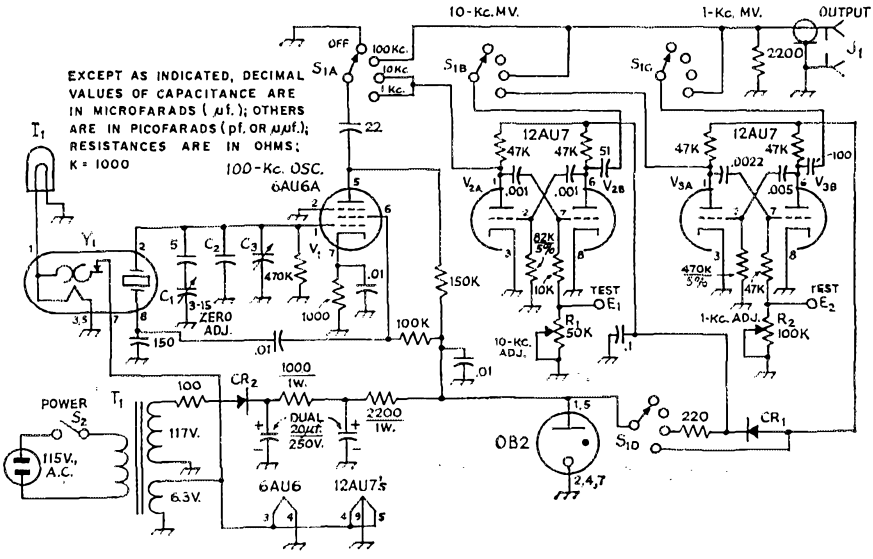


Fig. 1—Circuit of the KH6EGL frequency standard. Fixed capacitors are mylar, silver-mica, or NP0 ceramic, except where polarity indicates electrolytic. Unless indicated, fixed resistors are ½ watt.

C_1—3–15-pf. miniature air trimmer (Johnson 160-107, or similar).
C_2—10- or 12-pf. silver mica, or NP0 ceramic (see text).
C_3—Gimmick capacitor (see text).
CR_1, CR_2 — Silicon diode, 500 p.i.v. 25 ma. (min.).
E_1, E_2—Test-point terminal (see text).
I_1—6-volt 150-ma. lamp (No. 47).
J_1—Chassis-mounting coaxial receptacle.
R_1, R_2—Linear control.
S_1—Phenolic rotary switch: 2 sections, 4 poles, 5 positions (Centralab 1415, or similar; 1 position not used).
S_2—S.p.s.t. toggle switch.
T_1—Power transformer: approx. 125 volts, r.m.s., 50 ma.; 6.3 volts, 1.5 amp. (Triad R-30X, Merit P-3045, or equivalent).
Y_1—100-kc. crystal in temperature-controlled oven, 6.3-volt heater (Valpey VCO-2). (See text regarding omission of oven.)

by the value of the fixed capacitor C_2, and trimmer C_3. These values are quite critical. C_2 has a value of 10 pf. or 12 pf. Trimmer C_3 is a "gimmick" consisting simply of a 3-inch length of plastic-covered solid hookup wire connected to Pin 1 of the 6AU6, and dressed close to the chassis. The length of this wire is then trimmed to obtain the proper frequency coverage by C_1.

To realize maximum stability, the crystal oscillator remains in operation at all times when the unit is energized. Its output is switched by S_{1A}, a section of the interval-selection switch. In the off position, the output is shunted to ground. In the 100-kc. position, the 100-kc. signal is fed directly to the output terminal; in the 10-kc. and 1-kc. positions of S_1, the 100-kc. signal is fed to V_2.

V_2, a 12AU7, is connected as a synchronized free-running multivibrator. With B+ applied, this stage will oscillate on its own frequency if no synchronizing signal is present, generating a rough unstable signal. With the 100-kc. synchronizing signal applied, the oscillations of V_2 will fall in step with a subharmonic of the 100-kc. frequency. The output frequency of V_2, with proper adjustment of R_1, will be 1/10 the input frequency, or a clean 10-kc. signal. R_1 has sufficient range to cause division by 9, 10, or 11. Because the circuit is temperature-sensitive and is somewhat affected by the age or condition of the tube used at V_2, a fixed-value resistor is not too satisfactory at R_1. The variable resistor provides a means of compensating for these changes.

E_1 is a convenient point for observing the 10-kc. waveform with an oscilloscope. By "tapping down" on the grid circuit as shown, enough isolation is obtained so that an oscilloscope connection to the test point does not disturb circuit operation. An oscilloscope is not required for adjustment of the unit, but is quite convenient.

In the 10-kc. switch position, the 10-kc. output of V_2 is fed to the output terminal; in the 1-kc. position, it is fed to V_3. V_3, another 12AU7, is also connected as a synchronized free-running multivibrator. Aside from a difference in component values to suit a lower frequency of operation, the circuitry of this stage is identical to that of V_2. In the 1-kc. position of S_1, the 10-kc. signal from V_2 is fed as a synchronizing signal to V_3, and the 1-kc. output signal from V_3 is fed to the output terminal. The 1-kc.

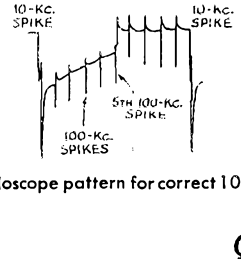


Fig. 2.—Oscilloscope pattern for correct 10-kc. adjustment.

control, R_2, permits adjustment for proper division by 10, dividing the 10-kc. input signal down to 1 kc. E_2 provides a test point for monitoring the 1-kc. signal.

Circuit constants were chosen for V_2 and V_3 to yield a symmetrical signal at the output of each, and the values shown in Fig. 1 should be adhered to unless you have an oscilloscope and don't mind spending considerable time adjusting these stages. (External-circuit loading, among other things, accounts for the difference in component values in the two sides of each multivibrator circuit.) A symmetrical 10-kc. square wave is generated by V_2, and a symmetrical 1-kc. square wave by V_3. Each output is differentiated by the coupling capacitor and following load resistor, so that the actual signals available at the output terminal are in the form of 10-kc. or 1-kc. spikes. Because the right half of each multivibrator tube acts as an amplifier when it is conducting, the sync triggers will be combined with the output spikes to form a composite signal. The 10-kc. output will therefore contain 100-kc. spikes during one half of the cycle, and the 1-kc. output will contain composite 10- and 100-kc. spikes during a half cycle, as shown in Figs. 2 and 3.

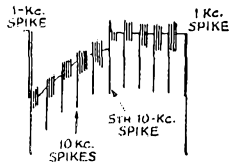


Fig. 3—Oscilloscope pattern for correct 1-kc. adjustment.

The line connected to the output terminal of the unit is tied to appropriate contacts of S_{1C} to pick up either 100-kc., 10-kc., or 1-kc. markers, as desired. The 2200-ohm resistor from the output terminal to ground serves to "swamp" the output, so that either a high- or a low-impedance connection can be made without the need for readjustments within the unit.

The power supply has a power diode in a half-wave rectifier arrangement, and a capacitor-input smoothing filter. The output voltage is regulated at 108 volts by a 0B2. A regulated supply was found necessary for stable operation of the multivibrators, especially the 1-kc. stage. The total current drawn by the unit is less than 25 ma.

Plate voltages to V_2 and V_3 are switched off by S_{1D} when these tubes are not actually being used, to avoid possible spurious signals in the output line. Thus, V_2 should have B+ applied only with S_1 in the 10-kc. and 1-kc. positions, and V_3 only in the 1-kc. position. It is not believed that the circuitry associated with S_{1D} has previously appeared in print. Ordinarily, either two separate switch sections, a multiple switch section, or one with progressively-shorting contacts would be required to achieve the desired switching sequence. Since none of these was available at the time, a silicon diode was used as an automatic one-way switch, as shown. With S_{1D} in the 10-kc. position, the diode acts as an open switch for current attempting to flow through V_3, while V_2 conducts normally. With S_{1D} switched to the 1-kc. position, the diode acts as a closed switch for current flow through V_2, and V_3 is directly connected to the B+ supply through the switch contacts. With this arrangement there is a small voltage drop across the diode when V_2 current flows through it. An equivalent resistance, 220 ohms, was therefore added in the 10-kc. position, along with a 0.1-μf. decoupling capacitor, to equalize the voltages applied to V_2 in the two switch positions.

Construction

The photos show various views of the unit. Components are housed in a small metal cabinet which includes a 5 × 7-inch chassis. The arrangement of parts is not critical. Tie-point strips were used to secure power-supply filter components and, where necessary, to support the B+ line. Most of the other small components will be self-supporting when soldered to the appropriate terminals. Mylar, silver-mica, or NP0 ceramic capacitors are recommended for best stability, particularly in the grid circuit of the 100-kc. oscillator.

If the crystal oven is not used, a conventional crystal socket may be substituted for the octal socket required for the plug-in crystal-oven unit.

To make each of the test points illustrated, drill a hole through the chassis large enough to pass a piece of spaghetti insulation. Then slip a length of spaghetti through the hole, and extend it underneath the chassis to the junction of the appropriate fixed resistor and adjustment control. Clip the spaghetti off about one inch above the chassis. Then slip a length of No. 18 bus wire through the spaghetti and solder it to the proper lug on the control. Bend the end of the bus wire over the top end of the spaghetti to keep it from slipping off, and the construction is completed.

Even with the vernier circuitry used for the 100-kc.-oscillator frequency adjustment, the 3-15-pf. variable capacitor C_1 has a very large range for the adjustment technique to be described. A vernier drive, or at least a large knob, to aid in adjusting the capacitor, would be worthwhile. Markings should be made on the chassis indicating the shaft positions for maximum and minimum capacitances of C_1. Knobs are not required for the 10- and 1-kc. adjustment controls, but slotted shafts for screwdriver adjustment would be handy. Slots can be cut with a hacksaw, but care should be used to keep filings out of the resistive element.

Adjustment Procedures

After the unit has been wired and checked for errors, insert the tubes and the crystal. Apply power while observing the voltage-regulator tube. This tube should ignite (a light purple glow) almost instantly, indicating that the B+ supply is being properly regulated. If the tube does not glow at all, or if it glows very brightly

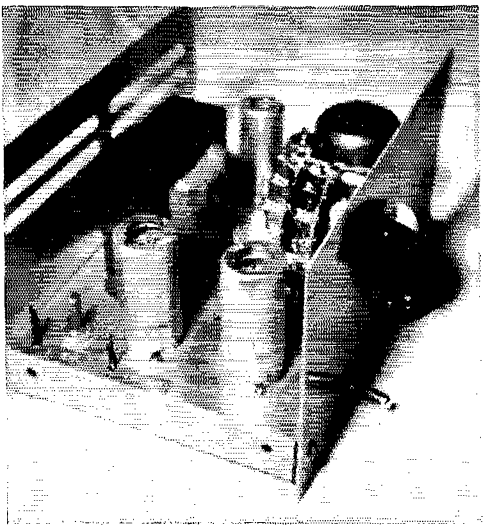
(almost white), check the power-supply wiring. After the heaters of the other tubes have warmed up, there should be some slight change in the intensity of the glow as S_1 is rotated through its four positions. If the crystal oven and the thermostatic-indicator lamp are used, this lamp should also glow as soon as power is turned on.

If everything appears normal after applying power, the output of the frequency standard may then be connected to the receiver antenna terminal. A coaxial lead is recommended to avoid stray-signal pickup. Ground the shield to the chassis at each end. The author found that if this cable is limited to a few feet of RG-58/U, normal receiver operation is not affected, and this lead may be left connected even when the standard is not in use.

During the first few adjustments, the receiving antenna should be disconnected from the receiver. An antenna-disconnect switch would be very useful during both adjustment and operation. In installations where a common antenna is used for transmission and reception, throwing the switch to the transmit position should be sufficient. Set all frequency-standard adjustments at mid-range. Then replace the top and bottom covers, and allow the unit to warm up for a half hour or more.

If the thermostatic oven is used, the indicator lamp will begin blinking on and off shortly after power is applied, indicating that the thermostat is cycling. During the warm-up period, check for the presence of 100-kc. markers in the receiver, with S_1 in the 100-kc. position. Use the receiver b.f.o. With S_1 switched to the off position, the 100-kc. markers should disappear. Adjustment of the 100-kc. oscillator will be performed last; its frequency will be sufficiently accurate to perform the other adjustments first.

Adjustment of the 10- and 1-kc. multivibrators may be made with an oscilloscope, or by using only the receiver. After sufficient warm-up time, remove only the top cover of the unit to gain access to the 10-kc. adjustment control (and test points, if used).



End view with cover removed, showing the 1-kc. (left), and 10-kc. oscilloscope test points, and the mounting of the 10-kc. multivibrator control R_1.

Oscilloscope Method of 10-Kc. Adjustment

If an oscilloscope is used, clip a high-impedance scope lead to E_1 and a ground lead to the chassis. Switch S_1 to 10 kc., and synchronize the internal scope sweep to display one cycle of the 10-kc. waveform. If jitter cannot be removed with the scope controls, adjust R_1 slightly. Refer to Fig. 2. The 10-kc. waveform will not be a square-wave when monitored at this point in the circuit, but will appear, as shown, with negative 100-kc. spikes. Half of the 10-kc. cycle will show an upward slope, while the other half should be essentially square. By adjusting the 10-kc. control (R_1), the length of the upward-slope portion of the wave can be changed. Rock the adjustment back and forth slightly to see the effects. It may be necessary to readjust the scope sweep frequency while doing this. The proper point of adjustment is reached when the upward-slope portion of the wave ends just behind the fifth 100-kc. spike, as shown in Fig. 2. There should then be nine 100-kc. spikes between each of the large negative 10-kc. spikes.

Receiver Method of 10-Kc. Adjustment

If only the receiver is used for adjustment, or for periodic checks, switch S_1 to obtain 100-kc. markers. Using the b.f.o., carefully note the receiver dial settings for zero-beating two adjacent 100-kc. markers. Use any convenient frequency range. If you use the receiver bandspread dial, use the end at which the markers appear to be spread out the most. (Some receivers exhibit quite a difference at the two ends of the bandspread dial.)

After zero-beating one of the two selected 100-kc. markers, flip S_1 to the 10-kc. position. Tune the receiver toward the second 100-kc. marker. At about 1/10 the tuning distance, a new signal should now be found. This signal may sound rough. Carefully adjust the 10-kc. control for the smoothest signal obtainable. Then return the receiver to the original 100-kc. marker, flipping S_1 to the 100-kc. position for positive identification. Return S_1 to the 10-kc. position and again slowly tune the receiver toward the second 100-kc. marker. Many signals will come in, go through zero beat, and go out, before the second 100-kc. marker is reached. Count these signals as they go through zero beat, stopping at the second 100-kc. marker. Flip S_1 to 100 kc. for positive identification of this 100-kc. marker. If the second 100-kc. marker was the tenth signal to go into zero beat, the adjustment is properly set. If it was the ninth, the eleventh, or any other number except ten, switch S_1 to 10 kc. and zero-beat one of the signals between 100-kc. markers. Now slightly offset the b.f.o. pitch control (or the receiver tuning) for a low-frequency audio note. Then slowly readjust the

Table I

Stations Transmitting on H.F. Standard Frequencies

Call Sign	*Location*	*Frequencies, Mc.*
ATA	New Delhi, India	10
CHU	Ottawa, Canada	3.330, 7.335, 14.670
FFH	Paris, France	2.5, 5, 10
HBN	Neuchatel, Switzerland	2.5, 5
IBF	Torino, Italy	5
JJY	Tokyo, Japan	2.5, 5, 10, 15
LOL	Buenos Aires, Argentina	2.5, 5, 10, 15, 20, 25
MSF	Rugby, England	2.5, 5, 10
OMA	Prague, Czechoslovakia	2.5
WWV	Beltsville, Maryland	2.5, 5, 10, 15, 20, 25
WWVH	Puunene, Maui, Hawaii	5, 10, 15
ZUO	Johannesburg, S. Africa	10
ZUO	Olifantsfontein, S. Africa	5

10-kc. control. (If 11 or more signals were counted, less resistance is needed: if 9 or less signals were counted, more resistance is needed.) While adjusting R_1, the audio note should get rough, then suddenly change pitch. Carefully adjust R_1 for the smoothest note possible at this new pitch. Again count the signals between 100-kc. markers. If necessary, make further readjustment of R_1 until the count checks out correctly.

Oscilloscope Method of 1-Kc. Adjustment

After the 10-kc. adjustment has been properly set, the 1-kc. adjustment can be made. Clip the scope lead to E_2, and synchronize the scope sweep to display one cycle of the 1-kc. signal. If jitter cannot be removed with the scope controls, adjust R_2 a bit. Refer to Fig. 3. The 1-kc. waveform will contain negative 10-kc. spikes, followed by a few smaller 100-kc. spikes, as shown. As with the 10-kc. adjustment, the upward-slope portion of the wave should end just behind the fifth synchronizing trigger. On the 1-kc. wave, this will be on the first 100-kc. spike behind the fifth 10-kc. negative trigger. If the square portion of the wave begins behind any other 10-kc. trigger, or a later 100-kc. spike, readjustment is in order. The scope will probably have to be resynchronized after even a slight adjustment has been performed. When the waveform of Fig. 3 is obtained, the adjustment is complete.

Receiver Method of 1-Kc. Adjustment

If the receiver is being used to check the 1-kc. adjustment, tune the receiver between two 100-kc. markers, and turn the b.f.o. off. Switch S_1 to 1 kc. An audio tone should then be heard in the receiver. Rock the 1-kc. control slowly back and forth to get a feel for its action. As the control is adjusted, the audio note will get rough, or change pitch very slightly at certain settings. If the control is turned far enough, the pitch of the beat will abruptly change to a different frequency — higher in one direction of adjustment, or lower in the other. Starting from the original pitch, move the adjustment in the direction to obtain a higher note, stopping just after the pitch changes. Then back off on the adjustment very slightly to the point where the original pitch returns, and continue ½ turn (or 30°) more. This setting of the adjustment yields the cleanest and most stable signal. Now its frequency must be checked to make sure it is at 1 kc.

The simplest method of checking the 1-kc. adjustment is to compare the 1-kc. tone in the receiver aurally against a standard 1-kc. signal, such as from CHU Canada or JJY Japan (often heard in the western states). See Table I for frequencies. WWV also transmits a lightly-modulated 1-kc. signal along with the pulsed time code on the 3rd minute of most 5-minute periods. Using this method, it is necessary only to listen to the tone from one of the transmissions, and establish the pitch in your mind. Then switch on the 1-kc. markers to the receiver. If the tone now heard in the receiver is not the same as that heard from the standard station, follow the procedure in the preceding paragraph, and adjust for the correct pitch. If you doubt your accuracy using this method, or if you lack a 1-kc. standard tone source, use the double-check procedure given later under the section on frequency measurement.

After adjustment has been completed, replace the top cover and allow 10 or 15 minutes for additional warm-up. Again check both the 10- and 1-kc. adjustments to make sure they are correct for the operating temperature of your circuit.

100-Kc. Range Adjustment

The most satisfactory method of checking and adjusting the 100-kc. crystal frequency is by direct comparison of a harmonic marker against a standard-frequency transmission. Table I is a list of most of the stations throughout the world transmitting on standard frequencies (derived from a precision frequency standard) in the high-frequency range. All except CHU, Canada, operate on harmonics of 100 kc. If yours is not a general-coverage receiver, the strongest local broadcast station can be used with fair accuracy,

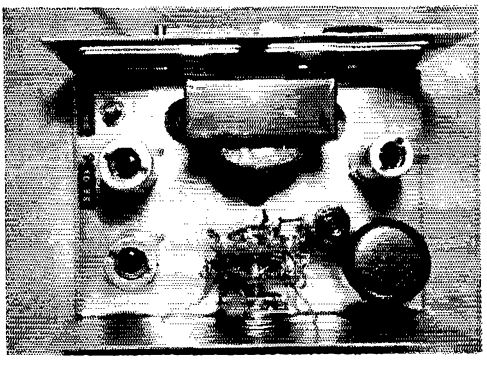
by following the procedure given, and adjusting on a 10-kc. harmonic of the frequency-standard unit.

Best results will be obtained if the received signal and the 100-kc.-marker strengths are about equal at the receiver input. Otherwise, one signal will tend to override the other, masking any frequency-beating effect. Tune the receiver to the standard station to be used, with S_1 at off, and with the receiver b.f.o. turned off. Then switch S_1 to 100 kc. With the proper values at C_2 and C_3, a low-pitched beat may be heard between a harmonic of the 100-kc. oscillator and the standard-frequency signal. This is best observed when there is no tone modulation on the received signal, so that the beats against the modulation sidebands will not be confused with the beat against the carrier itself. Variable coupling or step-switched attenuation[4] in either the antenna line or the lead from the standard unit, as required, will be useful in equalizing the strength of the two signals. Adjust the attenuator for the loudest beat note.

Now remove the bottom cover of the standard. The beat note will probably change pitch slightly because of a change in circuit capacitance. Make sure that the 100-kc. oscillator output is low in frequency by adjusting C_1 to maximum capacitance. The beat note should go to a higher pitch with this adjustment. At minimum capacitance, the beat note should be lowest. If the opposite takes place, your marker is on the high-frequency side of the standard-frequency transmission, and a larger value for C_2 is in order. Once you have established that your frequency is low, replace the bottom cover and proceed with adjustments.

While listening to the beat-note pitch between the standard-frequency transmission and the 100-kc. harmonic, turn C_1 from minimum to maximum. At this time, it will probably not be possible to reach zero beat. Remove the bottom cover and clip $\frac{1}{4}$ inch of wire from the gimmick capacitor C_3. Replace the bottom cover and again turn C_1 through its range. The beat note should be lower in pitch, but may still not go through zero beat. Repeat this procedure, clipping only $\frac{1}{4}$ inch at a time from the gimmick wire. Always check the adjustment range with the bottom cover replaced. The range adjustment is complete when zero beat occurs at approximate mid-range of C_1. This occurred with about one inch of gimmick wire remaining in the unit constructed by the author.

[4] Scherer, "A Step Attenuator," *CQ*, October, 1964.



Top view of the frequency-standard unit. The plug-in crystal oven and 100-kc. oscillator tube are to the right. At the left are the multivibrator tubes; the tube nearest to the panel is V_3. At the center are the interval switch (mounted on the panel) and the power transformer. Transformer and switch leads pass through grommets set in the chassis. The VR tube is to the left of the oven. The tube shields are not a strict necessity.

Precision 100-Kc. Adjustment

Replace and secure all covers. Wait at least 15 or 20 minutes for additional warm-up, so that the oscillator and crystal become well stabilized. Switch S_1 to off, and make sure that the receiver is tuned accurately to the standard-frequency transmission (b.f.o. turned off). Then switch S_1 to 100 kc. Carefully adjust C_1 for zero beat. Now switch S_1 to 10 kc. The signals should remain at zero beat.

From this point on, it makes no difference whether tone modulation is present on the signal or not. Switch S_1 to 1 kc. The audio tone heard in the receiver may seem to vary in intensity slowly, or perhaps rapidly. The rate of this variation is the amount of frequency error of the particular marker you are using. If the pulsations occur at the rate of three per second, your standard is off by 3 cycles at the frequency to which your receiver is tuned. This error is directly proportional to the frequency involved; at twice the receiver frequency, your standard would be in error by 6 cycles. Therefore, adjustments made at the higher received frequencies will normally be the most accurate.

Now adjust C_1 so that the rate of the pulsations decreases. By careful adjustment, a point should be found where the pulsations cease entirely, or are at least several seconds apart. Accuracy better than one pulsation in two or three seconds is usually not attainable because received-signal fading and beat pulsations cannot be distinguished. Even so, an error of $\frac{1}{2}$ cycle per second at 10 Mc., for example, represents only a 5-cycle error at 100 Mc., and this is equivalent to accuracy of 5 parts in 10^8. Quite accurate for a home-built unit adjusted without elaborate test equipment, isn't it? However, Doppler shift of the received signal, especially if received over a multihop path, and stability of the standard will probably limit absolute accuracy to a few parts in 10^7 at best.

Under adverse receiving conditions, such as usually occur in the evening or early-morning hours, the received frequency will vary up and down by a few cycles. This will be detected as an alternate increase and decrease in the rate pulsations if you are attempting to adjust your standard. Under these conditions, you may get the impression that your unit is more unstable than it actually is. The cause is severe Doppler shifting of some components of the received signal, because of vertical movement of the

ionosphere. Naturally, most precise adjustments can be made by avoiding these conditions.

Frequency Measurements

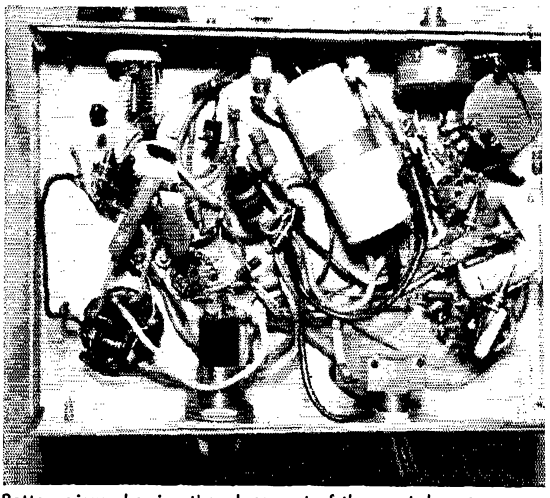
Before attempting to perform any frequency measurements, you should first familiarize yourself with the tuning of the 1-kc. markers. This procedure will also serve to double-check the accuracy of the 1-kc. adjustment. Switch S_1 to 100 kc. and, with the receiving antenna disconnected and the b.f.o. turned on, zero-beat a 100-kc. marker. Then switch to 10 kc., and tune the receiver to an adjacent 10-kc. marker, zero-beating it with great care.

Now switch S_1 to 1 kc. As when checking the 100-kc. oscillator, the 1-kc. tone may seem to vary in intensity. A *very slight* readjustment of the b.f.o. pitch control will change the rate at which the tone changes. At a perfect zero beat, the intensity should at least take several seconds to change, depending on the stability of the receiver. Now tune the receiver *very slowly* toward the 100-kc. marker. A myriad of changing pitches will be heard in the receiver. Disregard most of them, paying attention only to the signals which go into and come out of zero beat. Continue tuning while counting the signals as they go into zero beat. Stop tuning the receiver on the tenth signal and carefully adjust for zero beat. Then switch S_1 to 100 kc. The 100-kc. marker will now be perfectly zero beat if the 1-kc. adjustment is correct. If you do not come out at zero beat, perhaps you miscounted the 1-kc. markers; repeat the procedure to check.

If, after two or three checks, the count is still other than 10, further 1-kc. adjustment of R_2 is probably required. Start from the point at which the tenth 1-kc. marker was zero beat and, with S_1 at 100 kc., tune the receiver to zero-beat the 100-kc. marker. Note the direction of tuning. If you continued in the same direction as when counting the 1-kc. markers, refer to the first paragraph under "Receiver Method of 1-Kc. Adjustment," and adjust the control for a higher pitch. If it was necessary to reverse the tuning direction, follow the same procedure, but adjust the control for a lower pitch. Then repeat the count.

Frequency measurements are made by comparing the unknown frequency against the 1-kc. markers. The markers are identified by counting from a known 10-kc. marker frequency, using the above procedure. The 10-kc. markers should be identifiable from the receiver's tuning calibration, but could be identified by counting from a known 100-kc. marker, if necessary.

First tune in the signal which is to be measured, zero-beating it with the receiver b.f.o. turned on. The standard markers should be turned off. Jot down the approximate frequency as indicated by the receiver calibration, say, 7084 kc. as an example. Then switch S_1 to 10 kc., and tune the receiver to the nearest 10-kc. marker — in this case, 7080 kc. Switch out the antenna to eliminate confusion which might be caused by other signals in the same frequency



Bottom view, showing the placement of the crystal zero-adjusting capacitor C_1 (upper left), output jack (upper center), and multivibrator-adjusting controls (upper right). The 1-kc. control, which may require more frequent attention than the 10-kc. control, is mounted so as to be adjustable from the rear of the cabinet. The substitution of a coaxial receptacle for the output jack is recommended, as mentioned in the text.

range. With the receiver b.f.o. still on, zero-beat the 10-kc. marker. Then switch S_1 to 1 kc. and, while slowly returning the receiver to the original setting at 7084 kc., count the 1-kc. markers as they go into zero beat. Stop on the 1-kc. marker closest to the original receiver setting, zero-beating the marker very carefully by noting the 1-kc. audio-intensity fluctuations. Assuming that this was the fourth 1-kc. marker in our example, the receiver is now tuned precisely to 7084 kc.

Turn the 1-kc. markers off, and switch the antenna in. The signal being measured will most likely not be at zero beat. Note first of all whether the audio pitch of the signal is higher or lower than the 1-kc. audio tone. If it is higher, the receiver is tuned more than 1 kc. away from the signal. Second, note in which direction the receiver must be tuned to zero-beat the signal being measured, by shifting the b.f.o. pitch control,[5] or the receiver tuning, very slightly. If the pitch was greater than 1 kc., precisely retune the receiver 1 kc. higher or lower, as required, so that the receiver tuning is less than 1 kc. away from the signal being measured. If no retuning was required, precisely zero-beat the original marker.

Assume that in our example the pitch was less than 1 kc., and that the signal is downward in frequency. From this information, we know that the signal lies somewhere between 7083 and 7084 kc. Now we wish to determine more exactly where the signal is. There are several methods of doing this. With the receiver and

[5] If the b.f.o. pitch control is used, you must know in which frequency direction it operates. With some receivers this may change from one band to another, depending on whether the local oscillator is on the high- or low-frequency side of the received signal.

b.f.o. tuned precisely to 7084 kc., turn off the markers and switch the antenna to the receiver. The frequency of the audio beat note of the signal being measured will be its frequency difference from 7084 kc. A quite accurate method of measuring this audio frequency is through the use of a calibrated audio signal generator and an oscilloscope. A 1-to-1 Lissajous pattern of the receiver audio output against the audio-generator signal will establish the frequency to within the calibration accuracy of the generator, which should be best at the lower frequencies. (The highest frequency required is less than 1000 cycles.) For extreme accuracy (to within a cycle or two) the homemade frequency counter described in a previous issue of *QST*,[6] with the addition of two more counting flip-flops, could be used to measure the receiver audio frequency directly. A musician's pitch pipe could also be used, and the various notes available compared to the pitch of the signal. Some interpolation might be necessary, but accuracy to 50 cycles is not unreasonable to expect. The notes of the pitch pipe should be shown in cycles on the instrument.

The b.f.o. pitch control might also be used to determine the frequency difference from the 1-kc. intervals. By adjusting only the b.f.o. pitch control, zero-beat the signal being measured as carefully as possible. Note the exact position of the pitch control. Now switch out the antenna, and switch on the 1-kc. marker. Swing the pitch control to again zero-beat the 7084-kc. marker. Then, without retuning the receiver, swing the pitch control to zero-beat the 7083-kc. marker. The relationship of the measured frequency can be established from the three relative positions of the pitch control. If the control was 3/10 of the way toward 7083 kc. when the measured signal was at zero beat, its frequency is about 300 cycles below 7084, or at 7083.700 kc. For further accuracy by this method, set the pitch control halfway between the two zero-beat points for the 1-kc. marker. Again using the changing audio intensity as a guide, the control can be set to precisely 7083.5 kc. This may provide a closer known frequency to the zero-beat point of the signal being measured. The chances are that the b.f.o. tuning is not linear. (This can be determined beforehand by checking the zero-beat point of three adjacent 1-kc. markers, and two intermediate 500 cycle points, for a total of five points over a 2-kc. frequency spread.) When using the b.f.o. for interpolation, accuracy of about 100 to 250 cycles can be expected, depending on the linearity and frequency range of the b.f.o. control.

When using any of the above methods, the receiver can be retuned to the next adjacent 1-kc. marker on the other side of the signal, and the checks repeated from that receiver setting. This will give a double-check on the measurement. During any measurement, it is most important to remember on which side of the signal your receiver is tuned. In fact, keeping brief notes on the whole measurement procedure by recording receiver settings relative to the signal frequency, and other data, is recommended so that, if necessary, you can recompute the exact frequency from your notes. A simple error like adding, when you should be subtracting, will make even the most precise measurements worth almost nothing, unless you have kept notes.

When using the frequency standard from a cold start, sufficient warm-up time should be allowed; at least one hour is advisable. For best accuracy, the 100-kc. frequency adjustment should be checked just prior to performing any measurements, to assure that the basic frequency is correct. If the unit is left in continuous operation, its stability should be quite good. The 100-kc. crystal temperature, with the circuit operating properly, will be the most significant factor in frequency stability. Room temperature variations may cause noticeable frequency shifting if an oven is not used. For those who are interested in the utmost precision (within amateur capabilities), your particular oscillator characteristics may be determined through periodic checks over a long period of time, and logging the required adjustments. Frequency errors can be roughly determined by counting the audio intensity beats per second, using lower standard frequencies if necessary for a slower count rate. The direction of frequency error can be determined by the adjustment capacitance required; your oscillator frequency is high if you have to add capacitance, or low if you have to reduce capacitance to zero-beat the standard-frequency signal.

In almost every constructional article published there is room for some improvement in the design. This one is no exception. A worthwhile addition to the unit might be a buffer-amplifier stage at the output, for two reasons. First, the output signal could be boosted to a hefty level, even at 30 Mc. Second, a discrepancy not previously mentioned would be overcome. With the present switching arrangement, the 100-kc. oscillator frequency shifts upward by about 2 parts in 10^6 when switching from the 100-kc. position to the 10- and 1-kc. positions. This is caused by the difference in loading on the 100-kc. oscillator. If only the 10- and 1-kc. markers are used for the high-precision measurements, as well as when adjusting the 100-kc. oscillator, no problems should be encountered, but this point is worth remembering when using only the 100-kc. markers.

For those who want to check their frequency-measuring capability, ARRL invites participation of all interested persons in two frequency-measuring tests yearly. These are held in February and in September. Watch for a notice in the "Operating News" section of *QST* as these months draw near, or monitor your nearest Official Bulletin station for an announcement.

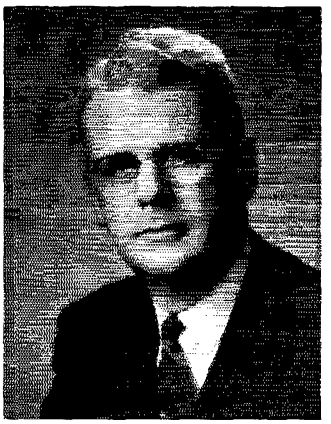
QST

[6] Skeen, "Low-Cost Precision Frequency Measurement," *QST*, January, 1965.
Also see "Technical Correspondence," *QST*, April, 1965.

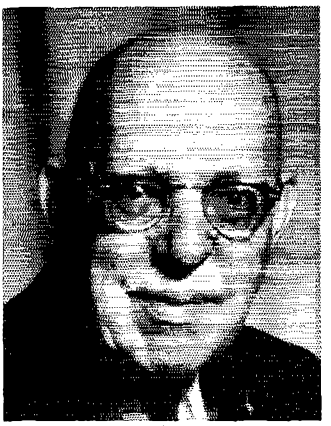
The ARRL Board of Directors

Last month our editorial discussed the functioning of the Board of Directors as the legislative body of our representative democracy. This month, as the time appointed for the Board Meeting, May 21, draws nigh, *QST* takes pleasure in presenting thumbnail sketches and photographs of the men who will make the League's decisions, the directors of the sixteen ARRL divisions. Make sure your director has your views on the issues of the day, direct or through your club, by the middle of the month; his address is on page 8 of this and every issue of *QST*.

Noel B. Eaton, VE3CJ, of Burlington, Ontario; director of the Canadian Division since May 13, 1960; retired president of the Eaton Knitting Co. Ltd.; was vice director 1959–1960; past president of Ontario Amateur Radio Federation and Hamilton Amateur Radio Club; was Wing Commander, RCAF; treasurer, and member International Executive Committee, Region II Division, IARU; member, ARRL Executive Committee and of the Planning Committee; also operator of 6Y5BP in the Cayman Islands.

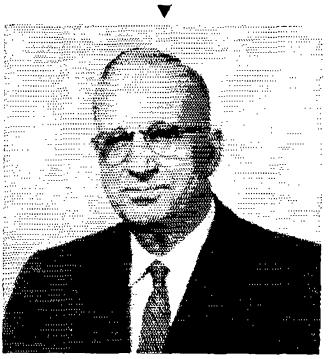


P. Lanier Anderson, W4MWH, of Danville, Virginia; director of the Roanoke Division since January 1, 1953; owner, P. L. Anderson & Son, building contractors; holds DXCC, 35 w.p.m. code proficiency certificate; participates in a.m., s.s.b. and c.w. nets; ORS, AREC, A-1 Operator Club; was member of the Housing Committee for the new hq.; acting chairman of the Finance Committee.



Harry M. Engwicht, W6HC, of San Jose, Calif.; director of the Pacific Division since March 14, 1955; professor of electrical engineering, San Jose State College; vice director, 1954–1955; alternate state radio officer for Santa Clara County RACES; chairman Pacific Area Staff, and member Transcontinental Corps, and National Traffic System; director, Project Oscar, Inc.; ORS, AREC, A-1 Operator Club; first licensed in 1919; member, Planning Commitcee.

Gilbert L. Crossley, W3YA/-W3DKN of State College, Pa.; director of the Atlantic Division since January 1, 1954; retired assistant professor of electrical engineering at Pennsylvania State University; deputy state radio officer, and Centre County radio officer, RACES; assistant state director, MARS-Army; emergency coordinator, AREC; was the first Western Pennsylvania section communications manager, 1926–1928; ORS, A-1 Operator Club, first licensed in 1915; currently chairman of the Planning Committee.



Carl L. Smith, WØBWJ, of Denver, Colorado; director of the Rocky Mountain Division since January 1, 1961; flight captain, Western Air Lines; was vice director 1957–1958 and assistant 1955–1956; Colorado Section Communications Manager, 1959–1960; former president, Denver Radio Club; member of the AREC; member of the Merit and Awards Committee.

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Robert W. Denniston, WØNMX, of Newton, Iowa; director of the Midwest Division since January 1, 1956; president of Denniston and Partridge Co., a chain of 23 lumberyards; past president of the Des Moines, Newton and Potomac Valley Radio Clubs; Jasper County Radio Officer, RACES; communications officer, Jasper County Red Cross; NCS of Iowa 160-Meter Net and of Jasper County Emergency Net; Emergency Coordinator, AREC; ex-FO8AJ and other DXotic calls; DXCC; A-1 Operator Club; licensed since 1933; member, Executive Committee of ARRL and of IARU Region II.

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Harry J. Dannals, W2TUK, of Huntington, New York; director of the Hudson Division since January 22, 1965; senior engineer, Sperry Gyroscope Co.; was vice director 1961–1965 and assistant 1958–1961; SCM, NYC-LI, 1955–1961; president, Hudson Amateur Radio Council; past vice president, SSBARA and of Lake Success Radio Club; past president, Nassau Radio Club; director, Suffolk County Radio Club; ORS, OPS, OO, OES, AREC, A-1 Operator Club, CP-35.

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Roemer O. Best, W5QKF, of Corpus Christi, Texas; director of the West Gulf Division since January 1, 1961; a dentist; past president and past secretary, Corpus Christi Amateur Radio Club; Region 3 Radio Officer, Texas RACES; Section Emergency Coordinator, AREC, 1956–1960; A-1 Operator Club; Lt. Cdr., USNR; Army MARS; member of the Membership and Publications Committee.

Robert York Chapman W1QV, of Groton, Connecticut; director of the New England Division since January 1, 1965; director, Acoustical Research and Development Division, U.S. Naval Submarine Base, New London; past president, past activities manager and life member of the Tri-City Radio Club, Inc., and chairman of its annual hamfests since 1948; past director of Civil Defense, Town of Groton; DXCC, OPS, OBS, A-1 Operator Club; licensed with present call since 1924.

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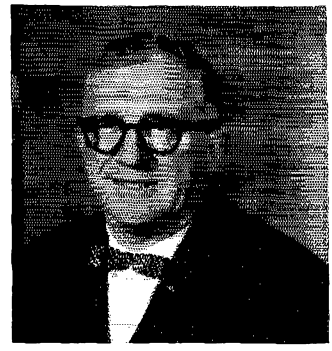

Howard F. Shepherd, Jr., W6QJW, of Los Angeles, California; director of the Southwestern Division since January 1, 1965; attorney at law; vice director 1961–1963 and assistant 1963–1965; legal advisor and past chairman of Los Angeles Council of Radio Clubs; past chairman of the 50 Clubs of California; director, Project Oscar, Inc., and of Western S.S.B. Association; Region I Radio Officer, California RACES; DXCC, AREC; licensed since 1938.

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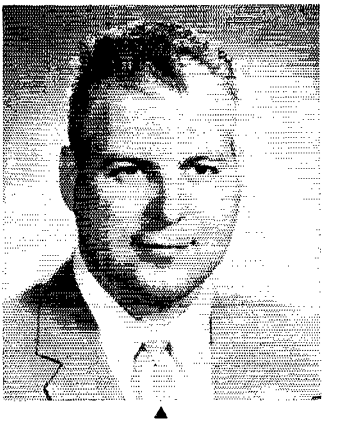
Thomas M. Moss, W4HYW, of East Point, Ga.; director of the Southeastern Division since January 1, 1964; communications equipment operator, Headquarters Third Army; was vice director from 1956 to 1964; SCM, Georgia, 1946–1948; past president, Confederate Signal Corps; past secretary, Atlanta Radio Club; past director, Southeastern DX Club; former SEC; ARRL W4 QSL Bureau manager since 1951; ORS, OPS, OBS, OO, A-1 Operator Club; member, Merit and Awards Committee.

Philip P. Spencer, W5LDH/-W5LXX, of New Orleans, La.; director of the Delta Division since January 1, 1964; attorney at law; past president of the Tulane Amateur Radio Club and of the Longhorn Amateur Radio Club; past secretary, Greater New Orleans Amateur Radio Club, Inc.; West Gulf DX Assn., Yasme Foundation and World Wide Propagation Assn.; holds DXCC; former section emergency communicator; member, Membership and Publications Committee.



Charles G. Compton, WØ-BUO, of St. Paul, Minn.; director of the Dakota Division since January 1, 1959; account representative, Data Systems, Inc.; was vice director, 1957–1959; past president St. Paul Radio Club; radio officer, St. Paul RACES; OPS, AREC, A-1 Operator Club; member, ARRL Executive Committee; chairman, Public Relations Committee; chairman, Ad Hoc Committee on Elections.

Dana E. Cartwright, W8-UPB, of Cincinnati, Ohio; director of the Great Lakes Division since January 1, 1960; retired as plant supervisor, Stearns and Foster Company; communications officer and maintenance engineer, Hamilton County (Ohio) Civil Defense; was radio advisor for Ohio Civil Defense for 10 years and Ohio SEC for 12; served as vice director 1958 to 1960; trustee of W8VVL and W8VND, Red Cross stations, and of K8YOJ connected with Civil Defense; serves on the Public Relations Committee.

Robert B. Thurston, W7-PGY, of Seattle, Washington; director of the Northwestern Division since January 1, 1965; telephone installer and repair man, U.S. Naval Air Station, Seattle; was vice director from 1961 to 1965; Washington SCM, 1958 to 1965; has held all offices in North Seattle Amateur Radio Club and is presently a trustee; has been a net manager and NCS, Air Force MARS; PAM, ORS, OPS, OO, AREC, A-1 Operator Club; licensed since 1951.

Philip E. Haller, W9HPG, of Chicago, Illinois; director of the Central Division since January 21, 1963; electronics engineer, Commonwealth Edison Co.; vice director, 1959–1963; past president and secretary, Chicago Radio Traffic Assn.; past vice president, Hamfesters Radio Club; past chairman and secretary, Chicago Area Radio Club Council; assistant radio officer, Chicago Civil Defense Corps; EC, OO, AREC; A-1 Operator Club; licensed in 1925 as 9ATG; member, Public Relations Committee.

FCC's Proposals For Incentive Licensing

On March 31, the Federal Communications Commission issued a Notice of Proposed Rule Making in Docket 15928 to upgrade the license structure in the amateur radio service. This action was responsive to eleven petitions on the general subject of incentive licensing, one (RM-499) by the League and ten others from individuals or groups.

The matter is discussed on our editorial page this month. Highlights of the proposed rules appear in the adjacent box. The entire text of the notice follows. Please read the editorial, study the proposals carefully, and then register your view with your ARRL director, preferably before the middle of May since the Board will meet on May 21 in Quebec.

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

In the Matter of	DOCKET NO. 15928
Amendment of the Amateur Radio Service Rules to provide for incentive licensing and distinctive call signs	RM-378, 455, 470, 474, 480, 481, 499, 516, 517, 538, 577

NOTICE OF PROPOSED RULE MAKING

By the Commission: Commissioner Loevinger absent.

1. The Commission has under consideration nine petitions proposing, to varying degrees, that special privileges be given to the holders of Amateur Extra Class licenses as an incentive for licensees to obtain this highest class of Amateur operator authorization. Many of the petitioners additionally propose that, as a stepping-stone to the Amateur Extra license, another higher class of operator license be created which would also carry special privileges as an inducement to its attainment. A number of the petitioners recommend changes in the procedure for assignment of station call signs to correspond to a new license structure.

Since we shall consider the call sign problem in this connection, we will also consider RM-470 and RM-474, petitions which are solely concerned with the call sign assignment procedures. The attached appendix lists the petitioners.

2. To support their proposals, the petitioners essentially contend that there is a need for a general improvement and "up-grading" of operations in the Amateur Radio Service which can best be fulfilled by establishing an "incentive licensing" program. They maintain that amateur operators will thereby be encouraged to self-improvement by qualifying for higher classes of licenses. The chief proponent of these views is the American Radio Relay League (ARRL), a national amateur radio organization with approximately 85,000 members. In its petition, RM-499, the ARRL states:

> "A most significant trend has developed in the last few years which has caused increasing concern to the League as to whether the basic purposes and objectives of the amateur radio service, particularly those relating to technical qualifications and proficiency, as set forth in subparagraphs (b), (c) and (d) of Section 12.0 [97.1] are being and may continue to be adequately achieved.
>
> This trend has arisen from two developments. . . .
>
> In 1951, the Commission after an extensive rule making proceeding in Docket No. 9295, adopted major changes in the amateur license structure. Both lower-level (Novice and Technician) and higher-level (Amateur Extra) classes were established with commensurate examination requirements. All frequency bands and all modes of operation were made available equally to the Amateur Extra, Advanced, General and Conditional Class. Although special privileges were contemplated by the Commission for the new Amateur Extra Class, none has yet been adopted. Thus, once an amateur has obtained his General or Conditional Class license he no longer has any practical or meaningful incentive to increase his technical knowledge and proficiency and earn a higher grade of license.
>
> The second development contributing to the trend is the development and availability of highly complex and efficient manufactured equipment, particularly single sideband suppressed carrier (s.s.b.) radiotelephone transmitters, receivers and transceivers. The design and construction of many equipments are so excellent and the operation is so simple that it no longer is necessary for an amateur using such equipment to have practical knowledge sufficient to construct his own equipment or to even fully understand the circuitry and theory of operation of the manufactured equipment. As a result, there has been little incentive for many amateurs, once licensed, to increase their technical knowledge and proficiency as contemplated by subsections (b), (c) and (d) of Section 12.0 [97.1] of the Commission's Rules."

3. A summary of the specific pertinent proposals in the petitions under consideration is as follows:

a. Six petitions (RM-455, 480, 499, 516, 517, 538) propose that the Advanced Class license, which has not been issued to new applicants since 1952, be again made available but as a new higher class of authorization with special privileges. Some of the petitioners would "grandfather-in" the present holders of the old Advanced Class license (about 40,000). While the suggestions vary as to the type of examination which would be required for this new Advanced Class license, they generally contemplate a difficulty level somewhere between that of the examinations for the General and Amateur Extra Class licenses.

b. RM-577 advocates that there be both an "Extra Phone" and "Extra CW" license, both licenses to be issued to present holders of the Amateur Extra Class license. Other persons could then apply for either or both licenses depending upon the type of operation desired.

c. With regard to the nature of the privileges for these higher classes of licenses, six petitions (RM-455, 480, 481, 499, 516, 517) propose the reservation of portions of high frequency (HF) telephone bands between 3.5 and 29.7 Mc/s. RM-455 would additionally reserve HF telegraphy segments for the Amateur Extra Class. RM-538 and 577 recommend reserved telephony and telegraphy sub-bands in all, or most, of the bands below 148 Mc/s for the Amateur Extra Class. Three petitions (RM-455, 499 and

A Résumé of FCC's Docket No. 15928 Proposals

License Class	Operating Privileges		Examples of Call Signs
	Effective 1 year after Adoption of Proposed Rules	2 years after Adoption	
Extra	Only Extra Class Licensees may operate in these segments		W1AA — if first licensed prior to July 1, 1932
	3500–3525	3500–3550	
	7000–7025	7000–7050	WA1AA — if first licensed after July 1, 1932
	14,000–14,025	14,000–14,050	
	21,000–21,025	21,000–21,050	
First Eligibility: Advanced, General or Conditional for one year. Exam: 16 w.p.m. code, written exam between General and Extra in difficulty	Only Extra and First Class licensees may operate in these segments		K1AA — if first licensed prior to July 1, 1932
	3800–3850	3800–3900	
	7200–7225	7200–7250	KA1AA — if first licensed after July 1, 1932
	14,200–14,235	14,200–14,275	
	21,250–21,300	21,250–21,350	
	50,000–50,100	50,000–50,250	
	144,000–144,500	144,000–145,000	
Advanced — no longer issued — renewed only as General Class	Same as General Class		
General	All privileges except those reserved to holders of the Extra and First Class licenses		W1AAA
Conditional	Same as General		WC1AAA, WD1AAA
Technicial	As at present		WT1AAA, WU1AAA
Novice (2-year term)	As at present, except no phone on 145-147 Mc.		KN1AAA

516) would leave the width of the present HF telephony sub-bands unchanged but available only to Advanced and Extra-Class operators while three others (RM-481, 517, 577) would expand the width of the telephony bands but reserve only portions thereof to the Advanced and Extra Class. Two petitions (RM-481 and RM-577) recommend that the reserved telephony segments be restricted to single side band or suppressed carrier emissions. RM-499 and RM-516 propose a staggered timetable for implementation of the reservation of the telephony bands.

d. RM-378 proposes that two-letter station call signs (call signs with a single letter prefix and a double letter suffix) be issued to holders of the Amateur Extra Class license. A number of the other petitions also recommend new call sign assignment procedures which relate to the "incentive licensing" program.

4. The proposals for an "incentive licensing" program have generated the largest number of comments and the greatest controversy in an amateur rule-making matter in many years. Nearly all of these comments are in response to RM-499, the ARRL petition. A large number of persons, about equally divided, merely approved or opposed RM-499. Of those who gave reasons for their opposition, only a very few apparently felt that an "incentive licensing" program was not desirable or was unnecessary. These persons either thought that amateur radio operations were presently satisfactory or that methods other than "incentive licensing," such as requiring an examination for license renewal, would cure any ills. Many objectors to the ARRL proposal stated that the reservation of frequency bands to higher class licensees to the extent advocated by the League would unduly encroach upon the operating privileges of the lower classes of licensees. They maintained that loss of these most desirable frequency bands would force licensees to acquire higher classes of licenses in order either to utilize their equipment or to enjoy the most rewarding aspects of amateur radio operation.

Endorsement of the ARRL position was received from many persons of widely diversified interest in the Amateur Radio Service.

a. From a retired former Chief Signal Officer of the Army:

"During the early years of my military career (the 1930's) whenever an individual who possessed a radio amateur license came to my attention I did my utmost to have the individual assigned to communications work. His license spoke well of his technical understanding and intense interest. During the latter part of my career (the last decade or so) such has not been my feeling. The license has generally meant 'Here is another hobbyist — maybe he has it and maybe he doesn't.' The license has lost its stature; it appears to be anybody's, just for the asking. . . ."

b. From the Bar Association Librarian of a large city:

"It does not disturb me that for a time I may be precluded from operating in certain bands until I have demonstrated that I am able to understand and therefore successfully negotiate more advanced requirements. May I say here that I do not believe the reliability of commercially produced equipment to be any excuse for ignorance in its operators.

I see every reason to believe that the amateur service would flourish under an incentive program. In this era of continuously pressed demands for

increased competence in every area of activity. I cannot see how amateur radio can prosper if it adheres to the comfortable ways of yesterday."

c. From the president of a leading electronics manufacturing company:

"A decade ago when a licensed radio amateur applied to the company for employment, mere possession of a 'ham ticket' was sufficient guarantee that the holder was technically competent, could read a schematic, had the capability to learn, and was capable of mature growth in the industry. Many of today's leaders in the electronics field advanced along this very path. Now, although the electronics industry is in chronic shortage of trained technicians and engineers, by and large, applicants for these jobs are not coming from the ranks of the radio amateur. Possession of a radio amateur license does not now mean that the holder is technically qualified in any sense. On the contrary, the Personnel Department of this Company has been continually disappointed with the quality, calibre and technical ability of holders of radio amateur licenses to such an extent that such individuals are subject to careful screening before they are considered for employment."

d. From a college engineering and technology educator:

"As a college instructor, we automatically assumed (and with good basis) that an engineering student who was also a radio amateur, would be a highly capable student willing and able to accept the loads and responsibilities of an engineering program. This idea to an even higher degree was present when the new student possessed a license of one of the more advanced classes. . . .

In contrast, today we in education almost prefer not to have our students come to us with amateur radio licenses. Typically, today's ham is concerned with contests and chatter and knows little or nothing of theory and construction. His approach to study and lab is hit-or-miss or the try-this-or-that approach. He appears never to have tried to understand the basis of electronics to say nothing of his equipment itself. He has probably never wired anything more complex than a cable or two and would not consider the modification or service of even his personal receiver. He simply wouldn't know how and is not really interested in it beyond its function of reception."

e. From the Communications director of a state Civil Defense department:

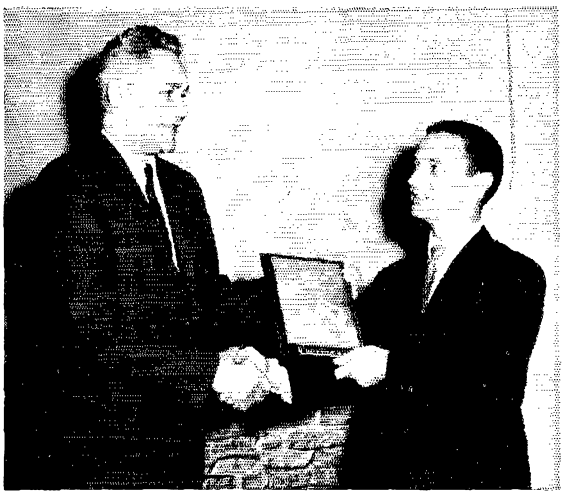
"The . . . Division of Civil Defense values very highly the service rendered to our organization by amateur radio operators through the Radio Amateur Civil Emergency Service. Without this Service our emergency communications would be severely handicapped. The reservoir of trained technicians, available within the amateur radio service, is of immeasurable value to the success of our civil defense program in (the State).

With this thought in mind, it is felt that any attempt to up-grade the amateur service will ultimately result in a higher grade of trained personnel which may be called upon in time of national emergency. . . . Therefore, I would like to recommend immediate adoption of the suggestions contained in their proposal, and further recommend a complete revision of the examination material with the view of increasing the scope of the examination as well as the degree of difficulty of the questions contained therein."

5. The Commission has carefully considered each of the subject petitions and the documents in response thereto in the light of its responsibilities under the Communications Act to regulate the use of the radio frequency spectrum in the public interest, convenience, and necessity. It is altogether clear that justification for the continued allocation to the Amateur Radio Service of a substantial portion of the spectrum in the face of incessant and important demands by other radio services can not be founded on anything other than a continuing movement of the Amateur Service toward the goals specified in Section 97.1* of the Amateur Rules. It is the Commission's opinion that revision of the present license operating privilege structure is an appropriate and desirable step to take at this time to insure such progress and place a proper emphasis upon the quality of the service as well as upon its mere numerical growth and activity. Accordingly, we propose to revise our rules to provide for higher classes of licenses with special privileges as an incentive to the general "up-grading" of licensees. We propose, additionally, to revise the privileges and term of the Novice Class license, to modify a basis of eligibility for the Conditional Class license, and to provide for distinctive station call signs. These latter proposals are all considered to be consistent with, and necessary to, an incentive licensing program.

It has been suggested in some of the comments that, although there is a need for improvement of licensee knowledge and proficiency in the Amateur Radio Service, rule changes are not appropriate since the licensees should adopt their own program for improvement. While, of course, self-initiative by licensees is vital, we can not agree that Commission action is inappropriate. Section 97.1(c) of the rules clearly contemplates the improvement of the Amateur Radio Service through rules which provide for

* "§ 97.1. Basis and purpose. The rules and regulations in this part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles: (a) Recognition and *enhancement* of the value of the amateur service to the public as a voluntary noncommercial communications service, particularly with respect to providing emergency communications. (b) Continuation and *extension* of the amateur's proven ability to contribute to the advancement the radio art. (c) Encouragement and *improvement* of the amateur radio service through rules which provide for advancing skills in both the communication and technical phases of the art. (d) *Expansion* of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts. (e) Continuation and *extension* of the amateur's unique ability to enhance international good will." (Italics supplied.)



Great Lakes Assistant Director Jack Siringer, W8AJW, (l.) presents a *QST* Cover Plaque Award to Ralph W. Burhans, W8FKC, for his article on "An I.F. Tracking Filter for Weak-Signal Reception," which appeared in the September issue of QST. Each month the League's Directors select the "best" article of the month. This is the second such award for W8FKC.

the advancement of skills in both the communication and technical phases of the radio art.

6. In consideration of the foregoing, the Commission proposes amendment of its Amateur Radio Service Rules as follows:

A — A new higher class of license to be designated the Amateur First Class license shall be created. Eligibility for this license shall be limited to an Advanced, General or Conditional Class licensee who has held such license for at least one year. Examinations for this license will be conducted at Commission Field Offices or examination points. Applicants will be required to pass a 16 word per minute code test and a written examination of a difficulty level between the General and Amateur Extra Class examinations.

B — Holders of either the Amateur Extra Class or the Amateur First Class license shall be exclusively entitled to utilize the frequency segments 3800–3850 kc/s, 7200–7225 kc/s, 14200–14235 kc/s, 21250–21300 kc/s, 50–50.1 Mc/s, and 144–144.5 Mc/s effective one year after adoption of these rule changes, and, 3800–3900 kc/s, 7200–7250 kc/s, 14200–14275 kc/s, 21250–21350 kc/s, 50–50.25 Mc/s, and 144–145 Mc/s effective two years after adoption of these rule changes.

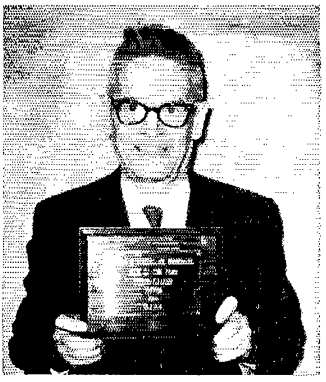
C — Holders of the Amateur Extra Class license shall be exclusively entitled to utilize the frequency segments 3500–3525 kc/s, 7000–7025 kc/s, 14000–14025 kc/s, and 21–21.025 Mc/s effective one year after adoption of these rule changes, and, 3500–3550 kc/s, 7000–7050 kc/s, 14000–14050 kc/s, and 21–21.050 Mc/s effective two years after the adoption of these rules changes.

D — The Advanced Class license shall no longer be renewed. Present holders of this license shall be issued the General Class license upon renewal. The basis for this proposal is that there no longer exists any valid distinction between the Advanced and General Class licenses as to the difficulty of the examination. Therefore, continued issuance of the Advanced Class license has become an unnecessary administrative burden and, under an incentive licensing program, would merely lead to confusion.

E — The Conditional Class license shall no longer be available to new applicants who claim eligibility solely by virtue of active duty in the military service. This proposal is consistent with the Commission's policy that, where feasible, applicants for higher classes of amateur licenses be examined by Commission personnel rather than by volunteer mail examiners. Of course, many military members will be able to establish their eligibility for the Conditional Class license under one of the other categories such as the distance basis or temporary overseas residence.

F — New holders of the Novice Class license shall be given a two year non-renewable license term in lieu of the present one year non-renewable term. This will afford Novice Class licensees a more reasonable period for the development of skills necessary to advancement to the higher classes of licenses.

G — Effective one year after adoption of these rules, telephony privileges for the Novice Class licensees in the frequency segment 145–147 Mc/s shall be deleted. Deletion of this privilege



The Mid-South Amateur Radio Association has chosen ARRL Vice Director Franklin Cassen, W4WBK as its "Ham of the Year" and has presented him with a handsome plaque attesting thereto.

is proposed because too many Novice Class licensees operate telephony equipment to the neglect of improvement of their telegraphy speed. One of the prime purposes of the Novice Class license is to prepare, through actual operating experience, for the higher classes of licenses which require increased code proficiency.

H — Each new amateur station shall be systematically assigned a distinctive call sign to denote the licensee's class of operator license.

This is necessary in order for our monitoring facilities to immediately determine whether a particular licensee is operating within the range of his privileges and whether a licensee is subject to re-examination of his qualifications.

The following schedule will be used for assignment of station call signs. Presently assigned call signs will be changed upon renewal or modification of the station license to conform with this schedule:

(1) Amateur Extra Class — the single letter prefix "W" and a double letter suffix, provided that the licensee submits evidence of having held an amateur station license issued by the United States Government prior to July 1, 1932 (e.g. W2AB); a double letter prefix beginning with the letter "W" and a double letter suffix (e.g. WA2AB),**

(2) Amateur First Class — the single letter prefix "K" and a double letter suffix, provided that the licensee submits evidence of having held an amateur station license issued by the United States Government prior to July 1, 1932 (e.g. K2AB); a double letter prefix beginning with the letter "K" and a double letter suffix (e.g. KA2AB);

(3) General (Advanced) — a single letter prefix and a three letter suffix (e.g. W2ABC);

(4) Conditional — the double letter prefix "WC" or "WD" and a three letter suffix (e.g. WC2ABC);

(5) Technician — the double letter prefix "WT" or "WU" and a three letter suffix (e.g. WT2ABC);

(6) Novice — the prefix KN and a three letter suffix (e.g. KN2ABC);

(7) The call signs of General (Advanced), Conditional or Technician Class licensees who currently hold a station call sign which has a single letter prefix and a double letter suffix will not be changed solely because of failure to qualify for an Amateur First or Extra Class license.

(8) Stations located in Alaska, Hawaii, Puerto

** Consideration will also be given to the assignment of call signs having a two-letter prefix and a one-letter suffix (e.g., WA2B).

Rico, and in United States possessions under Commission jurisdiction will be assigned special double letter prefixes to show their specific locations followed by a double or triple letter suffix which will, where feasible, indicate the class of operator license.

I — Assignment of station call signs shall be in accordance with the foregoing schedule with only the following exceptions:

(1) A specific unassigned call sign may be reassigned to a previous holder thereof provided that it is appropriate to the class of operator license currently held by the station licensee;

(2) A specific unassigned call sign may be assigned to an amateur organization in memoriam to a deceased member and former holder thereof provided that it is appropriate to the class of operator license currently held by the station trustee;

(3) A specific unassigned call sign may be temporarily assigned to a station connected with an event, or events, of general public interest provided that it is appropriate to the class of operator license currently held by the station trustee or licensee.

7. It is the Commission's belief that these proposed amendments reflect a realistic solution to the need for an immediate and effective incentive licensing program in the Amateur Radio Service as advocated by most of the petitioners. To the extent that the particulars of any of the petitions involved are at variance with these proposals, they should be considered as having been denied. However, this does not preclude, and the Commission hereby encourages, the submission of new counter-suggestions for consideration. Comments are particularly invited as to: (1) the utility and interest in continuing the Amateur Extra Class of license in the light of the proposal to establish an Amateur First Class license and the possibility that the reserved frequencies associated with the Amateur Extra Class may not be fully occupied; (2) the width and the placement of the various reserved frequency segments for each class of license in each band.

8. These proposed amendments are issued pursuant to the authority contained in Section 4(i) and 303 of the Communications Act of 1934, as amended.

9. Pursuant to applicable procedures set forth in Section 1.415 of the Commission's Rules, interested persons may file comments on or before July 15, 1965 and reply comments on or before July 30, 1965.

All relevant and timely comments will be considered by the Commission before final action is taken in this proceeding. In reaching its decision, the Commission may also take in account other relevant information before it, in addition to the specific comments invited by this Notice.

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

FEDERAL COMMUNICATIONS COMMISSION

BEN F. WAPLE
Secretary

Adopted: March 31, 1965

Appendix

PETITIONS INVOLVED IN THIS PROCEEDING

Petition No.	*Date Filed*	*Petitioners*
378	Nov. 5, 1962	Chester L. Smith Bedford, Massachusetts
455	June 5, 1963	Roy R. Cone Chicago, Illinois
470	Aug. 9, 1963	Walter A. May, Jr., Simon Kahn, Stanford G. Houghton, Stephen M. Newmark Los Angeles, California
474	Aug. 26, 1963	Alex S. Labounsky Oyster Bay, New York
480 and 481	Sept. 11, 1963	Ellen W. Ackerman Panama City, Florida
499	Oct. 3, 1963	American Radio Relay League Newington, Connecticut
516	Oct. 28, 1963	George H. Goldstone Bloomfield Hills, Michigan
517	Oct. 28, 1963	Lowell E. White Elmwood Park, Illinois
538	Nov. 22, 1963	Leland W. Aurick, George S. Gadbois Columbia, Pennsylvania
577	Mar. 3, 1964	Wayne Green, Peterborough, New Hampshire

FEE ADJUSTMENTS PROPOSED

The FCC has recently released a Notice of Proposed Rulemaking in Docket 15881, looking toward minor changes in the fees it assesses applicants for its various licenses. In the amateur field, the only proposal is to exempt foreign licensees from fees for permits based on reciprocal licensing.

The ARRL Executive Committee will examine the matter at a meeting scheduled for April 5, too late for inclusion of a report in this issue. The original deadline for filing comment in the usual original and fourteen copies was set at April 30. Extensions are likely in general-interest matters of this type.

RECIPROCAL OPERATING

Bolivia became the third country to sign a reciprocal operating agreement with the U. S. under authority of Public Law 88-313. The new agreement is effective as of April 14. Previous agreements are with Costa Rica and the Dominican Republic; there is also, of course, the separate treaty with Canada, which continues in force.

The United Kingdom moved closer to reciprocity recently when the Postmaster General, responding to a question in Parliament, said he would be willing to grant licenses to amateurs who are citizens of other countries on the basis of reciprocity.

Meanwhile, negotiations continue with some twenty countries. Successes will be announced on regular W1AW schedules as they occur, and will be reported in the Happenings of the Month section of the next available *QST*.

TELEPHONE FRAUD BILLS

Various companies of the Bell System have asked for the introduction into state legislatures of bills which would make unlawful the manufacture, sale, possession and/or use of devices by which long-distance calls can fraudulently be made without being recorded by the automatic auditing equipment of the telephone companies. The bill is known to have appeared in the Colorado, Oklahoma and Wyoming legislatures.

Concern has been expressed by amateurs that the bill might be construed by overzealous or biased law enforcement officials to apply to

traffic-handling efforts of radio amateurs. The *League's General Counsel is in touch with Bell* System officials on the national level to insure that the bill will not be interpreted in this light. However, it would be in the best interests of all if amateurs would check to see whether such legislation has been introduced into the legislature of each state and report the language of any such bills to the General Counsel, Robert M. Booth, Jr., W3PS, 1100 Vermont Avenue N.W., Washington, D.C. 20005.

ARREST FOR OBSCENE LANGUAGE

Careful teamwork and close cooperation between monitoring personnel of the Federal Communications Commission and agents of the Federal Bureau of Investigation has resulted in the arrest on March 8 of a licensed amateur operator in Ohio. Since January 21, 1965, FCC and MARS officials have been deluged with complaints of an unidentified station transmitting obscenities by c.w. and phone, directed against President Johnson, the Department of State, the Central Intelligence Agency and the FCC. Most of the operation took place on MARS frequencies according to the government news release.

Monitors of FCC's Field Engineering Bureau, once given the green light, quickly located the source of the offending transmission. Evidence was collected by the FBI, with the help of a search warrant issued by the U. S. Attorney's Office at Columbus. The FBI release stated that the amateur was actually transmitting obscenities when arrested. Conviction could bring a maximum penalty of two years in prison and/or $10,000 fine.

AFCEA CONVENTION AND K4NAA

The 19th Annual Convention of the Armed Forces Communications and Electronics Association will be held May 25–27, 1965 at The Sheraton Park Hotel in Washington, D. C. One of the features will be operation of the Navy ham station K4NAA from the hotel on a round-the-clock basis. Guest operators from among convention delegates and visitors are welcome; such persons should not forget to have the original copy of the present ham license on their persons, as required by FCC regulations.

Among the distinguished speakers will be Dr. Thomas P. Cheatham, Jr., Deputy Director of Defense Research and Engineering for Tactical Warfare Programs; Brigadier General David Sarnoff, RCA's Chairman of the Board; and Lieutenant General Alfred D. Starbird, U.S.A., Director of the Defense Communications Agency.

NEW COMMISSIONER OF FCC

James J. Wadsworth, former U. S. Ambassador to the United Nations, on March 25 was nominated by President Johnson to be a Commissioner on the Federal Communications Commission. Mr. Wadsworth, 59 and a Republican, fills the vacancy existing since year end, when Frederick W. Ford resigned to become president of the National Community Television Association. Mr. Wadsworth has a wide background in international affairs and disarmament matters; Washington sources regard his appointment as "top drawer" even though his experience has been in the field of diplomacy rather than communications. The Senate is expected to confirm the appointment soon after hearings scheduled for April 13.

(In earlier speculation, one of several names published as "under active consideration" was that of Seymour N. Siegel, W2NEM, director of the New York City broadcasting stations, WNYC-AM-FM-TV.)

A.R.R.L. QSL BUREAU

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

W1, K1, WA1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass. 01247.
W2, K2, WA2, WB2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J. 07720.
W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 204, Chalfont, Pa. 18914.
W4, K4, WA4 — Thomas M. Moss, W4HYW, Box 20644, Municipal Airport Branch, Atlanta, Ga. 30320.
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, Calif. 92106.
W7, K7, WA7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon 97301.
W8, K8, WA8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland, Ohio 44110.
W9, K9, WA9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois 60128.
WØ, KØ, WAØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn. 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, Ont.
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, B. C.
VE8 — George T. Kondo, VE8RX, % 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 — Douglas B. Ritcey, Dept. of Transport, Goose Bay, Labrador.
KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, P.R.
KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701.
KL7 — Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska.
KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.
(Cards for SWLs may be handled via Leroy Waite, 39 Hanum St., Ballston Spa, N. Y.)

What ARRL Means to Me

BY LOUISE RAMSEY MOREAU,* WB6BBO/W3WRE

During its 50th anniversary year of 1964, the League conducted a Golden Anniversary Essay Contest on the subject which titles this article. Ardent traffic enthusiast W B6BBO's entry won honorable mention. Subsequent issues will carry other winning essays.

WHAT ARRL means to me is not easily put into words. The crystallization of the meaning into a single definition leaves me much in the same position as I was in elementary school when I was assigned to write an essay on "My Father." It was difficult because these feelings and thoughts are beyond everyday phrases.

As a beginner, a Novice, the League meant a sense of *belonging* . . . of being inside the magic circle that is Amateur Radio, and one of the family. It meant tangibles: the blue Rag Chewers' Certificate, and the possibilities of more evidence of what I had done. The smooth, even rhythm of code practice four nights a week, and the put-up-or-shut-up moment just before a qualifying run. It meant *Handbooks*, and other aids to assist me in building my station: and it also meant the friendly hand of the *License Manual* under my elbow, to help me face the General Class exam.

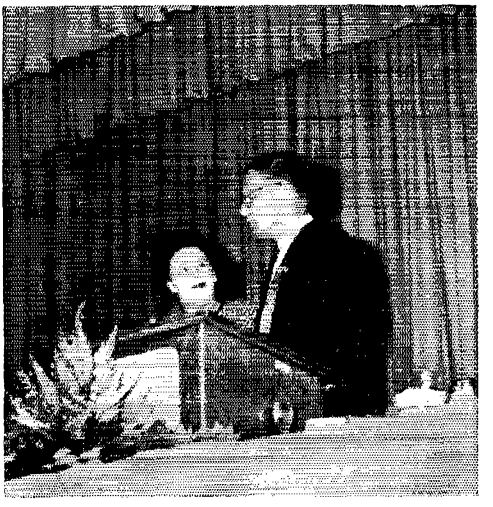
When I lost my "N" the League suddenly meant intangibles, more than tangibles, as I became an AREC member and began to participate in the weekly drills. It meant not only belonging and being a part of things but, with my first actual disaster experience, it put a meaning into the words so often read in the newspapers: "The only contact this area has with the outside world is through the ham radio operators." With that first experience in emergency operation, ARRL meant helping others who needed it. It meant the long, silent hours of keeping watch on the local net frequency in case there should be a call for aid. It meant messages, telling of damages, and needs relayed into the long-haul circuits, followed by more regarding the personal welfare of people involved. It meant anxious inquiries into the area from friends and families on the outside, and it meant a warm feeling of accomplishment when the EC thanked us and told us to secure our stations. No certificate could possibly match the "well done" given to all of us at the end.

That first emergency made me curious about those messages that I relayed and how they got to their destination and, ever since that time, ARRL has meant one thing: traffic. To me ARRL means the nightly activation of the National Traffic System, from the first single call of the Section NCS as he starts the wheels rolling for the entire system. It means sharp, high-pitched c.w., the slow, uncertain fists of the beginners, stumbling a bit over the as-yet unfamiliar symbols and abbreviations that are the language of the nets, and the rapid rhythm of the more experienced members, who willingly slow their speed and help the newcomer through the almost baffling argot and techniques, until he is able to walk alone. It means an ever-widening circle of c.w. flowing outward into the various levels, picking up speed as it reaches Region, then Area, and TCC; and decreasing as the process reverses itself back to Section.

Here, ARRL means the nightly story of people being people. It is: Greetings from the fair; happy birthday; and many thanks for your hospitality. It means: Aunt Annabelle is sick; congratulations on your new job; or, Bill and I were married on the 12th. It means: It's a boy!; Merry Christmas; and a greeting to, or from, a Serviceman at some far-off base. It's traffic, the pleasure of greeting someone they know by a radiogram with a text as personal as the sender's voice. Also it is the heritage of 120 years of brasspounding history, for the traffic fraternity are the last of the telegraphers in message work.

All of this is preparation and training for the time when we join forces with the AREC to lend our skills and equipment, so that someone, worried about friends or family, can reach out and, through us, touch those whom they love when

(*Continued on page 170*)



Louise Moreau, WB6BBO, receives her honorable-mention award, an engraved desk pen set, from ARRL's W1LVQ at the 1964 Southwestern Division Convention, Palm Springs, Calif.

* 2084½ Lewis Ave., Altadena, Calif.

Complete the Drive in Sixty-Five!

Who will be the lucky seventh?

Six ARRL divisions have made at least 100% of their assigned Building Fund quota, but four others are only a few percentage points behind. The six divisions which have oversubscribed are:

Canada	**New England**
Dakota	**Pacific**
Hudson	**Rocky Mountain**

Right behind these six leaders we have:

Northwestern	Southwestern
Roanoke	Central

It is so close that the members of the Northwestern Division need contribute only $232 to put themselves in the black (with, of course, the customary help from matching funds). The Roanoke Division is close behind, needing only $332 to go over the top. The Southwestern and Central Division are also strong contenders, for although they need quite a few more dollars, they have a large number of members to call on.

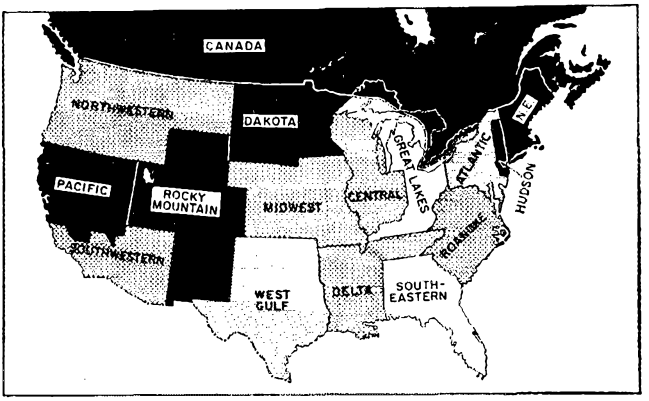
Here are the percentage standings of those divisions which have not yet reached the 100% mark:

Northwestern	94.2	Delta	81.7
Roanoke	91.7	West Gulf	78.1
Southwestern	86.9	Atlantic	66.7
Central	86.5	Southeastern	58.5
Midwest	84.3	Great Lakes	57.6

Don't forget that every dollar you contribute to the Building Fund is matched by a dollar from a special fund which was established by a group of men in business who feel that much of their success can be traced back to their initial enthusiasm in amateur radio.

Who will be the lucky seventh?

Solid black indicates 100% of quota; double cross-hatching 80–100%; single cross-hatching 60–80%, no cross-hatching below 60%.



Members Are Saying . . .

It really makes me proud to know that I am part of the ARRL after all it has done for me and every other ham. I only hope that, like myself, other habitual procrastinators will quit stalling and contribute to the Building Fund. — *W12YZF*

The ARRL drive is the only one in my memory which has made no effort to "dun" potential contributors by mail or solicitor. This alone should impress some of your members. Even if your solicitation had been most aggressive, however, I know of no agency or organization which has a better right to expect my contribution, as well as that of every other ham in this country. — *W1FTM*

Please accept enclosed check as a subscription to the Building Fund. Please give appropriate credit to Roanoke Division. — *W4III*

After thirty-five years of hamming, I can't think of another organization or group that has done as much for us as the ARRL. I'm pleased to have the opportunity to contribute to its future success. — *W7BAC*

As an old-time ham I know that if we didn't have the ARRL there would not be any ham radio today. I don't care how many soreheads get mad. Keep up the good work. As for incentive licensing, I'm for it. In fact, I would make everyone take a new exam the next time their licenses expire. — *W2OO*

Good luck on your drive to finish in sixty-five! — *W1ØGCO*

The enclosed is for the Building Fund. Thank you for the help given to me through your organization. — *K2VGV*

My sincere thanks for your excellent attention to my favorite hobby. You have my 100% support. — *K8ZLO*

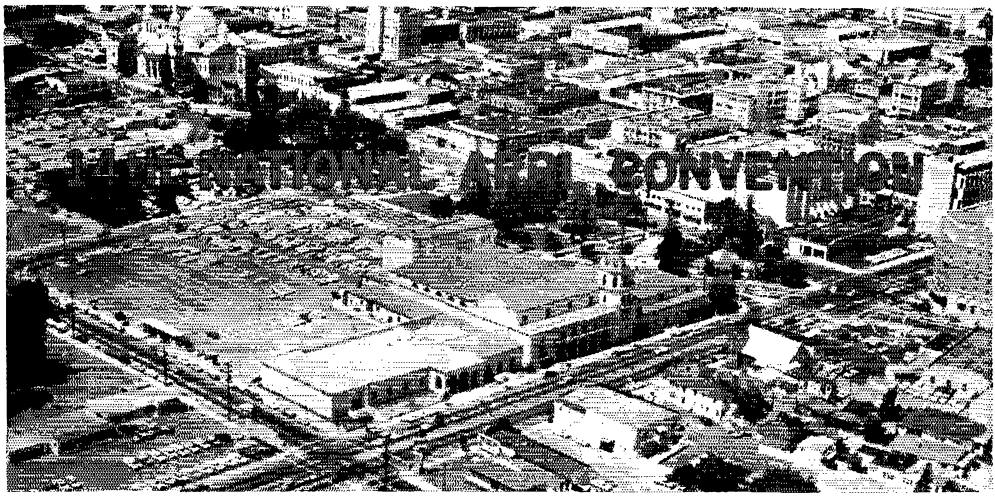
Please dedicate the attached Building Fund contribution to the memory of Bob Peck, W9MOW, a gentleman and a ham's ham. — *WØIIV*

I enclose a contribution for the Building Fund. I am sorry that my division has not done as well as it ought to so this will make it look a bit better. This is my second contribution. — *K8KEB*

I am enclosing check for Building Fund and I hope to be able to send some more a little later. I think that the League is doing a good job and I am for you 100% in what you are doing. — *W5DPN*

May this new building stand forever as a monument not to only the greatest hobby on earth, but also as a symbol of freedom and personal enterprise. — *W8VDR*.

I notice the Delta Division is lagging behind on its quota for our new building. I enclose my second check herewith, and "push" the Delta Division up higher on the antenna tower and hope we'll soon have that $250,000 "beam" loaded up! — *W5FGO*



The convention site, with San Jose Civic Auditorium and McCabe Convention Hall in the foreground, and the Hotel Sainte Claire at the right edge of the picture.

San Jose, California——July 2-5, 1965

BY JEAN A. GMELIN,* W6ZRJ

THE Convention of the Decade is the key phrase describing the 1965 14th ARRL National Convention set for the Hotel Sainte Claire, San Jose, California, Friday through Monday, July 2, 3, 4 and 5. Four action-packed days have been planned by the Associated Radio Clubs of Greater San Jose, with a program including several simultaneous technical and operational talks by leading amateurs and radio-electronics experts. Frank Glass, W6MVL, Convention Chairman, points out that the event celebrates the first year of ARRL's second half century.

The convention will have something for the newcomer and old timer alike; c.w., RTTY, amateur TV, s.s.b., DX, traffic, a.m., v.h.f., repeaters, YL and XYL activities and many other facets of amateur radio.

Technical Talks

The convention program, coordinated by Hal Whitfield, WA6HVN, will include two phases, technical and operational, both running simultaneously. Technical program chairman, Ken Holladay, K6HCP, has set up talks in the areas of antenna design and operations, s.s.b. generators, design of 90% efficient finals, miniature circuit techniques, design of amateur satellites, amateur satellite tracking, operation and design of transistor circuits, techniques for the beginning amateur, DX operations, and RTTY operations and design.

A special v.h.f.-u.h.f. series of presentations and activities has also been scheduled including talks by *QST* V.h.f. Editor Edward P. Tilton, W1HDQ, on design of v.h.f. equipment, use of solid state equipment in v.h.f. work, new designs in v.h.f./u.h.f. gear, a special 432-Mc. antenna-measuring session on "how to get the most out of your v.h.f. antenna" and a session on moon-bounce work.

Operating Program

The operational activities and ARRL portions of the program include both NTS and independent traffic operations: meetings of station appointees, featuring Ed Handy, W1BDI, ARRL Communications Manager; AREC, with George Hart, W1NJM, National Emergency Coordinator; a special series of meetings on frequency measurement and Official Observer work open to all interested amateurs; DX operations; and RTTY traffic work. The ARRL Open Forum will be a two-hour convention kickoff session, with a report on the status of amateur radio and the ARRL by President Herbert Hoover, Jr., W6ZH, and General Manager John Huntoon, W1LVQ; ARRL General Counsel Robert M. Booth, Jr., W3PS, will be present to answer legal questions on such matters as tower construction and TVI responsibility.

During all four days of the convention, exhibits by leading manufacturers, local distributors and representatives will be open, showing latest equipment and materials available to the amateur. Special rooms and booths for ARRL, traffic and net operations, antique wireless equipment, DX and QSL exhibits, code proficiency and code practice will also be at hand.

FCC representatives will conduct amateur examinations for the General and Extra Classes. A code speed championship will be conducted, both in sending and receiving, as well as an RTTY sending contest.

* Vice-chairman, Convention Committee.

What You Need to Know

When: Friday through Monday, July 2, 3, 4 and 5.
Where: Hotel Sainte Claire, San Jose, California
What: 14th National ARRL Convention
Registration: Pre-registration deadline: June 1, 1965. Regular registration starts noon July 2.
Accommodations: Convention Hotel Ste. Claire, with singles, doubles and twins available, or your choice of any of two dozen fine motels in the San Jose area. For information on accommodations or registrations write ARCs, P.O. Box 6, San Jose, California 95103.
Cost: General registration fee of $9.50 covers the main convention banquet and all regular convention meetings and events. Luncheons and breakfasts at special low convention rates will be extra.
Further Details, Write: ARCs, P.O. Box 6, San Jose, California 95103

CONVENTION FEATURES AND SPECIAL EVENTS

Contests: Code speed, homebrew construction, mobile judging, hidden transmitter hunts, special contests for YLs and XYLs.
Equipment Exhibit: The latest in design and operation of amateur gear, special ARRL booth, RTTY room, traffic and net room, DX room, antique wireless room and exhibit.
QSL Display: Send your QSL with your pre-registration for exhibit on the pre-registration QSL board, or bring your card along for the general board.
Operating Convention Station: W6UW will guide in mobiles and make general contacts. Contact the convention station to receive a special W6UW 14th ARRL National Convention QSL.
Sight-seeing Tours: Women's special convention tour of the "Valley of Heart's Delight"; see the world famous Winchester Mystery House, a real California wine cellar, an authentic California mission. Register early to be sure you are included.
Noise Figure Measurement Display: A display showing the latest techniques of measuring noise figures of receivers, open for conventioneers to measure the noise figures of their own equipment. Bring your gear and make checks on noise figures and learn new techniques of improving this important factor in receiving equipment.
Golf Tournament: Interested amateurs are invited to take part in the National Convention Golf Tournament to be held on Friday afternoon on a scenic Santa Clara Valley fairway, with a special 14th National Convention trophy for the winner. Please note that reservations for tournament space should be in to the Golf Tournament Chairman as early as possible in order to line up premium space. If you would like to take part, write a special note to Golf Chairman, ARCs, P.O. Box 6, San Jose, California 95103.

The MARS groups (Army, Navy and Air Force) will hold special meetings and will man a special exhibit and sign-up room, as well as an equipment swap session. Amateurs are also invited to bring gear to be judged in a home-brew equipment contest; the top ten pieces will be on special exhibit and prizes will be given to the winners.

A special feature of the convention will be an initial report on Oscar III operations and achievements by the Oscar Association of Los Altos. It is hoped that special tours of the Oscar Headquarters facility and W6EE, on the campus of Foothill College, can also be arranged. Actual Oscar III test hardware will be on display at the convention and Oscar personnel will be present to discuss the project with interested amateurs.

1965 ARRL National Convention General Chairman Frank Glass, W6MVL.

Ladies Activities

Among the many activities planned for the ladies, both the amateur and the non-amateur, will be a free bus tour of the Santa Clara Valley, seeing such places of interest as the Winchester Mystery House and the famous San Jose Rose Gardens, champagne tasting at the world-renowned Paul Masson Champagne Cellar, a tour of historic Mission Santa Clara and the University of Santa Clara, a brief look at the Rosicrucian Museum and luncheon at a hilltop restaurant commanding a magnificent view of the Valley. In order to have adequate bus transportation available, it will be necessary to know by Friday night the number of ladies attending this event, which will take place on Saturday, July 3, beginning at 10:00 A.M. The bus tour will, of necessity, be limited to 300 women and the luncheon to 400 women, so it is urgent that the ladies indicate their interest in these activities at the time of pre-registration for the convention. Other ladies' events will include the traditional SWOOP party; ladies' breakfast on Sunday morning; a Saturday morning YLRL breakfast; YLRL Forum, moderated by Martha Edwards, W6QYL, YLRL President; and demonstrations and talks throughout the week-end in the large, comfortable Hospitality Room where the ladies will be able to

relax, read, watch color television, visit with new friends and renew old acquaintances over a fresh cup of coffee. Many lovely gift items have been selected for the ladies in addition to the contest awards. There will be detailed information on bus routes and easy auto transportation to other points of interest in the city, such as shopping centers, museums and art galleries. Chairman for the ladies' program is Carolyn Gmelin, K6BGM, ably assisted by Bernie Beck, WA6QQH, and members of the BAYLARC. Ladies interested in further information or in suggesting additional activities may write to Caroline in care of the Associated Radio Clubs of Greater San Jose, P.O. Box 6, San Jose.

General Convention Highlights

Friday, July 2, will be the Convention "prep" day and will include an amateur radio golf tournament, special meetings of nets, clubs and MARS groups and various dinner meetings. Any group wishing a dinner meeting that evening should contact the convention committee before June 1.

Bernie Beck, WA6QQH, assistant ladies' chairman (on the left) and Caroline Gmelin, K6BGM, ladies' chairman.

A dance, featuring a live orchestra, will be held Saturday night from 8 P.M. to 2 A.M. and the traditional Royal Order of the Wouff Hong initiation ceremony (with the famous Oakland Radio Club live presentation) will be held at the witching hour.

Breakfasts on Sunday morning will be held for special interest groups, including traffic, QCWA, RTTY, v.h.f., DX Clubs, s.s.b. and others. Speakers will be available to discuss topics of special interest. Hidden transmitter hunts and mobile judging competitions will also be held Sunday morning; there will be judging of both commercial and home-brew installations.

A highlight of the Convention will be the Western Style steak barbecue, Sunday afternoon, with a 12-ounce New York cut steak, plus all the trimmings, cooked on the spot and served by superb "western" chefs. The dinner will be followed by comments on the status of amateur radio by such notables as William S. Grenfell,

Mission Santa Clara at the University of Santa Clara, a main stop on the ladies' tour.

W4GF, Chief of the Rules and Standards Branch of FCC; ARRL President Herbert Hoover, Jr., W6ZH, and ARRL General Manager John Huntoon, W1LVQ. The usual amateur radio contests and competitions will be held with exceptionally good prizes being offered to the winners this year. Awards will be given out in the barbecue.

Monday morning's program will feature a special general convention breakfast, with President Hoover officiating, and "the amateur and public service" as the main topic of discussion. At this time, President Hoover, with the aid of Headquarters personnel, will outline plans and suggestions for the implementation of the ARRL Board of Directors' policy for public service and the new Amateur Radio Public Service Corps.

Registration

Cost of the convention has been arranged to

The convention committee at work; seated left to right: Robert Buell, WA6VWI, secretary; Jean Gmelin, W6ZRJ, vice-chairman; and ARRL Pacific Division Director Harry Engwicht, W6HC. Standing: Herb Brasch, WA6YDF, publicity; Bill Walters, W6MKE, registrations; Frank Mabie, WA6KCY, banquet; Hal Whitfield, WA6HVN, program coordinator; Ken Holladay, K6HCP, technical program; Bob Sheets, WA6YLC, ticket information.

take advantage of convention rates wherever possible. Convention Headquarters, the Hotel Sainte Claire, has set aside rooms for convention participants and will include all normal facilities, plus the use of the hotel's "sauna" for all convention participants, whether registered at the hotel or not. Ste. Claire rates: singles, $8.50; doubles, $10.50; king-size singles, $10.50; king-size doubles, $13.00; twins same as king size; parlors (sleeping rooms which make up into parlors), same price as king-size.

Those planning to attend the convention and stay at the Sainte Claire are advised to make reservations early, as space may be limited. For those who prefer drive-in accommodations, there are a large number of fine motels in the area.

W6UW, official convention station, will be in operation during most of the weekend, starting at noon Friday, July 2, on phone, on 3995 kc., 7225 kc. and 145.35 Mc. For latest convention information, amateurs are invited to copy W6ZRJ at 0230 GMT on 3590 kc., Tuesdays, Thursdays and Saturdays; W6UW, Wednesdays at 0400 on 3815 kc., s.s.b.; and W6PIY Saturdays at 0400 on 3905 kc. s.s.b.

"This will be the Convention of the Decade, and no effort has been spared to make this affair one of the most memorable in amateur history," according to Pacific Division Director Harry Engwicht, W6HC, whose encouragement and efforts brought the National to San Jose for the first time. San Jose, the Garden City, in the beautiful Santa Clara Valley, Valley of Heart's Delight, welcomes you.

Tentative General Program

Friday, July 2

Afternoon: Convention activities begin. Registration.
1965 National Convention Golf Tournament at La Rinconada Country Club, Los Gatos, California

Evening: Special interest group dinners, MARS dinner, net dinners.

Saturday, July 3

Morning: ARRL Open Forum, President Herbert Hoover, Jr., W6ZH, General Manager John Huntoon, W1LVQ, and other League officials.
YLRL Breakfast, under auspices of BAYLARCs.
Ladies' bus tour of the Santa Clara Valley, "Valley of Heart's Delight."

Afternoon: TECHNICAL PROGRAM

"The World Above 50 Mc., Past, Present and Future," Edward P. Tilton, W1HDQ, V.h.f. Editor, *QST*.
"Applications of Low Cost Semi-Conductors in Amateur Radio," D. E. Schliebus, K1DIT, Fairchild Semi-Conductor.
"Oscar-Amateur Space Communications, A Report," the Oscar Association.
"Amateur TV," Alf Modine, K6TWF, Chairman.
"50 Years of Technical Progress," George Grammer, W1DF, Technical Editor, *QST*.
"An Amateur RTTY Session," Northern California Amateur Teletypewriter Society.
"Antenna Matching Techniques," U1IF Radio Society, W6GD.
"Noise Figure Measurements," William Orr, W6SAI, Eimac Corp.
"A New High Efficiency Amplifier Circuit," Harold Vance, K2FF, RCA.

OPERATIONAL PROGRAM

League Officials meeting, for SCM, SEC, Assistant SCM, RM, PAM, EC, Assistant EC and others, including NTS officials. Ed Handy, W1BDI, ARRL Communications Manager.
Traffic and Net Panel Meeting; George Hart, W1NJM, National Emergency Coordinator.

LADIES' PROGRAM

Continuation of bus tour and luncheon at Villa Felice.
Ladies Hospitality Room and Lounge open during convention activities.
SWOOP Party, conducted by Ester Given and the BAYLARCs of San Francisco.

Evening: ARRL National Convention Dance in the Main Ballroom.
Wouff Hong Initiation at midnight.

Sunday, July 4

Morning: Special Interest Group Breakfasts:
Traffic
V.h.f.
DX
RTTY
QCWA
S.s.b.
General Interest
All Ladies

Afternoon: TECHNICAL PROGRAM

"What Ground?" Robert L. Ruyle, WØFCH, Hy-Gain.
"FCC Program," William S. Grenfell, W4GF, Chief, Rules and Standards Branch, FCC.
"QRM and Its Possible Elimination," John R. Hunt, WØJAY, Galaxy Electronics.
"Moonbounce," Taylor Howard, W6UGL, Stanford University.
"What Can be Worked on VHF?" Alan T. Margot, W6FZA.
"New Developments Affecting Amateur Radio," Chuck Carney, WØGDJ, Collins Radio.
"Weak Signal Detection," Hank Olson, W6GXN.

OPERATIONAL PROGRAM

"A General ARPSC Meeting," F. E. Handy, W1BDI, Communications Manager and George Hart, W1NJM, National Emergency Coordinator.
"Official Observer and Frequency Measuring Program"
Part I: "Precise Frequency Measurements," Tom Lott, VE2AGF/W6.
Part II: "The Status of the OO Program for Amateur Radio," F. E. Handy, W1BDI.

LADIES' PROGRAM

YLRL Forum, conducted by Martha Edwards, W6QYL, President YLRL.
"A Day in the Life of a Florist," Mrs. W. S. Nelson.
"Art Projects in Glass and Wood and Artificial Flowers," Mrs. Dodie Paschke.

Late Afternoon and Evening:

Main Banquet/Barbecue, awards, introductions, comments by League officials and guests.

Monday, July 5

Morning: General Breakfast and presentation, "The Amateur and Public Service," Herbert Hoover, Jr., W6ZH, President, ARRL.
Antenna Measuring Party
Transmitter Hunts
Mobile Judging
Bus transportation to Frontier Village and/or Happy Hollow for the ladies with children.

Afternoon: General ARRL Communications Department meeting, a report on the status of the Communications Department, F. E. Handy, W1BDI.

QST

Oscar III Orbits the Earth!

World-wide Two-Meter DX Records Established

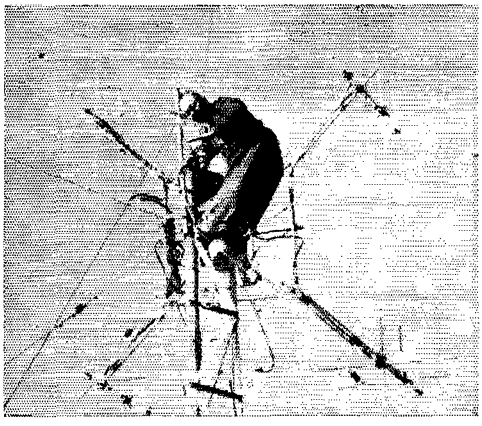
BY WILLIAM I. ORR,* W6SAI

The band resembled 20 meters during a weekend contest . . . frantic calls . . . pile-ups . . . QRM . . . calls partially heard . . . QRZ? . . . bedlam! But it was not a contest in the usual sense of the word, and it was not 20 meters. This was March, 1965 and it was 2 meters, not 20 meters at all! Oscar III, the home-made radio amateur repeater satellite was in orbit about the earth, intercepting 2 meter signals from earth-bound radio amateurs, amplifying the signals instantaneously, and flinging them back to earth, as the amazing 36-pound electronics package spun about the globe in its 103-minute orbit. Yes, amateur radio had indeed entered an exciting new era of v.h.f. communication techniques and achievements! The first page of the book of events had barely been enscribed. Trans-oceanic reception and two-way QSO's had smashed a formidable v.h.f. barrier for a fortunate few. New states and call areas had been gained by many via the satellite. Would Oscar III leave a lasting effect on the 50-year tradition of amateur radio's record of performance and discovery? The outlook seemed hopeful . . . the prognosis was good . . . and Oscar III was working!

OVER five years of intensive work lay behind the group of radio amateurs, intently huddled about the racks of v.h.f. tracking equipment, recorders, transmitters and receivers. Two and one-half years of planning and more than eight thousand hours of design and assembly time on the satellite had finally been completed. The goal was always bright through the years, but the path had been dim and obscure, full of unexpected twistings, turnings and unwanted diversions. This effort was now clearly in the past. No more could be done. All that was left ahead was to wait . . . perhaps the hardest task of all . . . to wait for that precise moment in time when all would succeed or fail in an instant, far away in outer space.

The room was silent except for the hissing background noise of the tracking receiver tuned to the beacon frequency. Once the satellite had achieved orbit, if all went well, the beacon would signal success . . . and the beacon signal was expected about now . . . now . . . the amateurs virtually stopped breathing as the second hand of the GMT clock slowly swept across the anticipated time of acquisition. It should be right now . . . now. . . .

* Project Oscar, Inc., Foothill College, Los Altos Hills, Calif.



Up goes the 4-bay tracking antenna at W6EE. W6ASH balances atop the 30-foot tracking tower on the roof of the Project Oscar building. The cross-polarized array is rotatable and movable in elevation.

Oscar III in Orbit

The drama evolved slowly and quietly at first. Oscar III was ejected from the parent research and development vehicle of the U.S. Air Force somewhere over Alaska, it had been estimated, leisurely arcing away from the larger satellite into its own 103-minute, 570-statute mile circular orbit, inclined at an angle of 70 degrees. As the radio amateur satellite was released from the carrier, its battery supply was activated and the four whip-like antennas sprang erect. Oscar III was in business, ready to repeat back to earth amateur signals it received on the 2-meter band!

Shortly after ejection was effected, the 145.85 Mc. telemetry beacon of Oscar III was heard at 2003 GMT (March 9, 1965) almost simultaneously by KL7FDB (Kodiak, Alaska), K6GSJ, K6UQH, W6ASH, W6NLZ and W2UK/KH6. In addition, K6GSJ heard bits of the satellite-repeated signal of K6UQH before Oscar III slipped out of range! It was noted by all observers that the 145.95-Mc. coherent beacon of the satellite had not been heard and was presumed inoperative. Sufficient tracking data had been accumulated, however, to permit Harley Gabrielson, W6HEK, and his prediction group to generate preliminary orbital predictions for a hasty QST broadcast from Oscar Hq station W6EE shortly after Oscar III passed below the horizon. W2UK/KH6 said goodbye to Oscar III during orbit 2 as the amateur satellite processed west-

ward over the ocean in its series of orbits as the earth revolved beneath it.

Oscar III over Europe and the Atlantic Seaboard

On the opposite side of the globe, Bill Brady (ex-W2ABP) in London logged Oscar III's beacon on orbit 3 for the first reported European reception.

Next to be alerted by the 145.85-Mc. beacon of Oscar III were DL6EZA and HB9RG, the former hearing the latter during orbit 4. In addition, ex-W2ABP (London) logged HB9RG during orbit 8!

And now the thrill of the chase began! Resembling elusive hare and pursuing hound, Oscar III swept across the United States in successive orbits, alerting hundreds of v.h.f. enthusiasts who awaited the satellite with growing excitement! During orbit 6, as Oscar III passed in a southernly direction near 70 degrees west Longitude, the storm of v.h.f. activity broke, leaving a trail of new v.h.f. records in the wake of the satellite. For the first time in the history of amateur radio it was possible to hear all districts in the U.S.A. on the 2-meter band via the fantastic "bird" whirling overhead! Before Oscar III had worked its way past the east coast of W-land, W8PT logged W4WNH for the first reported U.S.A. reception via Oscar III, K8UIF heard W8KAY, K1HTV heard K2IEJ, W2AZL heard K2MWA/2 and the telemetry beacon of Oscar III was heard by K6HMS in far-distant Costa Mesa, California.

"Many are Called but Few are Chosen"

The following orbit (7) over mid-western U.S.A. permitted scores of stations to hear each other via Oscar III, but the rapid flight of the satellite gave little time for amateurs to adjust themselves to the new techniques of operation necessary to achieve satellite-repeated contacts. Old v.h.f. communication techniques proved generally inadequate to meet the exciting new challenge. Many called too fast, or too slow; too short, or too long. Pile-ups grew on strong satellite-repeated signals. Those lucky radio amateurs who establish the world's first satellite-repeated QSO's will long remember the amazing sensation of having the 2-meter band suddenly burst alive with signals from hundreds, and even thousands of miles away! The news quickly swept hamdom: *Oscar III was in orbit and was working!*

The First QSO's Via Oscar III

The history of the first days of life of Oscar III is confused and blurred, emerging only after a search of log records and tape recordings. It is still not complete, and not all contacts are yet verified. Even so, it is an exciting story. Honors for the first reported two-way satellite-repeater QSO go to HB9RG (Zurich, Switzerland) and DL6-EZA (Schoerzingen, Germany) who established c.w. contact via Oscar III early during orbit 9. Shortly thereafter, during orbit 13, K9AAJ (Quincy, Ill.) and K2IEJ (Oceanside, N.Y.) achieved the second two-way repeater QSO, and established the first two-way U.S.A. contact via Oscar III. As tape recorded at K9AAJ, this contact went as follows:

(Orbit 13, March 10, 1965 at 1701 GMT)

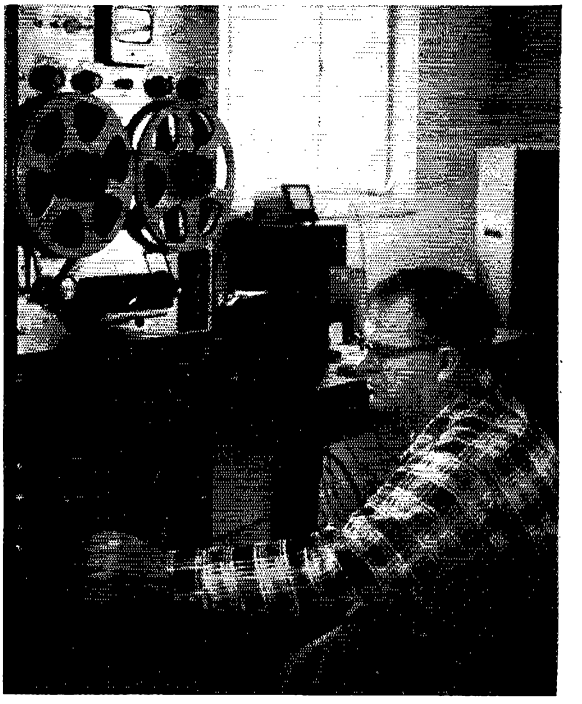
. . . . . DE K2IEJ
K2IEJ DE K9AAJ BK
R K9AAJ DE K2IEJ S6 BK
TKS S4 HR BK
R TKS 73 DE K2IEJ
R R TKS 73 DE K9AAJ

And that's how it was done! In less than 30 seconds, these two satellite-tamers followed in the footsteps of HB9RG and DL6EZA as record holders in a new phase of v.h.f. amateur radio communication!

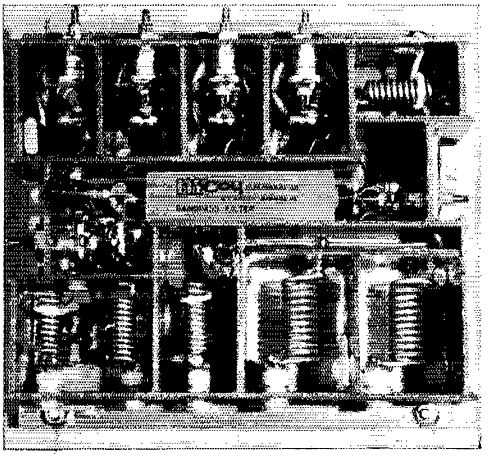
Amateur DX Records via Oscar III Grow Daily

DX records were made and broken daily via Oscar III. The first reported transcontinental reception via the repeater satellite occurred during orbit 7 when K6HMS (Costa Mesa, Calif.) heard W1JSM (Waltham, Mass.). By orbit 9, Oscar III and the 2-meter band were red-hot: K9AAJ heard and recorded the c.w. signals of KL7CUH (College, Alaska) and HB9RG had worked a DL station, as previously mentioned. During a later orbit over Australia, VK7DK and VK7LZ established contact via Oscar III for the first reported QSO from "down under".

Hardly had the crew at Oscar Hq. recovered from this good news than W1BU (Medfield,



K6UAA puts the finishing touches on the tracking equipment at W6EE. Telemetry signals plus WWV was recorded on tape. A low-noise converter and ARR-15 receiver were used for tracking.



Interior view of the receiver portion of the repeater. Across the lower edge are the r.f. stages, with the i.f. stages at the top and the 30 Mc. crystal filter mounted at the center of the assembly. After completion, the equipment was poured full of quick-setting epoxy foam.

Mass.) reported that he had heard the satellite-repeated *trans-oceanic* signals of HB9RG during pass 19 (0252 GMT) when Oscar III was over the mid-atlantic! This electrifying report raised the old v.h.f. query: was it possible to communicate across the Atlantic on the 2-meter band? Moonbounce activity had provided an affirmative answer to this question, and now the means was at hand to accomplish this near-impossible feat by means of another medium — and one that numbers of v.h.f. enthusiasts could employ with their normal station equipment — if Lady Luck smiled their way!

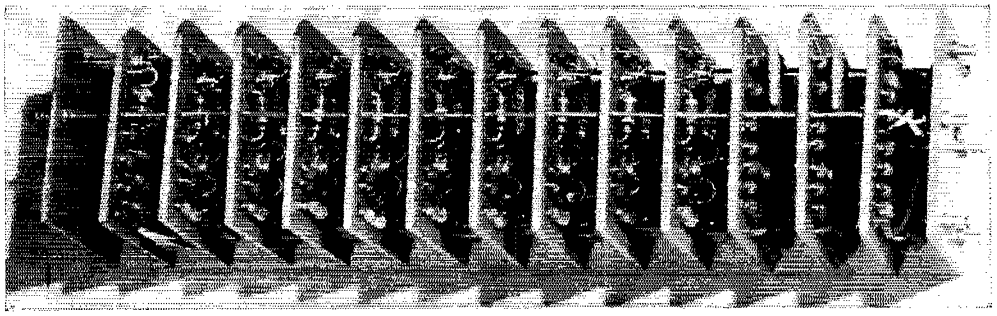
While W1BU and others worked frantically to achieve the impossible, other radio amateurs continued to establish more v.h.f. contacts via Oscar III. During orbit 22, KL7CUH heard U.S. amateur signals via Oscar III as far east as W4WNH and K2IEJ. The old 2-meter land-based DX records continued to topple: HB9RG worked SM7OSC during orbit 30 and heard UP2ON during orbit 32. Sam Harris, W1BU, heard G3LTF in England during orbit 33, and VE3ETO reported reception of DL3YBA. As of this orbit, however, no European amateur had reported hearing an American amateur via Oscar III repeater. As a further temptation, W1BU heard SM7OSC during orbit 34, and W6NLZ worked K2GUG for the first reported trans-continental Oscar III QSO during orbit 35. During orbit 36, W6QJW heard W2UK/KH6. Could the trans-pacific path between California and Hawaii be conquered too?

The First Transatlantic QSO via Oscar III

The first transatlantic QSO grew a bit nearer as DL3YBA reported hearing U.S.A. stations during orbit 35, and EI6D reported reception of K2GUG during orbit 47. EI6D also received the satellite-repeated signals of W9ZIH and K2GUG during orbit 48! On the west coast, WA6MGZ (Mountain View, Calif.) was heard by W2UK/-KH6 (orbit 51) and W6GDO (Sacramento, Calif.) heard KL7CUH (orbit 51). The stage seemed set for some long distance records. Finally, after painstakingly accurate orbital calculations and perfect timing W1BU used orbit 61 to achieve a two-way Oscar-repeater QSO across the Atlantic Ocean with DL3YBA (Munich, Germany)! The record-shattering contact took place at 0322 GMT during a mutually useable contact period that existed for less than two minutes! This fleeting instant, during which the satellite passed through the tiny "target area" in mid-atlantic was sufficient for two knowledgeable v.h.f. experts to establish a new record! Signals were very QSA, and about S3 to S4.

During orbit 63, W6GDO copied W4HJQ on sideband, for the first reported U.S.A. long-distance s.s.b. reception via Oscar III, and WA6MGZ heard W2UK/KH6 during orbit 65 off the California coast. The following orbit (66), K2MWA/2 reported reception of G6AG, while EI2A heard K2MWA/2, DL3YBA and HB9RG. Fellow-Irishman EI6D heard K2GUG and F3NB heard K2MWA/2 — all during the same orbit. A bit later, WA2WEB heard EA4AO and G3EDD (orbit 162), and was heard by KL7CUH (orbit 119).

Almost everything that occurred on 2 meters after these first few exciting days was an anti-climax. During a telephone conversation between W1BU and W6SAI, Sam remarked casually, and as an after thought, that he had logged a QSO with HB9RG on orbit 72, and had a partial contact with G3LTF during orbit 74! (So what else was new?).



The transistorized HI keyer of Oscar III was built on 14 small circuit boards. The complete keyer measures less than six inches long. Power requirements: 20 volts at less than 4 ma.!

European Amateurs QSO via Oscar III

European radio amateurs were quick to utilize the repeater capabilities of Oscar III. Starting with the initial reception of HB9RG by DL6EZA, it has been reported that HB9RG has contacted DL6EZA (orbit 9), DL9GU (orbit 17), DJ4ZC (s.s.b., orbit 19), SM7OSC (orbit 30), and SM7BA (orbit 49)! In addition, this star Swiss DX'er heard UP2ON (orbit 32) and OK1CG (orbit 34). Hans also contacted G3ABR during orbit 59.

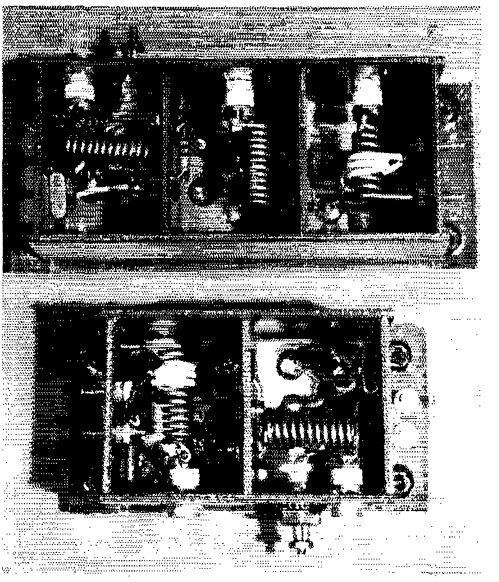
French amateurs F9DE, F2RD and F3NB received DL3YBA and HB9RG via Oscar III during orbit 50. HB9RG, in turn, worked DJ3ENA (orbit 60), OK1CG (orbit 61), and OZ9AC (orbit 63). Swedish amateur SM6PU worked HB9RG (orbit 62) and Irish EI2A heard DL3YBA and HB9RG during the same orbit. Old-time DX'er EA4AO (ex-EAR96) achieved Spanish honors via Oscar III when he worked HB9RG (orbit 88). EI4Q in Dublin heard SM-7OSC, EA4AO, G6AG, DL3YBA and an unidentified OE1 (Austria) during the same orbit.

The first reported Italian QSO was I1BMV–HB9RG (orbit 169). UR2BU (TARTU Estonian S.S.R.) logged DL3YBA, HB9RG, G6AG, EA4AO, OK2WCG, SM7OSC, DJ2RSA, while F3NB heard ON4FG and LZ1KBA.

English G6AG was logged "across the pond" by W1BU, W1JSM, and W1YQI during orbit 102. During orbit 105, W2UK/KH6 logged W6YK. Even though the W6 — K6 path had not yet been conquered by a two-way Oscar III, "Tommy", W2UK/KH6 proved his mettle by logging KL7CUH (orbit 120) via Oscar III for the first reported KH6 — KL7 reception!

Scores of Stateside QSO's via Oscar III

While all the frenzied trans-oceanic DX activity was going on, scores of U.S. amateurs were making two-way QSO's via Oscar III and collecting new states and call areas in their log books. Satellite-repeated contacts, while still elusive and difficult to achieve, were now being made on many orbits of Oscar III over W-land and Canada. What had been amazing, newsworthy and astounding a few days or hours before, now seemed relatively commonplace. Discussions of one- or two-thousand mile QSO's no longer evoked astonishment among the followers of Oscar III. The satellite was working, to the immense satisfaction of amateurs, and all was well with the world!



These are the two beacon transmitters. The small unit is the 145.95 Mc. coherent beacon which apparently failed during or soon after launch. The large unit is the telemetry beacon on 145.85 Mc.

What will we amateurs think once the battery of Oscar III has been exhausted and the long distance signals no longer appear regularly on the 2-meter band? Will the exciting days of March, 1965 resemble a hazy dream in which the v.h.f. band was turned topsy-turvy by an orbiting miracle? Oscar III was but an example of creative accomplishment by a group of dedicated amateurs and showed one path to new, undreamed communication techniques. What will the future bring? Will others dream such dreams? Each QSO via Oscar III stands as a salute of a deed well done! May other such deeds be created by radio amateurs in days ahead! QST

Strays

Received too late to be included in W3ZP's article in the April issue, this view of the modified Heath HW-12 transceiver shows the locations of the Monimatch switch (upper left), and attenuator switch (upper right). The crystal and crystal/v.f.o. switch are mounted below the original bias-set/operate switch at the lower right.

Orbital Predictions for Oscar III

BY HARLEY GABRIELSON,* W6HEK

How do you keep track of an invisible 36-pound object, hurtling through space at nearly 17,000 miles per hour, 570 statute miles above the earth? How do you tell where it is today, and where it will be tomorrow, or next week? This was the job of the Prediction Group of Project Oscar — and an interesting and unusual job it was too! Playing detective to Oscar III was a formidable task, and one whose planning started long before the radio amateur satellite was lofted into space.

Making predictions that will define the position at a given time of a satellite, and that will determine the orbit are, initially, a bit of a guessing game, especially if the forthcoming orbit is not known beforehand. The harassed predictor takes a few fragmentary reception reports and from them generates a "best estimate" for the first few days of orbit and hopes that his results aren't too wide of the mark. If they are, he'll soon know it, as he usually has a number of amateur prediction "experts" second-guessing him at every opportunity! Fortunately, for Oscar III, for the Prediction Group, and for the myriad users of Oscar III, the "best estimates" covering the early orbits were reasonably accurate; otherwise the Prediction Group would have had no rest until they generated a better "best estimate"!

Establishing the Orbital Parameters

Doppler data is the key to establishing orbital parameters [1], and this information is gained through tracking the "bird". Tracking information provided by four "key" amateur tracking stations provided the basic information from which the orbital parameters of Oscar III were extracted. Reception reports of the Oscar III telemetry beacon on 145.85 Mc. (received at Oscar Hq. by mail and via amateur radio) were carefully studied for verification of predictions and for clues leading to discovery of possible errors in forecasts. The four "key" tracking stations were W5TFY (Richardson, Texas), K6FB (Palo Alto, Calif.), W7ZXM (Seattle, Washington) and WA6TGY (San Jose, Calif.). Data from these stations, backed up by "reading the mail" made it possible to make a reasonably good estimate of the orbit of the "bird". This major effort, on the part of many amateurs paid off — much sleep was lost, but the satellite wasn't! By the end of the first week, the initial predictions were in error by about 2 minutes in time and 4 degrees in longitude. The Prediction team then had reasonable confidence of being able to predict orbital data from week to week without fear of "losing" the satellite.

The Prediction Operation

A typical prediction operation ran in this fashion. Doppler data from W5TFY, for example, was relayed by W5CYE on 14-Mc. RTTY to W6EE, W6NRM or WA6JSA. This was raw material to establish west longitude of equatorial crossing, and time of crossing in GMT for a particular orbit. This information, and corresponding data for another known orbit several days earlier allowed the average period to be determined, and the average advance in longitudinal crossing was also found for that group of orbits. The 570 statute-mile altitude and near-circular orbit of Oscar III provided a very low decay rate so that measured orbital values, once established, changed only slightly from week to week.

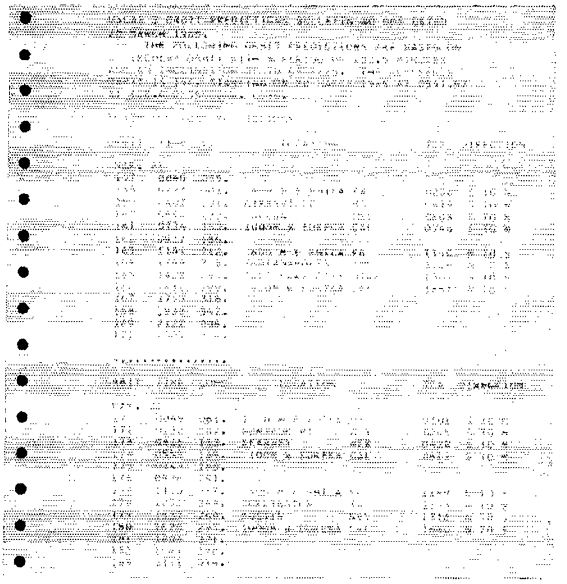
The position of Oscar III at a particular time over the United States, as an example, was closely determined during orbit 49 by examination of Doppler data generated by W5TFY, K6FB and WA6TGY. W5TFY's data showed that Oscar III was 1000 miles "north of west" of Richardson, Texas when observed at his "closest time of approach" (TCA). Similar measurements made by K6FB and WA6TGY showed that the satellite was 450 miles "south of west" of the San Francisco Bay area at their TCA.

A line was then drawn through these two points on a map determining a segment of the sub-satellite orbital track. A typical track, measured between two TCA points might be 350 miles or so, representing about a minute of "flight" time. The corresponding equatorial crossing time and longitude were then deter-

Gary McGill punches Oscar III orbital data into the 1620 computer located at the Data Processing Lab. at Foothill College, home of Project Oscar. Doppler data was received via RTTY from W5TFY and others. No amateur, Gary may succumb after the trials and tribulations of Oscar IIII

* Project Oscar, Inc., Foothill College, Los Altos Hills, Calif.

1 "Making Your Own Orbital Predictions from Doppler Measurements", Hilton, W6VKP, *QST*, March, 1962.



A sample of the computer readout covering orbits 157 through 183.

mined for this particular track, using methods outlined in recent *QST* articles [2].

Once the basic orbital parameters had been determined, the raw data was fed to the IBM 1620 computer in the Data Processing Laboratory at Foothill College, which was kindly loaned to Project Oscar for the time necessary to complete the exercise. The computer proceeded to extrapolate the parameters into a printed tabulation of predictions for future orbits. To reduce the amount of labor and to minimize the possibility of inadvertent errors creeping into manipulation of such a large mass of material, the college computer was programmed to deliver its output in the form of a teletype tape which could be used directly for RTTY transmission by W6EE. During the RTTY broadcast, an extra teletype printer was used to print duplicate copies of the predictions. One of these copies was rushed to "Chuck" Towns, K6LFH, who read the complete prediction table into a tape recorder for immediate broadcast on 80-, 40- and 20-meter sideband.

The IBM computer had to be modified to accomplish the time-saving operation as the normal computer output was an eight-level code (eight code impulses per character) whereas the RTTY machines employed a five-level tape.

"Reference City Data"

In addition to providing equatorial crossing information for each orbit, the computer was programmed to provide additional data for various cities. A computer "library" of reference cities across the U.S.A. was established. Each city in the "library" was located on (or close to) the fortieth parallel of latitude, and the cities were spaced at intervals of one degree of longitude across the country. Additional "library entries" were included for points in the Atlantic and Pacific Oceans for those amateurs interested in contacts across these bodies of water. As the predictions were generated in the computer, the "library" was continually checked (by the computer) and if the sub-orbital track of Oscar III carried it across or near one of these referenced cities, this reference was added to the listing, and the time of passing over the area and the direction of travel of Oscar III was added to the read-out. Similar "libraries" were assembled for Europe (fiftieth parallel) and for Australia (thirtieth parallel south), so that predictions could be generated for these areas as well as for North America.

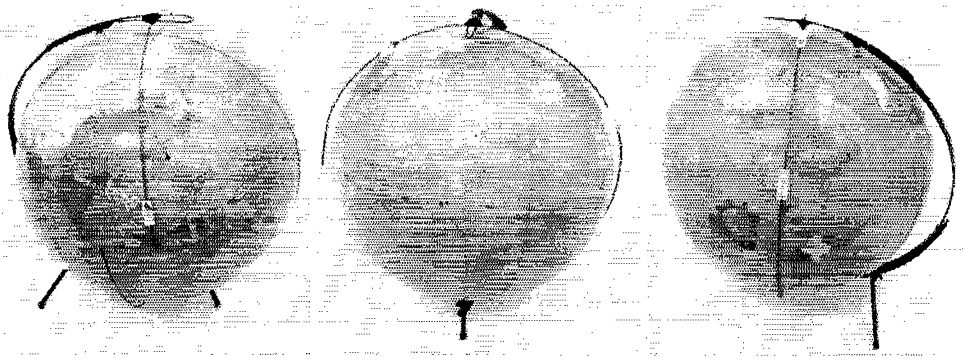
The Prediction Sheets

The automation of the prediction system made it possible to turn out a large quantity of material in a short time with a reasonable degree of accuracy. Once the computer tape was completed, it was rushed from the Data Processing Laboratory at the college to the Oscar Headquarters building, about a mile away, where Bob Walton, W6CYL, and his RTTY crew greeted it with open arms. "Chuck" Cook, W6SCR, placed a pre-prepared "leader" RTTY tape in the keyer, hit the control switch and the prediction bulletin was "on the air" on simultaneous transmissions on 80, 40 and 20 meters.

Two extra prediction sheets were produced. One went to K6LFH for the s.s.b. prediction tape and the second went to Walter Read,

W6CYL examines computer tape before it is placed in the RTTY equipment. W6EE transmitted predictions on c.w. and s.s.b. as well as RTTY.

[2] "Keeping Track of Oscar", Burhans and Rankins, *QST*, May, 1962. "Quickie" Orbital Predictions for Oscar III", Orr and Walters, *QST*, Feb., 1965. "Oscar III Orbital Predictions and How to Use Them", Gabrielson, *QST*, Mar., 1965.



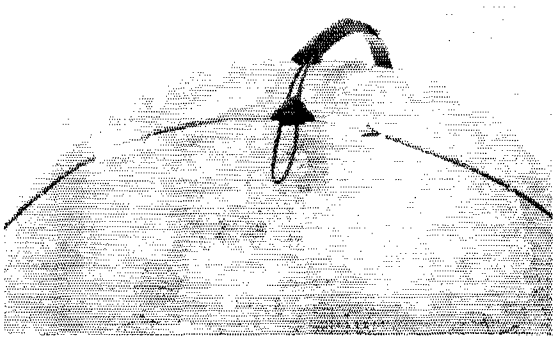
(A) (B) (C)

Orbit 68 of Oscar III. Starting at an equatorial crossing near Singapore (A), the bird flew in a northward direction over China and Siberia, reaching its northernmost point of 70 degrees north Latitude over the Bering Straits. Oscar III then headed southward (B), across Alaska, western Canada, and down over the Rocky Mountains. Many U. S. amateurs reported reception of satellite-repeated signals on this pass. The satellite then passed over Mexico (C), down across the South Pacific, crossing Antarctica, and northward once again to cross the equator at about 280 degrees west Longitude to begin orbit 69.

W6ASH, who punched out a duplicate c.w. tape on his Boehme machine. Thus, by the time the initial RTTY broadcast was completed, "Chuck" Towns (K6LFH) had completed the voice tape and Walt Read had completed the c.w. tape. The three "master" tapes were then used and re-used for the W6EE daily prediction broadcasts.

A Global Orbit Display

A globe proves to be a handy device to exhibit a particular orbit. Shown in photograph A is such a display. A length of heavy wire is bent about the globe and taped in place so that the top of the wire circle crosses the 70th north parallel. This is the farthest north point that may be reached with an orbit having a 70 degree inclination, such as possessed by Oscar III. The lower end of the loop is displaced about 25 degrees to represent the progression of the orbit as the earth rotates. This photograph represents the start of orbit 68, at an equatorial crossing of 255 degrees west longitude. At the start of the orbit, Oscar III is in position for contacts between amateurs in Malaysia and surrounding areas. Later, the satellite could be used for contacts in and around Japan. Photograph B shows the portion of orbit 68 as Oscar III crosses from west to east over Siberia and Alaska and then heads "south" towards W-land. Photograph C illustrates the portion of orbit 68 as Oscar III traverses the United States, going from north to south (over Colorado at 1547 GMT). During this passage, K4QIF worked WA6MGZ, K6HMS heard K2GUG, W7ZC heard VE3BQ, K1HTV heard W9ZIH, W6ELT heard K2GUG, W8KAY heard W4MNT, and WØTKX heard K9AAJ. A study of these three pictures also shows the possibility of a W7 — KL7 QSO, and a W5 — Central American contact.



This indicating device made from a world globe represents pass 74 over northern Europe. W1BU worked Europe during the early portion of this pass.

Another interesting orbit is 74, starting in South America at 60 degrees west longitude (Photograph D). Oscar III arcs up over the eastern seaboard of America, then across Greenland and over northern Europe, "flying" from west to east, thence "down" across central Asia. During this orbit, when Oscar III was travelling northward over the Atlantic, W1BU achieved a partial QSO with G3LTF in England. Although no European QSO's were reported during this orbit, the northern traverse of Oscar III across Europe places it in an excellent position for QSO's between European amateurs. The possibilities existing in an orbit such as this are not readily apparent unless the observer arms himself with a globe and a loop of wire!

Kudos to All

The programming for the IBM 1620 computer was produced by Gary McGill and computer operation was handled by Bill Walters, W6MKE. Modification of the computer to provide teletype tape punch-out was done by Jim Strom, W6MXG. Gracious thanks are due to Lawrence Harvey and the members of the Data Processing Laboratory of Foothill College for their patience with this effort, and their generosity in making computer time available to Project Oscar. QST

CALLS HEARD

orbit 1

*k6gsj:*k6uqh.

orbit 6

*w8pt:*w4wnh. *k9uif:*w8kay. *w4wnh:*w8kay. *k1htv:*k2iej, w8kay. *w2abp/g:*hb9rg. *w2azl:*k2muwa/2. *wa4fjm:*w1hjz. *w4aws:*w8kay.

orbit 7

*w0mox:*w0eye, w5eqp. *w9uif:*k8ubn (ssb). *w8kay:*w4wnh, k9aaj, w0ler. *k9aaj:*w4wnh, w0eye, w0lfe. *w4wnh:*k9aaj. w9tgb:w5ajg, w8kwj. *w0ler:* w4mnt, w2arj. *w0pam:*w9tgb, w4mnt, w0ler, k9aaj, w0eye, w0eoz. *w0eoz:*k9aaj. *w4aws:* w0iyk. *k6hms:*w1jsm. *k2tti:*w0mox, w0kap, w0mie, w0eye. *w3gkp:*k9aaj. *k1htv:*w9tgb, w0jhs:*k9aaj.* w1jsm:w5ajg.

orbit 8

*wa6tqy:*w5ajg, w4aws, k5arx. *k6hcp:*k9uid. *wa6qqi:*k9uid, w7uzy, w4aws, w0mox, k6hms, k9aaj. *k9aaj:*w5ajg, w4buz, w0mox, k7iew, w0iyk, k6hms, wb6kvp. *k6hms:*w4buz, k9uif, w0mox, k9aaj. *k6buk:*w4buz k9mf. *w6gdo:*wb6kap. *k0jqo:*k6sdz. *k7icw:*w4buz. *w8kay:*k9uif, w4buz. *w8mre:* k7iew, k5iql, w9tgb, k4yvj, w4aws. *w0pb:*w4buz. *wa6tqu:* w5ajg, k5arx, w4aws. *w4wnh:*w4buz, k2iej, k9aaj, w0eye. *w4aws:*k9aaj, w4wnh.

orbit 9

*w2abp/g:*hb9rg. *w7zxm:*k9aaj. *wb6hut:*k5tqp, k9aaj, k6sdz, w6gdo, wb6kvp. *k9aaj:*k17cuh. *w6gdo:*k6sdz. *k6hms:*k6szk, w0iyk. *k6buk:*w6sdz. *k7icw:*k9jfp, k9aaj. *wb6kap:*w6gdo.

orbit 12

*w8kay:*w4wnh, w9tg. *w4wnh:*w5ajg, w9tgb, w8kay.

orbit 13

*wa2web:*w0mox, wb6kap, w6mie, w0eye. *k6qsj:*k6sdz. *w9pqb:*w0mox, w8kay, w4wnh. *k9aaj:*k2iej, w8kay, w4wnh, w9tgb. *w9tqb:*k6ho. *w7zc:*w4wnh. *k6hms:*w0mox, w4wnh, k2iej, w8kay, k2gug, w9tgb, k17au, w0eye. *k7icw:*k9aaj, *w4wnh:*w9ler, k9aaj, w4hjq, k2iej. *w4wnh:*w9ler, k9aaj. w4hjq, k2iej.

orbit 14

*wa6qqi:*k9aaj. *k6hms:*w0mox, w0eye, w6gdo, w6yk, k17au, w4wnh, k9aaj, k4uif, w6uxn.

orbit 16

*ah0az:*telemetry

orbit 17

*hb9rg:*d19gu. *dj4zc:*hb9rg (ssb)

orbit 19

*w1bu:*hb9rg. *hb9rg:*dj4zc (ssb).

orbit 20

w5kxd: w0iyk, w4aws, k9aaj, w0eye, w4buz, w1sjm, k3obu, w4wnh. *w1jsm:*w4wnh. *hb9rg:* d16eza. *w4wnh:*w9zih, k2tgj, w9tgb, w8yio, k4qif, w8kay, w4aws. *k9aaj:*wa2web. *k1htv:* w9tgb, k2reh, w8yio, w9zih, k2rth. *w8kay:*k2reh, w9tgb, k9uif, w9zih, w8yio. *wa4fjm:*w9zih, w8yio, k2reh, w4aws, k1rth. *w4aws:*k5wxz, wa2web, w8yio, k7dzg. *w3gkp:*k9uif, k2rth.

orbit 21

*k6uqh:*w8feu. *wa6qqi:*k2kji, k4qif, w5ajg. *w7zc:*k2iej, w0mox, w9tgb. *wb6hut:*k6ged, w9tgb, k4qif, k9aaj, w6dee. *w4wnh:* w0eye, k2kji, w4fj, w9tgb, k4qif, w5ajg, w4buz, k2iej. *w6gdo:*w9tgb, k3rth, k5tjr, w1jsm. *k6hms:*k6hcp, w9tgb, w8yio, k4qif, w0mox, w1gco. *k1htv:*w9tgb, w6gdo, w0mox. *w8kay:*w9jre, k2kji, k2iej, w9tgb, k4qif, k2gug, w0mox, k5wxz, w8nsh, k9aaj. *wa4fjm:*w9tgb. *ve4gi:*w6gdo, k7dzg, w7pua/4, w5ajg, w8yio, k2cj , k2gug. *w0pb:*w9tgb, k4qif, w5anh. *w0jhs:*w6egh. *w1jsm:*w4buz, k9aaj, w6gdo. *w4aws:* w4wnh, k4qif, w0mox, w5ajg, w6gdo, k9aaj, k5tqp. *w0tkx:* w6dng, w8nsh, w8yio, w9tgb, w4bwz, k7rua/2, w4wnh.

orbit 22

*w7zxm:*k9aaj, w4wnh, k9ef, w5jzy. *w6qjw:*w4wnh, w6ib, w6yk. *k6hcp:*k9aaj. *w7zc:*w0ler, w5ajg, k6jyo, k1lsc/6. *k17cuh:*k9aaj, k7icw, w4wnh, k2iej, k5tqp, wa6mgz, w7egn, k7dsk. *w4wnh:*k7dzg, wb6jzy, w1bu, w6gdo, k9aaj, k2iej: *k0jqv:*w5ajg, k6jyo. *k6hms:*k4uif, w4wnh, k4buz, w4mnt, k4ixc, w0lfe. *w6ab:*k9aaj. *k0jqv:*k6jyo, k9aaj, w5ajg. *k7icw:* w6nlz, k9aaj, w8feh, w6gdo. *w0jhs:*k9aaj, wb6jzy. *w6gdo:* w0ler, k5wxz. k9aaj, wb6jzy. *w8kay:*k9aaj, w5ajg, w1bu, k2iej, w6gdo. *w0tkx:*k6ged, w4wnh, k9aaj.

orbit 23

*k7icw:*k6hcp

orbit 26

*w9tqb:*w4wnh. *w4wnh:*w9wdd, k9aaj, k2iej, w8nsh. *k9aaj:* k5tqp. *k0jqv:*k3ujg. *ve4gi:*k9aaj.

orbit 27

*w4wnh:*k9aaj, w9wdd, w9pbp. *k0jqo:*w4wnh, k9aaj. *w8kay:* k9aaj, w9pbp. *ve4gi:*w9pbp. *ve3eto:*w9pbp, w9pgw.

orbit 28

*k0jqo:*w6ab, k6msg. *w6ab:*w6msg.

orbit 30

*hb9rg:*su7ose. *dj4zc:*dj4au (ssb).

orbit 32

*hb9rg:*up2on

orbit 33

*w1bu:*g3ltf *k1htv:*k2iej, w1bu, k2rth *ve3eto:*d 3yba

orbit 34

*w1bu:*sm7ose, w6nlz. *hb9rg:*ok1cg. *w5ukq:*w4aws. *w4aws:* w8kay, k4ixc, k0cer, k9aaj, k4qif. *k1htv:*k9aaj, w9zih, w0ic, k2mwa/2. *w1aip:* w8yio, w4ads, k4ixc, k2gtg, k9aaj. *w1jsm:*w9zih, w4aws, k0rkt, k5wxz, k0cer, k4qif, w9wiz. *w4wnk:*w9zih. *w0idy:*k9aaj. *w8kay:*k4xc, w9tgb, k5wxz, w4xi, k4qif. *w0pb:*w8kay, k5wxz. *w0rli:*k0cer. *w0tkx:* w9zih, k9aaj, w8kay. w8yio, w9wdh, w4ms.

Preliminary reports indicate that the Oscar III translator has become erratic or ceased operation some time after orbit 206 (1300 GMT, March 24, 1965). A study of available telemetry information reveals that the primary battery voltage is considerably lower than normal. Project Oscar requests that radio amateurs monitor the telemetry channel (145.85 mc.) as this transmitter is designed to switch to a separate, long-life solar cell and battery supply once the primary power supply fails. Reports of translator response, signals heard through the translator and beacon signals after orbit 206 would be welcomed by Project Oscar. In addition, logs, reports of QSO's via Oscar III and newspaper and magazine clippings of this radio amateur space experiment are requested. Please send all information, data, etc. to:

Project Oscar, Foothill College, Los Altos Hills, Calif.

— W6SAI

orbit 35

*wi6sai:*k2iej, w4yyj, k4qif. *w6nlz:*k2gug. *w6qjw:*w4yyj, w2gug, w4wnh. *k6ugh:*w6gdo, w8feu. *klhtv:*k2gug, w4wnh, k5lkz, k4qif wb6kap. *wi6gdo:*w5ajg, k2iej, k3yyj. *w4wnh:* w4yyj, k2gug, w4hjz, k2iej, k4qif, k4ioc. *k6jqv:*k4qif. *k7icw:*wb6kap, k2iej, k1lhk, w0hjz, w6dqj, w6nlz. *w8kay:* k2lmg, w4aws, k4q'f, k2iej, k4yyj, k6gcd. *wa6tgy:*k4ixc, w3byf, w1bu, k2iej, w4bof, k5jaz, wb6ajz, k6hmh. *w1jsm:* k2iej, k4ixc, w9zih. *w0tkx:*w6dng.

orbit 36

*w6qjw:*k7nit, w6ib, w2uk/kh6. *k0jqv:*w8nfh, wb6jzy. *w6gdo:* wb6kap. *w5ukq:*w8nsh. *w6gdo:*w4wnh, k7nii. *w4wnh:*w5ajg, w8nsh, k7nii, w0wph. *k0jqv:*wb6jzy, w4wnh. *k7icw:*w8nsh. *wi6ler:*w6gdo, wb6jzy. *w6wwm:*w0tkx. *w0tkx:*wb6jzy, k6gdo.

orbit 37

*dj4zc:*sm7osc.

orbit 38

*vk7dk:*vk7lz.

orbit 40

*k6jqv:*w4wnh. *klhtv:*k9aaj. *w4wnh:*k2icj. k9aaj, w9wok. *k7icw:*k9aaj. *w8kay:*k9aaj. *w4aws:*k7dzg.

orbit 41

*w4wnh:*w8feh, k9aaj, w5ukq. *k0jqv:*w4wnh. *w8kay:*k9aaj, w4wnh.

orbit 42

*k6uqh:*k7dzq.

orbit 45

*dj4zc:*d13yba (ssb)

orbit 46

*hb9rg:*dj4au. *4ulitu:*d13yba. *dl3yba:*(unident. W signals). *k2mwa/2:*g6ag.

orbit 47

*w1bu:*d13yba, w4wnh. *ei6d:*k2gug. *k2mwa/2:*4h3yba. *w1jsm:*k4qif, wa2gus. *w4aws:*w6eiu, k2gug, k2iej.

orbit 48

*ei6d:*w9zih, k2gug. *klhtv:*w4mnt, k2gug. *w0pb:*k2gug. *k3okc:*k2gug, w8zy. *w4wnh:*k9aaj, w4mnt. k2iej, w4hjq. *w8kay:*k2gug, w4mnt. *w1jsm:*k5wxz, k4ixc, w4mnt. *w0tkx:*k9aaj. *w3ykp:*k2gug, w3byf.

orbit 49

*k6hms:*w0lfe, w0mox, w6eye k4qif, w4mt, k4ixc, w5wx. *w6gdo:*w0ler, k5mbv. *w7zc:*w0ic, wa6mgz, w9zab. *w0ler:* wb6jzy. *w4wnh:*w0tgb, w9zih, w8yio, k4ixc, k4qif, w0ler, w0ic, w9zih. *k0jqv:*k2iej. *k7icw:*k4yyj, w4wnh, wa6mgz, k4qif. *k7bho:*w0ler, wa6mgz. *wi6elt:*wb6jzy, w0ler, k4qic, wa6mgz, w6dng. *w8kay:*k4ixc. *w0tkx:*w4ms. *w1jsm:*wb6jzy. *w0tkx:*wb6jzy, w0ler, w4ms, w8yio. *w3gkp:*wa6mgz. *ve3eto:*w8yio, k2gug, wa2web.

orbit 50

*w6dng:*w9tgh, w6qjw. *j3nb:*dl3yba, hb9rg, sm7osc. *k6hms:*k6jyo, k6gcd, w0lfe. *w6gdo:*k2gug. *w6hek:*wa6mgz. *w0ler:*w6nlz. *w6elt:*k5wxz. *w8kay:*k2gug. *w0tkx:*k5wxz.

orbit 51

*w2uk/kh6:*wa6mgz. *k6hms:*wa6mgz *k7bho:*wa6mgz, k17cuh. *w6gdo* wa6qqi, kl7cuh. *dj4zc:*dl3yba, hb9rg.

orbit 52

*ei6d:*k2gug

orbit 53

*klhtv:*w2azl, k5wxz. *w4wnh:*k5wxz, w2azl.

orbit 54

*k6hms:*k6jyo, k6gcd. *klhtv:*k6uzg, k4ixc. *w4wnh:*k5wxz w6dqj, w9zih, k9aaj, w5ajg. *k7icw:*w5ajg, w4mnt. *w6elt:*w5ajg, w9awn, w6dqj. *w8kay:*w4aws. *w4aws:*w6dkg.

orbit 55

*w6qjw:*w0idy, w6djz, w7lhl *wb6jzy:*w5njk, w0ic. *w0tkx:* wb6jzy, wb6mvp. *w6hek:*w0ic. *w5hb:*w0ic. *w0pb:*w0ic. *w4wnh:*wb6jzy, w0ic, wb6kvp w4mnt, wa6mgz, k5tqp. *k7icw:*w0ic. *wi6elt:*wb6kap. *w8kay:*w5nce. *wa6htj:*wb6jzy, w0hcv. *wa6tgy:*w4wnh. *w0tkx:*wb6jzy.

orbit 56

*k6uqh:*w0ic, wb6kat, wb6mgz. *k7icw:*k9aaj. *w2uk/kh6:* wb6jzy.

orbit 59

*hb9rg:*g3bar.

orbit 60

*hb9rg:*dj3ena.

orbit 61

*w1bu:*g3ltf. *hb9rg:*ok1cg. *w1bu:*dl3yba. *klhtv:*w8yio, w4aws, w3byf. k2iej, w2azl. *w8kay:*w8yio, w4aws. *k2mwa/2:*g6ag. *w1jsm:*w2azl, w8yio, w4aws, k2mwa/2, wa2web, ve3bpr. *w3gkp:*w8yio.

orbit 62

*k6buk:*k7dzg. *sm6pu:*hb9rg. *klhtv:*w8yio, w4aws, k4qif, k9aaj, w1vhh, k2ieg. *w4wnh:*k9aaj, w4aws, k9uif, w8feh, k2iej. *k7icw:*k0oqi, w9aag, k2mwf/4, ve3dil. *w1jm:*ve3bpr, k4qib, w4wnh, ve3dir, k2mwa/2, k5wxz, w4aws, k9aaj, w2azl. *w0tkx:*w4wnh, w3byf, k2mwa/2, k2gug. *w3gkp:*k9aaj, *k9aaj:*k4qif

orbit 63

*w8gdo:*w4hjq (ssb). *k6hms:*w4wnh, wb6kap, w5wx, k4ixc, k2gug. *w7zc:*k9aaj, w4wnh, w3ekr, w4mhs, k5wxz. *klhtv:*, k4qif, wb6kap. *w4wnh:*k9aaj, ve6bp, k4mhs, w6eye, wa6mgz, k5tqp, w2azl, w4hjq, *k7icw:*k4qif, w4wnh, wb6kap, w7bka. *k7bho:*wb6jzy, k9aaj, k9uif. *w8kay:*k5wxz. *wa6htj:*k9aaj. *w6gdo:*w5nuk, wb6jzy, k6uqh, wb6kap, k4qif. *w1jsm:*k5wxz. k4qif, k2iej, k5kaq, w4mnt, k9aaj, k2rth, wa2euk, w4vhh, w0dhd, w8nsh *k0tkx:*w2azy, w0ler.

orbit 64

*k0jqv:*kh6qpe, k9aaj, k2iej, w4wnh, k4qif. *k7icw:*wb6jzy, w5kxd. *w7zc:*w6eye, w2uk/kh6, w0lth. *wi6elt:*k7nii, wa6mgz. *wa6htj:*k5wxz. *w6gdo:*k7nii. k5wxz.

orbit 65

*wa6mgz:*w2uk/kh6, kl7cuh. *k7bho:*w6nlz, wa6mgz. *k2mwa/2:*g6ag

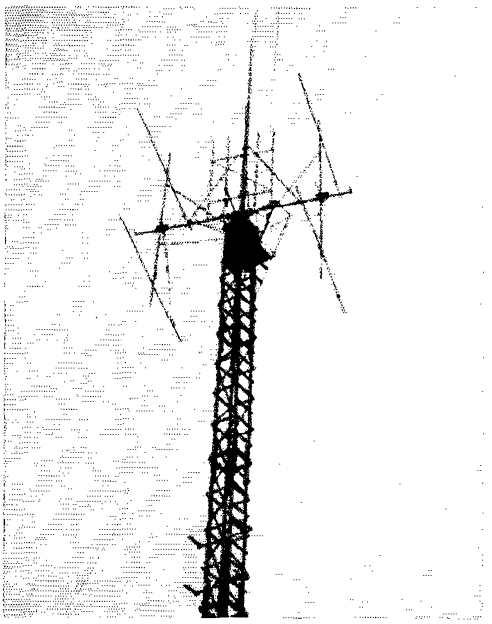
orbit 66

*k2mwa/2:*g6ag: *ei2a:*k2mwa/2 dl3yba, hb9rg *vl6d:*k2gug. note. *f3nb:*k2mwa/2, dl3yba. sm7psc. sm7bcx, dl9gu, 0n4fg, dj3en, g6gn, 6a1ao. g6ag, dj1aq, g3ltf, lz1kba, sm5bi (no orbit numbers)

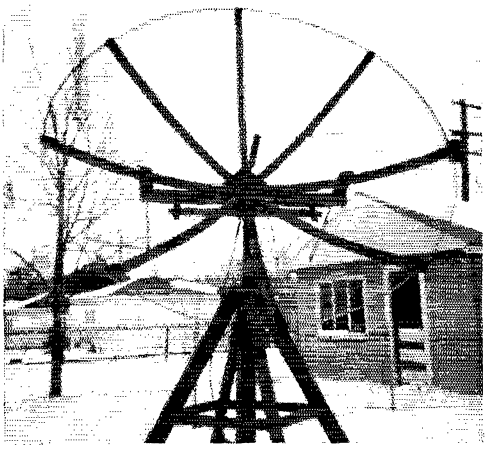
No doubt many of our readers can appreciate the countless hours that have been devoted to the project by the Oscar gang. The design, the construction, the testing, the negotiating for a vehicle, the communications arrangements, the tracking coordination — it has been a large task. But it was done because of the enthusiasm of a dedicated group. What is perhaps not appreciated is the size of the financial problem. The Oscar gang has succeeded because of the unstinting contribution of time and equipment by several groups and companies, and many individuals. Nevertheless, as W6SAI told us the other day, there have been times when they have had to spend money as if it were going out of style. Now that Oscar III is finished, it is time to plan for Oscar IV. If Project Oscar has stirred your fancy, if you'd like to help them put another one up — a financial contribution from you is in order. Project Oscar, Foothill College, Los Altos Hills, Calif.

Some Oscar Participants

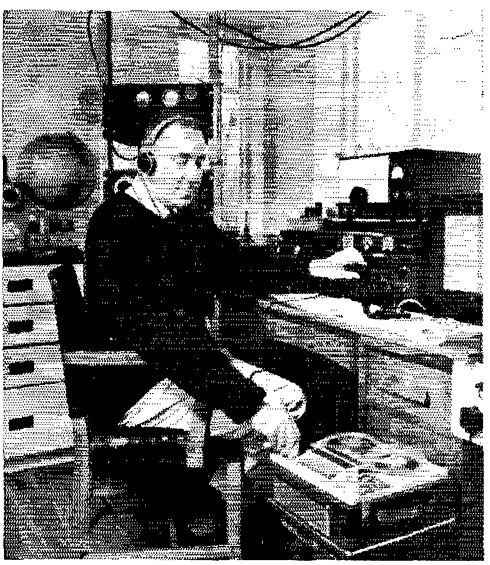
This is Lee Gray, K9AAJ, who along with K2IEJ, made the first U.S.A. two-way QSO via Oscar III. Lee uses an eight-over eight J-slot antenna and 1 kw. Receiver is a Parks converter and a 75A-4.



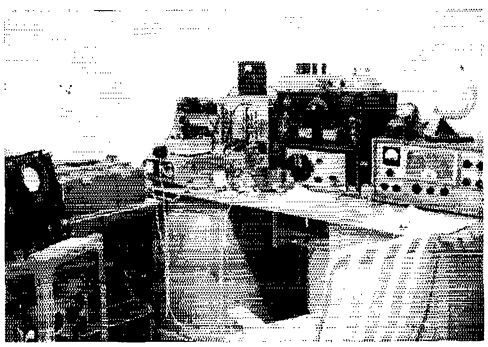
Hidden somewhere in this antenna maze is SM6PU's Oscar tracking antenna. The antenna is switchable between horizontal or vertical polarization and can be either rotated or tilted by remote control.



This 7-foot dish antenna was used by Walt Guse, W9TGB for tracking Oscar III. The antenna was positioned by a friend, Whitely Adams.



G6AG's station consists of a 1-kw. transmitter, crystal-controlled converter and home-constructed receiver, and a 8 over 8 Yagi antenna 50 feet high.



The Oscar operating position at EI6D. Crystal controlled converters and an HRO-5 are used for receiving. The transmitter is a SCR-522 driving a 100-watt amplifier.

And this is all we had room for this month.

E. Fla. c.w. and phone section leader WA4NGO used this Tri-Ex rotating tower which supported an oversized 2-L 40-meter beam at 86 feet, 7-L for 20 on an 81½-ft. boom at 71 feet "impulsively tossed together" just prior to the SS and 4-L at 54 feet for 15.

COMPILED BY ELLEN WHITE,* W1YYM

Now that you've checked your section tabulation to see how well you did against local competition, chuckled at the cartoons and examined the photos accompanying this report, take a few minutes to read further and learn about the over-all picture of the 31st ARRL Sweepstakes.

Was it a success? With approximately 2260 reports in, this was a record year for *any* SS! This initial opportunity for the contester to demonstrate his Sweepstakes enthusiasm and versatility (without jeopardizing time on either mode) boosted phone participation to well over 900.

Twenty c.w. section award winners went all-out on phone and took another award for their efforts on this mode: Winners of *both* certificates are K1DIR K4BAI K4CFD W4KFC K4LPW WA4NGO WA5CBL K5RIIZ K5TYP K6EVR W6KG KH6FIF W7ESK K1AII/KL7 W8NCD K8TIG W9RQM WAØAAD and KØBUU.

The message preamble exchange continues to be popular and several hundred participants commented, "I *like* the separation of weekends." An analysis of over 220 comments has guided the Awards Committee to modify the pattern for the forthcoming '65 SS to permit 24 hours of operation out of a 30-hour period, time-out periods to be no less than one-half hour at a time. More on this later in the year.

All section and club certificate winners are reminded that awards are scheduled for mid-May mailing.

* Ass't. Communications Manager, ARRL.

Club Scores

A total of 80 clubs qualified for the club tabulation, earning 105 club certificate awards. With the new SS pattern of separate weekends in effect, the top clubs turned out more members on *both* modes amassing significant phone and c.w. totals, testifying to the versatility of the top three. This SS, the Potomac Valley Radio Club turned in the top aggregate, well over three and a quarter million points, followed by the '63 champs, the Frankford Radio Club. The Rubber City Hotshots of Ohio moved from 5th to 3rd. The 11 top performers of the Ohio Valley Amateur Radio Association moved the club from 18th to 4th! In western N. Y., the able Rochester Amateur Radio Association crew went from 30th to 6th place while the Inglewood Amateur Radio Club of California went all the way from 28th to 7th spot for top west coast club showing.

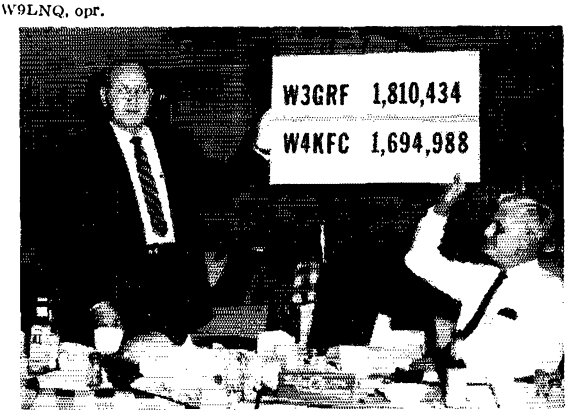
With separate weekends, versatility in both modes is required for a top club total. If you break the top ten '64 club scores down into separate phone and c.w. figures, this becomes evident and perhaps points up the mode the contenders need to strengthen.

C.W.	Position	PHONE
Potomac Valley RC	1	Potomac Valley RC
Frankford RC	2	Frankford RC
Rubber City Hotshots	3	Rubber City Hotshots
Ohio Valley AR Assn.	4	South Jersey Radio Assn.
Conn. Wireless Assn.	5	Rochester AR Assn.
Inglewood ARC	6	Sioux City AR Assn.
Motor City RC	7	Motor City RC
Rochester AR Assn.	8	Inglewood ARC
South Jersey Radio Assn.	9	Ohio Valley AR Assn.
Sioux City AR Assn.	10	Conn. Wireless Assn.

CLUB SCORES

Club	Score	Valid Entries	C. W. Winner	Phone Winner
Potomac Valley Radio Club	3,281,438	82	W4KFC	W3GRF[1]
Frankford Radio Club	2,318,610	70	W3BES	W3HHK
Rubber City Hotshots (Ohio)	767,155	55	K8IGT	K8NYM
Ohio Valley Amateur Radio Assn	564,767	11	W8RSW	W8JZM
South Jersey Radio Assn	362,199	39	WB2EJF	WA2EIY
Rochester Amateur Radio Assn	326,886	29	WA2HUV	K2IIL
Inglewood Amateur Radio Club	280,582	11	K6JBV	WB6FQO
Connecticut Wireless Assn.	271,893	8	W1ECH	.....
Motor City Radio Club (Mich.)	256,376	9	WA8CZH	WA8CZH
Sioux City Amateur Radio Assn. (Iowa)	250,930	10	W0CXN	K0NIM8
Miami Valley Amateur Radio Contest Society (Ohio)	233,857	13	W8CEA	W8LLT
Fort Myers Amateur Radio Club (Fla.)	232,305	15	W4KET	W4KET
Oak Ridge Radio Operators' Club (Tenn.)	224,346	3	.....	.....
Larkfield Radio Club (N. Y.)	222,052	13	WA2YLL	WA2YLL
Suffolk County Radio Club (N. Y.)	218,870	13	K2ZYR	W2GKZ
Central Michigan Amateur Radio Club	208,384	13	W8VPC	W8WYC[2]
Germantown Radio Club (Pa.)	192,253	6	K3LWR/3	.....
Fork Amateur Radio Club (N. Dak.)	180,417	9	WA0AAD	WA0AAD
Ramona Radio Club	182,682	4	WA6QNN	.....
Wisconsin Valley Radio Assn.	177,015	3	.....	.....
Lake Success Radio Club (N. Y.)	174,569	12	WA2TJA	W2CWD
Huntsville Amateur Radio Club (Ala.)	170,737	7	.....	W1YIZ
Van Wert Amateur Radio Club (Ohio)	154,440	10	W8DHG	W8DHG
Argonne Amateur Radio Club (Ill.)	144,312	12	W9RCJ	W9PVT
Tuseo Radio Club (Ohio)	135,653	11	K8SMA	K8ANA
Red Bud Amateur Radio Club (Mich.)	133,239	5	W8DUS	.....
Radio Amateurs of Greater Syracuse	129,218	10	K2KPK	WA2PQG
Waupaca Amateur Radio Club (Wisc.)	123,581	8	K9WIE	K9YRC
Hamfesters Radio Club (Ill.)	123,068	5	.....	W9AA[3]
1200 Radio Club (Mass.)	118,935	4	.....	K1WJD
Seven-Eleven Amateur Radio Club (N. J.)	115,717	11	WB2CZZ	K2KFP
Order of Boiled Owls of New Mexico	106,925	3	W5CK	.....
Milwaukee Radio Amateurs' Club	99,909	8	W9BLQ	W9VSO
Newington Amateur Radio League (Conn.)	96,866	3	W1BGD	.....
Order of Boiled Owls of Ohio	95,590	4	W8ETU	.....
North Penn Amateur Radio Club	94,082	9	W3NCW	W3JSA
City College of New York Radio Club	93,192	4	WA2TKL	.....
Louisville's Active Radio Operators (Ky.)	88,479	5	W4CVI	.....
York Radio Club (Ill.)	83,632	12	WA9RJM	WA9IIJ
Central Connecticut Amateur Radio Club	81,950	7	K1THQ	K1THQ
Kanawha Radio Club (W. Va.)	81,017	3	.....	.....
New York Ionosphere Busters	79,053	4	.....	WB2GYD
Massasoit Amateur Radio Assn. (Mass.)	79,319	4	W1WLZ	.....
Northwest St. Louis Amateur Radio Club (Mo.)	76,018	5	.....	K0GSV
Massillon Amateur Radio Club (Ohio)	71,828	5	K8QMJ	.....
Telco Amateur Radio Club of Manhattan	71,548	7	W2LQP	W2LQP
West Park Radiops (Ohio)	67,902	10	WA8HVR	W8AJW
Atlanta Society of Teenage Radio Operators (Ga.)	63,919	7	WA4QZY	WA4IWE/4
Roosevelt High School Radio Club (N. Y.)	57,385	5	WB2CPU	.....
Detroit Amateur Radio Assn	55,326	5	K8QLL	.....
Blackstone Valley Amateur Radio Club (R. I.)	53,439	5	.....	W1YRC
Starved Rock Radio Club (Ill.)	51,278	8	.....	K9RHV/9
Denver Radio Club (Colo.)	50,775	5	.....	K0VFN
Rock Creek Amateur Radio Assn. (Md.)	44,325	6	W3AMK	.....
Horseshoe Radio Club (Pa.)	41,192	7	K3ELL	K3SIQ
Gloucester County Radio Club (N. J.)	40,963	10	WB2EDH	WB2EDH
Canton Amateur Radio Club (Ohio)	39,294	3	.....	.....
Radio Club of Tacoma (Wash.)	37,968	4	.....	W5YFS/7
Bristol Amateur Radio Club (Tenn.)	34,292	6	K4TYE	W4YAU
Nutley Amateur Radio Assn. (N. J.)	31,947	4	W2NEP	.....
Walton Radio Assn. (N. Y.)	30,030	3	W2TFL	.....
Morton West Amateur Radio Club (Ill.)	26,424	6	WA9KWP	.....
Hall High School Amateur Radio Club (Ark.)	26,370	3	.....	WA4GRA
North Augusta-Belvedere Radio Club (S. C.)	24,164	3	.....	.....
Lockhead Employees Radio Club	21,990	6	WA6WTL	.....
Pleasant Valley School Amateur Radio Club (Iowa)	20,432	7	WN0LJW	.....
Northwest Amateur Radio Club (Ill.)	20,111	6	WA9IXA	.....
Columbus Amateur Radio Assn. (Ohio)	18,899	5	.....	WA8DOM/8
Rock Falls Radio Club (Ill.)	18,140	3	.....	WA9IYU
Boeing Employees' Amateur Radio Club (Wash.)	12,540	4	K7KYG	.....
Springfield Amateur Radio Club (Ohio)	12,058	4	.....	WA8AEY
Westside Amateur Radio Club (La.)	9863	3	.....	.....
4-H Amateur Radio Club of Fairfax County (Va.)	9606	4	WA4RDN	.....
Point Radio Amateurs (Wisc.)	8851	7	K9LGU	.....
Dorsey High Radio Club	7183	4	WB6DFQ	.....
Lakewood Radio Club (Ohio)	6869	6	W8PM	WA8HQG
Northeast High School Radio Transmitting Soc. (Pa.)	1446	3	.....	K3QGQ
Six Meter Club of Chicago	375	3	.....	K9RVG
Kettering Amateur Radio Experimenters (Ohio)	191	3	.....	.....
Flying Stallion Radio Transmitting Patrol of Troop 456 B.S.A. (Pa.)	77	3	.....	.....

[1] K1ANV, opr. [2] W8TJQ, opr. [3] W9LNQ, opr.



One of the interesting sidelights of the SS is the intra-club competition within PVRC. The club is divided into two teams, with the '64 "team captains" W3GRF and W4KFC. At the annual Christmas party, winning team captain W3GRF, with an assist from club prexy W4ZM, displays his teams' winning side score. These fellas' don't miss a trick, even using A-1 sauce!

PHONE WINNERS, 31st A.R.R.L. SWEEPSTAKES

Section	*Call*	*Score*	*Transmitter(s)*	*Receiver(s)*	*Antenna(s)*
Delaware	K3GEK	34,760	HX-20-813	SX-111	Dipoles (40, 20).
E. Penna.	K3DVS[3]	102,510	Galaxy-300	Galaxy-300	Dipoles; Tribander.
Md.-D. C.	W3GRF[1]	130,032	32S3-30L-1	75S-3	Longwire (75); 3-L (40); 5-L (20); 5-L (15).
S. N. J.	WA2BLV	56,181	HT-37	HQ-170	Dipole (75); 2-L (40); Tribander.
W. N. Y.	K2IML	72,036	HT-32	75S-1	Vertical; Inverted Vee.
W. Penna.	W3BBO	34,020	Marauder	HQ-110, HC-10	Dipole (75, 40); TA-33 Jr.
Illinois	K9VKH	85,260	HT-32A	SX-111	TH-4.
Indiana	W9IOP	100,674	32S-3B	75S-3B	Dipole; 2-L (40); 3-L (20); 3-L (15).
Wisconsin	W9RQM	61,740	813	HRO-50T	Zepp (75); Ground-plane (40); Rotary SJK (20).
Minnesota	WØJPH	36,332	32S-1	75S-1	Inverted Vee; 3-L (20).
No. Dakota	WA0AAD	57,702	HT-32B	HQ-170A	Inverted Vee (75, 40); Quad (20, 15).
So. Dakota	WØPRZ	12,273	32S-1; TR-3	75S-3; 75A-4; TR-3	.....
Arkansas	WA5CBL	64,998	HT-37	SX-101A	Inverted Vee (75); 2-L (40); 4-L (20); 4-L (15).
Louisiana	W5KC	42,021	HT-37	HRO-7	Doublet (75, 40); TA-33.
Mississippi	K5TYP[2]	148,920	TR-3; RV-3	TR-3; RV-3	Dipole (75); Vertical (40, 15); Beam (20).
Tennessee	K4LPW	92,528	HT-32	SX-101A	Longwire; Vertical.
Kentucky	W4BCV	13,959	CE-100-V	75S-3	Vertical, Dipole (75); 2-L (40); 4-L (20); 3-L (15).
Michigan	K8TIG[3]	85,782	32S-3	75S-1	Dipoles (75, 40); 3-L (20, 15).
Ohio	W8LLT	65,016	KWM-2	KWM-2	Inverted Vees; 3-L.
E. N. Y.	WA2OOO	22,358	TR-3	TR-3	Dipole (75, 40); TA-33.
N. Y. C.-L. I.	WA2TKL	55,710	NCX-3	NCX-3	Vertical (75, 40); Dipole, Beam (20).
N. N. J.	K2KFP	24,960	GSB-100	SX-111	Ground-plane (75, 40); Tribander.
Iowa	KØBUU	74,571	GSB-100	75A-4	TH-4.
Kansas	KØKLW	55,242	32S-1	75S-3	Trap dipoles.
Missouri	KØUWZ	58,401	HT-37	HQ-170	Inverted Vee; TA-33.
Nebraska	KØCVA	106,926	TR-3	TR-3	Inverted Vee; Dipole (40); 3-L (20).
Connecticut	K1THQ	40,875	5100-B-51SB-B	2-B; 2-AQ	Dipoles.
E. Mass.	K1DIR	73,840	HT-32A-4-250As	75S-1	Dipole (75); 2-L (40); 3-L (20, 15).
Maine	K1RQE	43,092	SB-10	HQ-170C	Dipoles; TA-33.
N. H.	W1FZ	21,624	CE-100-V	75A-4	Beams.
R. I.	W1YRC	51,423	32S-3	75S-3B	Dipoles; TA-33.
Vt.	K1PNE	17,289	4-400A	Super Pro	Rhombic.
W. Mass.	K1NWE	33,768	HT-32	NC-303	Dipole; TA-33.
Alaska	K1AII/KL7	1,710	30L-1	R-390	LPA.
Idaho	K7LPF	24	HT-32	2-B	.....
Montana	W7CBY	9,216	813	Conv., HC-3	Quad (20, 15, 10).
Ore.	W7WLL	79,900	32S-1-4[illegible]B-1	75S-1	Doublet (75, 40); TH-4.
Wash.	W7ESK	192,273	32S-3	75S-1	Dipole, 2 vertical phased half waves (75); 2-L (40); Stacked 3-L (20, 15).
E. Bay	W6KG	50,250	KW	.....	Beams.
Hawaii	KH6FIF	10,080	NCX; Ranger	NCX; 2-B	Inverted Vee (40); TA-33.
Nevada	K7WLX	7,992	DX-20-4-811A	SX-99	Vertical.
Sac. V.	WA6SLU	34,645	HT-37-4-250A	2-B	2-L (40); 3-L (20).
S. F.	WA6AUD	18,096	HT-37	HQ-170	Dipoles (75, 40); Beam
S. J. V.	W6TZN	40,848	HX-10-HA-10	75S-1	Inverted Vee; Tribander.
S. C. V.	K6CLM	62,985	TR-3-4-1000A	TR-3	2-L (40); 3-L (20, 15).
N. C.	WA4LGG	17,313	HW-32	HW-32	Dipole (40); Quad (20).
S. C.	K4YYL	60,977	NCX-3	NCX-3	Dipoles (75, 40); Ground-plane (40); Tribander.
Va.	W4KFC	118,860	32S-3; 32S-3-4E27	75A-4	End Fed (75); Ground-plane (40); 3-L (20, 15).
W. Va.	W8NCD[4]	47,838	TR-3	TR-3	Vertical.
Colo.	KØJGF	52,983	KWM-1	KWM-1	Tribander.
N. Mex.	WA5DUH	27,540	DX-40	HQ-180	Beam.
Utah	K7AQB	55,449	HT-37	SX-117	Inverted Vee (75); Vertical (20, 15, 10); 3-L (15).
Wyo.	K7ORN	20,493	HX-10	HQ-170	Dipole (75, 40); Tribander.
Ala.	K4CFD	85,334	HT-37	2-B	Dipole (75, 40); TA-33.
C. Z.	KZ5TT	588	32S-3	75S-3	Tribander.
E. Fla.	WA4NGO	81,972	CE-100V-4-400As	75A-4; RME-6900	Inverted Vee (75); 2-L (40); 7-L (20); 4-L (15).
Ga.	K4BAI	101,745	NCX-3; 100TH	NCX-3; HQ-170	Dipole (75); 2-L (40); TA-33.
W. I.	KP4BFD	375	HX-20	HX-20	Vertical.
W. Fla.	K4DAD	58,380	NCX-3	NCX-3	3-L (20); Dipole (75).
Ariz.	W7AYY	74,973	KWM-2	KWM-2	Verticals.
L. A.	K6EVR[5]	159,980	CE-100V	75S-3	Dipole (75); 2-L (40, 15); 5-L (20).
S. Dgo.	W6NAT	22,656	SBE-34-3-400Z	2-B	Longwire, Inverted Vees (75, 40); Doublet (40); 3-L (20, 15).
S. Bar.	WB6DPV	6,000	HX-11	RME-6900	Inverted Vee (75); Dipole (40, 15).
N. Tex.	K5RHZ	111,345	SR-150	.....	Dipoles (80, 40); 3-L (20, 15, 10).
Okla.	K5HWO	36,180	32S-3-30L-1	75S-3	TA-33.
S. Tex.	K5LZO	132,192	32S-3	75S-1	Vertical; Tribander.
Alta.	VE6OR	28,152	HT-37	2-A	Dipole (75); 3-L (20); 2-L (15).
Ont.	VE3CKW	37,236	KWM-2	KWM-2	Vertical; Dipole (40); Tribander.
Que.	VE2AUV	94,248	NCX-3	NCX-3	Dipoles (75, 40); Beam (20).

[1] K1ANV, opr. [2] K1KTH, opr. [3] W8FAW, opr. [4] WA8DGE, opr. [5] W9WNV, opr.

C. W. WINNERS, 31st A.R.R.L. SWEEPSTAKES

Section	Call	Score	Transmitter(s)	Receiver(s)	Antenna(s)
Delaware	W3GAU	79,380	32S-1	75A-4	Dipoles; 3-L (20).
E. Penna.	W3BES	110,445	32S-3	75S-3	Ground-plane; TA-33; Doublet.
Md.-D. C.	W3MSK	107,240	CE-100V	75S-3	2-L, Dipole (80); 4-L (40); 7-L (20, 15).
S. N. J.	WB2APG	92,123	6146s; Viking II; TR3	75S-3	Dipole; 2-L (40); TA-36.
W. N. Y.	K2KTK	83,403	Valiant	SX-101A	Dipole; TA-33 Jr.
W. Penna.	W3YLJ	105,913	DX-100	HQ-170	Dipole; Vertical; 2-L (20).
Illinois	W9RCJ	93,805	DX-100	75A-2	Inverted Vee; TA-33.
Indiana	WA9AUM	69,960	Eico 720	2-B	175-ft. end-fed wire.
Wisconsin	W9RQM	95,850	VOF-807-813	HRO-50T	Zepp (80); ground-plane; Rotary 8JK (20).
Minnesota	WØAIH	115,066	CE-100V	75A-3	Zepp (80); 2-L (40); 4-L (20); 4-L Quad (15).
No. Dakota	WAØAAD	41,183	HT-32B	HQ-170A	Inverted Vee; Cubical Quad (20).
So. Dakota	WØCUC/Ø	49,075	Valiant; SW-240	HQ-180; 75A-1	Inverted Vee; TH-2.
Arkansas	WA5CBL	75,701	HT-37-NCL2000	SX-101A	Inverted Vee; 2-L (40); 4-L (20, 15).
Louisiana	W5YDC	68,775	Marauder	75A-4	.....
Mississippi	K5TYP	104,340	TR-3	2-B	Dipoles; Verticals; Rotary (20).
Tennessee	K4LPW	115,888	HT-32	SX-101	Longwire; Vertical; Beam.
Kentucky	K4GSU	104,825	Ranger-811A	75A-4	Dipole (80); 2-L (40); 3-L (20).
Michigan	K8TIG	102,675	32S-3	75S-1	Dipoles (80, 40); Tribander.
Ohio	W8RSW	88,148	CE-100V	75A-4	Doublets.
E. N. Y.	WA2OJD	50,660	SB-400	75S-3B	Fan Dipole, Semi-vertical (80); Bob-tail beam (40); TA-33.
N. Y. C.-L. I.	W2DSC	74,000	Valiant	75A-1	Dipoles (80, 40); Tribander.
N. N. J.	W2VJN	89,820	32S-3	75S-3	Vee; Inverted Vee; Tribander.
Iowa	KØBUU	65,160	GSB-100	75A-4	TH-4.
Kansas	WØIEM	39,456	DX-100	HQ-140X	Vertical.
Missouri	WØWYJ	61,138	DX-100	Mohawk	Dipoles (80, 40); Beam (20).
Nebraska	WAØETE	27,706	Ranger	SX-101	Inverted Vee (80, 40); Ground-plane (20, 15, 10).
Connecticut	W1ICP[1]	64,872	Pr. 250s	75A-2	Center fed, tuned feeders; Beam (20).
E. Mass.	K1DIR	92,126	HT-32-4-250As	SX-101A	Dipole (80); 2-L (40); 3-L (20, 15).
Maine	W1GKJ	52,930	SR-150-813s	SR-150	.....
N. H.	W1DYE	53,156	Valiant	NC-303	Dipoles (80, 40, 20).
R. I.	K1EWL	52,605	Eico 720-LA-1	HQ-100AC	Dipoles; Ground-plane.
Vermont	K1UZG	38,571	Ranger	2-B	Dipoles (80, 40); 4-L (20, 15).
W. Mass.	W1EOB	48,100	Exciter-4-250A	75A-3	Inverted Vee (80); Center fed (40); 3-L (20).
Alaska	K1AII/KL7	17,000	30[illegible]	SR-[illegible]0	LPA
Idaho	K7CPC	43,215	DX[illegible]0	HQ[illegible]70A	End fed (80, 40); Phased Verticals (20); Vertical (15).
Montana	W7HAH	24,875	Ma[illegible]uder	HQ[illegible]80	Inverted Vee (80, 40); Tribander.
Oregon	W7TDK	75,331	S-[illegible]e-4-1000A	[illegible]-Line	Inverted Vee (80); Beams (40, 20).
Washington	W7ESK[2]	132,586	32S-[illegible]	75S-[illegible]	Phased Verticals, Dipole (80); 2-L (40); Stacked beams (20, 15).
E. Bay	W6KG	70,855	CE-100V	75A-4	Doublet (80); Beams.
Hawaii	KH6FIF	23,045	Ranger-BC-610	2-B	Inverted Vee (40); TA-33.
Nevada	W7KEV	48,913	807-4-65A	HQ-129X	Zepp; Doublet.
Sac. V.	WA6SLU	53,040	4-250A	2-B	2-L (40); 3-L (20).
S. F.	WA6RXM/6	35,700	DX-100	SX-101A	Dipole (40); Tribander.
S. J. V.	W6BVM	56,055	Viking I	75A-2	.....
S. C. V.	K6VVA	82,425	HT-32A	75A-4	Inverted Vee, Dipoles (80, 40); 3-L (20); 3-L (15).
N. C.	W4LYV	35,360	32V-3	75A-4	.....
S. C.	W4BWZ	36,836	VFO-6AG7-6V6-807	SX-71	Windom
Va.	W4KFC	155,955	VFO-4E27; 32S3	75A-2	End Fed (80); Ground-plane (40); 3-L (20, 15).
W. Va.	W8NCD[3]	52,511	TR-3	Tr-3	Vertical; Dipole.
Colo.	KØSLD	85,775	HT-32A; HT-33A	SX-115	.....
N. Mex.	W5CK	53,235	HX-10	2-B	Inverted Vee; Quad.
Utah	K7RAJ	63,294	DX-60	HQ-170A	Dipoles; 3-L.
Ala.	K4CFD	72,463	HT-37	2-B	Dipoles (80, 40); TA-33.
C. Z.	KZ5OP	85,509	32S-3B	75S-3B	2-L (40); TH-4 (20, 15).
E. Fla.	WA4NGO	122,443	CE-100V; SB-400	75A-4; RME 6900	2-L (40); 7-L (20); 4-L (15).
Ga.	K4BAI	103,295	NCX-3; 100-TH	75A-2	Dipole (80); 2-L (40); TA-33.
W. I.	KP4BJU	8,619	Valiant	HQ-170	Center-fed (80).
W. Fla.	W4JJ[4]	86,688	6146-6146-5763-6CL6-6AU6	NC-300	Ground-plane; Dipoles; Beams.
Ariz.	K7TNW	65,325	KWM-2	HQ-150	Dipole; TH-3.
L. A.	K6EVR[5]	140,600	CE-100V	75S-3	Dipole (80); 2-L (40, 15); 5-L (20).
S. Dgo.	K6LKD	60,300	Viking II	SX-101	Dipoles.
S. Bar.	W6GEB	51,440	Apache	Homebrew 20-tube	100' Wire; 14AVQ.
N. Tex.	K5RHZ	91,800	SR-150	SR-150	Dipole (80); 2-L (40); 3-L (20, 15, 10).
Okla.	K5OCX	79,144	Apache	75S-1	Dipoles; Beam.
S. Tex.	W5WZQ	102,583	Valiant	SB-300	Beams.
Mar.	VE1RB	31,977	813s	75A-4	Zepp (80, 40); TA-33 (20, 15).
Que.	VE2AYU	29,624	Homebuilt 803	Conv.-HRO Jr.; BC-453	Vertical (80); 3-L Ver. (40, 20); Quad (20, 15).
Ont.	VE3CVX[6]	70,200	HT-32	HQ-180A	Inverted Vee (80); Ground-plane (40); Tribander (20, 15).
Sask.	VE5VP	34,510	VFO-6AG7-6L6-807s	S-76	Longwire; Tribander.
Alta.	VE6MA	16,500	Ranger	HQ-110	Vertical; Doublets.
B. C.	VE7AGN	20,930	6AG7-6AG7-2E26-807s	Home-made	Center fed superhet.
Yukon	VE8WT	23,954	HT-37-3-1000	2-B	.....

[1] W1YNP, opr. [2] W7WJB, opr. [3] WA8DGE, opr. [4] K4VFY, opr. [5] W9WNV, opr. [6] VE3FUX, opr.

Quotes

"As usual the competence of the operators was top notch." — *K1QVT* (opr. *VE2UN*). . . . "Haven't heard 15 like that for a long, long time!" — *WA6WTD*. . . . "Worked *WA2EIY* my nr. 302 and time 2222; his nr. 22 and time 2222. His birthdate was April 2, the freq. 14.2 and the mode was 2 X SSB. This 2 way contact was obviously worth 2 points." — *WA0AAD*. . . . "How am I supposed to win with *him* (KFC) next door?" — *WA4PRF*. . . . "At 2350 my fourth (and last) rig went out, leaving me surrounded by transmitters, none of which would work." — *WA6KLL*. . . . "I stomped so hard on my foot switch that the screws came out three times in an hour and I was constantly stopping to fix it, my relay, and of course to chow down." — *K6VVA*. . . . "Decided to try high powers: my mistake. With 150 watts and a multiplier my phone score would have been at least 110-K." — *WA4NGO*. . . . "Everyone got the word about the SS but the stork, a 7 lb. 4 oz. boy!" — *W3ZUH*. . . . "Missed WAS in 24 hours because of Kansas." — *W9GFF*. . . . "Heard a station calling CD FD!" — *WA5HZY*. . . . "You might say that the SS was great if you don't mind the *DUS*. Worked W3*DUS*, WA4*DUS*, W8*DUS* and VE3*DUS*!" — *W4KFC*. . . . "If you can't beat 'em, join 'em. Next year look for me at the U. of Mich., K8TIG." — *WA8CZH*. . . . "Everything was in my favor except conditions, rig, receiver, antenna, antenna relay, clock, etc." — *WA6UOQ*. . . . "Someone caught me with a mouth full of hamburg which I had to swallow whole. This doesn't happen on c.w." — *W8FAW* (opr. *K8TIG*). . . . "VE5US must use a mile-long rhombic pointed towards S. C. to account for that potent 599X plus signal he put in here on c.w." — *W4JA*. . . . "Last year I felt I was quite an oldtimer with my ck 24. This year there were so many on that I felt like a young punk. There was VE3WW '12, W4SD '14, W4ZM '15, W1VG '16 and W9KZ '19 and all kinds of 'em in the 20's." — *W6BVM*. . . . "It sure was a thrill to work both Dakotas on 75 sideband with only 100 watts." — *K8MMZ*. . . . "21 gave many sections with little trouble and power." — *K7UTF*. . . . "I was surprised to meet up with so many VHF ops, while working the d.c. phone bands." — *K3OBU*. . . . "The phone party demonstrated that a.m. is practically extinct. It is a hard way to make contacts when the going is rough." — *W3EIS*. . . . "The odds of two people in a group of 24 having the same birthday are better than even, believe it or not." — *KØPPD*. . . . "This year homework took a back seat." — *WA9FMQ*. . . . "One hour off to climb tower at 4 a.m., temperature 25, to tighten bolts for rotor-to-mast assembly. Glad my car has a spotlight!" — *WA5CBL*. . . . "I now have a noticeable twitch between my thumb and index finger." — *KØBFF* (one of the *W2TAB* oprs.). . . . "Worst problem here was convincing people my call does have three O's." — *WA2OOO*. . . . "A W3 (ck. 29) called me (ck. 29) an old buzzard — right into an open microphone over the air!" — *WA2OJD*. . . . "15 turned up with some pleasant surprises in the form of KH6 KZ5 VE8 VE6 VE5, etc." — *K1ZHS*. . . . "I found the SS in my horoscope, it read 'develop greater interest in hobby, creative pursuit. Correspond. Fine time for exchange of information. Friends may offer valuable suggestions. Romance in the air. Be receptive!' " — *K8ZMI*. . . . "This was my first SS and after making a few phone contacts for kicks, the competition bug bit and I went to work 12 hours." — *W2ZVS*. . . . "Many thanks to the people who took time out in the c.w. SS to wish me a happy birthday." — *K3FOD*. . . . "Think I'll move to the Yukon." — *VE3EFD*. . . . "I was called out about noon on Sunday to go sit with a sick computor." — *K5SOD*. . . . "Coincidence, my birthdate is March 16. My nr. 16 went to W7TDK whose birthdate is also March 16." — *K7OLZ*. . . . "Never realized I could feed the dog, answer the phone, log and call CQ, all at the same time." — *WB6CVV*. . . . "I have known WB6DQX for some time but it took this phone contest for us to realize we have the same birthday." — *WB6EFA*. . . . "Do I get credit for the two YU's who called in response to my CQ SS on forty phone in broad daylight?" — *WA4NGO*. . . . "Now why is it I can always get a VE8 when my score is so low that it really doesn't matter?" — *WØMYB*. . . . "I have one of the poorest contest calls, everyone thought I was breaking. It was not enhanced by the fact that my birthday is Nov. 21, the date of the SS." — *W8BKK*. . . . "Murphy caught up with me this time, I lost a h.v. transformer and four hours." — *W3QMZ*. . . . "More stations and more sections in less time than last year." — *WA4KQI*. . . . "Most pleasing part of the c.w. SS was acing THE MAN K6VVA on 40 when we called a few stations at the same time." — *WA6TQK*. . . . "Arrival of a new daughter resulted in a lower score." — *WA6JSA*. . . . "The contest really puts the solid state gear to the test; worked K6PSP who was also running a solid state transmitter. Next year back to the tubes though." — *WA6UVR*. . . . "Rather embarrassing not to be able to work my own section, Montana." — *W7EWR*. . . . "A few of the stations were willing to accept my number, etc. but didn't want to give me anything!" — *K7IAE*. . . . "Got detention for sleeping in four of Monday's classes." — *WB2GMK*. . . . "Worked more states in the SS than I did my first four months of being a Novice." — *WA0CJZ*. . . . "There should be a special multiplier for having a glove on one hand and being wrapped in a blanket." — *KØQIX/Ø*. . . . "Missed VE7 and KZ5, they were on 15 phone while I was on 20." — *K1ANV* (opr. *W3GRF*). . . . "The rare phone section this time was W. Mass." — *K1THQ*. . . . "QRM got a bit rough on 20 phone with the 5-L beam pointed east. I wasn't used to hearing the W5's and everyone east of them so well at the same time." — *K9ELT* (opr. *W6RW*). . . . "Never heard the band change so fast in just 10 minutes. At 2355 it was a fiasco, at 0005 it was dead as dead could be." — *WA6VAS*. . . . "I'm beginning to think W. Fla. is harder to work than N. H. and Wyo." — *W8APC*. . . . "I found the QT ops the best as a whole, easy speed but they got it through the first time." — *W1OPR*. . . . "Two resolutions for '65: move upstairs so I don't have to operate in 30-degree temperatures and use earphones with rubber cushions." — *K3ZLR*. . . . "There's no laundry chute in my new house for sneaking into the basement shack." — Buck, *VE3ON*. . . . "I had a good time with low power, it's always nice to run into old friends in this contest." — *WA6VTL*. . . . "My trusty old plate transformer (vintage 1937) failed after 4½ hours, putting me out of the c.w. SS." — *K3JQU/4*. . . . "Wait till next year." — *K1MYQ*.

DIVISION LEADERS

(*Single Operator*)

C.W.		Phone
W3BES	Atlantic	W3GRF
W9RQM	Central	W9IOP
WØAIH	Dakota	WAØAAD
K4LPW	Delta	K5TYP
K4GSU	Great Lakes	K8TIG
W2VJN	Hudson	WA2TKL
KØBUU	Midwest	KØCVA
K1DIR	New England	K1DIR
W7ESK	Northwestern	W7ESK
K6VVA	Pacific	K6CLM
W4KFC	Roanoke	W4KFC
KØSLD	Rocky Mountain	K7AQB
WA4NGO	Southeastern	K4BAI
K6EVR	Southwestern	K6EVR
W5WZQ	West Gulf	K5LZO
VE3CVX	Canadian	VE2AUV

Disqualification

In accordance with contest rule 7, the phone log of K1RYT has been deemed ineligible for score listings or awards.

WA4NGO, ex-K6CTV, displayed winning form winning phone and c.w. E. Fla. awards, 4th highest c.w. score and S.E. Division A-1 top position. Among the station gear are a 100-V and 6100 exciter, a parallel 4-400A amplifier, 75A-4 and RME 6900; plus the MM-1 RF analyzer, Panadaptor, etc.

C. W. SCORES

Thirty-first Sweepstakes Contest

Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is award winner for that Section unless otherwise indicated. . . . Likewise the "power factor" used in computing points in each score is indicated by the letter A or B. . . . A indicates *power up to and including 150 watts* (multiplier of 1.25 c.w., 1.5 phones), B over 150 watts (multiplier of 1). . . . The total operating time to the nearest hour, when given for each station, is the last figure following the score. . . . Example of listings: W3GAU 79,380-447-72-A-16, or final score 79,380, number of stations 447, number of multipliers 72, power factor of 1.25, total operating time 16 hours. . . . An asterisk denotes Novice certificate winners. A double asterisk denotes Technician certificate winners. Multi-operator stations are grouped in order of score following single-operator station listings in each section tabulation.

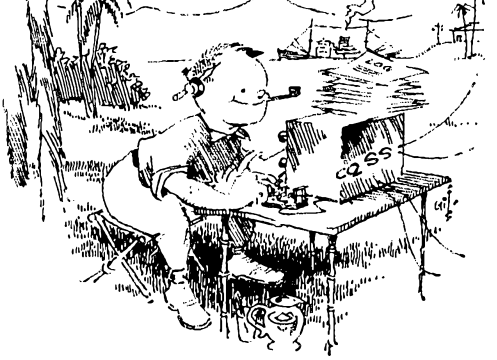
ATLANTIC DIVISION

Delaware

W3GAU	79,380-447-72-A-16
W3IYE	55,028-320-69-A- –
K3COO	14,350-142-41-A-10
K3ZMI	12,631-121-43-A-14
W3DRD	9360- 86-39-A-13
K3UXQ	113- 8- 6-A- 3

Eastern Pennsylvania

W3BES	110,445-700-74-A-24
W3FLY	98,875-566-70-A-24
W3GHM	85,043-494-69-A- –
W3HHK	67,025-383-70-A-14
W3KFQ	61,305-366-67-A-12
W3QMZ	42,612-319-69-B-21
W3KDF	41,600-260-64-A-14
W3NOH	41,400-360-46-A-14
W3RIP	37,760-236-64-A-14
W3WJD	36,900-250-60-A- 9
K3JCT	35,955-283-51-A- 9
K3LWR/3	35,883-232-62-A-21
K3LJZ	35,400-240-50-A-14
W3JXS	34,493-220-63-A-16
K3YQJ	30,013-247-49-A-15
W3GRS	28,000-175-64-A- 9
K3HUA	27,349-216-51-A-24
W3KVW	27,000-180-60-A-14
W3ISE	25,155-234-43-A-14
K3HNP	22,770-199-46-A- –
W3AEM	22,568-217-52-B-14
W3JET	21,206-189-45-A-17
K3GNI	16,988-151-45-A- 8
K3EGE	16,800-160-42-A-10
W3CBF/3	16,482-201-41-B-18
K3MCO	16,200-145-45-A- –
K3RVC	15,641-150-43-A-18
W3HYX	15,435-146-42-A-12
W3GSD	10,545-114-37-A- –
K3ZOL	10,080-112-36-A- 9
W3EQA	9204-119-39-B- 7
W3NCW	8970- 92-39-A-10
K3NJW	8033-120-27-A-13
W3ARK	7813-109-36-B- 7
K3YVQ	7518-102-31-A- 9
W3GSY	5610- 68-33-A- –
K3RZE	5525- 85-26-A-10
K3RFB	5376- 96-28-B-13
K3JLI	5270- 63-34-A- 3
K3TYL	5130- 76-27-A-14
K3OHU	4590- 77-24-A-16
W3DBX	4464- 62-36-B- 7
W3CGS	4080- 51-32-A- 8
W3IVC	4000- 65-25-A- 5
K3NVC	3825- 51-30-A-12
W3EER	3698- 51-29-A- 6
K3PBL	3373- 71-19-A-13
W3ABZ	3315- 52-26-A- 4
K3ZXG	3300- 64-22-A-11
W3OY	3080- 56-22-A- 8
K3WJQ	2625- 52-21-A-11
WA3BNF	2318- 56-18-A- 9
K3YQS	2310- 44-21-A-11
W3QOT	2160- 45-24-A-12
K3PLJ	2019- 52-17-A- 6
K3LOW	1900- 38-20-A- 3
W3JSA	1710- 36-19-A- 3
K3IWK	1665- 37-18-A-18
K3IAM	1615- 38-17-A- 4
K3ZTE	1538- 41-15-A-10
WA3AHB	1508- 36-18-A- –
K3ZPL	1425- 40-15-A- –
K3ZRK	1280- 32-16-A- 6
W3BUR	1163- 31-15-A- 1
K3ZLZ	1100- 28-16-A- 9
W3SOH	798- 29-11-A- –
WN3AMQ*	633- 23-11-A-10
WN3AYW	550- 23-11-A- 5
WN3BFR	550- 20-11-A- 9
WA3ALW	425- 17-10-A- 1
WN3BSV	105- 12- 4-A- 4
WA3BAN	69- 6- 5-A- 3
W3GKQ	22- 4- 4-B- 2
K3QQQ	20- 4- 2-A- 1
K3PWU	3- 1- 1-A- 1
W3MWC (K3s JJG JLI)	133,293-737-74-A-24
W3CCH (K3s RZF TEJ)	64,310-436-59-A-24
W3KT (multiopr.)	53,575-310-69-A- –
K3HTZ (WB2EUR, K3HTZ)	37,625-301-50-A-17
K3OMP (K3s MHD OMP PWM)	32,334-318-51-B-24
W3YP (4 oprs.)	25,970-215-49-A-24
K3WVB (K3s ULL WVB)	11,400-148-40-B-23



Maryland-D. C.

W3MSK[1]	107,240-591-74-A-24
W3MSR	91,958-550-67-A-22
W3ZKH[2]	80,660-555-74-B- –
W3TMZ	78,840-540-73-B-21
W3GRF	77,970-574-69-B- –
K3QDD	68,640-433-64-A-20
W3EIS	66,063-378-70-A-21
K3GUR	65,995-394-67-A-21
W3MFJ	58,039-347-67-A-18
K3CKT	57,173-347-66-A-21
W3AXW	48,675-295-66-A-23
K3KMO	48,205-311-62-A-22
W3MCG	46,649-280-67-A-16
K3JYZ	45,500-325-56-A-20
W3ZVJ	45,080-322-56-A- –
W3RNY	33,880-242-56-A-15
W3AFM	32,880-275-60-B-19
W3ZQ	31,930-259-62-B-13
W3KDP	29,580-256-58-B- –
W3ZNH	29,219-216-55-A-14
W1QMM/3	24,380-185-53-A-16
W3KA	21,165-166-51-A- –
W3AEL	21,000-175-48-A- 8
W3EYF	20,556-129-65-A-15
W3IPO	18,375-148-50-A-10
K3EKO	17,894-195-46-B- 8
K3URZ	17,806-205-35-A-11
K3VZV	17,063-166-42-A-21
K3YGU	15,836-155-41-A-22
W3AMK	15,216-132-47-A- 8
K3CYA	14,430-112-52-A-11
K3GZK	9250-100-37-A-15
W3UE	8835- 93-38-A- 9
K3FOD	8006- 97-35-A- –
W3EAX[3]	6525- 87-30-A- –
W3FBE	6394- 83-31-A-10
W3ZUH	5873- 87-27-A- 8
W9GKY/3	5329- 74-29-A- 7
K3VHS	5198- 95-22-A- 8
K3VJY	4016- 60-27-A- –
K3FKU	2325- 60-20-A- –
K2ERC	4800- 60-32-A- 9
W2YNR	4437- 78-29-B-10
WA2KOK	4188- 67-25-A-11
W2APD	3478- 56-26-A- 6
WB2EUU	2975- 61-20-A- 6
WB2FWZ	1958- 46-18-A- 8
WA2HSP	1755- 39-18-A- 2
K2EJW	1203- 37-13-A- 8
WA2KRY	1148- 28-17-A- 5
WB2KRK	880- 24-16-A-14
K2HBY	765- 26-12-A- 6
K2PI	518- 23- 9-A- 4
WN2MRB*	281- 13- 9-A- 3
WN2LYI	120- 8- 6-A- 4
WN2OXA	69- 6- 5-A- 7
K2AQL	63- 5- 5-A- 1
W2ORA	63- 5- 5-A- 1
WA2UOF (WA2s MBS UOF)	12,375-150-33-A-11

Western New York

K2KTK	83,403-457-73-A-18
WA2HUV	62,059-371-67-A-19
WB2MFX	58,181-403-73-B-23
W2MTA/2	40,744-308-53-A-16
W3HVM	1948- 41-19-A- 4
K3ZYP	1473- 31-19-A- –
W3FYS	1428- 42-17-B- –
WA3AZI	1418- 33-18-A-11
WA3BCQ	1160- 29-16-A- –
W3JEH	1144- 31-15-A- –
WA3BAS	3400- 70-25-B- 7
W3HZG	650- 20-13-A- 6
K3WTV	236- 11- 9-A- 4
K3QDC	213- 18- 5-A- 1
K3ZYB	120- 12- 4-A- 3
K3ZSX	18- 4- 2-A- 6
W3GQF (K3s CUW GJD, W3WZL)	77,848-529-74-B-22
W3DVO (K1ANV, W3DVO)	43,596-346-63-B-24
K3FQF (K3s FDB FKY FQF)	17,302-211-41-B-18
WN3AVH (WN3AVH, KN3-FWR)	1400- 42-16-A-24
WN3AMO (WN3s AMO BKX)	1126- 32-17-A-16

Southern New Jersey

WB2APG	92,123-523-71-A-17
WA2WLN	70,183-420-67-A-21
WA2BLV	55,825-385-58-A-12
W2QDY	33,900-226-60-A-17
WA2CUB	31,270-240-53-A-10
WB2FJF	28,750-250-46-A-15
K2CPR	22,540-161-56-A-10
WB2EOQ	22,040-233-38-A-17
W2HDW	19,988-205-39-A- 8
W2EBW	17,616-185-48-B-19
WB2EDH	12,813-125-41-A-17
W2ZVW	11,760-140-42-B- 6
W2DAJ	10,250-125-41-B- 9
W2TLO	7326- 99-37-B- 5
WB2ALX	7220-101-38-B-15
K2BG	6300- 90-35-B- 6
WB2AZ	5118- 89-23-A-11
W2ESX	4900-123-16-A- 9
WB2CON	25,904-198-53-A-15
W5RLV/2	19,610-185-53-B-14
W2GVH	19,500-250-39-B-15
WB2EXW	18,963-187-41-A-17
WB2KTJ	18,858-207-38-A-13
W2TFL	18,574-201-39-A-14
WB2HFU	15,470-182-34-A-12
K2EEN	12,911-158-33-A- –
WB2JWW	9581-113-35-A-18
WA2SWW	8291-101-33-A-13
W2UJS	7656-134-29-B-12
K2KKH	5801-111-21-A-12
WB2FWG	5655- 89-26-A- –
K2PKK	3795- 66-23-A- 8
WB2DFR	1155- 33-14-A- 4
K2UAN	1024- 32-13-A- 7
WB2JRH	731- 30-13-A- 8
K2KBI	630- 21-12-A- 5
WB2FQJ	439- 20- 9-A- 5
WB2BBD	340- 17-10-B- 2
WA2ZQN	293- 13- 9-A- –
WN2PCP*	281- 14- 9-A- –
WA2KVN	200- 10- 8-A- 4
K2BUI	96- 8- 6-B- 2
K2MTW/2	15- 3- 2-A- 1
K2LXC	5- 2- 2-A- 1
W2TAB (7 oprs.)	21,063-210-51-B-21
WB2NZA (WB2s FPG NZA)	16,388-173-38-A-21
WA2SSJ/2 (WA2s SSJ SXH)	13,845-145-39-A-24
W2OFQ (7 oprs.)	6960-118-24-A-22

Western Pennsylvania

W3YIJ	105,913-590-74-A-21
K3ILC	57,281-356-65-A- –
K3YUT	23,006-207-45-A-16
W8OTI/3	21,931-163-55-A-13
W3OJY	18,290-118-62-A- 9
K3VCH	13,875-156-37-A-14
W3QPF	9735-118-33-A- 9
K3ZLR	7401- 98-31-A-12
W3AFY	7035-101-28-A-11
W3EFW	4200- 70-24-A- 8
K3ELL	4060- 58-28-A-11
W3OEO	2475- 50-20-A- 4
K3FCK	1845- 41-18-A- 6
WA3AKB	1163- 31-15-A-10
WN3BTB*	600- 22-15-A-13
W3KQD	488- 15-13-A- 2
WN3BGE	344- 16-11-A- 5
K3VAR (WN3BUD K3VAR)	10,346-143-31-A- –
K3ZYK (2 oprs.)	4725- 70-28-A-15

CENTRAL DIVISION

Illinois

W9RCJ	93,805-514-73-A-21
W9QOG	70,975-421-68-A-22
W9GFF	67,638-387-70-A-24
W9MAK	66,296-373-71-A-16
W9BUD	62,205-379-66-A-23
W9AA/9[4]	60,030-348-69-A-18
W9IRS	54,438-325-67-A-20
W9YYG	54,240-452-60-B-17
W9NFC	53,165-343-62-A-19
K9UIY	34,220-240-58-A-24
WA9APT	33,750-250-54-A-14
WA9IYU	33,619-254-55-A-23
K9EIV/9	33,474-220-61-A-16
K9ULF	30,210-212-57-A-14
WA9EQJ	23,983-189-53-A- –
WA9BUG	23,520-194-49-A-16
K9SLK	21,863-165-53-A-19
K9RPX	21,315-176-49-A-22
WA9HHH	20,803-158-53-A-22
K9QOV	19,563-158-50-A-17
WA9HJM	16,740-155-54-B-20
WA9IIH	16,110-142-48-A-12
WA9AXX	14,388-170-44-B-15
WA9BRE/9[5]	13,781-127-45-A-17
WA9DXA	13,750-126-44-A-14
WA9KGX	12,578-122-43-A-15
WA9EOD	12,210-132-37-A-17
WA9JUA	10,938-125-35-A-14
WA9AXL	10,830-114-38-A-10
K9LEO/9	10,643-131-38-A-15
WA9CCP	10,453-115-37-A-13
WA9JAV	9701-104-39-A-13
W9GXR	9000-100-36-A- 8
WA9GUM	8628-120-29-A-16
W9AGM	8500- 85-40-A- 5
W9VBV	8000-100-32-A- 7
WA9AJF	7980- 84-38-A-10

NOVICE CERTIFICATE WINNERS

WN1CDQ	WN3BTB	WN6KPR	WN9LDK
WN1CMG	WN4SKP	WN6LFR	WN9LTS
WN2MRA	WN4SPU	WN7ASV	WN9LWJ
WN2MRB	WN4UGE	WN7BKG	WNØIJW
WN2MYY	WN5KAJ	WN8MCR	WNØIPD
WN2OHK	WN5KQA	WN8NLX	WNØKDS
WN3AMQ	WN6JKE	WN8OBF	

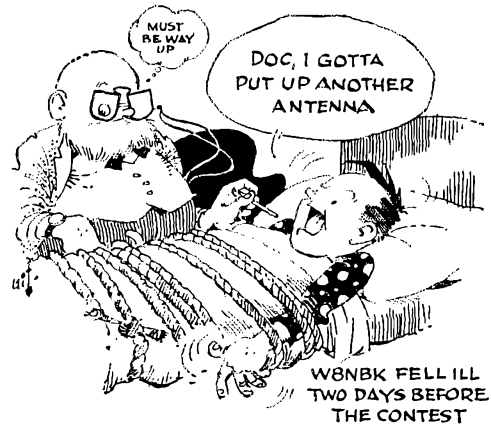
TOP TEN

Single Operator	*Multioperator*
C.W.	
W4KFC	W3MIWC
K6EVR	K5LZO
W7ESK	K5QVH
WA4NGO	W3GQF
K4LPW	W2SZ
WØAIH	W3CCH
W3BES	W9BGX
W3MSK	K2YNT
W3YLJ	WAØBWM
K4GSU	W3KT
Phone	
K6EVR	W3MWC
K5TYP	W3ZKH
W7ESK	W2SZ
K5LZO	WB2APG
W3GRF	WB6GFJ
W3TMZ	WAØAGM/Ø
W3AZD	W3PQT
W4KFC	WAØACI
K5RHZ	WB2BWV
KØCVA	WAØSEH

WA9CIO 7840-100-32-A- –
WA9HCR 7219- 88-33-A-15
WA9JJE 7000-100-28-A- –
WN9LTS* 6460- 68-38-A-16
K9DCV 6370-101-26-A-11
W9ZYD 6316- 82-31-A- 5
WN9LN8 5839-101-27-A-20
W9WR 5624- 74-38-B- –
WA9HVQ 5500- 90-25-A-13
W9ZSQ 5460- 82-28-A- 9
K9UQN 5320- 76-28-A- 7
WN9LOL 5256- 77-29-A-14
WA9KYT 5070- 78-26-A-11
K9DGC 4988- 67-30-A-11
WA9HSS 4531- 73-25-A- –
W9OKI 4423- 61-29-A- 5
WA9GUS 4420- 68-26-A- 8
WA9IXF 4531- 75-25-A-15
WA9LUD 4111- 77-23-A- –
WA9KWP 4094- 67-25-A-16
W9REC 3840- 48-32-A- 8
W9EYF 3679- 60-27-A-16
W9QVE 3570- 68-21-A- 6
K9BQL 3248- 56-29-B- –
WA9IRY 3163- 55-23-A-16
WN9KQT 3156- 60-25-A-18
WA9NHI 3156- 55-25-A- 8
W9MLR 3000- 50-25-B- 8
K9EFC 2674- 48-23-A-13
WN9LTP 2668- 50-22-A-11
W9ZEN 2500- 40-25-A- 7
WA9GQK 2351- 52-19-A-14
WA9JZK 2328- 49-19-A- 6
WA9JIS 2284- 44-21-A-11
WN9LYR 2043- 43-19-A-12
W9NZS 1980- 36-22-A- 7
WA9FTS 1870- 45-17-A- 5
WA9JOQ 1800- 45-16-A- 7
WN9LGT 1365- 42-14-A- –
WA9JXH 1068- 36-14-A- –
WN9MAQ 1041- 26-17-A- 9
WA9ITA 1004- 38-11-A- 9
WA9AQU 1000- 26-16-A- 6
W9CWH 980- 25-16-A- 2
WA9DCN 870- 29-12-A- 2
WA9INK 780- 25-13-A- –
W9EUN 694- 20-15-A- 4
W9GQY 688- 28-10-A- 4
WA9ESA 630- 32- 8-A- 4
W9BVM 615- 22-12-A- 7
K9ZCT 480- 21-12-A- 8
WA9IVL 426- 19-11-A- 2
K9DTB 351- 14-10-A- 5
WN9MVZ 250- 20- 5-A-10
WN9NHQ 240- 18- 6-A- 4
WN9LFU 100- 18- 5-A- 5
K9ZSY 13- 3- 2-A- 2
W9BGX (K8PBZ, W9ICE) 60,300-360-67-A-18
WA9FZB (WA9S AIY FZB) 20,700-210-50-B-24
WA9BMG (WA9s BMG FVZ) 6840- 91-32-A-12
K9CYZ (K9CYZ, WA9AQP) 6720- 84-32-A- 9
WN9MCB (WN9s MCB MEY) 1520- 50-16-A-24

Indiana

WA9AUM 69,960-424-66-A-19
W9AQW 40,241-260-63-A- –
W9RGB 26,650-206-52-A-18
WA9ITB 23,336-193-49-A-13
W9CNG 15,600-130-48-A- –
WA9CYG 10,966-144-31-A-22
W9HRB 10,238-105-39-A- 9
K9FIC 8320-107-40-B-15
W9HNJ 7955- 87-37-A-11
WA9NHO 7752- 77-51-B-17
K9RJO/9 7181- 87-35-A-14
W9CUC 7080- 91-32-A-11
K9FZU 6464-103-32-B-17
WN9LDK* 4560- 57-32-A-13
WA9KHS 4249- 54-33-A-10



W8NBK FELL ILL TWO DAYS BEFORE THE CONTEST

WA9IRE 3698- 51-29-A-13
W9RRC 2925- 65-18-A- 8
W9QLW 2214- 41-27-B- 3
WA9JHH 2020- 52-16-A- 6
W9DGA 1998- 47-17-A- 2
W9GGK 665- 19-14-A- 4
W9UTQ 384- 16-12-B- 3
W9YB (6 oprs.) 43,875-326-54-A-24
WA9BWY (WA9s BWY MXG) 13,454-166-47-A-11

Wisconsin

W9RQM 95,850-542-71-A-22
K9KGA 79,220-470-69-A-22
W9YT[6] 67,650-513-66-B-21
W9QQQ 60,173-340-71-A- –
K9WIE 52,679-319-67-A-16
K9YBC 40,640-256-64-A-17
WA9FUH 30,994-281-45-A-21
WA9FMQ 28,980-207-56-A-13
W9BLQ 27,075-189-60-A-12
W9GMV 21,432-188-57-B-17
W9FBC 19,425-210-37-A-24
WA9ETL 15,910-157-43-A-18
K9IME 14,639-121-49-A-13
W9PJT 13,440-162-42-B- 9
W9VZP 13,348-142-47-B- 7
WA9IQN 12,595-119-44-A-19
W9KJW 11,825-110-43-A-13
WA9JDT 11,424-112-51-B- –
K9CJP 10,246-109-47-B-12
WA9HCZ 3219- 52-25-A-11
K9LGU 3076- 54-23-A- 3
WN9LWJ* 2350- 47-20-A-22
WA9JDK 1760- 40-22-B- 6
W9OVZ 1743- 42-17-A- 7
W9BCC 1560- 39-16-A- 9
W9CHD 1275- 34-15-A- –
WA9FAB 601- 19-13-A- 2
WA9EDZ 338- 15- 9-A- –
K9TRK7 264- 17- 8-B- 1
WN9MNX 70- 7- 4-A-11
W9KXK 50- 5- 4-A- –
K9LGU/9 23- 3- 3-A- 1
WA9KAD 3- 1- 1-A- 1
WN9MRG 3- 1- 1-A- 7

DAKOTA DIVISION

Minnesota

WØA1H 115,066-634-73-A-23
WØJPH 86,615-514-68-A-21
KØIJL 40,200-272-60-A-14
WØYCR 32,450-236-55-A- –
WA0BGA 25,374-197-53-A-13
WAØFLB 20,140-152-53-A-21
KØZXE/Ø 11,610-129-36-A-14
WA0CAH 10,920-103-48-A-24
WAØHVR 7400-100-37-B- 9
WAØIIJ 5438- 81-29-A-20
WAØHQT 5329- 81-29-A- 7
WØKUI 3200- 50-32-B- –
KØWKY 2250- 39-24-A-11
WØEQJ 1700- 45-17-A- –
WØTKX 1400- 40-14-A- 7
WNØKDS* 1225- 39-14-A-19
KØPPD 298- 23- 7-A- 5
WAØEPG 275- 12-10-A- 6
WNØILX 248- 17- 6-A- –
KØSXQ 84- 7- 4-A- 1
WØSZW/Ø 33- 3- 3-A- 2
WAØBWM (WAØs BWM DKA) 56,240-355-65-A-20
WØYC (5 oprs.) 53,165-344-62-A-24

North Dakota

WAØAAD 41,183-294-57-A-17
KØIVQ 37,050-260-57-A-12
WAØHYI 21,444-193-47-A-24
KØKLG 19,824-213-48-B- –
KØRSA 15,875-129-50-A-11
KØQWY 13,983-119-47-A- 5

W5JTB 21,136-248-48-B-12
WA5HJK 12,915-126-41-A-18
WA5KQN 8678- 99-39-A-19
W5ERR 7140-105-35-B- 9
WN5KAJ* 5985- 69-36-A-17
WN5KBZ 1282- 34-18-A- –
W5YZL 765- 25-12-A- –
WN5KLF 550- 22-11-A-13

Mississippi

K5TYP[9] 104,340-564-74-A-24
K5RUO 74,365-446-67-A-23
WA5HEC 19,620-165-48-A-20

Tennessee

K4LPW 115,888-648-73-A-22
WA4CGA 51,233-311-65-A-23
WA4IUM 42,821-313-57-A-16
W4SQE 26,000-201-52-A-20
WA4PCW 15,930-179-36-A- –
K4EJW/4 14,228-139-42-A-15
K4TYE 10,500-100-42-A- 8
W4OGG 9000- 90-50-B- –
WA4KYO 6953-109-27-A-17
WA4PFD 1675- 36-20-A- 6
WA4NEC 1320- 33-16-A- 5
WA4JVU 1050- 30-15-A- 3
K4ILW 602- 19-13-A- 3
WA4JCD 20- 4- 2-A- 1
WN3BGU/4 10- 2- 2-A- 3
K4SXD/4 (K4s SXD WUG, WA4HRG) 5198- 63-33-A- 8

GREAT LAKES DIVISION

Kentucky

K4GSU 104,825-613-70-A-22
W4CVI 59,925-332-69-A-22
W4JBQ 30,030-215-56-A-12
W4BCV 17,212-167-52-B- 6
WA4PGA 10,950-110-40-A-17
K4CDY 7493- 81-37-A- 7
WN4NKP* 4095- 62-28-A-17
WN4UVN 440- 17-11-A-11
W4WPI 380- 19- 8-A- –
WN4UMN 315- 16- 9-A- 7
WN4IJS 26- 4- 3-A-13
W4LDL 3- 1- 1-A- 1

Michigan

K8TIG[10] 102,675-555-74-A-23
WA8CZH 74,550-420-71-A-20
W8DUS 64,090-385-68-A-23
K8DKC[11] 61,050-408-60-A-20
K8IUZ 60,288-371-65-A-21
W8VPC 54,720 304-72-A-22
W8CRD 40,260-244-66-A- –
W8JQL 38,201-254-61-A-16
W8MPD 35,995-313-46-A-20
K8ZZV 35,063-271-56-A-22
K8RDE 33,983-199-69-A-11
W8DGP 33,713-234-58-A-15
K8GKX 33,133-231-58-A-17
W8TJQ 30,855-182-68-A-20
WA8HBS 28,600-220-52-A-11
W8OQH 23,863-209-46-A-13
W8UMX 23,184-185-63-B- –
W8PXA 21,938-195-45-A-10
WA8FKY 16,740-141-48-A-16
W8RAE 15,313-125-49-A- –
K8QLL 13,277-113-47-A- 8
W8PER[12] 13,241-164-33-A-17
W8PVI 12,188-125-39-A- –
W8BNF 10,767-146-37-B-10
K8ZQE 10,120- 90-46-A-11
W8TBN 9555- 98-39-A- 8
WA8NST 8550-114-30-A-13
K8KQV 8415-110-34-A-10
WA8HDM 8400- 96-35-A-17
W8FX 7468-103-29-A- 9
W8TKW 6800- 68-40-A- –
W8KOX 5700- 60-38-A- 9
WA8GEM 5445- 66-33-A- 8
WA8MAM 5231- 79-27-A-15
W8KZM 4920- 82-30-B-12
WA8ECH 4880- 62-32-A-13
K8QKT 3937- 65-31-B-14
W8EGI 3290- 47-28-A- 3
WA8DXW 1890- 32-24-A- 8
W8VWY 1643- 37-18-A- 6
WN8OBF* 1485- 34-18-A-17
WA8CYQ 1365- 48-15-B- –
W8UMP 910- 28-13-A- 3
WA8JUQ 585- 18-13-A- 6
W8MSK 553- 13-A- 2
K8ZXQ 350- 14-10-A- 7
W8DM 300- 12-10-A- –
W8WYC 214- 10- 9-A- 2
WA8HBL 120- 8- 6-A- 1
WN8MCG 38- 6- 3-A- 3
WN8NSD 10- 2- 2-A- 5
WN8OIB 5- 3- 1-A-11
W8SH (6 oprs.) 47,895-312-62-A-24
WA8HHO (WA8s DDI HBK HHO) 30,520-218-56-A- –
WA8FLK (WA8s MCD MOA) 1305- 31-18-A-18

Ohio

W8RSW 88,148-511-69-A-22
W8FGX 78,798-572-69-B-18
W8CJN 78,455-442-71-A-24
K8SMA 61,888-405-62-A-18
K8HGT 54,900-305-72-A-20
W8OYI 54,400-320-68-A-14
W8ETU 52,020-306-68-A-17

W8DHG	50,375-310-65-A-23	W8PBS	900- 30-15-B- 8	WA2YLL	56,578-371-61-A-20				
K8QHJ	48,379-342-57-A-20	WN8LXF	714- 43- 7-A- –	WA2TJA	52,785-308-69-A-19				
K8NYM	46,980-261-72-A-19	WA8AUZ	690- 23-12-A-11	WB2CKS	50,423-301-67-A-15				
WA8FAE	44,100-283-63-A- –	WN8NQJ	601- 19-13-A- 5	WB2BEV	43,863-322-55-A-21				
W8ZJM	43,873-305-73-B-14	K8RMD	575- 23-10-A- 3	WA2TKL	36,139-213-69-A-17				
W8DQG	42,600-284-60-A-17	WA8CPT	540- 27- 8-A- 8	WA2SJC	36,993-177-61-A-18				
WA8EWT	42,289-284-63-A-19	W8VDF	540- 18-15-B- –	W2OWD	36,977-257-53-B-12				
WA8DCQ	41,183-301-57-A-18	K8LGB	504- 16-13-A- 3	K2KD	24,910-189-53-A-17				
W8LHV	38,675-239-65-A-13	WA8MAZ	475- 20-10-A- 7	K2STHQ	24,624-284-54-B-14				
K8DDG	37,896-249-61-A-14	W8FWB	454- 17-11-A- 7	WB2MHT	23,596-277-43-A- –				
W8CEA	36,068-229-63-A-12	WN8NBO	435- 16-12-A- –	W2GKZ	23,072-208-56-B-12				
W8JSU	35,175-210-67-A-14	W8DAE	375- 15-10-A- 1	WB2MRM	20,703-170-49-A-19				
K8ORL	35,035-289-49-A- –	WA8NCX	375- 15-10-A- 6	WB2IQG	20,000-200-50-B-13				
W8EOG	34,980-318-44-A- –	WA8EYA	326- 14- 9-A- 6	WB2LFL	17,000-200-34-A-20				
K8ANA	33,390-268-63-B-19	WN8NQI	325- 14-10-A- 6	K2GBH	16,275-157-42-A-15				
W8EXI	32,788-215-61-A-18	K8MLV	315- 14- 9-A- 2	WA2TGL	15,694-140-45-A-13				
W8VQI	32,624-233-56-A-17	W8ZIP	289- 16- 7-A- 7	K2CMV	15,400-154-40-A- –				
K8RXU	32,130-252-51-A-21	WA8HQG	224- 14- 8-B- 2	WA2KHV	15,050-140-43-A-14				
WA8GYT	30,258-247-49-A-16	WA8MJD	175- 11- 7-A- 8	WB2DHV	12,236-161-38-B- –				
W8HOJ	29,218-203-58-A- 8	WN8LUZ	149- 8- 7-A-13	WB2HQT	10,911-102-43-A- 7				
W8RYP	25,440-212-48-A-21	K8OKK	126- 11- 6-B- 2	WB2HLX	10,530-110-39-A-20				
WA8HVY	25,358-208-49-A-12	WN8MGD	100- 10- 5-A- 5	K2HTX	10,455-102-41-A-12				
K8LEE	25,350-195-52-A- 8	W8PCS	98- 7- 7-B- 2	WB2IQM	10,194-119-35-A-13				
K8YSO	24,115-181-53-A-14	K8MMZ	88- 7- 5-A- –	WB2EZG/2	9835-144-28-A-15				
W8UPH	24,000-200-48-A-14	WA8LSD	75- 6- 5-A- 4	WB2EMJ	8500- 85-40-A-14				
WA8FQW	19,604-193-52-B-14	K8AIG	13- 5- 1-A- 3	W2HAJ	8500-100-34-A-12				
K8EKG	18,345-173-44-A- 8	WA8MJX	10- 2- 2-A- 1	WB2DBW	8373- 96-34-A-14				
W8GFH	18,296-144-51-A-13	K8ZPF	5- 2- 1-A- 1	WB2AXH	7680-101-32-A-24				
W8DWP	17,888-135-53-A-12	K8PDF (W8IQT, K8PLDF)		W2ZV	7200- 80-36-A-16				
K8IKO	16,215-138-47-A-16		3770- 58-26-A- 7	WA2URD	7140-105-28-A-10				
WA8KHP	16,000-160-40-A-14	W8FY (W8CZR, K8PBE)		WA2VCT	6930- 99-35-B-14				
WA8KEX	15,923-193-33-A-15		3300- 56-24-A-10	WB2KRJ	6859- 98-31-A-14				
W8APC	15,228-141-54-B-10	WN8LVT (WN8s LVT LWH)		WA2VDA	6450- 86-30-A-15				
WA8ADJ	13,218-156-34-A-15		1620- 37-18-A-18	W2DP	5198- 80-27-A- –				
WA8MLA	12,200-122-40-A-16	WN8NUL/8 (K8PMB, WN8S LXS NUL)	173- 14- 6-A-23	K2BH	3250- 50-26-A- –				
W8CWS	11,118-109-50-B- 7			K2GIN	5184- 81-32-B-12				
WA8HXR	11,008-119-37-A-22	WN8NAZ/8 (K8PMB, WN8S LXS NAZ)	15- 3- 2-A-11	K2AJR	5130- 76-27-A- 7				
WA8HVR	10,620-118-36-A- 6			W2UAL	4715- 76-26-A- 9				
WA8EMD	10,125-113-45-B-13	WN8LXS (WN8s LXS NAZ NWS)	3- 2- 1-A-16	WB2HTJ	4320- 64-27-A-11				
W8UEX	9790- 89-44-A- 6			WA2VQV	3334- 65-21-A- 9				
WA8FKD	9063-126-29-A-10			W2HAE	3250- 50-26-A- 4				
W8MXO	8745- 80-44-A- –			WB2GRF	2380- 56-17-A-12				
W8NHO	7360- 92-32-A-19			WB2HGO	2205- 42-21-A- 5				
W8ELE	6776- 80-44-B-13			W2OTT	2200- 55-16-A- 3				
W8AJW	6758- 80-34-A- –			W2NCG	2115- 47-18-A- 6				
K8VGL	6525- 90-29-A-14			WA2AEO	1853- 39-19-A- 8				
WA8DZS	6318- 65-38-A- 9			WN2MRA*	1395- 32-18-A- –				
WA8JSX	6237- 95-32-B- –			WB2FYD	1103- 32-14-A- 7				
W4SON/8	6146- 76-33-A- 9			K2PNK	780- 27-12-A- 9				
W8VZE	6120- 68-36-A- 8			W2OBU	695- 22-11-A- 7				
WA8GLM	6032-116-26-B- 7			WB2EHB	563- 24-10-A- 4				
W8KMK	4914- 63-39-B- 6			WN2OWY	484- 23- 9-A- –				
K8COT	4788- 91-28-B- 9			W2TNI	430- 22- 8-A- 6				
WA8LEO	4688- 75-25-A- –			WB2ETF	375- 15-10-A- 3				
W8ZCQ	4495- 62-29-A- 4			WB2LWE	160- 9- 8-A- 4				
WA8MQE	4290- 70-26-A- 9			WB2LGR	135- 9- 6-A- 1				
W8YCP	4224- 66-32-B- 3			WA2SYU	60- 6- 4-A- 1				
W8IBX	3900- 60-26-A- 2			WB2CAN	53- 7- 3-A- 1				
WA8JSY	3098- 60-21-A- 6			WB2FCB	29- 23- 1-A- 2				
K8CTP	2520- 48-21-A- –			W2ZSD	23- 3- 3-A- –				
W8NWR	2520- 56-18-A- 4			WB2LUK	1- 1- 1-A- 1				
W8CHT	2438- 39-25-A- 5			WA2ZXL (WA2ZXL, WB2RJG)					
K8HTM	2386- 42-23-A- 7				33,212-386-46-B-24				
W8PM	2160- 36-24-A- 6			WB2FAJ (4 oprs.)					
W8FUP	2156- 38-23-A-14				31,185-285-44-A-24				
K8BFZ	1975- 40-20-A- 8			WB2GIS (WB2s GIS GMU)					
K8GVK	1575- 30-21-A- –				25,373-199-51-A-23				
WA8GYJ	1428- 42-17-B-12			WB2BPI (WB2s BPI DXM)					
WA8IOA	1219- 34-15-A- 7				18,338-164-45-A-22				
W8BSH	1008- 28-18-B- 2			WA2LQO (K2IYK, WB2EJO)					
W8NPF	999- 21-17-A- 3				12,772-132-39-A- –				
WN8MCR*	926- 35-13-A-13								

HUDSON DIVISION

Eastern New York

WA2OJD	50,660-298-68-A-18
WB2BAL	35,775-270-54-A-14
W2JBQ/2	35,100-260-54-A-16
K2GDP	25,380-188-54-A-12
WB2IVB	24,640-158-64-A-10
WB2CPU	19,950-202-40-A-19
WB2HBI	16,509-142-47-A-13
W2MVJ	10,260-112-38-A- –
WB2ERK	7935-140-23-A-15
WB2LUW	6996- 97-29-A-15
WB2JYV	6953-103-27-A-16
WB2MBI	6250-100-25-A-14
WB2DXL	5993-107-34-A-18
WN2MYY*	1500- 41-15-A-16
WN2OLB	875- 29-14-A-15
W2USA[13]	875- 25-14-A- 3
W2FSL	600- 20-12-A- –
WB2HDS	325- 14-10-A- 2
W2SZ (4 oprs.)	70,244-525-68-B-24
WB2HTL (WB2s FVD HTL)	1219- 33-15-A- –

N. Y. C.-L. I.

W2DSC[14]	74,000-464-64-A-24
K2ZYR	66,480-416-64-A- –
WA2RUB	65,576-392-67-A-21

Northern New Jersey

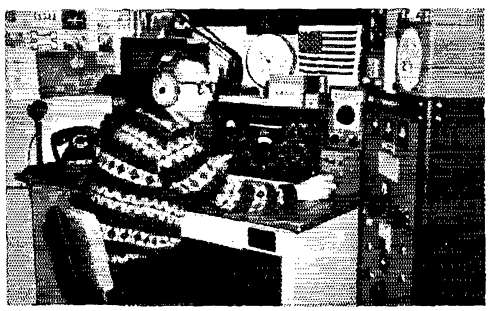
W2VJN	89,820-504-72-A-21
WB2ALF	86,700-513-68-A-24
W2NNL	72,371-460-63-A-21
WB2FTT	48,903-324-62-A-22
W2TSL	47,688-382-50-A-19
K2GUN	46,250-313-74-B- –
WB2DEP	30,012-231-53-A- –
WB2CZZ	29,585-244-61-B-15
WB2KSG	25,358-243-42-A-23
W2NEP	23,940-169-57-A-11
W2SJB	22,724-295-46-B-16
WB2HJC/2	22,613-201-45-A-12
W2LQP	22,540-161-56-A-10
WB2CRX	20,720-198-55-A-17
W2DRV	17,160-165-52-B-10
W2TPJ	16,625-190-35-A- 8
WB2CST	16,278-142-34-A-17
WB2KXG	12,880-115-46-A-15
WB2PWI	10,845-121-36-A-19
K2KFP	9288-130-36-B- 8
WB2KDB	8525-110-31-A-10
WB2FGZ	8500-100-34-A-20
WB2JWA	8288-107-34-A-12
WA2UDI	7920- 96-33-A- 8
WA2VMU	7875-114-25-A-10
WB2JYM	7214-100-29-A-11
W2ECO	6649-100-27-A- –
W2TJD	6004- 79-38-B- –
W2IBZ	5406- 87-25-A- 7
WB2LDX	5355- 67-34-A-10
WN2OHK*	4875- 68-30-A- –
WA2PWI	4750- 50-38-A-11
K3RRA/2	4043- 77-21-A-10
WA2BRW	3645- 50-27-A-13
WB2FFK	2835- 54-21-A-10
WB2SGV	2800- 58-20-A-12
WB2ICH	2486- 59-17-A- –
WB2GMK	2400- 51-20-A-16
WB2JDW	2138- 45-19-A- 9
WA2MYB	2000- 40-20-A- 3
WN2NCU	1980- 48-18-A-11
W2BWW	1938- 31-25-A- 6
WB2JPR	1924- 42-19-A- 8
WA2UUQ	1680- 45-16-A-12
WB2KTG	1620- 40-18-A- 9
W2DMJ	1125- 30-15-A- 2
WA2ZDN	975- 30-13-A- 3
WB2LZF	480- 16-12-A- 2
WN2OXN	188- 14- 6-A-24
WB2GMR	166- 10- 7-A- –
WB2KQJ	128- 10- 6-A- 7
W2JEY	3- 1- 1-A- 1
K2YNT	(WA2KZV, WB2GMR, WN2NZU) 56,560-305-64-A- –

MIDWEST DIVISION

Iowa

KØBUU	65,160-389-67-A-23
KØGXR	60,288-376-65-A-18
WØCXN	50,400-288-70-A-18
WAØASL	41,974-270-63-A-14
KØAZJ	33,320-239-56-A-12
WØFZO	24,700-190-52-A- –
WØEQN	22,400-206-56-B-13
WØATA	21,420-182-48-A-14
KØMHX	21,250-171-50-A-13
KØPUB	17,663-160-45-A- 7

WØAIH, top Minnesota c.w., 6th high over-all, and Dakota Division code high, says he's been hamming for 17 of his 31 years and got started contesting back in '50 with a challenge by WØFID (now WA4NGO). The fine antenna shot shows the beam at 90-, 80- and 55-foot elevations. The 83-foot vertical tower is loaded on 160, 80 and 40 and also is the center support for a half-wave 160-meter zepp which is used as one full wave on 80. Under the TV-type vertical tower are 16 radials, all over 60-feet long and put under the turf of very friendly neighbors! Active WØAIH claims there's nothing more relaxing after a long Sunday morning of services and Bible class then to come home and use an electronic keyer for talking.



WAØCZA 12,505-123-41-A-10
WAØFAX 11,500-118-42-A- –
WØBSY 11,070-108-41-A-10
WØQVA 10,000-125-40-B- 8
WØJTC 4410- 63-35-B-13
WØDRE 4050- 61-27-A- 6
WAØDNB 2275- 46-25-B- 2
WNØIJW* 1400- 28-20-A- 9
WAØIJS 1063- 28-17-A-16
WNØJYJ 1041- 26-17-A-10
K1DQV/Ø 394- 18- 9-A- 2
WAØFWN 300- 17- 8-A- 9
WNØIIQ 149- 10- 7-A- 5
WAØHXW (WØDSP, WAØFWN, WNØIJW) 10,810- 94-46-A-13
WAØIJF (WAØs ICQ IJF) 2498- 58-18-A- 8

Kansas

WØIEM 39,456-272-59-A-22
KØGZP 32- 4- 4-B- 1

Missouri

WØWYJ 61,138-365-67-A-17
WØQWS 50,763-333-62-A-20
KØZBO 41,831-245-69-A-18
WAØAJV 32,200-232-56-A-22
KØFFC 21,960-184-48-A-12
KØDEQ 19,345-149-53-A-16
WAØGQZ 19,116-201-41-A- –
KØCSV 18,865-154-49-A-14
WØGUZ 17,550-131-54-A-15
KØJPL 8848- 94-46-B- 5
WØGWT 5836- 81-29-A- 8
KØYIP 5250- 70-30-A- 5
WAØFAE 2625- 50-21-A- 8
WNØIPD* 1530- 39-18-A-20
KØYGR 1085- 31-14-A- 5
WNØILQ 1013- 28-15-A- 7
WAØELM 944- 29-16-B- –
WNØJNF 260- 17- 8-A-14
WNØKBZ 125- 10- 5-A-14
WØCTV/Ø (5 oprs.) 17,296-198-47-B-23
WØZLN/Ø (4 oprs.) 7315- 78-38-A-10

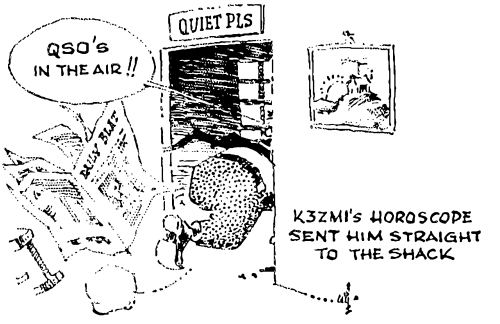
Nebraska

WAØETE 27,706-206-55-A- –
KØQIX/Ø 20,605-160-52-A-16
WAØEDH 9990-113-36-A- –
WAØHGY 5379- 85-33-B-13
WNØ1BD* 4568-112-21-A-17
KØCVA 390- 13-12-A- –
WNØKCK (WNØs KCG KCK) 900- 24-15-A-20
WNØJES (WNØs JES KPR) 250- 15- 8-A-16

NEW ENGLAND DIVISION

Connecticut

W1BGD[15] 70,900-430-66-A-24
W1WPO[15] 69,897-509-69-B-24
W1ECH[15] 69,296-491-71-B-24
W1CP[16] 64,872-484-68-B-21
K1ZND 56,420-366-62-A-20
K1LBH 46,965-304-62-A-16
K1HTV 37,975-246-62-A-19
W1CSM 37,773-265-58-A-17
W1BIH 35,632-264-68-B-10
W1TX 26,040-210-62-B-13
W1AFM 24,975-222-45-A-18
W1BHV 25,704-206-63-B-20
W1FTX 20,550-137-60-A-12
K1VQB 19,435-150-52-A- –
WA1APY 19,211-165-47-A-16
W1PS[18] 18,270-117-63-A-12
K1CEC[18] 17,600-159-44-A-10
W1TCJ 17,258-177-39-A-13
W1ILV 16,614-215-39-B-12
K1PKQ 13,939-208-27-A-13
W1QAK 12,900-120-43-A- 7
K1THQ 12,250-123-40-A-11
K1STM 12,113-162-30-A-19
W1IFM 10,750-109-40-A-11
K1MUJ/1[17] 9400-100-47-B- –
K1THP 8520-108-32-A-14
W1ZJJ 8438-113-30-A-19
K1UYZ 7455-107-28-A- 6
W1OPB 7110- 81-36-A- 9
W1AW[15, 18] 6386-103-31-B- –
WA1AHQ 6143- 95-26-A-13
W1IKE[15] 4050- 60-27-A- 4
W1BDI[15] 3836- 50-31-A- 4
K1VII 3750- 60-25-A-14
WN1CDQ* 3600- 61-24-A-14
WA1AAV 2970- 60-22-A-10
K1DPB 2966- 57-21-A- –
K1VIJ 2703- 47-23-A-10
WN1CYB 1700- 57-15-A-16
WN1CKI 1403- 38-17-A-16
WN1CXN 551- 27- 9-A-10
K7QJN/1 399- 15-11-A- 3
K1MYQ[16] 210- 12- 7-A- 1
WN1BJP 60- 7- 4-A- 3



WN1CMN 49- 7- 3-A- 6
WN1CDM 5- 2- 1-A- 1
K1LWC (K1s LWC QKZ) 22,366-217-53-B-21
K1VQZ (K1s UDD VQZ) 12,300-120-41-A-19
WN1BWD (WN1s BWD CQX) 1540- 41-16-A-22
WN1CIO (WN1s CIN CIO) 990- 36-12-A-20

Eastern Massachusetts

K1DIR 92,126-634-73-B-22
W1JYH 88,720-625-71-B-17
K1WJD 81,360-563-72-B-21
K1YKT 62,730-370-68-A-22
K1ZHS 60,230-348-69-A-18
W1WLZ 39,900-280-57-A-17
K1CUD 27,135-201-54-A-14
K1SOP 26,065-203-52-A-16
W1AQE 23,708-165-58-A-13
K1TWF 22,815-177-52-A-18
K1RYQ 22,325-170-53-A-22
W1KEE 16,790-147-46-A-19
W1EPE 16,176-170-48-B-12
WA1CRK 15,004-173-44-B- 8
WA1CZH 14,820-135-48-A- –
K1VUT 12,593-130-49-B- 9
K1VWL 12,415-100-52-A- –
K1WQY 12,225-168-30-A-14
K1ZJJ 8291-201-33-A-13
W1MO 7459- 77-39-A- 6
W1PLJ 7128- 99-36-B-10
K1LAD 4518- 70-26-A- 9
K1AWP 4500- 75-24-A- 7
K1VHS 4150- 85-20-A- 7
K1TCE 3300- 83-16-A- 8
K1CLM 813- 25-13-A- –
WN1CMG* 563- 24-10-A-10
WN1BRL 315- 17- 9-A-11
K1ZQV 106- 8- 5-A- 5
W1MIX (4 oprs.) 32,254-277-47-A-17
WA1BFY (W1s TEG USO, K1ZII) 27,068-206-54-A-24
K1PHR (K1s FFX PHR WNH) 14,280-184-40-B-14

Maine

W1GKJ 52,930-396-67-B-19
K1GAX 26,535-174-61-A- –
W1NJL/1 24,035-210-46-A- –
WA1ALT 9818-119-33-A-16
K1NAN (12 oprs.) 34,020-284-48-A-24

New Hampshire

W1DYE 53,156-338-63-A-24
K1NBN 44,464-440-56-B-18
W1PEC 5792- 91-32-B-13
W1DAE 3000- 51-24-A- 5
K1PQV 394- 18- 9-A- 8
K1CTQ (4 oprs.) 41,804-321-53-A-24

Rhode Island

K1EWL 52,605-334-63-A-18
K1USD 22,050-223-40-A-12
K1BRJ 12,139-126-39-A-15
K1QFI 4676-129-29-A- 9
W1VBR 2772- 77-18-B- 7
W1VXL (K1HZE, W1YKQ) 49,988-325-62-A-23

Vermont

K1UZG 38,571-264-59-A-21
W1FPS 6240- 80-39-B- –

Western Massachusetts

W1EOB 48,100-325-74-B-14
W1EZD 44,200-340-65-B-18
K1IJU 16,065-180-36-A-10
K1LSW 13,640-124-44-A-14
W1WF 11,280- 99-47-A- 9
K1OOV 11,180-131-43-B- –
K1DFC 11,040-138-40-B-16
K1YST 10,803-149-29-A-12
W1AUT 2250- 60-15-A- –
K1ZQC 1000- 27-16-A- 2
K1ZZI (K1s FPI ZZI) 28,788-248-47-A-24

NORTHWESTERN DIVISION

Alaska

K1AII/KL7 17,000-173-50-B- 7
KL7CGE 11,715-109-44-A-16

Idaho

K7CPC 43,215-261-67-A-20
K7HLR 31,980-245-52-A- –
K7GJZ 11,550-105-44-A-10
K7YWM 3850- 73-22-A-19
K7LPF 450- 15-12-A- 2

Montana

W7HAH 24,875-205-50-A- 9
W7EWR 23,963-179-54-A- –
K7YEM 10,163-140-30-A-10
W7FO (8 oprs.) 30,113-225-55-A-24

Oregon

W7TDK 75,331-535-71-B-23
W7AXJ 24,300-203-60-B-18
K7FCB[19] 23,800-171-56-A-23
K7ZNE 20,378-146-57-A-18
K7ZMR 600- 20-12-A- –
K7NZE (4 oprs.) 26,325-195-54-A-24
WN7AIP (WN7s ADL AIP AXK) 881- 31-15-A-17

Washington

W7ESK[20] 132,586-732-73-A-24
K7KPM 44,231-276-63-A-21
W7IUS 42,775-243-59-A-11
K7UKC 41,480-349-61-B-18
K7SNB 39,675-265-60-A-21
K7ZRF 27,716-200-57-A-15
K7VPF 25,680-219-48-A- –
W7JC 20,440-183-56-B-15
W7FVI 14,700-150-49-A-13
W7GYF 13,500-120-45-A- 7
K7YHQ 10,850-111-40-A-13
K7KYG 8000-100-40-B- –
K7BZE 6195- 89-28-A- 7
K7EKX 5600- 71-31-A-17
K7IAE 3360- 49-28-A- 4
WN7ASV* 2805- 58-22-A-20
W7HLP 2520- 70-18-B-10
K7RSB 1870- 45-17-A-15
WA7BMC 1553- 38-18-A-18
W7OVJ 1296- 31-17-A- 5
WN7ASM 715- 29-11-A- –
WN7ACQ 150- 11- 6-A- 3
K7HTV (K7HTV, WA7BRW) 15,593-149-42-A-23
W7YD (4 oprs.) 7120- 96-32-A-24

PACIFIC DIVISION

East Bay

W6KG 70,855-383-74-A-19
W6TYM 54,180-389-70-B-24
WA6VAT 52,360-308-68-A-17
WA6KLL 20,520-152-54-A-18
WB6CUA 18,360-153-48-A-15
WA6UQM 17,701-145-49-A-10
WB6ETY 17,213-156-45-A-21
WØNBX 13,000-130-50-B-16
WB6BID 11,498-110-42-A-12
K6LRN 10,725-110-39-A-15
WB6BBC 6210- 92-27-A-16
WB6JGS 4293-101-17-A-13
WA6UAV 3090- 52-24-A- 6
W6BB[21] 2499- 63-21-B-10
WA6IRK 825- 32-11-A-10
WN6KVF 94- 8- 5-A- 5
WA6FFF (WA6s FFF YNY) 9123- 93-41-A-24

Hawaii

KH6FIF 23,045-211-55-B-24
KH6ETB 11,880-108-44-A-10

Nevada

W7KEV 48,913-304-65-A-15
K7KHA 33,880-244-56-A-18
W7AKE 10,120-116-44-B-16

Sacramento Valley

WA6SLU 53,040-412-65-B-22
WA6SVY 33,248-216-62-A-24
K6ORT 23,010-216-54-A-14
W6VPV 25,783-221-59-B-17
W6ZGM 22,601-187-49-A-20
W6EGX 16,875-125-54-A- –
K6DQB 11,840-128-37-A-17
WA6TZT 338- 15- 9-A- 5

San Francisco

WA6RXM/6 35,700-238-60-A-24
WB6FZH 27,891-211-53-A-19
W6WLV 15,273-149-41-A-17

San Joaquin Valley

W6BVM 56,055-310-74-A-18
K6RTK 45,833-291-63-A-14
WA6TZN 9650- 99-40-A- 9
WA6VPN 4360- 55-32-A- 9
WA6FOL 3274- 50-27-A- 8

Santa Clara Valley

K6VVA 82,425-471-70-A-18
W6UTV 68,178-417-66-A- –
K6EBB 46,284-305-61-A-24
WA6TQK 42,000-280-60-A-20
W6ASH 39,552-309-64-B- –
W5FPI/6 39,530-236-67-A-14
WB6CAA 29,070-208-57-A-15
WB6FHH 28,160-182-64-A-13
WB6KBK 16,380-126-52-A- –
W6CUF 8250-100-33-A- –
WA6JSA 8044-100-33-A- 6
W6CLZ 6916- 91-38-B- 9
W6QBY 5952- 97-31-B-12
WB6BIG 5705- 82-35-B-10
WB6BYT 4313- 60-30-A-12
WA6UVR 3105- 69-18-A-10
WA6VAS 2280- 58-17-A- 9
WN6JKE* 2250- 54-18-A-18
W6TPL 1932- 43-23-B- 5
WA6VVV 1268- 39-13-A- 6
WN6LVT 1040- 35-13-A-15
K6BXI (W1BOD, K6s BXD BX1) 12,556-123-41-A-23
W6YL (K6LVN, WB6EAD) 5638-106-22-A-18

ROANOKE DIVISION

North Carolina

W4LYV 35,360-226-64-A-13
W4WUW 27,466-261-43-A-18

WN9LTS of Illinois led all Novice entries with 6460 points. *After working the SS, John got up enough courage to take and pass his General Class examination.*

VE3BCU/W4
27,431-200-55-A- -
WA4ICU 24,241-237-41-A-18
WA4FFW 14,200-143-40-A-12
K4QWQ 9158-111-33-A- 6
WN4TRQ 120- 7- 6-A- 4
WA4NAG 35- 6- 4-A- 2
WA4TCV (WA4s STL TCV)
52,700-310-68-A- -

South Carolina

W4BWZ 36,836-259-57-A-20
WA4TLB 21,499-185-49-A-20
W4HGW 17,508-150-47-A-14
K5HN/4 11,960-130-46-B-11
W4YSJ 11,130-106-42-A-24
W4JA 10,780-110-49-B-10
W4ULY 1260- 29-18-A- 7
K4YYL 765- 26-12-A- 2
WA4JHD (2 oprs.)
9068-100-39-A-11

Virginia

W4KFC 155,955-846-74-A-24
W4PTR 82,080-458-72-A-23
W4ZM 66,300-390-68-A-15
W4DVT 63,325-374-68-A-22
W4PNK 62,806-390-65-A- -
W4YZC 57,285-402-57-A- -
W4MXU 56,875-350-65-A- -
W4JAT 19,200-308-64-A-15
K4MXF 47,569-323-59-A-17
W4NH 45,000-300-60-A-13
W4SNU 37,193-262-57-A-20
W4GF 37,166-283-53-A-17
K4VWH 31,200-212-60-A-17
WA4IVL 30,380-198-62-A-18
W4WBX 30,210-456-53-A-13
W4ZSH 28,944-213-55-A-17
K4CG[22] 27,945-243-46-A-19
W4TKR 27,625-213-52-A-14
WA4DUS 27,025-230-47-A-15
W4BVV 22,854-200-47-A-11
W4WBC 12,430-113-44-A-11
K4UYY 11,295-126-36-A-13
K3JQU/4 10,078-144-29-A- 5
WA4OAE 9116-110-33-A- -
WA4KQI 8085-119-28-A-10
W2AUS/4 6738- 77-35-A-12
WA4MTP 6320- 80-32-A- -
WA4HBO 6210- 92-27 A-11
W4HVG 5261- 92-23-A- 5
WA4RDN 5038- 68-31-A- 8
K4IKP 3510- 55-26-A- 3
WA5JIT/4 2423- 62-19-A- 9
WA4VWB 2200- 44-20-A-10
WA4PRF 2000- 50-16-A- -
W4JXD 1013- 27-15-A- -
W4JUK 884- 27-16-B- 6
WA4IVP 368- 21- 7-A- 6
W4KXV (W4KXV, WA4GHV)
20,010-174-46-A-12
WA4QOC (WA4s KBG QOC)
3250- 54-25-A- 9

West Virginia

W8NCD[23] 52,511-314-67-A-23
WA8EUC 28,494-247-47-A-20
W8HRQ 27,454-260-53-B-16
K3ACD/8 18,565-158-47-A-17
K8UZX 14,711-157-47-B-14
WA8IMY 7595-109-28-A- -
WA8KQX 4858- 67-29-A-12
WN8NLX* 3045- 65-21-A-22
W8BKK 570- 19-12-A- 3
W8LMF (K8WHN, W8LMF)
25,900-185-56-A-18

ROCKY MOUNTAIN DIVISION

Colorado

K0SLD 85,775-618-73-B-19
WA0CVS 55,193-340-66-A-16
K0VFN 16,970-310-61-A-22
W0WME 37,628-260-58-A-24
WA0GUH 23,925-181-55-A-16
W0IUQ 17,089-141-49-A-19
K0GVA 15,694-141-45-A-12
WA0JWN 13,585-125-44-A-12
W0MYB 248- 11- 9-A- 1

New Mexico

W5CK 53,235-341-63-A-18
K5STL 46,778-297-63-A-16
W8BZY/5 19,500-157-50-A-17
K2JAD/5 10,384-109-39-A-15
W5DZA 8610- 85-41-A-16
W5LEF 6912-101-36-B- 7
WA5IFX 5015- 61-34-A-11

Utah

K7RAJ 63,294-392-65-A-21
W7QDM 58,419-364-65-A-23
W7POU 23,120-145-64-A-19
K7TEO 20,519-165-49-A-18
K7JMJ/7 7735-112-28-A-16
K7UOT 6110-103-26-A-13
W7ZC 3894- 60-33-B- -

Wyoming

W7TSM 24,579-193-53-A-24
K7VTM 1408- 33-22-B-13

SOUTHEASTERN DIVISION

Alabama

K4CFD 72,463-492-62-A-24
W4OSM 68,329-423-65-A-22
K4ANB 15,375-125-50-A-11
K5IQA/4 10,500-101-42-A-18
K4NMN 8024-119-34-B-14
W4CUF[24] 7343- 89-33-A- 4
K4BSK 5250- 75-28-A- 5
W4DS 2688- 43-25-A- 7
WN4UGE* 1710- 40-18-A-10
WA4RER (WA4s RER RES TID) 34,365-237-58-A-24

Canal Zone

KZ5OP 85,509-524-67-A-22
KZ5GE 6800- 81-34-A-11

Eastern Florida

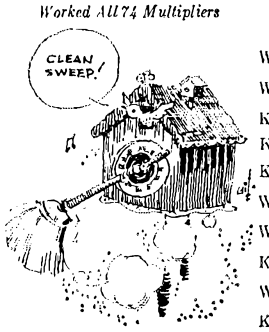
WA4NGO 122,443-735-67-A-21
W4JTA 51,431-321-65-A-24
WA4JYB 46,913-355-54-A- -
W4KET 37,990-266-58-A-13
W4WYJ 36,903-256-58-A-16
W4RRB 34,984-250-57-A- -
W4UUV 22,920-195-48-A-16
WA4SVO 21,438-181-49-A-18
WA4IDH 18,400-184-50-B-10
W4NTE 17,653-154-46-A-20
W4IEI 17,423-152-46-A-10
WA4PWF 10,783-118-38-A-19
WA4LFP/4 9350-117-34-A-18
WA4RIJ 7680- 99-32-A-15
WA4PHJ 7306- 85-35-A-13
WA4IVU 6052- 89-34-B- 7
WA4HYG 3850- 55-28-A- 9
WA4KUR 3720- 68-24-A-14
W4ZOK 3432- 52-33-B-12
WA4HFR 442- 17-13-B- 6
WA4UGS (5 oprs.)
34,770-244-57-A- -
W4STA (W2NJ, W4STA)
22,275-165-54-A-16
WA4KGH (WA4s KGH VHF)
4160- 53-32-A-15

Georgia

K4BAI 103,295-566-73-A-24
K4TEA 73,723-400-74-A-17
W4YE 60,645-470-65-B- -
K4EZ 34,958-237-59-A-10
WA4QZY 25,755-205-51-A-24
W4HOS 17,280-128-54-A-10
K4CRY 12,600-131-40-A-12
WA4FTM 12,100-110-44-A-14
WA4JOB 11,700-117-40-A-15

"THE CLEAN SWEEP"

Worked All 74 Multipliers



W1EOB
K2GUN
W3AZD[1]
W3BES
W3GQF[2]
W3MSK
W3MWC[2]
W3YLJ
W3ZKH

W3ZKH[1,2]
W4KFC
K4TEA
K5LZO[2]
K5TYP
W5WZQ
W6BVM
K6EVR
W6KG
K8TIG

[1] Phone [2] Multioperator

WA4LBJ 8044-100-33-A- 8
WA4QJN 7905-105-31-A-12
WN4SPU* 5569- 71-33-A-23
K4NFP 1628- 32-21-A- 7
WN4UPE 324- 21- 7-A-13
WA4JXL (WA4s JXL VFR)
1811- 32- 6-A-12

West Indies

KP4BJU 8619-110-39-B- 6

Western Florida

W4JJ[25] 86,688-475-73-A-19

SOUTHWESTERN DIVISION

Arizona

K7TNW 65,325-415-65-A-23
W7ZMD 64,080-366-72-A-20
W0YFT/7 61,100-378-65-A-19
W7AYY 59,760-376-64-A-19
K7TTJ 35,030-226-62-A-15
K7AL 31,122-276-57-B- -
K7UTF 9500-101-38-A- 9
W7FCD 6568- 72-37-A-14
W7KRW 6159- 93-28-A- 9
WN7BKG* 1976- 49-17-A- -
K7OZM 1794- 39-23-B- 7
W7ENA 1628- 31-21-A- 3
K7RLL 770- 25-14-A- 5
W7PZ 480- 16-15-A- -

Los Angeles

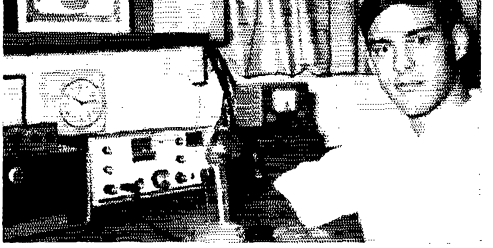
K6EVR[26] 140,600-767-74-A-24
WA6QNN 91,260-511-72-A-24
W6RW[27] 77,770-556-70-B-16
K6JBV 63,135-368-69-A-24
K4PUZ/6 63,066-463-69-B- -
WB6GVV[28] 62,453-380-66-A-19
K3VPF/6 52,470-332-66-A-22
WB6CEG 48,560-315-64-A-15
WB6AKZ 39,435-243-66-A-19
W6TGF 37,125-225-66-A-17
WA6YLW 34,583-240-58-A-21
W6OEO 30,281-214-57-A- -
K6VNX 29,640-247-60-B-15
WB6FSJ 22,313-254-53-B-20
WA6YEE 20,895-199-42-A-24
W6NKR 19,765-134-59-A- 7
WA6VTL 18,250-146-50-A- -
WB6CLY 17,733-176-41-A-16
WB6DHV 17,078-151-46-A-20
W6OIV 16,683-156-43-A-14
WA6UOQ 14,490-126-46-A- -
WA6KHK 11,480-112-41-A-12
WB6DFQ 5913-110-22-A-14
WB6HSO 5510- 77-29-A- 5
K6DLY 3570- 51-28-A- -
WB6HDG 2940- 42-28-A- 7
WB6MTH 2760- 69-16-A-15
WB6JQP/6 2430- 41-24-A- -
WA6WUP 2423- 52-19-A- 7
K6BPC[29] 1932- 46-21-B- 2
WB6JMQ 1853- 39-19-A- 7
K6YFZ 1680- 32-21-A- 8
WB6DHG 1398- 43-13-A- 5
WB6MNN 1380- 35-16-A- -
W6TCY 1275- 43-15-B-15
WN6KPR* 765- 31-12-A-12
WB6MEQ 744- 18-17-A- 3
WA6RQQ 650- 20-13-A- -
WA6SLF 380- 19- 8-A- 2
W6KUC 175- 10- 7-A- 1
WB6FQO 152- 10- 8-B- 1
WN6LDF 100- 10- 4-A- -
WN6NBP 50- 11- 2-A- -
K6ICQ 45- 6- 3-A- 1
WN6JJU 15- 3- 2-A- 5
WN6LDG 1- 1- 1-A- 1
WA6WOY (WA6s WOY WZD) 50,830-396-65-B-24
WN6MPH (WN6s KVA MPH) 2250- 60-18-A-20

San Diego

K6LKD 60,300-360-67-A-24
K6VZA 12,500-252-68-A- -
WA6WTD 32,625-218-60-A- -
K6OIZ 12,188-125-39-A-13
WB6KNN 11,214-134-42-B-13
WB6IEX 11,163- 95-47-A-23
WN6LFR* 2250- 48-19-A- -
WB6HPJ 1125- 50- 9-A-17
WA6RUS 1080- 24-18-A- 4
WB6ITM 650- 21-13-A- 2
WA6RND 298- 17- 7-A- 2
W6YZD 270- 12- 9-A- 1
WN6LXS 98- 7- 6-A- 4

Santa Barbara

W6GEB 51,440-323-64-A-21
WA6OJI/6 29,131-202-59-A- -
W6OUL 20,858-156-54-A-14
WB6DPV 15,390-163-38-A-15
WN6MDX 428- 17- 9-A- 2



(Left) K4YYL led the S. C. phone contingent with 61-K while (right) WA2EIY of S. N. J. topped the South Jersey Radio Assn. phone entries with 41-K.

Phone Scores

WEST GULF DIVISION

Northern Texas

K5RHZ 91,800-540-68-A-20
W5DWT 83,408-509-66-A-17
K2EIU/5 75,780-422-72-A-19
WA5EXR 21,450-200-44-A- –
K8YCM/5 15,238-134-46-A- 6
K5SOD 9214-101-39-A-11
W5NV8 4894- 70-29-A-10
K5PSL 2565- 40-27-A- 7
WA5EQQ 1211- 30-17-A- 8
K5WAB (K3ZNP, K8YCM, KØSMK) 152- 10- 8-B- 4

Oklahoma

K5OCX 79,144-428-67-A-18
W2WOE/5 54,054-431-63-B-19
W4SKI/5 28,928-206-57-A-24
W5HFN 20,528-161-51-A- –
WA5HXD 770- 25-14-A-12
WA5KOF 500- 20-10-A- 6
WA5IDX 316- 13-11-A- 3
W5YJ (K5GCQ, WA5BOB, K9ZFR) 6444- 93-36-B-12

Southern Texas

W5WZQ 102,583-560-74-A-24
WA5ABG 32,890-253-52-A- –
WA5HZY 30,504-246-62-B-20
W5LJT 23,569-247-49-B-11
WA5ENK 11,918-117-42-A-21
WA5GZX 5731- 68-35-A-10
WN5KQA* 2460- 41-24-A-11
K5MHG 1800- 38-21-A-10
K5PFL 1750- 35-20-A- 5
WN5KDP 375- 19-10-A- 5
WN5LBA 15- 4- 2-A- 3
K5LZO (K5LZO, WA5LES) 105,302-717-74-B- –
K5QVH (K5BFB, W5ZSX) 83,440-596-70-B-24

CANADIAN DIVISION

Maritime

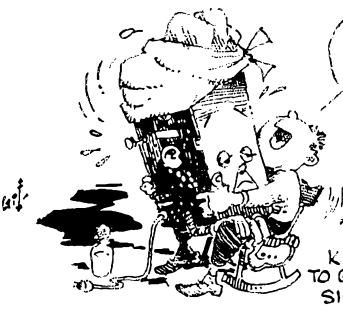
VE1RB 31,977-281-57-B-11
VO1AW 3853- 68-23-A- –
VE1DB 2420- 44-22-A- 8

Quebec

VE2AYU 29,624-269-56-B-23
VE2AZQ 1658- 40-17-A-15
VE2BQV 753- 22-14-A- 3
VE2UN[30] 658- 29-14-B- 2

Ontario

VE3CVX[31] 70,200-330-72-A-24
VE3DU8 36,211-247-59-A- –
VE3TT 32,843-228-58-A-17
VE3ON 21,330-159-54-A- –
VE3DH 15,990-157-41-A-11
VE3MAC[32] 8794-102-35-A-13
VE3ES 8280-105-40-B- 7
VE3DDU 8075- 96-34-A- 5
VE3CNA 3780- 63-24-A- 5
VE3FHQ 2106- 39-27-B-14
VE3DAW 1785- 43-17-A- –
VE3EFD 1480- 37-16-A-15
VE3DKB 694- 19-15-A- 6
VE3DBY 564- 21-11-A- –
VE3BNH 488- 15-13-A- 7
VE3UOT (6 oprs.) 18,768-200-48-B-24
VE3RIT (3 oprs.) 3168- 67-24-B-12



Manitoba

VE4UX 1170- 26-18-A- 4
VE4OM (10 oprs.) 32,625-246-58-A-24

Saskatchewan

VE5VP 34,510-252-56-A-18
VE5JI 9506-101-40-A- 9

Alberta

VE6MA 16,500-150-44-A-11

British Columbia

VE7AGN 20,930-171-52-A- –
VE7ACS (5 oprs.) 51,423-311-67-A- –

Yukon-N. W. T.

VE8WT 23,954-203-59-B- –
VE8BB 5215- 80-28-A-12
VE8NT 1140- 29-20-B- –

ATLANTIC DIVISION

Delaware

K3GEK 34,760-320-55-B-24
K3NHL 24,416-199-41-A-16
W3IYE 18,020-170-53-B- –
W3DRD 1392- 29-17-A- 4
K3OBU 1008- 24-14-A- 4

Eastern Pennsylvania

K3DVS/3 102,510-505-68-A-22
W3HHK 94,868-439-65-A-18
W3BES 86,292-425-68-A- –
W3WJD 85,224-429-67-A-18
W3GHM 49,242-283-58-A- –
K3EXA 48,587-276-59-A-24
W3JSA 41,328-246-56-A-17
W3GR8 39,240-218-60-A- 8
W3NOH 37,908-243-52-A- 9
K3BNS 27,664-268-52-B-15
K3IJZ 27,504-191-48-A-13
W3TGF 26,574-206-43-A-13
W3ISE 24,048-167-48-A-12
W3KDF 23,652-146-54-A-11
W3KFQ 22,608-158-48-A- –
W3QMZ 20,228-195-52-B-16
K3WVB 16,769-206-41-B-21
K3MCO 14,805-119-42-A- –
K3TSQ 13,260-130-34-A-16
K3PSW 13,248-138-48-B-17
W3EQA 12,510-142-45-B- 8
W3DBX 12,054-123-49-B- –
K3JGJ 11,124-103-36-A-18
W3KT 10,384-118-44-B- –
K3MNT 7524- 86-44-B- –
K3JXC 6930- 55-42-A-10
W3MJB 6516- 91-24-A-11
W3HNK 6006- 91-22-A- –
K3JCT 5772- 74-26-A- 4
K3UGH 5460- 91-20-A-10
W3ZQP 4350- 58-25-B-10
K3TYL 3672- 68-18-A-10
K3ZOL 3168- 66-16-A- 7
W3CGS 3150- 50-21-A- 7
W3GKQ 2852- 62-23-B-11
K3GNI 2765- 49-19-A- 6
W3ABT[1] 2754- 52-18-A- 4
K3PBL 2403- 45-18-A-16
K3TSI 2068- 43-17-A-12
W3JXS 1632- 34-16-A- 4
K3YQJ 1554- 37-14-A- 3
K3QGQ 1428- 34-14-A-14
K3RDT 1305- 29-15-A- –
K3OHU 1215- 23-18-A-11
W3AEM 1134- 34-18-B- 7
K3RFB 928- 29-16-B-10
K3HNP 495- 34- 5-A- 2
K3ZRK 384- 16- 8-A- 3
K3FLG 306- 17- 6-A- 3
W3ADX 96- 8- 4-A- 1
K3WJQ 54- 6- 3-A- 4
K3YUP 54- 6- 3-A- 4
K3ZBD 12- 2- 2-A- 1
WA3ARZ 6- 2- 1-A- 1
W3MWC (K3s JJG JLD) 153,081-710-73-A-23
W3YP (10 oprs.) 24,605-177-47-A-24
WA3ALW (K3s OIN TUN) 1560- 34-16-A- 8

Maryland-D. C.

W3GRF[2] 130,032-602-72-A-23
W3TMZ 122,955-585-70-A-23
W3AZD 122,100-550-74-A-24
W3ZVJ 48,384-384-63-B- –
W3TOO 45,135-256-59-A-18
W3AXW 43,829-241-61-A-23
K3KMO 41,499-261-53-A-19
W3KMV 26,640-151-60-A-19
W3MCG 20,925-140-50-A-13
K3ZKX 17,714-125-49-A- –
K3QDC 14,190-110-43-A-13
K4GSX/3 12,474-116-36-A- –
K2OMP/3 10,962-128-29-A-10
K3JYZ 10,416-112-31-A-11
W3AYD 8910- 90-33-A- –
W3EYF 8285- 65-43-A-10
W3WOT 7070-107-35-B- 7
W3IPO 6480- 80-27-A- 7
W3EIS 4125- 55-25-A- 5
WA3BAS 1454- 29-17-A- 4
W3ZNH 1080- 23-16-A- 2
K3LZX 828- 35-13-B- 4
W3HVM 459- 17- 9-A- 3
K3WWC 162- 9- 6-A- 4
K3QDD 84- 7- 4-A- 1
K3QDD/3 72- 6- 4-A- 1
W3ZKH (K3EST, W3ZKH) 108,188-731-74-B-24
W3PQT (5 oprs.) 57,090-395-66-B-20
W3MVB (K3CKT, W3MVB) 53,868-402-67-B-24
K3MUP (K3s MUP RKF) 8528-104-41-B-12
K3FQF (K3s FDB FKY FQF) 1230- 43-15-B-10

Southern New Jersey

WA2BLV 56,181-307-61-A-13
WA2EIY 41,238-237-58-A-23
W2QDY 31,350-190-55-A- –
K2ZOM 28,002-181-52-A- –
W2ORA 26,813-163-55-A-19
W2DAJ 25,108-218-53-B-11
WA2EOK 22,140-161-46-A-17
W2FYS/2 19,698-134-49-A-12
WB2FJF 18,113-174-35-A-16
WA2WLN 16,596-231-36-B-16
WB2BYF 13,671-110-42-A- –
WB2FOC 7296- 76-32-A- 8
WB2EDR 6984- 97-24-A-14
WA2GSO 4350- 50-29-A- 7
K2OEA 4200- 50-28-A- 4
K2SQM 4106- 60-23-A- 9
WB2CGW 3888- 54-24-A-10
W2YNR 2805- 45-22-A- 6
W2TLO 2781- 52-27-B- 7
WA2EMB 2760- 47-20-A- 5
W2LVW 2294- 52-15-A- 7
K2CPR 1890- 42-15-A- 3
K2ARY 1870- 55-17-B- 6
K2JXX 1199- 24-17-A- 3
W2FZP 864- 24-12-A- –
WB2ICB 528- 22-12-B- 5
WB2MNM 504- 24- 7-A- 5
WA2MGV 450- 30- 5-A- 9
WB2EOQ 429- 13-11-A- 1
K2MKD 360- 12-10-A- 2
K2AQI 312- 13- 8-A- 2
W2ZVW 18- 3- 3-B- 1
WB2APG (WB2APG, W3DQG) 76,512-410-64-A-24
WB2IFC (WB2s CEX IFC) 1292- 62- 7-A-13

Western New York

K2IML 72,036-349-69-A-16
WA2KTI 49,056-292-56-A-22
WB2MFX 42,978-253-58-A-21
W2VDX 38,133-223-57-A-17
W2ZVS 32,273-275-59-B-12
WA2WMT 29,916-278-54-B-23
WB2OSK 24,393-173-47-A-17
K2CEI 23,760-200-60-B-14
WB2HQJ 18,603-152-53-A-14
WA2AIL 16,698-128-44-A-12
W2SN1 14,674-163-46-B-12
WA2PQG 14,040-117-40-A-13
WB2KUX 10,875-146-25-A-16
WB2MIAC 10,080- 96-35-A-14
WA2WQG 7425- 76-33-A-21
WA2EOQ 5640- 60-47-B-16
K2KTK 4824- 67-24-A- 3
K2EQB 4727- 60-23-A- 4
WB2EXW 3563- 65-19-A-11
WB2CIP 3240- 60-18-A- 7
K2UCF/2 3060- 43-24-A- 7
WB2MDC 2904- 44-22-A-10
WA2ZQN 2370- 40-20-A- 9
WB2LWM 1764- 28-21-A- 3
WA2KND 1650- 55-10-A-10
W2AMY 1444- 38-19-B-12
K2ZFV 1116- 31-12-A- –
WA2SXM 988- 38-13-B- 3
W2UJS 378- 18- 7-A- 4
WA2ZNC/2 209- 76- 1-A-16
W2PVK 126- 9- 7-B- 2
WA2KVN 96- 8- 6-B- 1
WA2TJS 68- 23- 1-A- 5
WB2ERD 39- 13- 1-A-17
WA2HWC 35- 12- 1-A- –
WB2DPR 30- 5- 2-A- 1
K2JD 24- 12- 1-B- 1
WA2YTK 24- 8- 1-A- 1
W2TAB (7 oprs.) 32,366-212-53-B-24
W2OFQ (W2MSM, WA2HNQ YNC) 16,947-136-42-A-24
WB2NZA (WB2s FPG NZA) 5859- 93-21-A-16
WB2PVS/2 (WB2s FQQ PVS) 48- 8- 2-A- 7

Western Pennsylvania

W3BBO 34,020-212-54-A-21
K3SIQ 28,536-164-58-A-17
W3QII 19,496-159-41-A- –
K3UC 18,561-137-46-A-17
K3YUT 14,801-156-33-A-15
K3NOD 10,353-102-34-A-12
W3KQO 3825- 51-25-A- 6

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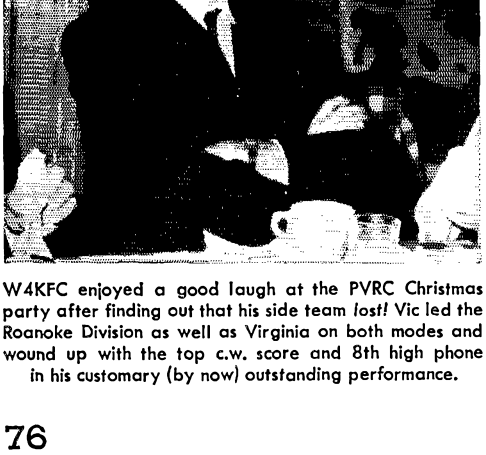
[1] K3EST, opr. [2] W6HOH, opr. [3] WA3ARI, opr. [4] W9LNQ, opr. [5] K7KBY, opr. [6] K9ZNB, opr. [7] K9LGU, opr. [8] K5PKA, opr. [9] W8GKB, opr. [10] W8CQN, opr. [11] WA8CPH, opr. [12] WA8JXD, opr. [13] K2LSX, opr. [14] WA2APT, opr. [15] Hq. staff, not eligible for award. [16] W1YNP, opr. [17] K1YRP, opr. [18] W1WPR, opr. [19] K7WWR, opr. [20] W7WJB, opr. [21] K6GWQ, opr. [22] K3WUW, opr. [23] WA8DGE, opr. [24] K4WOP, opr. [25] K4VFY, opr.. [26] W9WNV, opr. [27] K9ELT, opr. [28] WA6NON, opr. [29] K6QPH, opr. [30] K1QVT, opr. [31] VE3FUX, opr. [32] VE3CGJ.



W4KFC enjoyed a good laugh at the PVRC Christmas party after finding out that his side team *lost*! Vic led the Roanoke Division as well as Virginia on both modes and wound up with the top c.w. score and 8th high phone in his customary (by now) outstanding performance.

K3ELL 2376- 36-22-A- 4
W3YLJ 390- 13-10-A- 1
K3VAR 171- 12- 6-A- –
W3LIV 60- 5- 4-A- 1
K3ZYK (2 oprs.) 462- 15-11-A- 7

CENTRAL DIVISION

Illinois

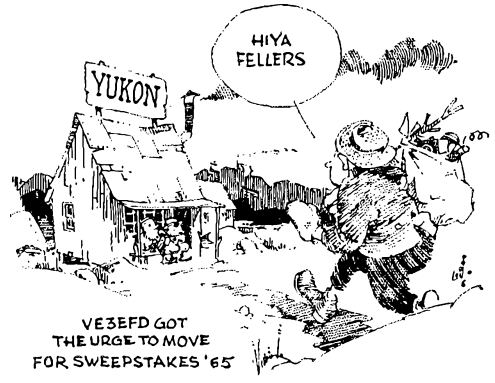
K9VKH 85,260-415-70-A-21
K9BGL 80,400-401-67-A-24
K9ZBI 58,752-433-68-B-23
W9ARV 50,051-275-61-A-16
W9OKM 45,600-240-64-A-20
W9QXO 38,084-203-63-A-21
WA9IIJ 34,604-198-59-A-20
W9CPK 27,636-189-49-A-12
W9AJX 27,500-250-55-B-16
WA9BQF 25,440-160-53-A-18
W9RHV/9 23,712-153-52-A-18
W9AA/9[3] 22,680-140-54-A-18
WA9LEE 22,644-229-51-B-17
WA9AXX 20,935-201-53-B-17
W9NLF 18,300-122-50-A- –
WA9GQT 14,934-135-38-A-14
WA9IYU 14,040-201-36-B-20
W9GFF 13,432-148-46-B- 9
W9CRN 10,032- 89-38-A-12
W3TWE/9 9672-105-31-A-10
K9RNQ 9419- 81-39-A- 6
W9PBY 9000-200-45-B- –
K9MQI 8858-106-43-B- 8
W9JMY 8463- 92-31-A- 8
WA9CDI 8256- 97-43-B-18
W9PVT 8001- 65-42-A- 9
WA9JOQ 7680- 84-32-A-11
WA9FNQ 7182- 87-28-A-17
WA9HJM 7138- 83-43-B- 8
WA9IBT 6798-103-33-B-14
W9GQY 6525- 75-29-A-10
K9TRA 6510- 62-35-A-11
W9IJT 6240- 66-32-A-10
K9ZJT 5255- 65-31-A- 9
WA9JAV 4070- 55-37-B-12
WA9CHG 3750- 52-25-A-19
WA9KGX 3402- 46-27-A-12
W9ZYL 3300- 66-25-B- –
K9BQL 3276- 42-26-A- –
K9ULF 3102- 47-22-A- 7
WA9FTS 2898- 42-23-A- 7
K9WMP 2814- 34-28-A- 4
WA9HHH 2738- 38-25-A-13
W9NZS 2394- 38-21-A- 6
WA9IRY 2376- 44-18-A-13
WA9AJF 1980- 30-22-A- 8
W9GXR 1938- 35-19-A- 3
WA9NHI 1728- 37-16-A- 5
WA9CCP 1458- 28-18-A- 3
K9KHZ 1173- 23-17-A- 3
W9RVM 1122- 22-17-A- 4
K9WDY 870- 29-10-A- 2
W9YH4 644- 23-14-B- 2
WA9ANU 512- 18-11-A-10
W9AGM 429- 13-11-A- 1
K9RVG 369- 41- 3-A-14
W9PNY 300- 10-10-A- 2
W9VBV 270- 15- 6-A- 1
K9SLK 195- 13- 5-A- 1
K9DTR 41- 5- 3-A- 2
WN9LRY 36- 13- 1-A-14
WA9NHA 30- 5- 3-B- 1
K9RGH 21- 7- 1-A- 1
WA9APT 3- 1- 1-A- –
W9DID 3- 1- 1-A- 1
K9VUX/9 3- 1- 1-A- 1
K9WMM (K9s ULF WMM ZAF) 21,114-156-46-A-15
W9BXU (4 oprs.) 13,440-149-32-A-22
WA9BRE (4 oprs.) 7673- 84-31-A-19
W9BGX (K8PBZ, W9ICE) 7140- 85-28-A- 6
WA9FZB (WA9s AIY FZB) 6519- 81-41-B-12

Indiana

W9IOP 100,674-504-68-A-19
WA9BWY 50,310-283-60-A-21
W9YSQ 32,098-127-58-A-14
WA9BRD 21,084-126-58-A-11
W9EPI 18,762-107-59-A-16
WA9RGK 16,767-123-46-A-12
W9HRB 4785- 55-29-A- 3
W9LKI 4524- 52-29-A- 5
K9RJO/9 4017- 55-26-A-12
W9CGF 39- 13- 1-A-11
W9QLW 28- 4- 4-B- 1
WA9AMZ/9 15- 5- 1-A- 1
K9FIC (K9FIC, WA9KLS) 30,744-216-48-A-19
W9EJH (K9s QKZ SJR, WA9BQU) 12,720-159-40-B-11
W9YB (8 oprs.) 31,515-191-55-A-24
WA9AQZ (WA9s AQZ IHZ, K9VNU) 7735-110-35-B-13

Wisconsin

W9RQM 61,740-347-60-A-20
K9KGA 53,436-294-61-A-20
W9VSO 34,056-260-66-B-15
W9EWC[3] 29,358-233-63-B- 8
W9VZP 28,560-238-60-B-16
WA9PGL 17,526-130-46-A-15
K9ESK 14,100-100-47-A-13
K9CJP 13,568-128-53-B-12
K9YBC 13,545-105-43-A-12
W9CIZ 7524-110-36-B- 7
WA9JDT 5616- 78-36-B- –
K9WIE 5549- 70-27-A- 4
WA9HRS 1914- 30-22-A- 8
WA9IDJ 1794- 26-23-A- 7
WA9AVZ 1680- 28-20-A- –
K9LGU 1575- 35-15-A- 2
W9JWT 1540- 35-22-B- 9
WA9HCZ 338- 13- 9-A- 8
W9BLQ 324- 14- 8-A- 3
WA9EDZ 216- 14- 8-B- 1
WA9JDK 50- 5- 5-B- 2



VE3EFD GOT THE URGE TO MOVE FOR SWEEPSTAKES '65

DAKOTA DIVISION

Minnesota

WØJPH 36,332-233-53-A-10
KØUIZ 27,878-158-59-A-12
KØKWK 20,658-162-44-A-16
WAØFUR 16,836-122-46-A- –
WØTIV 3488- 47-25-A- 6
WAØALF 864- 26-12-A- 5
WØAIH 816- 17-16-A- –
WØKUI 102- 9- 6-B- –
WAØACI (WAØs ACI GVW, KØPAU) 57,090-432-66-B- –
WAØIFJ (WAØs GXF HVR IED) 45,201-249-61-A-24
WØYC (KØs IFS UXQ, WAØARA) 1418- 32-15-A- 5

North Dakota

WAØAAD 57,702-326-59-A-20
WØKZZ 28,215-250-57-B-14
K6GII/Ø 21,860-226-55-B-13
KØFRP 12,915-105-41-A-11
WØCGM 4420- 66-34-B- –
KØHXL/Ø 2100- 35-20-A- 4
KØQWY 1653- 29-19-A- 4
KØRSA 77- 8- 3-A- 2
WAØEUA (5 oprs.) 22,419-213-53-B-22
WAØHYI (WAØs HYI IBE) 8046- 80-36-A-10

South Dakota

WØPRZ 42,273-232-61-A- –
WAØARZ 27,135-205-45-A-16
WAØAYP 13,356-110-42-A-15
K1CAU/Ø 1440- 25-20-A-,3

DELTA DIVISION

Arkansas

WA5CBL 64,998-319-69-A-17
W5DTR 690- 23-10-A- 2
WA5HNN 510- 17-10-A- 1

Louisiana

W5KC 42,021-242-58-A-13
W5LDH 25,263-201-63-B-12
WA5HJK 14,478-131-38-A-15
W7RVA/5 13,200-100-44-A-13
W5ERR 1958- 45-22-B- 5

Mississippi

K5TYP[6] 148,920-680-73-A-24
K5SVC 30,740-290-53-B-16
WA5HEC 7455- 71-35-A- 7

Tennessee

K4LPW 92,528-430-73-A-16
WA4AWG 47,880-228-70-A-24
WA4CGA 32,088-192-56-A-19
W4YAU 21,728-146-51-A-16
WA4UUM 20,588-155-45-A-10
K4SXD 15,228-108-47-A-10
WA4CUQ 15,042-109-46-A- 9
W4RSE 12,408- 98-44-A-22
W4IGW 10,710- 85-42-A- 9
W4OGG 6734- 92-37-B- 7
WA4VYL 4704- 56-28-A- 5
WA4JVU 3959- 46-29-A- 6
WA4PFD 594- 18-11-A- 3
W4RPU 126- 7- 6-A- 5
K4EJQ 18- 6- 1-A- 1
W4AM/4 (5 oprs.) 49,245-362-67-B- –
WA4UCI (K4s NUQ UWH, WA4DBG) 29,495-192-53-A-24

GREAT LAKES DIVISION

Kentucky

W4BCV 13,959-100-47-A- 5
K4RZK 13,145-120-55-B- –
K4CDY 1505- 30-17-A- 3

Michigan

K8TIG7 85,782-424-68-A-19
WA8OZH 68,913-371-62-A-20
W8WYC[8] 29,928-174-58-A-19
W8HUD 25,011-201-63-B-14
K8ZPY/8 24,174-161-51-A-15
W8BNF 20,355-173-59-B-14
K8RDE 18,252-170-54-B-10
W8VPC[9] 15,450-153-50-A-20
K8GPC 13,973-104-45-A-11
WA8JUG 10,472- 90-39-A-13
WA8LGE/8[10] 7722- 72-36-A- –
K8ZJU 4480- 80-28-B-10
W8DQL 4410- 49-30-A- –
WA8GEM 3696- 56-22-A- –
W8DUS 3456- 49-24-A- 2
WA8DXW 3240- 40-27-A- 8
K8QKT 1722- 42-21-B- –
W8MSK 1275- 25-17-A- 4
W8NBN 1080- 36-15-B- 5
WA8ECH 966- 24-14-A- 9
WA8OYQ 741- 20-13-A-12
WA8NST 720- 24-10-A- 7
K8LNB 630- 42- 5-A-14
WA8NAM 392- 15- 9-A-13
W8GDU 210- 10- 7-A- 3
W8CKK 93- 31- 1-A- 5
K8ZJY 6- 2- 1-A- 1

W8RHF (W8MPD, WA8s ERU FZC) 39,323-273-49-A-16
W8PER (W8BEB, WA8s FLW JXO) 16,020-166-40-A-17
K8ZZV (K8ZZV, WA8LRU) 12,240-107-40-A-18

Ohio

W8LIT 65,016-301-72-A- –
K8DOC 58,133-484-61-B-19
W8DHG 56,109-318-59-A-21
WA8HTR 44,103-242-61-A-23
K8NYM 43,968-229-64-A-19
K8ORL 41,958-259-54-A-19
W8ZJM 35,879-181-67-A-12
WA8FQW 33,335-285-59-B-18
W8VQI 31,103-189-55-A-17
WA8HVY 30,975-176-59-A-10
W8OYL 30,816-214-48-A- –
K8TAH 30,498-222-46-A-16
W8CEA 26,895-163-55-A- 7
WA8AUZ 24,684-187-44-A-21
W8YCP 20,604-152-68-B-12
WA8HXR 19,992-136-49-A-15
W8BGO 19,822-187-53-B-17
W8SUS 19,635 179-55-B-14
W8AJW 19,224-134-48-A- –
W8LHV 18,126-114-53-A- 9
K8BSM 17,748-153-58-B- 9
W8EXI 16,421-134-41-A-19
K8ANA 16,125-125-43-A-11
K8CTP 14,040-120-39-A- –
W8FYR 13,653-111-41-A- 9
W8DGQ 13,248- 96-46-A- 8
W8MXO 13,029-102-43-A- –
WA8KHP 12,495-119-35-A-14
K8GVK 12,336-132-32-A-14
W8UPH 11,712-122-32-A-10
W8BOJ 11,328-119-32-A- 4
W8OYI 10,472-107-48-B-10
K8RFU 9345- 89-35-A-10
WA8KOQ 8960-112-40-B- 6
W8LUZ 7980- 95-42-B- 7
K8TBS 6972- 83-28-A- –
K8LCN 6400- 80-40-B- 7
W8VRJ 4800- 50-32-A- 7
WA8DZS 4658- 57-27-A- 7
K8PBE 4658- 68-23-A- 8
W8APC 4320- 48-30-A- 9
WA8FKD 4064- 66-21-A- 9
W8TYL 4030- 65-31-B-10
K8YFX 3900- 52-25-A- 8
W8NAL 3600- 50-24-A- 7
K8BXU 3564- 54-22-A- 9
K8ZPF 3498- 53-22-A- –
W8OAC 3350- 67-25-B- –
W8WUO 3198- 41-26-A- 5
K8MMZ 3036- 44-23-A- –
W8GMK 2816- 44-32-B- 6
WA8HQG 2700- 50-27-B- 4
WA8AEY 2548- 49-26-B- 6
W8NHO 2537- 45-19-A-16
WA8PZS 2350- 47-25-B- 6
W8KCK 2240- 35-32-B- 3
W8IPS 2187- 41-18-A-14
WA8KRU 1980- 55-18-B- 6
W8CJN 1920- 32-20-A- –
WA8UPT 1920- 32-20-A-11
WA8LEO 1862- 40-17-A-14
W8RYP 1836- 36-17-A- 7
WIBVP/8 1683- 33-17-A- –
W8NQR 1596- 38-14-A-


Delta Division phone leader, 2nd high single operator phone and Mississippi award winner, K5TYP operated by K1KTH came close to 150-K. This photo was taken during the first few hours of the SS while John was fresh. His past SS ventures have been from W1HKK (in '61, 10th high) and E. Mass. winner in '60. Thanks to K1KTH, the Keesler ARC may boast bigger and better signals in a future SS.

W8GFH 1539- 27-19-A- -
W8PM 1392- 29-16-A- 4
W8CGG 1206- 27-16-A- 5
K8SMA 1134- 21-18-A- 1
WA8LVY 1112- 22-19-A- 7
W8VZE (040- 33-16-B- 4
WA8EWH 759- 23-11-A- -
K8GRO 705- 24-10-A- 6
WA8EWT 510- 18-10-A- 2
WA8JSX 420- 14-10-A- -
K8CHE 378- 21- 6-A- 3
W8QAO 252- 12- 7-A- 7
K8ZUD 252- 12- 7-A- 2
W8YHU 198- 11- 6-A- 2
W8POS 180- 10- 6-A- 2
WA8GYJ 114- 19- 2-A- 9
WA8LSD 42- 4- 4-A- 1
WA8NOI 42- 14- 1-A- 3
K8YSO 36- 4- 3-A- 1
K8RGG 21- 7- 1-A- 5
WA8NCX 18- 3- 3-A- 1
WA8DOM/8 6- 2- 1-A- 2
W8FWB 3- 1- 1-A- 1
WA8KHS 3- 1- 1-A- 1
WA8LRT 3- 1- 1-A- 1
K8PDF (WA8FWR, K8PDF)
21,327-160-51-A-17
W8EDU (4 oprs.)
10,317- 91-38-A- -
W8NCF (W8FWB, WA8EWH JTA)
1985- 31-21-A- 9
WA8FQK (WA8s FHP FQK)
369- 46- 3-A-13

HUDSON DIVISION

Eastern New York

WA2OOO 22,358-139-55-A- 8
WA2OJD 21,056-188-56-B-13
WB2LUW 17,493-151-39-A-22
WB2JVB 16,920-116-48-A- 8
WB2MVJ 11,025-110-35-A- -
K2GDP 5115- 55-31-A- 5
WB2EXZ 3906- 61-21-A-15
K2JCN 2520- 35-24-A- 6
WB2IEW 2423- 44-19-A-14
WB2IDW 2310- 53-22-B-12
WB2FVD 1734- 34-17-A- 4
WB2ERK 1608- 35-16-A- 6
WB2HBI 1176- 28-14-A- 5
W2JBQ/2 594- 17-12-A- 1
K2LSX/2 147- 7- 7-A- 2
K2UTV/2 18- 3- 3-B- 1
W2SZ (WA2s PJL YMZ, WA0DEV)
105,983-555-65-A-24

N. Y. C.-L. I.

WA2TKL 55,710-311-60-A-21
WA2YLL 53,897-305-59-A-19
WB2GYD 12,640-200-49-A-22
WA2RUB 10,672-210-55-A-19
WA2YBL 32,886-261-42-A-15
WB2IQB 32,130-180-60-A-19
WB2HJC 25,200-200-42-A-14
W2GKZ 25,193-214-59-B-12
W2CWD 24,440-240-52-B-12
WA2QEB 23,370-205-38-A-24
W2NDP 21,692-251-44-B-11
K2CHQ 20,286-221-46-B-18
WB2EMJ 16,620-139-40-A-15
K2HQR 13,200-100-44-A- 9
WB2BEV 11,633-119-33-A-10
WA2EXI 9300-100-31-A-13
WA2UWA 9180-102-45-B-11
WB2GIS 8657-100-29-A-15
K2HTX 8267- 84-33-A-13
WB2ESZ 7656- 89-29-A- -
W2IIAJ 7140- 85-28-A-10
K2JCC 7017- 81-29-A- -
WB2KXC 6720- 80-28-A-13
WB2ETF 6030- 67-30-A-13
K2YQR 5616- 72-26-A- 4
WB2FCB 5588- 84-25-A-11
WB2FPF 5475- 73-25-A- 8
WB2HIR 4620- 66-35-B-14
W2NRI 4200- 55-26-A-10
WA2HRX 4224- 64-22-A- 7
WB2CAN 3713- 51-25-A- 8
WB2DPG 3519- 51-23-A-10
WB2NSQ 3060- 60-17-A-10
W2THS 2740- 44-21-A- 8
W9ECV/2 2574- 33-26-A- 4
WB2IQG 1989- 39-17-A- 3
W2YWM 924- 33-14-B- 4
WB2HGO 540- 16-12-A- 3
K2CMV 486- 18- 9-A- 3
WA2SYU 459- 17- 9-A- -
WB2AEO 378- 22- 6-A- 7
WA2CAS 378- 14- 9-A- 1
WB2GTT 300- 25- 4-A- 4
WB2PCF 252- 21- 4-A- 3
W2IAE 210- 10- 7-A- -
W2OBU 180- 10- 6-A- 3
WB2IQM 168- 21- 4-B- 4
W2DID 165- 11-11-A- 1
WB2COW 18- 3- 2-A- 1
W2JB 3- 1- 1-A- 1
WB2BWV (W1s2 BWV LGR)
54,516-416-66-B-24
WA2PXB (4 oprs.)
27,612-236-39-A-24
WA2LQO (5 oprs.)
22,356-243-46-B-20
WA2ZXL (WA2ZXL, WB2BJG)
18,864-267-36-B-22
WB2MRM (WB2s (CU5 MRM)
14,364-139-36-A-21
WB2LHY (WA2s QMC WYL, WB2JWN)
12,753-111-39-A-13
WB2DXM (WB2s BPI DXM, WN2PTL) 9936-104-32-A-19
WB2FAJ (WB2s EQP FAJ)
6048- 84-24-A-17
WB2KRJ (WB2s KRJ MCB)
4125- 66-22-A-18

Northern New Jersey

K2KPP 24,960-160-52-A-17
WA2MGX 24,888-245-51-B-15
W2PBV 23,760-198-60-B-20
WB2DEP 23,741-166-49-A-17
K2OIX 15,390-143-54-B-10
W2LQP 14,580-108-45-A- 9
WA2PWI 11,310- 90-53-A-10
WB2CZZ 10,608-111-32-A-16
WB2GLI 8178- 94-29-A-11
W2KXL 7452- 82-46-B- -
WB2CRX/2 5850-118-25-B-12
WB2KQC 5504- 86-32-B-18
WB2FQC 3578- 78-15-A- -
WA2UDT 3276- 46-24-A- 3
W2JKH 2829- 42-23-A- 4
WB2NHT 2765- 50-19-A- 8
WB2JVM 2415- 58-14-A-10
WA2BKW 1536- 32-16-A-10
WB2KLD 1320- 56- 8-A-12
WB2HWH 1221- 37-11-A- 5
WA2ZDN 828- 23-12-A- 2
WB2PLK 594- 33- 6-A- 5
WB2KXG 558- 16-12-A- 5
WB2LSZ 540- 21- 9-A-11
WA2KRX 204- 17- 4-A- 7
W2KTR 108- 6- 6-A- 1
WB2JDW (WB2s ETV FBO JDW) 28,917-234-42-A-24

MIDWEST DIVISION

Iowa

K0BUU 74,571-371-67-A-24
K0MMS 52,608-274-64-A-19
WA0DNB 52,050-356-50-A-19
W0LBS 50,034-270-62-A-15
W0AXE 47,208-282-56-A-15
WA0ASL 40,050-225-60-A-14
W0BQN 31,752-217-49-A-12
W0BVR 25,568-207-56-B-15
WA0AIS 3168- 68-17-A- 9
W0SQN 2430- 41-20-A- 5
K0AAR 2040- 34-20-A-10
WA0EWN 252- 13- 7-A- 5
WA0CZA 168- 8- 7-A- 3
W0JAQ 162- 9- 6-A- 1
WA0FAX (WA0s DVN FAX FAY) 8160- 87-32-A- -
WA0HXW (W0DSP, WA0IJS)
6458- 62-35-A-10

Kansas

K0KLW 55,242-279-66-A-18
W0LXA 17,150-175-49-B-16
WA0BJN 11,525- 99-39-A- 9
W0JUV 9399-124-39-B-10
K0GZP 1675- 34-25-B- 8
W0SEH (W0s DNP ENY, K0WUD) 51,610-397-65-B-24

A W3 (CK29) CALLED WA2OJD (CK29) AN OLD BUZZARD

Missouri

K0UWZ 58,401-310-63-A-20
WA0AJV 44,100-246-60-A-20
K0EQY 19,932-151-44-A-12
K0GSV 19,320-140-46-A-17
K0YIP 18,081-123-49-A-13
WA0FAE 17,136-119-48-A-19
WA0ELM 16,776-112-48-A- -
K0JPL 11,134-147-38-B- 8
K0IDEQ 8925- 89-34-A-12
WA0EMX 2376- 44-18-A- 3
K0WPC 1050- 25-14-A- 6
WA0AGM (WA0s AGM EMS HTY) 59,400-454-66-B-24
W0CTV/0 (5 oprs.)
40,992-361-61-B-23
W0ZLN/0 (4 oprs.)
4746- 57-28-A-10

Nebraska

K0CVA 106,926-506-71-A-24
W0GVM 39,808-311-64-B-18
K0VVQ 18,975-142-46-A-12
K0ETA 11,316- 92-41-A-10
WA0HSX 8200-113-40-B-14
W0FQB 5780- 85-34-B- -
WA0HGY 468- 20-12-B- 2

NEW ENGLAND DIVISION

Connecticut

K1THQ 40,875-274-50-A-17
W1BIH 30,464-227-68-B-14
K1RPQ 28,084-238-59-B-16
W1ILV 21,748-273-46-B-13
K1WNT 20,787-169-41-A-17
W8RCJ/1 19,530-155-42-A-17
K1YGS 15,576-118-44-A-11
W1CP(III)2 14,832-156-48-B- -
K1ZND 14,586-113-34-A-13
K1THP 10,091-109-31-A-14
K1RPS 9741-100-34-A-11
W1AW(III)3 9420-157-30-B- 5
W1QAK 8100- 75-36-A- 6
K1OVF 7980- 76-35-A-13
W1BHV 7446-110-34-B-12

K8TIG, the University of Michigan station, was operated in a sterling fashion both weekends. On phone W8FAW (left) did the honors winding up with 86-K while the c.w. portion was keyed by W8CQN (right) to the tune of over 100-K. Both lads are seasoned operators, W8FAW first being licensed in '55 at 11 years and W8CQN first licensed as K3DUB in '58 at 12 years of age.

K1IKJ 4350- 58-25-A-11
K1QPN 3900- 50-26-A- 5
K1VQZ 1785- 35-17-A- 7
W1IKE(II) 1488- 27-18-A- 2
K1MYQ(II) 963- 13- 7-A- 4
WN1CYB 18- 6- 1-A-14
W1CSM 12- 2- 3-A- 1

Eastern Massachusetts

K1DIR 73,810-521-71-B-22
K1WJD 29,406-432-58-A-11
W1JYH 25,200-210-60-B- 6
W1MRQ 22,288-199-56-B-12
K1VWL 19,035-131-47-A- -
K1YU1 17,290-235-38-B-17
W1QIB 8064- 64-42-A- -
W1PLJ 7040- 80-44-B-11
W1AQE 6150- 84-25-A- 8
K1YRG 4389- 67-22-A- 5
K1BZL 2976- 63-24-B-14
W1MO 1980- 33-20-A- 3
K9RDF/1 1250- 25-17-A- 8
K1YRF 797- 31- 9-A- 5
W1EIQ 105- 7- 5-A- 2
WA2UVH/1 (WA2s RJA UVH) 31,206-301-53-B-24
W1MIX (WA2VAZ, WB2DBS) 1824- 32-19-A- 7

Maine

K1RQE 43,092-228-63-A-14
W1GKJ 42,768-327-66-B-18
W1RCC/1 31,284-237-44-A- -
W1NJL/1 15,300-150-34-A- -
W1DI8 5400-109-25-B- 4
WA1ADK 2835- 49-21-A-15
K1SGU 2376- 37-22-A- -

New Hampshire

W1FZ 24,624-171-48-A- -
W1DYE 13,140-148-30-A-11
K1YSD 4032- 76-28-B- -
W1TA/1 (K1s AEG NBN) 51,330-444-59-B-21

Rhode Island

W1YRC 51,423-283-61-A-16
W1HQV 44,307-283-54-A- -
K1UJX 1985- 32-21-A- 8
K1QFI 1062- 30-12-A- 6
W1DDD (K1QFI, W1AUT) 954- 27-12-A- 2

Vermont

K1PNE 17,289-174-51-B-10
K1UZG 2376- 36-22-A- 8
K1JJ 280- 14-10-B- -
W1UOP/1 (4 oprs.)
28,623-306-47-B-20

Western Massachusetts

K1NWE 33,768-201-55-A-19
WA1AEV 5555- 82-23-A-13
W1WP 5406- 81-34-B- 9
K1DFC 2162- 47-23-B- 6
K1YST 1541- 40-13-A- 8
K1LSW 459- 17- 9-A- 4

NORTHWESTERN DIVISION

Alaska

K1AH/KL7 10- 3- 2-B- -

Idaho

K7LPF 24- 4- 2-A- 2

Montana

W7CBY 9216- 96-32-A- -
K7PGL 8103-116-37-B-14
W7TCK (K7s RXO VRY YLR) 19,928-218-47-B-21
W7FO (8 oprs.)
19,539-178-39-A-19

Oregon

W7WLL 79,900-590-68-B-24
W7TDK 39,223-323-61-B-15
K7GWE 1428- 29-17-A- 5

Washington

W7ESK	132,273-640-71-A- –
W5YFS/7	25,599-186-46-A-16
K7AYD	9975- 95-35-A-11
K7YHQ	8694- 82-36-A-13
K7YDZ	2040- 34-20-A- 5
K7KPM	1658- 33-17-A- 2
W7DK/7[14]	1305- 30-15-A- 6
W7HLP	1287- 33-13-A- 3
K7NKZ	1089- 34-11-A- 8
W7OVJ	153- 9- 6-A- 3

PACIFIC DIVISION

East Bay

W6KG	50,250-375-67-B-19
WB6BKB	12,599-116-37-A-24
WA6VAT	878- 19-15-A- 2
K6LRN	48- 6- 4-B- 1
W6BB (6 oprs.)	26,070-240-55-B-24

Hawaii

KH6FIF	10,080-107-32-A- –

Nevada

K7WLX	7992-111-37-B-12
W7KOI	4644- 90-27-B-11
W7AKE	1254- 33-19-B- 5
K7FDB (K6EWP, K7QWP)	28,426-226-61-B-18

Sacramento Valley

WA6SLU	34,615-270-65-B-20
WA6JDT	966- 23-14-A- 4

San Francisco

WA6AUD	18,096-116-52-A- 9
WB6GVI	858- 26-11-A- 3
K6NCG (K7MZC, K0OHD, WA0DLG)	44,712-312-72-B-24

San Joaquin Valley

W6TZN	40,848-298-69-B-20
WA6MFY	23,664-205-58-B-18
W7YOZ/6	20,358-132-52-A-18
WA6SBG	11,880- 88-45-A- 8
WA6FOL	10,086-125-41-B- 8

Santa Clara Valley

K6CLM	62,985-489-65-B- –
K6VGW	36,105-209-58-A- –
WB6BIG	8400-100-42-B-16
K6VVA	2599- 57-23-B- –
WA6VA8	1305- 30-15-A- 7
WB6GFJ (WA6ZUA, WB6s FHH GFJ)	59,920-420-70-B-24
W6YL (4 oprs.)	29,952-216-48-A-22
WA6YRN (2 oprs.)	4316- 84-26-B-12

ROANOKE DIVISION

North Carolina

WA4LGG	17,313-208-58-A-23

South Carolina

K4YYL	60,977-347-59-A-22
WA4GRA	18,864-132-48-A-15
W4YSJ	14,484-142-51-B-20
WA4THS	13,500-100-45-A-18
W4ULY	5841- 61-33-A-10
WA4UYY	4976- 54-31-A- –
W4PED	324- 12- 9-A- 3
WA4TLB	98- 7- 5-A- 2

Virginia

W4KFC	118,860-567-70-A-22
W4BVV	65,408-336-57-A-15
W4VBX	51,456-402-64-B-17
WA4IVL	51,120-360-71-B-23
K4VWH	33,810-246-69-B-20
K4CG[15]	33,220-302-55-B-23
W4ZM	32,592-194-56-A-15
WA4BDB	27,888-168-56-A-16
W4WRC	20,352-192-53-B-15
K4WUM	16,113-132-41-A- 8
W1GF	10,360-142-37-B- 8
W4PTR	9828- 85-39-A- 8
W4MXU	8748-122-36-B- 8
W4JAT	5628- 67-28-A- 9
K4VCY	3780- 45-28-A-10
W4YZC	3570- 60-30-A- –
WA4MTP	2961- 48-21-A-14
W4OP	1824- 33-19-A- –
W4JUJ	621- 23- 9-A- 2
WA4TGF (5 oprs.)	25,281-300-43-B-19
WA4KBG (WA4s KBG QOC)	6006- 74-28-A-13
K4TSU (K4s IKF TSU ZHA)	2835- 54-27-B- 9
W4KXV (W4KXV, WA4GHV)	1512- 36-21-B- 6

West Virginia

W8NCD[16]	47,838-210-67-A-20
WA8IMY	8016- 85-32-A- 4
W8LMF	27- 3- 3-A- –
WA8EUC	12- 2- 2-A- –
WA8GRE (WA8s FIC GRE)	29,030-201-49-A-14

Versatile K1DIR led E. Mass. and the N. E. Division on both phone and c.w., enjoys building his own gear and then giving it the honest test; using it under contest competition. In the June VHF QSO Party Bob operates and maintains K1OOR 220-Mc. equipment.

KØTIV	504- 14-12-A- 2
WAØHYG	336- 14- 8-A- 4
WØMYB	210- 10- 7-A- 1
WØANA (4 oprs.)	47,212-415-58-B-23

ROCKY MOUNTAIN DIVISION

Colorado

KØJGF	52,983-307-58-A-13
WAØGUH	30,030-194-52-A-19
WAØBCM	11,638-134-46-B- –
WAØAHI	3863- 54-25-A-15
WAØCVS	2223- 41-19-A- 2
KØVFN	1785- 35-17-A- 7
WAØEEG	1562- 36-22-B- 3
WØWME (4 oprs.)	38,280-234-55-A-24
KØMIC (K4SNA, K5VOL)	36,414-291-63-B-16
WAØAOF (WAØs AOF BLQ)	6956- 94-37-B-14

New Mexico

WA5DUH	27,540-206-45-A- –
WA5ILD	11,025-106-35-A- 6
W8HZY/5	7128- 68-36-A-13
K5YEZ	4770- 53-30-A- 3
W5FHL	4350- 51-29-A- 5
W5RVZ	2280- 38-20-A- 4
W5LEF	1540- 35-22-B- 2

Utah

K7AQB	55,449-303-61-A-18
W7GNC	7701- 81-34-A-12
W7ZC	5304- 80-34-B- –
K7JVF (K7s JVF ZTM)	25,740-167-52-A-18

Wyoming

K7ORN	20,493-150-46-A- –
W7QPV (K7s HAW VTM, W7QPV)	42,399-337-63-B-24

SOUTHEASTERN DIVISION

Alabama

K4CFD	85,334-467-63-A- –
W4YIZ	21,855-156-47-A-14
W4DS	11,928-107-56-B- 9
WA4EBS	6804- 63-36-A- 9
WA4QXH	5712- 64-32-A-15
W4YFN	3276- 42-26-A- 8
W4USM	1320- 22-20-A- 2
K4KJD	374- 17-11-B- 2
K5IQA/4	315- 11-10-A- 3
WA4RER (WA4s RER RES)	34,788-225-52-A-24

Canal Zone

KZ5TT	588- 22-14-B- 2

Eastern Florida

WA4NGO	81,972-600-69-B-16
W4KET	42,456-234-61-A-13
WA4SVO	39,375-323-63-B-23
K4FQU	23,888-166-49-A-15
W4WYJ	10,899- 90-42-A-10
W4STA	9477- 81-39-A-10
W4CQZ	4452- 53-28-A- 6
W4PJG	2580- 43-20-A- 4
WA4IYG	2310- 35-22-A- 8
WA4HFB	27- 3- 3-A- 3
WA4ROE (WA4s HXY ROE SDB)	16,356-118-47-A-11

Georgia

K4BAI	101,745-485-70-A-24
WA4IWE/4	9345- 89-35-A-15
W4FQX	6336- 65-33-A- –
WA4URT	2295- 45-17-A- 7
WA4UVD	1350- 31-15-A- –
K4CRY	756- 22-12-A- 4
K4YSB/4 (K4s NYN UJS YSB)	28,560-280-51-B-24

West Indies

KP4BFD	375- 13-10-A- 2

Western Florida

K4DAD	58,380-351-56-A-20

SOUTHWESTERN DIVISION

Arizona

W7AYY	74,973-375-67-A-18
K7OLZ	50,850-289-60-A-17
WØYFT/7	47,436-267-59-A-19
K7VMO	47,151-258-62-A-20
K7UNW	32,924-242-47-A-14
K7VUR	6786- 81-29-A- 8
W7ENA	4056- 52-26-A- 5
W7PZ	128- 16- 8-B- –

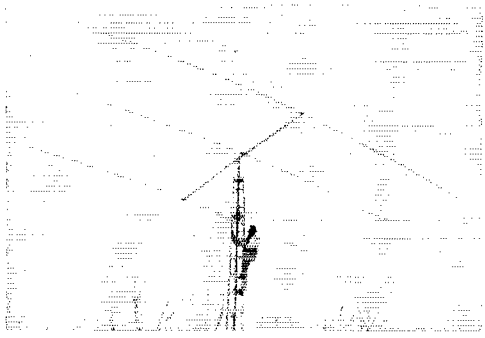
Los Angeles

K6EVR[17]	159,980-733-73-A-24
K4PUZ/6	71,255-357-67-A- –
WB6FQO	46,482-257-61-A-17
WA6QNN	45,120-242-64-A-10
K6HPC	41,580-330-63-B-18
WAØZAA	28,014-162-58-A-16
WB6FGE	23,100-153-52-A-18
W6TGF	20,727-141-49-A-14
W9HAD/6	20,445-145-47-A-19
WB6CEG	19,872-149-46-A- 9
WB6EXF/6	16,758-114-49-A-19
W6RW[18]	10,450-138-38-B- 4
WB6EDT	9308- 90-35-A- –
WA6ZJZ	7831- 99-41-B- 8
W6EIG	5811- 75-26-A- 9
K6JBV	4485- 67-23-A- 5
WB6HTM	1395- 32-15-A- 5
WB6DFQ	875- 27-11-A-11
WA6YWS	468- 18-13-B- –
K3VPF/6	372- 17- 8-A- 1
W6TGY	351- 20- 9-B-10
K6YPZ/6	297- 11- 9-A- 2
WB6DHG	195- 13- 5-A- 1
WA6KHK	10- 4- 1-A- –
WB6GVV (WA6NON, WB6GVV)	49,995-306-55-A-14
K6ICQ (K6s JCQ ICS)	31,350-194-55-A-12
W6YRA (WA6s OCI SAL)	8268-109-26-A-16
WB6HKK (WB6s HKK LXP)	7533- 82-31-A-16

San Diego

W6NAT	22,656-198-59-A- –
WB6FCR	17,250-126-46-B-16
WB6EFA	16,104-124-44-A- 8

WN1CDQ, Connecticut Novice winner, personified another new crop of hams. This was 14-year-old Donald's first contest and he put to good use a T-60 and SX-100, plus 80- and 40-meter dipoles.



Phone Nebraska leader, tops for Midwest on A-3 with 10th high phone is Omaha University freshman KØCVA. KØUKN snapped this photo as Ray was giving his 20-meter beam and 80-meter doublet a last-minute check.

WB6GMM	9576- 84-38-A-16
K6VZA	5985- 58-35-A- –
WB6KNN	5625- 76-25-A-10
K6OIZ	2106- 39-18-A- –
WB6ITM	1275- 25-17-A- 5
WA6WPG	750- 25-10-A- 3
WB6IEX	651- 16-14-A- 7
WB6HPJ	435- 29- 5-A-11

Santa Barbara

WB6DPV	6000- 81-25-A-11
WA6V8F	1482- 39-19-B- 3
W6GEB	1272- 27-16-A- 4
W6OUL	1152- 24-16-A- 4

WEST GULF DIVISION

Northern Texas

K5RHZ	111,345-571-65-A-19
WA5ALB	81,473-383-71-A-24
K8YCM/5	73,440-365-68-A-17
K2EIU/5	54,774-271-68-A-19
W5KHP	46,022-244-63-A-14
K5PSL	23,712-152-52-A-15
K5ODZ	19,113-139-46-A-17
K5WAB (4 oprs.)	10,879-128-43-B-24

Oklahoma

K5HWO	36,180-303-60-B-10
WA5HGV	8085- 77-35-A- –
K5OCX	6432- 67-32-A- 6
WN5KRD	21- 7- 1-A- 8
W5GKK (2 oprs.)	41,912-362-62-B-24
W5YJ (6 oprs.)	27,376-242-58-B-21

Southern Texas

K5LZO	132,192-614-72-A- –
K5PFL	33,180-199-56-A-17
WA5GZX	8910- 86-36-A-10
W5KTW	5618- 53-53-B-13
W5MYX (4 oprs.)	44,820-251-60-A-24

CANADIAN DIVISION

Alberta

VE6OR	28,152-204-46-A-13
VE6AAV	19,152-201-48-B-11
VE6NE	6048- 73-28-A-20
VE6AGV	3120- 42-26-A- 7
VE6MA	2607- 40-22-A- 6

Maritime

VE1NV (VE1s NV ST)	22,981-242-49-B-16

Ontario

VE3CKW	37,236-215-58-A-21
VE3BOG	21,840-195-56-B-15
VE3DVN	19,278-119-54-A-12
VE3EVZ	17,400-116-50-A-14
VE3ES	5508- 81-34-B- 6
W8JKD/VE3	5320- 70-38-B-13
VE3GAE	3192- 59-19-A- 4
VE3AUU	1296- 36-18-B- –
VE3FHQ	1140- 31-19-B- 3

Quebec

VE2AUV/2	94,248-473-68-A-24
VE2SH[20]	56,775-380- 5-A-19
VE2UX	11,676-142-42-B-15

[1] K3QFF, opr. [2] K1ANV, opr. [3] W9LNQ, opr. [4] WA9FBC, opr. [5] W9SZR, opr. [6] K1KTH, opr. [7] W8FAW, opr. [8] W8TJQ, opr. [9] K8ZKH, opr. [10] W8ETA, opr. [11] Hq. staff, not eligible for award. [12] W1YNP, opr. [13] W1WPR, opr. [14] W7IKG, opr. [15] K3WUW, opr. [16] WA8DGE, opr. [17] W9WNV, opr. [18] K6QPH, opr. [19] K9ELT, opr. [20] VE3RM, opr.

ARRL thanks the following amateurs for submitting their logs for checking purposes: W1BU W1DYE W2GGE W2NOQ WN2PBY W2SJB W3MFW K4RQE K4SCL/4 W6OJW K7TRG K7WPC K8RNP W9GIL WA9KGQ W9GUZ W9WDM VE3AWE VE6TP.

K6EVR, operated in both modes by contester W9WNV, turned in 2nd high c.w., top phone, leading the Southwestern Division and Los Angeles. This action shot shows Don avoiding duplicate QSOs while amassing 733 on two-way phone!

May 1940

. . . "Extended Variable Frequency Crystal Control", the lead article in this issue, described a method of crystal control that made it possible to cover the entire 14-Mc. band with only one crystal. The principle involved two crystal oscillators, one fixed, the other made variable by changing the air gap between the holder and the crystal. Output from the oscillators was multiplied and then mixed. The difference frequency was then multiplied and resulted in a much wider variation in frequency than the original "rubber" crystal had. Keith Hayes, W9ZGD, was given credit for this principle, and By Goodman, W1JPE (now W1DX), came up with the working model reported in the article . . . George Grammer, W1DF, described "An Inexpensive Electronic Key", a compact economy version of the electronic key described the previous month. W1DF's model incorporated the actuator into the keyer chassis and the device took up about the same table space as an ordinary key . . . George also came up with a simple visual negative-peak monitor which appeared as a one-pager, "Flasher-Type Overmodulation Indicator" . . . Other technical articles included "A New Electronic Television Transmitting System For The Amateur", by J. B. Sherman, (the secret of the system was a new miniature Iconoscope just recently available to amateurs); "A 56-Megacycle Mobile Station" by Arthur Lynch, W2DKJ; and a "Compact 112-Mc. Station" by Howard Lawrence, Jr., W2IUP.

. . . "The YL's Unite", the story of the newly formed Young Ladies' Radio League, YLRL, appeared in this issue.

. . . In the column, "Quote and Unquote", there was a note on suppression of ignition interference on frequencies between 40 and 60 Mc. The scheme involved the use of resistance in the high voltage circuit of the car's ignition system.

. . . Ed Battey, W1UE, reporting on the "1939 Sweepstakes Contest Results", mentioned that there were only 117 participants in the first SS back in 1930. This 1939 contest was loaded with 1704 participants!

. . . Ed Tilton, W1HDQ, reported in the column, "On the Ultra Highs", about the violent sunspot activity and aurora skip that took place in the month of March, 1939. There was little knowledge of the effect in scientific circles and it was a great opportunity for radio amateurs to do some pioneering observation of the phenomenon.

. . . Letters in the "Correspondence From Members" section of the magazine were suggesting purely technical systems for the S scale in the RST system. Fred Schnell, W9UZ, presented a method based on microvolts input to the receiver with a S-meter scale that would read only 0—1—2—3—4—5.

QST

Inverted-V Radiation Patterns

A Theoretical and Experimental Study

BY DALE W. COVINGTON,* K4GSX

The antenna now known in amateur circles as the inverted V, not being one of the "standard" forms, has not been analyzed in any of the current antenna texts. K4GSX undertook to work out the patterns mathematically and experimentally, with the results given here. A cage-type construction for increasing the bandwidth is also described.

ONE of the handiest antennas for the low frequency bands is the inverted V. Its simplicity makes it particularly useful for Field Day or fixed-portable installations. Despite the antenna's popularity [1,2,3] little seems to have been written about its radiation characteristics. The following note considers a few patterns in both the horizontal and vertical planes of the far *E*-field radiation of an inverted V. Some practical details of a broad-band V for 40 and 80 meters are also included.

Patterns

Perhaps a couple of points should be made before launching into the radiation patterns. First, the term "inverted V" actually describes two types of antennas. One is a half rhombic in the vertical plane,[4] fed at one end and terminated through a resistor to ground at the other end. More recently, use of the term implies resonant dipole antenna with its ends drooped. It is this latter type, with the approximation of sine currents on the V legs, that is treated here — not the travelling-wave rhombic antenna.

Second, the patterns of the inverted V are a function of the *E*-field polarization. There is no change of polarization effect for the field in the vertical plane perpendicular to the plane of the V. This field is horizontally polarized regardless of the angle of elevation. The radiation pattern in the horizontal plane about the antenna is not so simple. Fig. 1 illustrates the far fields that might be measured for the case of a 90-degree angle between the legs of the V. If one walked around the antenna with a short sensing dipole horizontally oriented, the field observed would have the characteristic figure-8 pattern of Fig. 1A. Maximum signal would occur broadside to the antenna, and at a point in line with the V a null would be seen. Rotating the sensing antenna to the vertical direction would yield no change in this null for a horizontal antenna with no droop, but the slope of the legs of a V introduces a completely different pattern, with a maximum somewhat smaller than before and positioned in line with the V. This new pattern is shown in Fig. 1B. The final field is therefore the sum of both horizontal and vertical *E*-fields being all horizontal broadside, all vertical off the ends, and a mixture in between.

The far *E*-field patterns were derived with suitable coördinate transformations from expressions given in a previous paper by Wells.[5] Two cases were solved. One was the total field magnitude in the horizontal plane perpendicular to the plane of the V and parallel to ground. The other was radiation in the vertical plane perpendicular to the antenna and ground. Computed values for the latter case were corrected to include the effects of earth that was perfectly conducting. Relative patterns are plotted in Figs. 2 and 3 for inverted V's with included angles between the legs of 120,

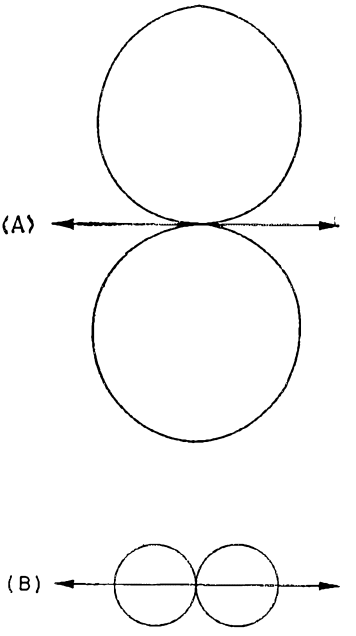


Fig. 1—Theoretical field patterns of an inverted V having a 90-degree apex angle for (A) horizontally-polarized component of radiation and (B) vertically-polarized component. Arrows indicate V leg directions.

* 1/Lt., Hq. and Hq. Co. U.S.A.S.A., Box 028, Ft. George G. Meade, Md.

[1] Glanzer, "The Inverted V-Shaped Dipole", *QST*, August 1960, p. 18.

[2] Allred, "E-Z Up Antenna for 75 and 40", *QST*, October 1961, p. 52.

[3] Dzambik, "Multiband Antenna", *QST*, November 1961, p. 55.

[4] *The A.R.R.L. Antenna Book*

[5] Wells, "Quadrant Aerial", *J. Inst. Elec. Engrs.*, Pt. III, 182 (1940), p. 91.

[6] Zawacki, "An 80 and 40 Meter Inverted V", *CQ*, March 1962, p. 32.

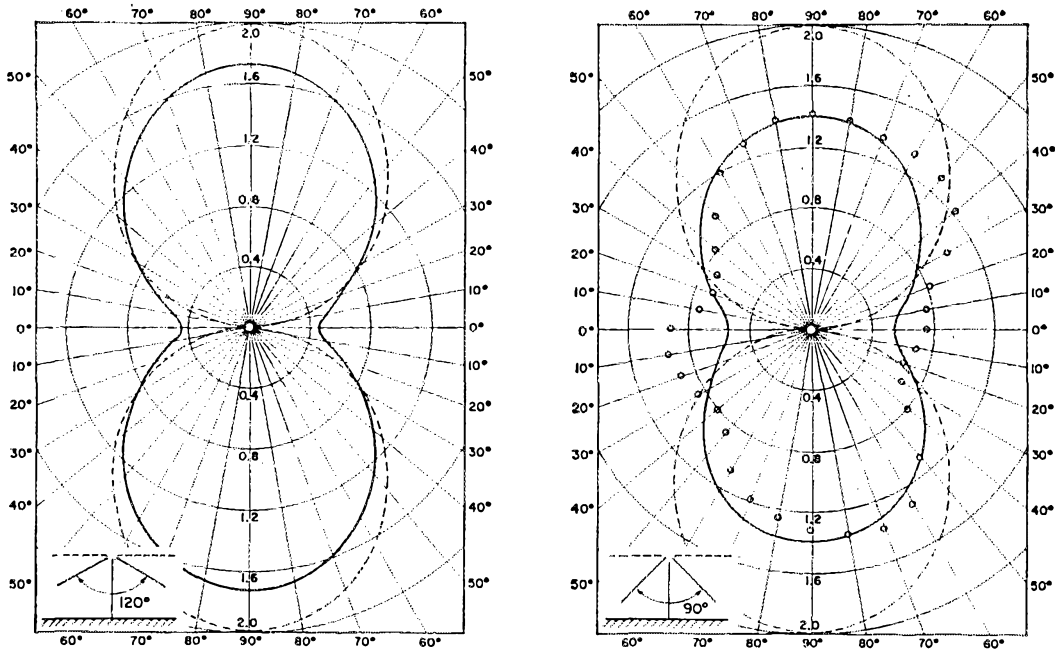


Fig. 2—Total relative field intensity in horizontal plane from inverted-V antennas having three different apex angles. This is the theoretical azimuthal pattern of the antenna irrespective of polarization. The legs of the V lie in the 0-0 direction. Dashed line shows pattern of a linear half-wave antenna for shape comparison.

90, and 60 degrees. For comparison purposes the angular multiplying factor of the horizontal half-wave antenna is also shown on the plots by a dotted line.

The horizontal patterns of Fig. 2 reveal a number of interesting features. First, the antenna behaves much like a horizontal dipole until the ends have been drooped a considerable amount. The plot for 120 degrees is quite close to the half-wave antenna. For the same *current* input the radiation along the axis of the V (0-0) direction) is greatest for the 90-degree V. Further droop does increase the net *percentage* of radiation off the ends to that broadside, as in the 60-degree V. In all three V's the *E*-field is at a 45-degree angle with respect to the horizon before θ of 27 degrees is reached. Thus V radiation is predominantly of horizontal polarization for all but the smallest V angles.

Experimental Measurements

There are always problems associated with accurate modeling and plotting of fields of low-gain antennas. Changes in polarization increase these difficulties. Nevertheless a small u.h.f. model of an inverted V was constructed. A u.h.f. oscillator excited a separate transmitting antenna that could be rotated in both polarization and orientation about the receiving V. Baluns were used to transform the coaxial feed to the balanced impedance of the antenna terminals. By using this simple rig, measurements were made of the total radiation in the horizontal plane. Some 20 wavelengths separated the two test antennas, so near-field effects were minimized. The small open circles in Fig. 2 are the experimentally measured field values. Although there was some distortion even for the dipole, the most obvious disagreement occurred off the ends of the 90-degree V. A recheck of the data revealed that the nulls were not particularly sharp for horizontally-polarized radiation. The response to vertical radiation alone at the horizontal null was some 12 percent greater than the theoretical patterns indicate. The general shape of both polarizations individually followed closely the predicted patterns shown in Fig. 1.

Vertical-Plane Patterns

Vertical-plane patterns of V's do not differ greatly from dipoles. Fig. 3 presents the vertical patterns of inverted-V antennas when the apex is located ½ wavelength above ground. Immediately striking is the similarity to the patterns of horizontal dipole also ½ wavelength from ground. The patterns, while close, are not quite identical. Actually there is a slight increase in V radiation for the lower angles of elevation and a slight decrease for the higher angles. Again for the 90-degree condition, the increase in radiation at 10 and 20 degrees is 0.3 and 0.5 percent, respectively, over that of a half-wave dipole normalized to 30 degrees. The decrease for the higher angles of 70 and 60 degrees is in about the same ratio.

The above theoretical patterns in all instances are the angular factor of the radiation-field expres-

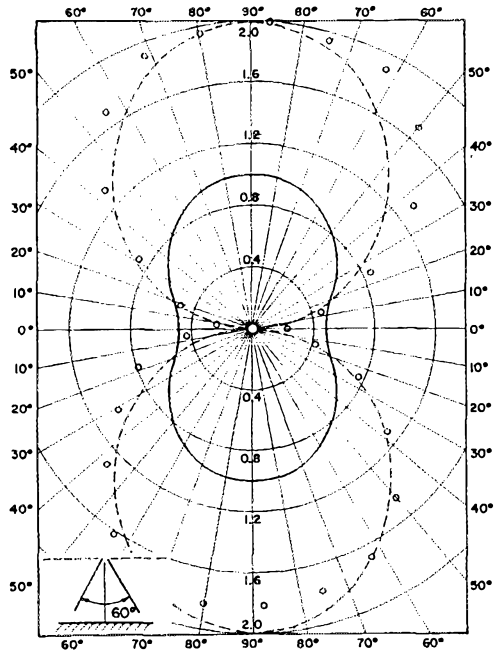


Fig. 2—Continued

sions. Actual field-strength comparisons between the various antennas for a constant input *power* would also require the inverse square root of the radiation resistance of the V. As the leg angle sharpens, this term does decrease, which compensates in part for the reduced angular factor.

Construction Details

On the more practical side, some details are included of a broad-band V for 40 and 80 meters that my father, W4LKB, built. As Fig. 4 indicates, two trees were used instead of a center support mast. Plastic clothesline strung between the trees was tied to a phenolic center insulator. The clothesline is light, strong, and slippery enough to permit easy raising and lowering of the antenna. Several techniques were tried in getting a light line into the trees, including the slingshot-fishing line approach. The best luck was obtained with a bow and featherless arrow.

Fig. 5 shows the center insulator, made with a $1\frac{1}{2} \times 2\frac{1}{2} \times 3\frac{1}{2}$ inch phenolic block and a U bolt. A coax terminal should be mounted on the block for 52-ohm RG-8/U coax. If RG-58 is used, a knot will keep the coax from pulling through the insulator and reduce the strain on the soldered connections.

Three wires in the cage were considered to be a good compromise between bandwidth and wire cost. Tee braces were constructed of light poplar, $\frac{1}{2} \times 1\frac{1}{8} \times 11$ inches for the upright and $\frac{1}{2} \times 1\frac{1}{8} \times 123\frac{3}{8}$ for the horizontal member. Holes were bored $\frac{7}{16}$ inch in from the brace ends to receive the antenna wire. These dimensions will yield an equal wire spacing of $11\frac{1}{2}$ inches. The braces were treated to baths of hot paraffin before assembly with brads or screws. End braces should be especially sturdy. The total length of the wire elements was 121.5 feet for 80 and 65 feet for 40. A good flexible wire — 7 strands of No. 22 copper is excellent — greatly facilitates stringing the cage. Spacing the braces 5 to 6 feet apart seemed to work well. Short lengths of copper or brass wire tightly twisted around the ends of the braces will keep the braces in position along the antenna wire.

Once the legs had been fanned out beneath the center section, it was easy to raise the antenna into position. The 40- and 80-meter antennas ran approximately perpendicular to each other to insure minimum interaction.

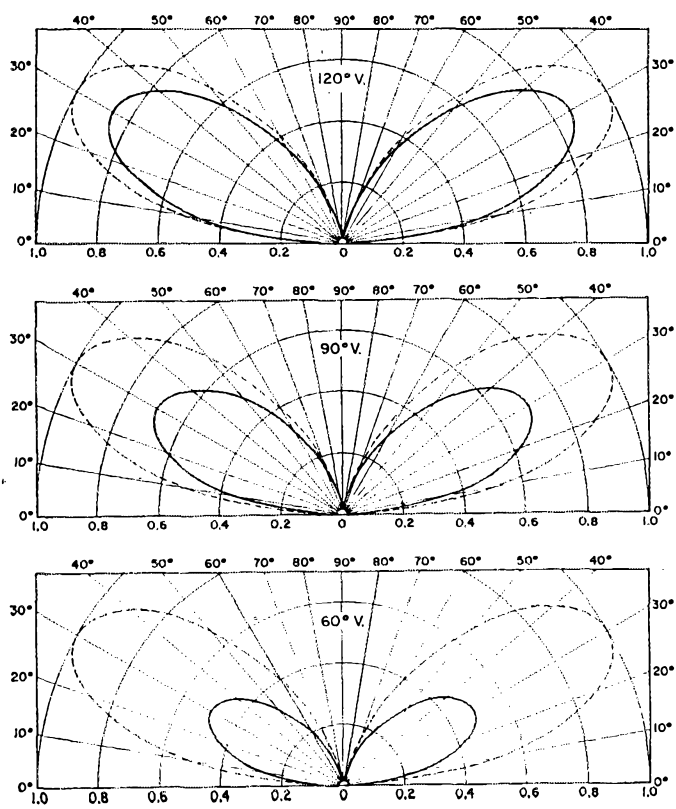


Fig. 3—Vertical-plane radiation patterns for V antennas having three apex angles. The antenna apex is assumed to be one-half wavelength above perfectly-conducting ground. Corresponding vertical pattern of a linear half-wave antenna is shown for shape comparison.

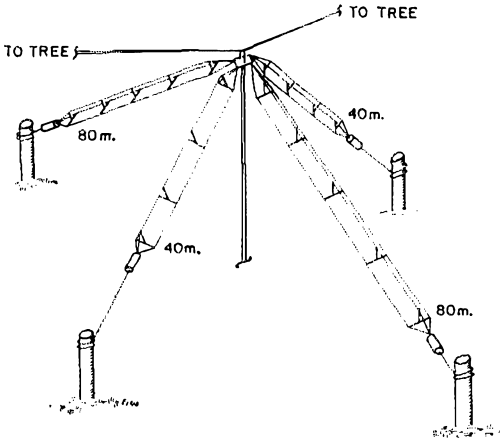


Fig. 4—Inverted-V antennas for two bands suspended from one support. Three-wire cages constructed as described in the text are used for widening the s.w.r. bandwidth. The two antennas are installed at right angles to each other to minimize interaction.

Results

Results from the cage V have been most encouraging. The angle formed by the legs of the 80-meter V is approximately 110 degrees, and is about 95 degrees for the 40-meter V. The apex of the antenna is around 45 feet above ground. This is less than ¼ wavelength for 80, and contacts here have been characteristic of high-angle radiation associated with antennas installed close to the earth. Several QSO's have been made across the U. S. and in Europe on a NW-SE oriented 40 while running 250 watts input. A portable 20-meter inverted V in a N-S direction gave consistently better coverage to the West than to the South.

Plots of the s.w.r. and final lengths are given in Fig. 6. As can be seen, the cage provides a broard-band antenna that maintains less than 2:1 s.w.r. over 80 and less than 1.3:1 over 40. Allred [2] and also some local hams have found that the bandwidth for single-wire V's was limited to around 200 kc. on 80 meters for an s.w.r. of less than 2:1. The over-all bandwidth might be improved by adjusting the angle of the V[6]. Finally, it had been mentioned [1] that the lengths of the V legs should be slightly greater than those for a horizontal antenna. However, it would appear from the above that a shortening of the leg length by roughly 3 percent yields a length closer to the desired resonant frequency.

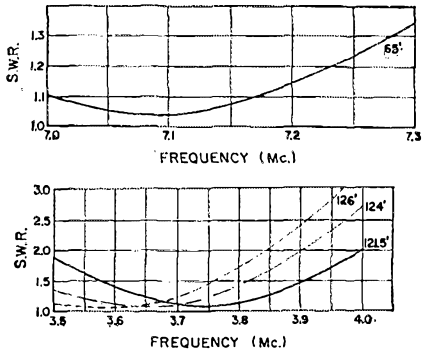


Fig. 6—Measured s.w.r. vs. frequency for the cage inverted-V antennas. The upper graph shows the effect of varying the over-all length of the 80-meter antenna.

In conclusion, the inverted V is an effortless and compact way of radiating. Basically, the V is a close relative of the horizontal dipole. Thus some thought should be given to orientation for low-angle DX use. Radiation at the higher angles is probably omnidirectional. Obviously the unbalance feed with 52 ohm coax will undoubtedly distort the radiation patterns unless care is exercised to cancel currents on the coax braid. At any rate an inverted V is certainly worth a try if that 40 or 80 band switch hasn't been used because of antenna problems.

It is a pleasure to acknowledge the stimulating influence of my father's keen interest in antennas and to present his cage construction hints. QST

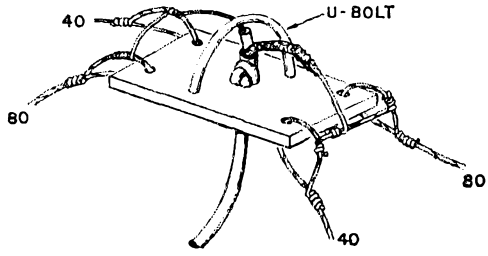


Fig. 5—Details of the center insulator used to support the two cage antennas.

Strays

ITU Centenary Operation

On May 16 and 17 the International Amateur Radio Club at Geneva, Switzerland, will be on the air around the clock in commemoration of the one-hundredth anniversary of the founding of the International Telecommunications Union on May 17, 1865.

Six stations, signing 4U1ITU through 4U6ITU, will be in operation on the following frequencies:

Transmitting	*Listening on transmitting frequency and*
1810, 1830	1810–1835
3503, 3797	3803–3810
7003, 7045	7203–7210
14,113, 14,292	
21,050, 21,400	
28,050, 28,625	
145,100	144,000–146,000

These stations will be manned by visiting operators from all parts of the world, who will be issued special certificates for their participation. Distinctive commemorative QSLs will be issued to all stations worked. If you'd like to be one of the operators on this occasion, or if you'd like a schedule at some special time during the operating period, get off a letter right away to the International Amateur Radio Club, P.O. Box 6, Geneva 20, Switzerland.

Correspondence From Members-

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

THE CONTEST IMAGE

¶ Amateur radio is not unique in one respect as compared with contemporary society; we have our share of radicals, neurotics and windbags. Ever since I have been old enough to change my own 6146's, I have received endless joy in participating in a variety of contests, which I assume has increased my operating dexterity to some extent (my peers tell me I have a long way to go), but nevertheless, during the same interval of time I have noted a continuous flow of anti-contest propaganda which appears to vary in intensity from time to time.

Having recently had a course in abnormal psychology, I have attempted to comprehend the origin of the disfavor which contest men find among the remainder of amateur society. I can only remember an event which occurred two weeks after my first SS in 1959: during the course of my first attendance of a local club meeting, I sat rather hazed as I listened to a pleasantly plump slob extemporaneously dissertate on the QRM generated on the 50.4 Sequathchie County Post Office Net by SS participants. After 45 minutes of this trash, the entire club (minus KN4-RIN) had vowed never to resubscribe to *QST* and to immediately initiate a national campaign to wipe out all contests and the ARRL. All of this because a lot of gullible people listened to some self-appointed authority, who boosted his own ego by being the center of attention for a couple of hours.

Of course this blew over in a month or so and all the crusaders returned to 6 meters and most of them still subscribe to *QST*. But, to this day the majority of them still have a bitter taste in their mouths as far as contests go. I can't help but wonder if this isn't a predominant concept throughout the country simply because of a multitude of incidents such as these.

Editorials and magazines continually call attention to the advantages of contest participation, as well as noting the small fraction of the spectrum utilized, but still there are anti-contest noise generators, who preach unfounded truths, whom the masses obediently listen to. The ironic part of the whole dilemma is that the average hard-core contest man thrives on operating and not on public relations, and hence doesn't give a damn what public decree the Kentucky Bollweevil Net has just issued in regard to contests.

Note this Mr. Noise Generator: Contests are as much of an institution in amateur radio as traffic, DX, ragchewing or testing without a dummy load. Furthermore, as long as there is a 40 meters there will be a few guys who will want to spend their whole weekend sitting in one of the 71 basic positions, and walking around on Monday mornings like Zombies with little rings around their ears. Also Mr Windbag, the majority of the operators, whom you refer to as competitive madmen, are better operators now than you can ever hope to be; assuming you would like to arbitrate further, you may locate me in the pile up on the first KL7 that pops up in the July CD party . . . touché. — *K4RIN*

NOVICE ADVICE

¶ If you are disappointed at the way things are working out, if you are not working out-of-state on 80 or 40 — or worse, not working out-of-town — take heart. I, too, went through that stage. It was six months between my first CQ and my first contact! Since then I have progressed a little, and helped a few Novices to get their tickets. And if on 80 or 40 you are not making 10-15 QSOs a month out-of-state, with an hour's operating a night, and power at the limit or less, one of three things is wrong.

Your code may be incomprehensible. Your best friends won't tell you; other hams cannot because they cannot read you. Send in step with W1AW till you can't tell the difference (with a code oscillator, of course).

You may not be getting out where you think you are. The crystal says 7155 kc., but your signal may be going out on 14,310. Only the most dedicated OO will find you here, under the monkey-chatter. Read *QST* articles on harmonics.

You may not be getting out at all. The r.f. energy you are generating is getting lost somewhere in the feedlines or antenna tuner. First make sure you are generating a reasonable amount of power — a 25 watt lamp should glow dully with 10 watts input, and fairly brightly with 75 watts. Then, beg, borrow or otherwise procure a monimatch and set up the antenna coupler to read 1:1. If still no soap change the antenna entirely, if using a dipole try a long wire. If using a vertical, try horizontal. It won't take long to hit the right combination.

Always remember the Novices' motto — What one fool can do; another can. Other Novices have made WAS in their year. So can you. — *VE3DQB*

BALUN BALANCE

¶ You will note that I have eliminated the customary salutation. I am mad, and I am going to sue, sue you, *QST*, K6HCP, WA6GYD, *CQ*, *73*, IARU and everybody else I can think of. You don't screen the stuff you publish properly and as a result I have suffered physical and mental harm and my head is throbbing, my stomach is in terrible shape and I may even die. I am in such bad shape maybe I want to die. And it will be your fault.

Last night Jerry, W2LVQ, arrived at the shack with a six pack of half quart beer and the February 65 issue of *QST*.

Nope, Jerry, Says I. Not on Tuesday night, you better make it on the weekend. Naw says Jerry, you need a 432 megacycles balun and I need one for 2 meters. We can make them from these beer cans according to this article in *QST*.

So we opened up a couple of cans and I settled back to read the article. Real great idea and the big soldering iron was located and plugged in to heat up, during which time we opened the necessary number of cans for 432 and 144 megacycles baluns. The baluns were built in jig time and were real peachy.

Jerry then decided that he wanted a balun for six

meters and we made a trip to the deli to obtain more material. Things got rather fuzzy after that and I don't remember anything until I woke up this morning with this damn headache and solder all over the floor and a big burn on the bedspread from the soldering iron. Seems Jerry couldn't get the electric blanket plugged in and thought the soldering iron would be a good substitute.

Well, now that I have gotten this off my chest and it has taken me 4.3 hours to type this letter I feel better. Tell you what I'll do.

If you will publish a free ad for me in Ham-Ads, I will forget all about the law suit.

Set it up as follows:

SWAP. One 7 megacycle balun. Require 2 large bottles of Kaopectate and a bottle of blackberry brandy. W2IVT.

Yes, that will be an equitable settlement. Jerry telephoned and said he will be over tonight. We are going to build some of the Coaxial Tank V.H.F. filters as described in October 64 *QST*. — *W2IVT*

I HOPE HE'S WRONG

¶ In reference to WØHJL letter, I make the plea to leave W6ISQ alone. If it wasn't for him I wouldn't have gotten the nerve to send in the 610, whose reply I am expecting any day now.

I hope when I do get on I do not find all the things ISQ describes, even though it is probably happening. Please keep ISQ. — *Bob Wilson, New York City.*

KNOWING THE RULES

¶ Upgrading the general level of operations on the amateur bands could be relatively simple. It requires a very small expenditure and a little reading. It is assumed that most hams read as evidenced by the fact that they had to pass an examination to get on the air. It is suggested that an addition be made to Part 97, the rules and regulations governing amateur radio service, as follows: "Each license of the amateur radio service shall have in his possession, or have access to, the latest copy of Part 97, rules and regulations."

It is also suggested that Form 610 be modified to include the following: "I have in my possession or have ready access to the latest rules and regulations governing the amateur radio service. I have read it and understand its privileges and restrictions and agree to operate in strict accordance with its requirements."

Part 97 is the document which lists both the purposes and rules of the game. It is printed in its entirety in the *License Manual*. It can also be obtained from the government printing office which will keep issues up to date by mailing changes as they are made. Shouldn't every player in the game know the rules? For example, those who know the rules would not say, on phone "W4WBK, W4YMG slant 6" or ". . . W4YMG portable 5". They would know better. They would insert the words "this is" or "from" immediately preceding their call.

In addition, they would give their geographical location when operating portable or mobile even in their home town. True, these few items are minor in nature, but in reading Part 97, no mention is made of degree of importance. Thus, being able to copy 13 w.p.m. for renewing a license appears to be just as important as staying within the band.

Incidentally, there is a radio service which is criticized by amateurs because of malicious, flagrant and other continued violations of their rules. When *all* amateurs follow *all* rules of their service, they are justified in voicing objections, but not until then. — *W4WBK*

NCEF

¶ I favor your proposal which calls for support of National Calling and Emergency Frequencies (NCEF). *Voluntary* support of the system already in existence is the way to "put it over." It would be a disgrace to each amateur radio operator if the FCC had to enforce an NCEF system. After reading your article, I have decided to construct a monitoring system for NCEF. Later I plan to construct a transmitter system. I hope that all hams will volunteer to support NCEF. NCEF needs support, not criticism. — *W5ZXG*

¶ Having been in several emergencies over a period of 40 odd years as a ham, I believe the NCEF proposal has "hit the nail on the head."

Let's get serious about this matter and give Hq. the necessary support in this worthwhile program. — *W1JB*

A PLEASURE

¶ Early this year I spent one week in Luxembourg for a DXpedition, and we worked about 500 W's besides about 200 stations from other parts of the world. It was the first time I could experience the frustration of a "rare" DX-station whose traffic is jammed by a bunch of lids. But there was no trouble at all with stateside stations. Sometimes we estimated 20 or more W-stations standing by on 14005 kcs, waiting for an LX-qso. But, nevertheless, there never was any unnecessary dit on the channel; thus I was able to give a whole bunch of W-hams an LX-qso in a short time. At times when the band was open to other call areas, even just two or three stations standing by on the freq — or rather, not standing by — drove me mad and made any traffic impossible, thus spoiling the enjoyment in ham radio. Hereby I want to express my thanks to those U.S. hams whom I had the pleasure to work with, and I want to congratulate the W's for their excellent operation skills. — *DJ4GA*

CB EDITORIAL

¶ Your editorial drooling over the possibility, however remote, of bringing a half million citizen banders into amateur radio, coming as it does from an organization that claims to represent the best interests of amateur radio, was one of the most disgusting things I have ever read. Without any prompting from you any citizen can obtain an amateur license provided he can pass the 13 w.p.m. code test and a written examination which requires little more than the ability to recognize Ohm's law.

It is my contention that the number of amateurs in this country has long since passed the saturation point. Therefore, I believe it to be both the duty and the responsibility of the FCC to regulate the difficulty of the examination from time to time so that the number entering amateur radio is approximately equal to those who drop out. When a college or university has more applicants than it has room for it raises its entrance requirements.

In the same issue as the editorial you state that the number of amateur licenses declined slightly in 1964. Whether this has anything to do with your covetous glances at the citizens banders I do not know. The reader can draw his own conclusions. One

thing is certain: where the FCC has been derelict the inexorable law of diminishing returns has taken over. Fortunately, this is one law that neither the League, the FCC nor the ham gear manufacturers can monkey with.

Maybe the person who wrote that editorial can write, but is the content something to be proud of? — *WB2CNB*

¶ Your editorial of sweet condoning, conniving, rotten sentimental tripe that appeared in your March issue of *QRD* (oops meant *QST*), in fact I think it would be a good idea if you renamed your vessel of inaccurate information *QRD*, it seems to fit very well followed by a question mark. Why must the League try to hide all of its dire motives behind some shield of so called rational thinking. Your suggestion, or attempt at placating the CBers sounds like pretty soon there will be a national organization, based in Newington, called very reverently the *CBRL*.

If you think by including in this stated editorial the fear that some wise guys among the amateur population would suspect an ulterior motive behind your sweet talk, you are one hundred percent correct. But the motive is not the one you seemed to be afraid of. You know damn well that you are losing many amateurs from your membership roll, and it sounds as though the hook is out for any poor stupid group of idiots, not only CBers, but any others interested in radio communications, to fill the ever widening gap in your financial records.

Don't get the idea that I am a dedicated CB hater: I am not. I can thank Citizens Band for renewing my interest in communications. I am sure the records still stand, and I will gladly state that before my call was WB6ARP, it was KEJ-2643. I must admit that the Citizens Band users in general are a very concerned group, who are willing to give up much of their personal time and effort to aid their fellow man.

My main contention here is to damn the League for their extorted attempt at dragging these innocent bystanders down the tubes with them. It's a pretty rotten stunt, to use a disorganized group of enthusiasts to further the aims of a few politically crooked salesmen. The League seems to have lost all of its established aims, that once were for the good of those represented by the League, but now seem to have been forgotten or disregarded in favor of rotten politics, favoritism, and deceit. Believe me gentlemen (and I use the word loosely) I will do my utmost to convince any and all CBers that I come in contact with to avoid the League and any of its proposals to upgrade them to the so called amateur status. Granted amateur radio could use more enthused devotees, but not the way you would control them. . . . — *WB6ARP*

¶ In light of my recent experience, I cannot restrain myself from comment on your March editorial. Three months ago I could cast little but disparaging remarks about your "love thy broth CBer" madness. But shortly after then I was approached by the leader of a large citizen band club in the area and asked if I would speak before their club on amateur radio on how they might become hams. With a certain amount of reservation I accepted. Today over half are licensed amateurs and a large portion of the remaining are virtually ready to take their examination. Of over 150 individuals to whom I have given code and theory instruction, this has been the most responsive and refreshingly eager group I have taught. Upon receiving their licenses did they rush out to purchase commercial gear? Hardly! Every one has *built* or is *building* a *Handbook* homebrew rig.

The simple truth in many cases is that the local CB club is relatively highly trained in message handling and emergency communication, and have in many cases taken over where amateurs have failed. This naturally causes resentment among the local amateurs, but this same scorning amateur is the one who would rather "chew the rag" on 75 meters than meet an occasional net schedule or spend an afternoon on a SET or AREC test. Since moving to New England from the midwest I have been trying to rejuvenate the defunct W. Mass. Phone Net in my capacity as PAM W. Mass. The lack of interest and the lethargic attitude of the phone amateurs in the section is amazing, yet my converted group of ex-CBers, remain only too eager to reactivate the net.

Am I therefore advocating sympathy to the local CBers and his CB club — Never! His illegal ways, DX'ing and QSL'ing are certainly not to be condoned, but I am emphatically stating that the CBer, properly trained, is potentially an excellent operator and will be an asset to the amateur fraternity considering his zeal and eagerness.

The responsibility for approaching and training these individuals clearly lies within the ARRL and its affiliated clubs, and I strongly urge you to begin your training sessions soon. — *K1RYT*

¶ I am a member of ARRL and the national stamp out CBers. I guess of the two ham organizations I better renew only one, guess which. — *W1AARXY*

IDEAS ANYONE?

¶ In response to W8LUZ and "More For Your Money." He named several items the FCC could spend some time with. Perhaps people in the right places could do something with the miserable condition of domestic automobile ignition systems. My radios, TV and CB equipment pick up every Ford that goes by and too many other cars also.— *WØFHF*

HAM STAMP

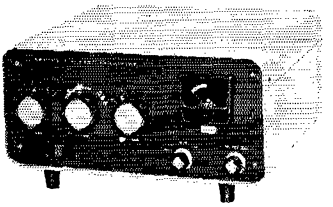
¶ It seems to me that W9KJ has missed the entire point of the commemorative stamp. It should be kept in mind that the stamp is meant for a general public which is concerned not with hidden symbolism but rather with the over-all idea of the stamp-amateur radio. It also seems to me that the real thing wrong with amateur radio today is a generally poor attitude on the part of such hams as W9KJ.

I say congratulations on a job well done. A stamp dedicated to all amateurs, even W9KJ. — *K9TXJ*

THE AMATEUR IS GENTLEMANLY

¶ I realize that no one person or club has the right to a clear channel on any frequency, but I am sure the other hams could stand clear when code practice is on. Although most of the old timers and quite a few newcomers don't need additional practice, some of us need it very badly. But, just when W1AW comes on someone starts to warm up on the same frequency or spots a *n.f.o.* in, and I miss half of the transmission; other faithful listeners do also. I do not have the best receiver in the world but one that is very efficient. If the other hams know what time and frequency you are on why don't they give us poor listeners a chance to get some good and badly needed practice? — *WA4TXW*

• Recent Equipment —

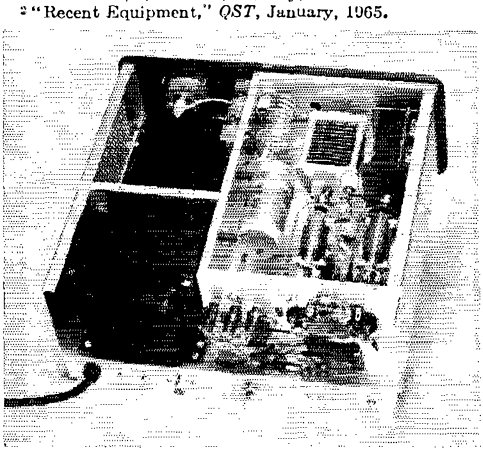


The Heathkit SB-200 Linear Amplifier

For the amateur willing to spend a few hours using a soldering iron and other simple hand tools, assembly and wiring of the Heathkit SB-200 linear amplifier is an enjoyable and rewarding experience. The end result of his efforts is a "pair of shoes" capable of 1 kilowatt d.c. input on c.w. and 1200 watts p.e.p. on s.s.b. The "shoebox" measures a mere 14⅞ by 6⅝ by 13⅜ inches, contains its own built-in power supply, a "Monimatch" type bridge for relative r.f. output/s.w.r. checks, and bandswitching for coverage of the amateur bands from 80 through 10 meters.

Latest unit to be released in the new Heathkit SB-series, the SB-200 is designed to match in size and appearance the SB-300 receiver [1] and SB-400 transmitter [2], and to work with them in an integrated equipment arrangement. However, it will work nicely with any exciter capable of supplying the necessary 100 watts of driving power. Our own on-the-air testing, in fact, was conducted with another brand of exciter in the 200-watt input class used as a driver.

[1] "Recent Equipment," *QST*, July, 1964.
[2] "Recent Equipment," *QST*, January, 1965.



The SB-200 with top shield plate and cabinet removed The large compartment at right contains the triode amplifiers, cooling fan, output pi-network components and associated band-switch sections. The broad-band input networks and switch section appear at the rear center; to their right are the grid circuit r.f. choke, bypass capacitors and resistors, a.l.c. diode rectifier circuit and mounted below is the bifilar filament choke. The compartment at upper left houses the power supply h.v. filter, meter and primary circuit breakers. On the rear apron, left to right, are the a.c. line cord, connectors for a.l.c. output, antenna relay control, r.f. output, ground post and exciter input.

The circuit arrangement of the SB-200 is simple and straightforward. The "shoes" are a pair of graphite-anode zero-bias triodes, either United Electronics UE572Bs or Cetron T-160-Ls; both types have identical characteristics and are interchangeable. The kit we put together was supplied with T-160-Ls.

The triodes are parallel-connected in a more or less conventional grounded-grid class-B configuration. Drive is applied to the cathodes via pretuned broad-band input networks, one for each band. All input networks are of the pi variety, except on 3.5 Mc. where an L arrangement is employed, and are selected by the amplifier bandswitch assembly. Input impedance is approximately 52 ohms. The tube cathodes are isolated by a bifilar choke in the filament leads.

The amplifier output circuit contains a bandswitched pi network and is adjustable for loads between 50 and 75 ohms. Two tapped inductors are used, one covering the 80-, 40- and 20-meter bands, the second for 15 and 10 meters. For 80-meter operation, padding capacitors are switched across the main tuning and output capacitors to satisfy resonance and loading requirements. The amplifier tubes and pi-output circuit components are enclosed in a tightly shielded compartment and are fan-cooled.

Metering in the SB-200 is accomplished with a basic 0-200 microampere movement, selector switch, and suitable shunt and multiplier resistors. The meter scale is calibrated to read 0-1000 ma. plate current, 1500-3000 plate volts and 0-100 ma. grid current. In addition, relative r.f. power output is indicated on an arbitrary 0-1000 scale. For s.w.r. checks the meter is marked to cover the range from 1:1 to 3:1.

The total weight of the amplifier is only 35 pounds. The major portion of this weight is contributed by the power transformer and associated components. High voltage d.c. for the triode plates is developed by a full-wave voltage-doubling circuit utilizing sixteen silicon diodes. Six 125-μf., 450-volt, electrolytic capacitors connected in series provide an effective filtering capacitance of about 21 μf.; resistors connected across each capacitor serve the dual function of voltage equalizers and bleeder. All filter components are mounted on a printed circuit board which, for sheer simplicity and speed, is a delight to assemble.

In addition to the high-voltage winding, the power transformer has two secondaries, one for the triode filaments and another which, with a

silicon diode and filter, supplies antenna relay control voltage and standby cut-off bias for the amplifier tubes. A dual primary allows operation from either 120 or 240 volts a.c.; selection is made by appropriate connection of jumper wires on a screw terminal strip. Overload protection is afforded by two 8-ampere circuit breakers, easily accessible under the hinged lid of the SB-200 cabinet.

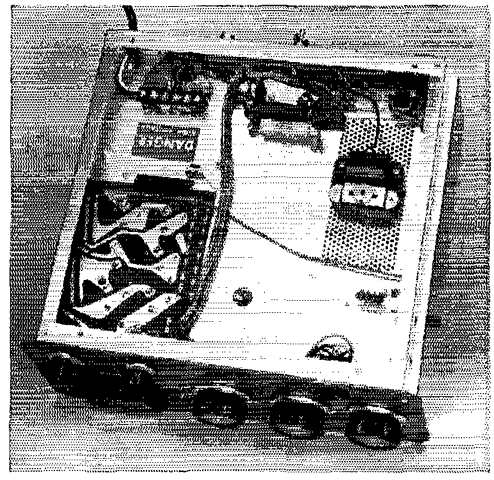
Controls are neatly arranged on the attractive Heath-green panel. The large knobs are, from left to right, output loading, plate tuning and band-switch. Smaller knobs below the meter select meter range and relative r.f. power sensitivity. A rocker-type switch at left turns the power supply on or off and simultaneously selects high-power or "barefoot" operation.

Connectors at the rear of the cabinet provide for exciter input, r.f. output, antenna relay control and a.l.c. output from the amplifier to an SB-400 or other exciter equipped with a.l.c. input. A husky terminal post provides the means for connecting the amplifier to an earth ground, an absolute necessity for safe use of any such high-power equipment.

Operation of the SB-200 is quick, easy and uncomplicated. With the rocker switch OFF the exciter is connected through the s.w.r. bridge to the antenna for "barefoot" operation. Throwing the switch to ON causes the instant-heating triode filaments to be energized and readies the solid-state power supply for immediate use. The bias voltage is applied through the coil of an internal d.p.d.t. change-over relay to the amplifier grids to cause plate current cutoff. The exciter remains connected through to the antenna until the relay control circuit is grounded via an external cable connected to extra contacts on the exciter VOX relay, an external exciter/receiver antenna change-over relay or a standby switch. This grounding action causes current to flow through the coil of the amplifier d.p.d.t. relay, the contacts of which in turn switch the exciter input to the UE572/T-160-L cathodes and the amplifier output through the s.w.r. bridge to the r.f. output connector; simultaneously, the cut-off bias is removed and the grids are left with −2 volts operating bias which limits resting plate current to approximately 90 ma. Tune-up takes but a few seconds after practice and is done with the aid of the relative r.f. output meter. When loaded to a kilowatt on c.w. the plate current reads 500 ma. and the plate voltage 2000.

A novel and useful feature of the SB-200 is the inclusion of a "Monimatch" type bridge. S.w.r. and relative output checks can be made using the exciter alone or with the amplifier operating at full output.

Assembling and wiring the SB-200 is a relatively simple task. We followed Heath's instructions to the letter and experienced no difficulty. The entire project required about 17 hours. We know of some amateurs who completed the job in 12 to 15 hours. However, because of the high voltage and power involved in kilowatt amplifier circuitry, special pains were taken with soldering and placement of wiring. The extra effort apparently paid off when the amplifier was tested. No troubles were encountered and we were off in a cloud of S9 reports on c.w. and plus-db reports on s.s.b. after dummy-load tests that indicated the T-160-Ls were delivering about 600 watts output. One breakdown occurred in the SB-200 after about ten days of operation. The ceramic wafer used to switch in padding across the main tuning capacitor on 80 meters let go in a spectacular pyrotechnic display. Heath provided a replacement that has given no trouble since installation and has informed us that they are making modifications in the band switch.



In this bottom view, the 120/240 volt a.c. terminal strip appears at upper left. The coaxial s.w.r. bridge cavity is attached to the inside rear apron and the antenna relay is visible in the upper right corner. The fan motor is mounted in perforated area at right. In the lower left corner is the power-supply filter printed-circuit board.

The SB-200 is a compact, stylish piece of equipment that fits in well with most station layouts. During assembly we had some fears that a kilowatt amplifier in such a small package would be quite hot (thermally). The fears were groundless. With its fan-cooled graphite-anode triodes and wrap-around cabinet generously perforated on top, bottom and sides, it turned out to be as cool as the proverbial cucumber considering its full-gallon input. Electrically, it is cool, too; tuning is smooth, and there were no signs of instability noted. —*W1JMY*

Heathkit SB-200 Linear Amplifier

Height: 6⅝ inches
Width: 11⅛ inches
Depth: 13⅜ inches
Weight: 35 pounds
Power Requirements: 120 volts 60 cycles or 240 volts 60 cycles
Price Class: $200
Manufacturer: Heath Company, Benton Harbor, Michigan 49023

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NJM

DEDICATION PLUS

In mid-March, the Roanoke Division of the League called a division-wide meeting of League Officials to discuss some of the public service problems being faced in that area. This was an experiment, to determine first how many of the LOs in the division would show up, and second whether or not enough useful discussion could be mounted to justify the expense of time and money. The undersigned was privileged to attend this meeting. Also in attendance were Division Director W4MWH and SCMs, SECs, RMs, PAMs and ECs from three of the four sections in the division — eighteen people in all. It was in session for approximately ten hours over a two-day week end period.

This is not intended as a report of what went on at the meeting, although such a report would be of some interest from an over-all standpoint. It is, rather, an observation of the innate differences between this meeting and other meetings of amateurs-for-public-service that we have attended. Usually, they are held at or in conjunction with a convention or hamfest, and everybody interested (or just plain everybody) is invited to attend. Frequently they degenerate into political discussions, or a vehicle for roasting someone for what he has done or has not done. About all that is accomplished is that a lot of people blow off a lot of steam. We thought this meeting would be pretty much the same.

It wasn't. A completely different kind of tenor and atmosphere prevailed from the outset. True, discussion at times became loud, even heated. Impatience and frustration and disgust ran rampant now and again. There was over-all agreement on only one thing — what we were trying to accomplish. Within that sphere, the fur flew.

But still, it was a different kind of disagreement from that which one finds at general amateur gatherings. These were dedicated people, here at their own time and largely at their own expense. Every proposal, no matter how cockeyed it might have seemed to others, was made from a completely constructive viewpoint. No one wanted to tear anything down, no one hated anyone else. It was a most progressive and constructive meeting throughout, far beyond our expectations.

There is much to be said for the advantages of a meeting on the subject of public service alone. The subject itself is one which deserves exclusivity of treatment, without diversion, without interruption, without limitation of time or debate. The Roanoke Division meeting was an experiment, and we think a successful one. Perhaps other similar meetings will follow, in this and other divisions. V.h.f., DX, s.s.b., and RTTY enthusiasts get together from time to time, why shouldn't we ARPSC people throw a shindig of our own?

Think it over. If you like the idea, talk it up a little. Do you want a section meeting? Everybody interested invited, or just appointees? Perhaps your director can be prevailed upon to call a division-wide meeting, as W4MWH did. Maybe you can muster something even larger, say a meeting covering an entire NTS region. It doesn't *have* to be an ARRL division. It doesn't even have to be a *big* meeting; in fact, sometimes a small, dedicated group can accomplish a great deal more than a large group composed mostly of those who are merely curious.

Understand, we're not running down ARPSC meetings at conventions and hamfests. These are wonderful for spreading the word and answering questions and recruiting. But for actually getting into the crux of our problems and discussing them across the table with a bunch of people who know what they're talking about, there is nothing like an LO meeting. Try one, sometime.

Here is a short rundown of some of the subjects discussed at the meeting: inclusion of certain LOs on director's letters mailing lists and inclusion of all net managers on present LO mailing lists; public service and other awards, methods and standards for issuing same; more

* National Emergency Coordinator

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

Full time 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 us 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.

Full details on this program are included in an article in the March issue of *QST*, page 60.

ARRL representation at conventions and hamfests, and requirement for ARRL program before *QST* publicity; relative importance of traffic itself and our system for handling it; contact between ECs and traffic officials; establishment of a new NTS category to include "independent" nets; more details regarding EC contact with officials at local level; reimbursement for travel by NTS officials above section level; stickers for posting on officials' desks containing name and telephone number of EC; extra points for handling messages in *all* ARRL contests. — *W1NJM.*

Diary of the AREC

A few additional reports have been received on the December-January floods in the Northwest.

On Jan. 7, WB6DNW was instrumental in relaying an emergency call from Somesbar, Calif., where 16 persons were stranded and had been subsisting for two weeks on deer meat and coffee. They had been unable to contact any of the rescue teams until WB6DNW finally heard the distress call from K6BMB and notified proper authorities. — *W6CIS.*

Hams in Oregon went into action throughout the state on Dec. 19, and in many cases were the only link to many of the isolated communities. The AREC in the tri-county area around Portland went to work setting up a complete network for the Red Cross both on 2 and 75 meters. Many portable stations were set up along with mobile units at the various shelters, and at the flooded areas that were being evacuated. Two stations in the Red Cross building were manned almost continuously. Liaison with other state nets was handled by fixed stations that monitored all nets and dispatched and routed traffic as needed. Fifty-eight amateurs were reported as having taken part. — *K7PHP, EC Multnomah Co., Ore.*

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On Feb. 4, seventy percent of the telephone communication into and from Richmond, Ind., was wiped out by a fire in the main office. K9QAN, EC Wayne Co., Ind., requested all amateurs to report to the City Hall for an emergency meeting. A 2-meter station was set up at c.d. headquarters where existing communication links with the city and state police and sheriff's office were located. WA9EFI acted as NTS liaison, receiving traffic on 2 and relaying it on 75 meters. The 2-meter equipment, supplied by the Darke Co., Ohio, c.d. was set up at Red Cross headquarters, the telephone company office, two hospitals, the newspaper office and the electric company. Communication required by the telephone crews working on the damaged control center was also provided by the 2-meter links. A total of 52 amateurs spent 858 man-hours during this operation. — *K9QAN, EC Wayne Co., Ind., and W8ILC, EC Darke Co., Ohio.*

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Because of heavy snowfall on Feb. 9 and 10, AREC members in and around Duluth, Minn. were alerted. WAØs DKP and IEF operated from a mobile unit, keeping in contact with WAØEDN who acted as base station. The mobile unit kept the AAA informed of road conditions, who in turn notified anyone inquiring. The following day, *WAØs* DKP and ATO continued the net operation with their reports to local radio stations and AAA. — *WAØEDN, EC St. Louis Co., Minn.*

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After finishing a transmitter hunt on Feb. 13, members of the Ramsey Co., Minn., AREC assisted the owner of an overturned car. WØMSO discovered the car and reported to KØPML via the 2-meter net. KØPML notified the Dakota Co. sheriff who dispatched Burnsville police. Other amateurs assisting were *KØs* KWK WPK and WAØBWO. — *WAØFUR, EC Ramsey Co., Minn.*

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Almost 50 amateurs from Wayne, Oakland and Macomb Cos., Mich., operated during near blizzard conditions on Feb. 25. K8AWC and W8CQB started a 10-meter net and were soon joined by *W8s* LGZ JXU KSL ZTX SS and VE3FIE. Amateurs provided communication where phone lines were downed, handling the overload of messages. — *W8LME, EC Oakland Co., Mich.*

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Two VE7 traffic men well known from the Section to TCC level are VE7BJV (left) and VE7BDJ (right). Hugh (VE7BJV) holds ORS, OO and EC appts., and CP-25, and Lee (VE7BDJ) holds ORS and CP-35. Both fellows like to hand out that B.C. multiplier in the CD Party and SS. (Photo by VE7BIO).

On Mar. 1, the eastern third of Nebraska was struck by a blizzard which soon had many roads closed. The high winds continued through the next day causing many roads to be drifted shut as soon as they were plowed out. A U. S. Mail truck which left Omaha on Monday was marooned in Wahoo until Tuesday afternoon, but amateurs along the route kept their postal officials informed of the situation at all times.

The Nebraska 75-Meter AREC net was called into operation by WAØEUM, EC of Lincoln, and SEC WØHYD. KØIIPT and WØMAO at the underground state c.d. headquarters received the bulk of the flood, road and weather reports sent in during the two day period. Communications were also handled into Omaha for the railroad as their lines were downed by the storm. — *KØJXN/WØHYD, SEC Nebraska.*

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When the submarine cable between Vancouver Island and Salt Spring Island, B. C., went out on Jan. 4, officials of the RCMP and the telephone company contacted VE7CB and requested that he alert amateurs for possible emergency communication. Five stations were active in a fifteen minute period, and while their services weren't required, both the police and telephone company expressed their gratitude for the prompt action. — *VE7FB, SCM B.C.*

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On Feb. 4, an earthquake in the Aleutian Islands spread fear of a tidal wave up and down the west coast. VE7EB, upon hearing the newscast of the earthquake, monitored the AREC emergency frequency. Several other stations checked in, and a constant check was made of all marine channels and local newscasts, but no emergency developed, and three hours after the operation started, the alert was cancelled — *VE7FB, SCM B. C.*

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On Feb. 7, members of the El Paso Co., Colo., AREC held a practice snow storm alert. It was a good thing they did too, because three days later they found themselves on a real alert during a storm that dropped 18 inches of snow on the area. — *WØGCH, EC El Paso Co., Colo.*

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With all the reports of emergency operations during the past few months, the non-emergency reports have had to take a back seat, and they have really been piling up. Here, then, is a summary of the activities:

Oct. 10 — Members of the Westchester Co., N. Y., AREC provided communication for the Columbus Day parade in New Rochelle, N. Y.

Oct. 11 — Providence, R. I., AREC members provided communication for that city's Columbus Day parade. Twelve mobiles were placed at strategic points along the parade route, and the parade marshal was able to keep in touch with the progress of the parade units, and issue instructions regarding them.

Oct. 17 — The Milwaukee, Wis., AREC provided communication for a 14-mile nature hike around Devils Lake, Wis. Portable units were set up at various points along the trail, and the progress of the various hiking groups was

coordinated. Eleven amateurs participated.

Oct. 26 — Ten members of the Kanawha Co., W. Va., AREC set up check points along the route of the All-W. Va. Speed Boat Race.

Oct. 31. — Eight AREC and RACES groups have reported they participated in Halloween Patrols, coordinating their activities with local police and fire officials. In each case, the operation was basically the same, with mobile units patrolling the streets with, in some cases, uniformed police officers riding in the cars, and base stations either set up at police headquarters or with a direct telephone line to the dispatcher. In every instance, the extra cars patrolling the streets curbed vandalism by quite a degree. Those AREC and RACES groups reporting activity were: Huntington L. I., N. Y.; West Hartford, Conn.; Burlington, Mass.; Englewood, N. J.; Delta, B. C.; Keyport, N. J.; Ledyard, Conn.; Villa Park, Ill.

Nov. 3 — AREC groups in N. C., under the direction of SEC W4MFK, set up and operated an election return service. While the operation wasn't a complete success in terms of results, much invaluable information was gathered which is enabling N. C. EOs to better prepare for any possible emergency.

Nov. 14 — Members of the Hertford Co., N. C., AREC assisted in a Polio Immunization Plan exercise. Six amateurs participated.

Nov. 15 — Humboldt Co., Iowa, AREC members set up communications for a barbecue. About 5,000 people attended and the amateurs were instrumental in relaying incoming telephone calls and providing general communication.

Nov. 15 — The Loudoun Co., Va., AREC supplied communications for "Operation Sugar Cube," the antipolio program, for 5 hours.

Nov. 28–Dec. 5 — Kansas City, Mo., amateurs set up a display booth at an auto show, demonstrating amateur radio and handling messages.

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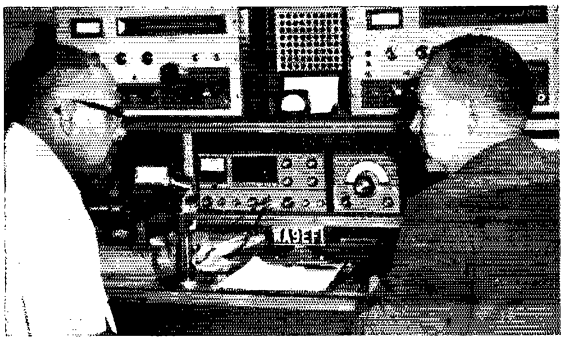
Forty-five SECs sent us reports for January, representing 19,693 AREC members. This is an increase of *nine* reports and over 2,000 AREC members from last year. Frankly, we're impressed but still not satisfied. How about *sixty* reports next month? Sections reporting: Hawaii, E. Mass., W. Pa., Ariz., W. Fla., Kansas, Wyo., Wisc., Maine, Mich., Ala., E. Fla., Wash., Nev., Ohio, Utah, Minn., Mo., Ont., N. Mex., Ark., W. Va., S. Tex., Va., Colo., S. Dak., Okla., Ill., N. N. J., Tenn., N. C., Ind., Iowa, Nebr., NYC-LI, Los A., Miss., R. I., Alta., Mont., Sask., Ill., E. Pa., B. C., Man.

National Traffic System

Last month we presented a statistical analysis of the performance of the various NTS nets at region level during 1961. This annual race for "top dog" among the regions has attracted quite a bit of interest, and there is no doubt that it has been beneficial in the over-all performance of NTS nets at this level. Sometimes we wonder if it is attracting too much interest, and if some of the nets are working for statistics instead of in the public interest.



WA9EFI (left) and W9PSD spent a total of 155 hours maintaining communications with the outside world during the telephone blackout in Richmond, Ind. (See details in the Diary).

True, you can work for both together, but the balance of interest has to be maintained. Frankly, we get a big bang out of statistical comparisons, and we wish we (personally) could do more of it instead of turning this fun-chore over to W1BGD. (He probably wishes it too.) But now and again we see evidence of a net manager's doing something strictly in the interest of statistics that isn't doing a thing for the net's performance. So we want to comment briefly on the value and place of statistics in the over-all scheme of NTS operations.

'Tis said that you can prove anything with figures. This is no doubt true if you approach through the rear door — that is, first determine what conclusion you *want* to reach, then find the figures that will reach it for you. This is a form of intellectual dishonesty. The true value of statistical comparisons, of course, is in getting the figures before you first and *then* analyzing what they mean. Sometimes the inevitable conclusions are not altogether pleasing, but this is a risk you must take if you are to be completely honest about it. If you merely want to prove something, don't mess with statistics; you may find they'll prove the opposite of what you want. But if you want facts and figures and are willing to let the chips fall where they may, then statistics can be a valuable source of facts.

We all know that NTS has had its ups and downs during the almost-16-years of its existence, but we have never used the statistics for anything but to tell us how we are doing. Sometimes this hasn't always been what we have wished for, but we have always wanted to *know*. Comparisons have always been made honestly. We have never used "gimmicks" to show something that wasn't really so. This is the way it should be, the way it must be, if we are to use statistics for facts and not just as a tool.

The aspect of statistical rivalry, while usually an incentive to greater effort, can sometimes result in debasement of the entire net. What we must keep our eye on is the end objective, efficient handling of traffic on a systematic basis. Anything which detracts from this is bad.

One net manager once pointed out to us that our use of "rate" as a statistical factor in making comparisons was inimical because it encouraged nets to handle their traffic quickly and therefore carelessly, that it encouraged speed over accuracy. Other factors used similarly can endanger the accuracy of handling in the system. After all, messages per minute and average per session are measures of *speed* in traffic handling, and accuracy is given no consideration. *Sure* one region net may be able to handle an average of a message a minute while another cannot muster 0.5, but couldn't this be because the net with the lower rate is more *careful* in handling its traffic?

Yes, this could be. But accuracy is basic. We do not use "rate" as a factor at local and section level, because that's where one learns the basics of NTS operation. When one "graduates" to region level and above one is expected already to know his ABC's and not have to be taught this any more than a graduate engineer has to be taught how to use a slide rule.

Besides, how does one measure accuracy? Oh, it can be done, all right, but not readily and not with figures. There are other important things left out of our statistical comparisons, things like use of standard form and procedures, good fists (or voice or RTTY procedures) and high quality signals, courtesy and patience — all basic, all to be taken for granted at the "graduate" levels of NTS.

We therefore counsel all NTS net managers, net controls and participants to worry *first* about handling the traffic accurately and in standard form and think about statistical comparisons only secondarily, as an incentive to greater efficiency and esteem among your fellow traffic men. — *W1NJM*

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About APO and FPO traffic: most of this has to be handled on MARS circuits sooner or later, so the quicker it lands there the better. However, NTS does not have any sure method of doing this that can apply universally. If a message is addressed to APO–SF, it is handled down through PAN, RN6 and NCN, and the latter net is responsible for seeing that it is placed in the proper channel for further handling. Similarly, APO–NY is handled through the NLI net or other NYC–LI section NTS net, which then arranges for its transfer into MARS circuits if this is called for. The same applies to FPO traffic, of course. Some of this traffic can be relayed, some cannot. The traffic that

cannot be relayed (i.e. placed in MARS for further handling) should be *mailed*.

We invite any NTS operator to take APO-FPO traffic out of NTS if he happens to receive it and is able to put it immediately into MARS channels, but we cannot impair the efficiency of NTS nets at area and region level by making special provision for it. As far as NTS is concerned, its destination is the post office to which it is addressed.

February reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
1RN	56	444	.350	7.9	90.8
2RN	56	615	.539	10.9	98.2
3RN	56	657	.427	11.7	95.2
4RN	55	873	.528	15.9	94.8
RN5	56	1117	.443	19.9	97.3
RN6	56	706	.624	12.6	96.6
RN7	28	551	.514	19.4	91.8[1]
8RN	56	414	.307	7.9	88.7
9RN	28	498	.742	17.8	98.2[1]
TEN	56	488	.470	8.7	83.3
ECN	28	99	.172	3.5	90.5[1]
TWN	28	288	.398	10.3	76.4[1]
EAN	28	1584	1.019	56.6	99.4
CAN	28	1187	.922	42.3	100
PAN	28	1073	.862	38.3	100
Sections[2]	1437	8870			
TCC Eastern	112[3]	674			
TCC Pacific	112[3]	889			
Totals	2024	21,048	EAN	9.6	CAN/PAN
Records	2117	28,659	1.183	19.1	100

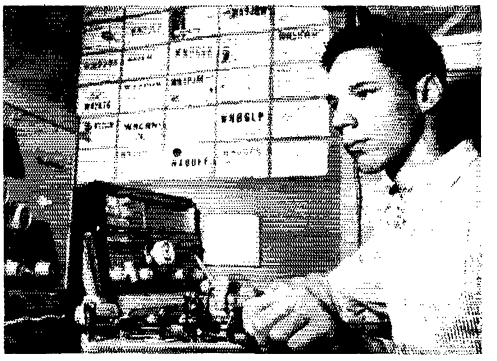
[1] Representation based on one or less sessions per day.

[2] Section nets reporting (50): WFPN, QFN, PFN (Fla.); MDD, MDDS (Md.-Del.-D. C.); BUN (Utah); PTTN (Pa.); NCN (early), NCN (late) (N. C.); ILN (Ill.); WSBN, WSN (Wis.); NTTN (Tex); BN, OSSBN (Ohio); SCN, NCN (Calif.); GSN (Ga.); TN (Tenn.); SCEN (S. C.); NYC-LIPN, NYC-LIVHF, NLS (NYC-LI); MTN (Man.); AENB, AENH, AENM, AENP (morn.), AENP (eve.); AENR, AENT (Ala.); CN, CPN (Conn.); OZK (Ark.); MWN, QMN, ODSBN (Mich.); BEN (Ind.); VN, VSBN (early), VSBN (late), VSN, VAMN (Va.); MSPN (noon), MSPN (eve.), MJN, MSN (Minn.); RISPN, RIN (R. I.); VT-NH (Vt.-N. H.).

[3] TCC functions not counted as net sessions.

No broken records this month, but still a creditable showing. Condx are coming back to normal (?) as represented in the rate figure. Representation seems to be up too, with only three nets showing less than 90%. Keep it up!

WA2GQZ has nothing but praise for the NYS gang, who missed one session in 2½ years. 3RN is still being bothered by long skip on the late session, but improvement is just around the corner. RN5's representation is the highest it has been since 1959. WB6BBO sez things are looking up on RN6, but she wishes there were more Nev. reps to take the load from W4CJD/7. K7JHA notes that this was the best Feb. RN7 has had in many years. The late 8RN session will be moved up to 0230 GMT on or about Apr. 15, sez W8CHT, who issued certificates to W8HCR, K8TDJ and WA8CFJ. W9QLW has issued a 9RN certificate to WA9DXA. A TEN certificate went to



WA2KXG, David Noland, is the manager of the New Jersey Novice Net and one of the N.N.J. RMs.

WAØFDK and WØLGG praises the fine showing the net is making. K1WJD has mailed the first EAN bulletin in quite a while, and it's packed full of good info. W9DYG is almost finished with another edition of CAN KAN which should be mailed in a few weeks. WB6JUH sez condx are pretty much back to normal and now they are just waiting for the summer QRN.

Transcontinental Corps — W3EML reports that this month was one of the best with 100% reports and only one missed sked. TCC certificates went to *W1s* BGD EMG NJM, *W2s* GVH MTA, K2SIL, *WA2s* BLV WLN, WB2-HWB, *W3s* EML NEM, *K3s* FHR MVO, *W4s* DLA DVT, K4VDL, WA4PDS, *W8s* CHT ELW, K8s KMQ NJW QKY TIG. W7DZX also reports an excellent month with only one missed sked. TCC certificate went to W6VNQ.

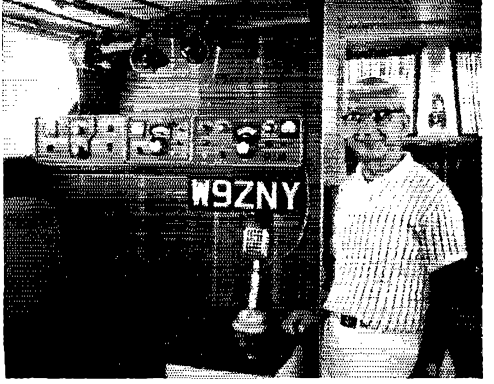
February reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	112	94.6	1776	674
Pacific	112	94.6	1758	880
Summary	224	94.6	3534	1554

TCC roster: Eastern Area (W3EML, Dir.) — *W1s* BGD EMG NJM, WA1CRK, W2GVH, WA2BLV, WB2HWB, *W3s* EML NEM, K3MVO, W4DVT, K4VDL, WA4PDS, *W8s* CHT ELW, *K8s* KMQ NJW QKY TIG. Pacific Area (W7DZX, Dir.) — *W6s* ARG EOT HC VNQ. K6DYX, WA6BRG, WB6JUH, *W7s* DZX GMC WST.

Net reports:

Net	Sessions	Check-ins	Traffic
HBN	28	457	617
HBN (Dec.)	31	532	1156
Interstate SSB	28	1302	1089
EASN	28	133	107
7290	39	1205	527
20 Meter SSB	20	855	1486
North American SSB	25	396	348
Northeast Barnyard	24	684	11
Mike Farad	52	547	1032



Strays

Probably many hams have the dream of someday operating mobile on their boat cruising the tropic seas. Frank Eskuchen, W9ZNY, has realized that dream. Here is his neat installation aboard his boat, the *Honey Too*. Power for the kw. input installation is obtained from a 3-kw. generator. Frank says he gets good use from his ham radio operation during the 7,000 mile round trip from Chicago down to Dinner Key in Florida and then back to Chicago. When he isn't fishing, he's hamming — What a life!

Hamfest Calendar

Alabama — The annual Birminghamfest, sponsored by the Birmingham Amateur Radio Club will be held on May 1 and 2. For full details write the Birmingham Amateur Radio Club, Box, 603, Birmingham 1, Alabama.

California — The 23rd Annual Hamfest of the Fresno Amateur Radio Club will be held Saturday, May 15. Tickets are $7.50 each, which includes the banquet. Write Fresno ARC, P.O. Box 783, Fresno, California for reservations.

Colorado — Plans are being made for the Hamboree at Southfork Colorado June 4, 5, and 6.

England — The London Single Sideband Dinner will be held at the Waldorf Hotel, Aldwych, London, W.C. 2, on Saturday, May 29. There will be a display of equipment of interest to radio amateurs in general and s.s.b. enthusiast in particular. For more information write Norman Fitch, G3FPK, 79, Murchison Rd., London, E. 10, England.

Florida — The St. Petersburg Amateur Radio Club Hamfest will be located at Phillippe Park, near Safety Harbor. Swap shop and fun for all, rain or shine, from 9 A.M. on May 16. Additional information from P.O. Box 4026, St. Petersburg, Fla.

Illinois — The Starved Rock Radio Club will hold its annual Hamfest June 6 at the La Salle County 4-H Home and picnic area southwest of Ottawa, Illinois, on Route 71. Free swap section, good exhibits of new equipment. Free coffee and doughnuts 1000 to 1030 CST. Registration in advance $1.50 (must be received before May 28). Registration at gate $2.00. For additional information and registration write George E. Keith, RFD, #1, Box 171, Oglesby, Illinois 61348.

Illinois — The Quad City Amateur Radio Club's Mississippi Valley Hamfest will be held May 23 at the Indian Bluff Forest Preserve, Moline, Illinois. More information from William Coopman, Jr., 911-23 Rd. Avenue, Moline, Illinois.

Illinois — The Kishwaukee Radio Club will hold its annual Swapfest Sunday, May 2, at the Hopkins Park Shelter House on Illinois Route 23 in DeKalb, Illinois. Write Al Brand, WA9MBJ, 415 E. Sycamore St., Sycamore, Illinois.

Indiana — The 1965 Hamfest by the Columbus Amateur Radio Club has been set for May 23 at the 4-H Club Fairground, about 3 miles south of Columbus, XYL entertainment and refreshments. More details from James Green, Box 126, Butlerville, Indiana 47223.

Kansas — The Neosho Valley Amateur Radio Club (Emporia, Kansas) Hamfest will be Sunday, May 2, rain or shine, at Bluestem Hall, northwest of Emporia. Covered-dish picnic at noon. Registration 50¢. For further information contact WØZGB, 420 Neosho St., Emporia, Kansas.

Kansas — The Kaw Valley Radio Club of Topeka, Kansas, will have their annual picnic on May 16. The location will be at Garfield Park, from 9:00 A.M. to 5:00 P.M. Information from L. M. Johnson, KØAER, 2400 James St., Topeka, Kansas.

Maine — The Portland Amateur Wireless Association will hold its annual Hamfest and Dinner at Portland at the Holiday Inn on May 15. Further details may be obtained from the Portland Amateur Wireless Asso., 277 Cumberland Ave., Portland, Maine.

Massachusetts — The Women Radio Operators of New England (WRONE) are holding their annual Spring Luncheon in Windsor, Connecticut on May 1. For details write Norma Gilbert, K1WXF, 15 Bertram St., Beverly, Massachusetts.

Missouri — The Ham Butchers Net will hold their annual picnic at the Shelter House, City Park in Warsaw, Missouri on Sunday, June 20. Tickets are $1.00 per person ($1.25 at the gate), children free. Bring your own eating hardware and covered dish. More information and reservations from John Knaak, KØEQY, 16 Maple Lane, Macon, Missouri.

Nebraska — The Pine Ridge Amateur Radio Club will have a Hamfest at the Chadron State Park, located 9 miles south of Chadron on June 6. Details from Stanley Stumf, WAØJKN, Rt. 2, Box 76, Chadron, Nebraska 69337.

New Jersey — The First Annual Beefsteak Dinner and Dance of the Knight Raiders V.H.F. Club of Passaic, New Jersey, will be held June 5, at Werners Grove, Belmont Ave., Haledon, New Jersey at 7:00 P.M. Tickets are $5.50 each, reservation deadline, May 16. Contact K2DEL, P.O. Box 1054, Passaic, New Jersey for further information.

New York — The annual Spring Auction of the Rockaway Amateur Radio Club will take place Friday, May 28, at 8:00 P.M. The event will be held at the Daniel M. O'Connell Post 272, American Legion Hall, 301 Beach 92nd Street, Rockaway Beach, New York. Doors will open at 6:00 P.M. for items to be auctioned. One dollar donation accepted at the door.

New York — The Cornell Amateur Radio Club will sponsor a swapfest and auction on Saturday, May 1, in Barton Hall on the Cornell University campus in Ithaca, New York. Refreshments will be served, admission is free.

New York — June 6 is the date for the Ham Family Day at Beck's Grove in Rome, New York. 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; each lady is asked to bring an old hat to the get-together. Children's activities, too. Reservations by mail are $1.00 for adults, and $1.50 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 Kerstetter, Box 721, Rome, New York.

New York — Western New York Hamfest, Saturday, May 22, Route 15, 4 miles south of N.Y.S. Thruway, Rochester, New York. Entire day of activities starting with FCC examinations, Old Timer's luncheon, afternoon of speakers and demonstrations, ending with large banquet. Advance registration and Banquet ticket, $5.00. Mail check to R.A.R.A., P.O. Box 1388, Rochester, New York.

New York — The Rochester Amateur Radio Asso. will hold its Western New York Hamfest on May 22 at Vinces 50 Acres, Route 15, West Henrietta Rd., Rochester, New York.

Pennsylvania — The Windjammers Net are having their Annual Banquet on May 22 at the Hometown Fire Company Hall at Hometown, Pennsylvania (near Tamaqua, Penna.)

Pennsylvania — The Eleventh Annual BreezShooters Hamfest to planned for May 23 at West View Park near Pittsburgh, Penna. For information write J. P. Carcia, Jr., K3PLN, 4311 Winterburn Ave., Pittsburgh, Pennsylvania 15207.

Pennsylvania — The North Penn Amateur Radio Club invites you to attend their 12th Annual Banquet at the Audubon Inn, Egypt and Pawlings Roads, Audubon, Penna., Friday, May 14 at 7:00 P.M. Prime Ribs of Beef or Shrimp at $4.00 each. Tickets may be purchased from Jack Barnshaw, K3ROK, 309 Prince Frederick St., King of Prussia, Penna. May 7 is the deadline for tickets; no tickets will be sold at the door.

Pennsylvania — The West Branch Amateur Radio Association of Williamsport, Pa., will hold its second annual Ham Get-Together on May 2 at the Fireman's Social Hall, Montoursville, Penna. Auction and contests from 1 until 6 P.M. Dinner and speaker from 5 until 8 P.M. Tickets are $3.75 each. For more information contact Ted Crowe, W3GPR, 345 Pearson Ave., Williamsport, Pennsylvania.

South Carolina — The sixth annual Greenville Hamfest will be held Sunday, May 2, at the Greenville County Fairground, Greenville, S.C. A complete program for the entire family is planned. Lunch will be served. Advance tickets and information from Don Robertson, WA4KLT, 101 Griffin Drive Greenville, South Carolina 29607.

Texas — The Second Annual El Paso Amateur Radio Club Swap Fiesta will be held on May 15 and 16 at Bassett Center in El Paso, Texas. A $2.00 donation can be paid to any member of the EPARC or to EPACR, 1501 Golden Hill Terrace, El Paso, Texas.

Virginia — The Roanoke Valley Amateur Radio Club will hold its annual Hamfest May 29 and 30 at the Vinton War Memorial, Vinton, Virginia. There will be a dutch treat dinner meeting at 6:00 P.M. Saturday, May 29. Registration will begin at 7:00 P.M. on the 29th, with an open house from 9:00 P.M. until 12 midnight. The Sunday program will include c.w. and traffic meetings in the morning

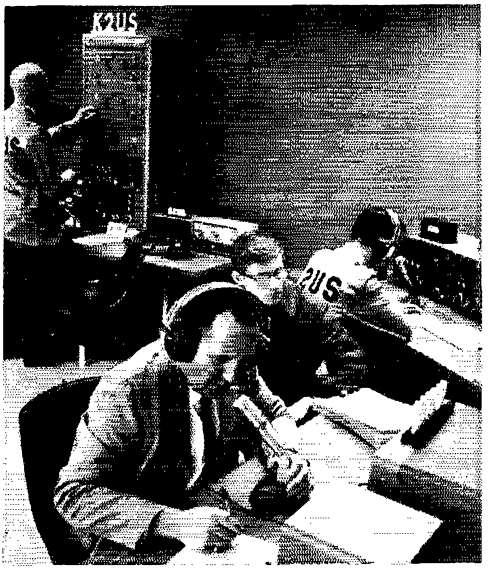
and a phone meeting in the afternoon. There will be free Bingo for the ladies and children. Lunch will be served at noon Sunday, price $1.50 adults, 75c for children under 12. Registration will be 6 for $5.00 in advance or $1.00 each at the door. For advance registration and information write Roanoke Valley ARC, P.O. Box 2002, Roanoke, Virginia.

Washington — The Bremerton Amateur Radio Club will hold its Annual Hamfest on May 15. For more information write W7NPK.

West Virginia — The Tri-State Amateur Radio Club announces its Third Annual Ham Picnic, June 6, at Camden Park in Huntington, W. Va. For details write Bob Fullerton, WA8KCJ, 2937 Auburn Rd., Huntington, West Virginia.

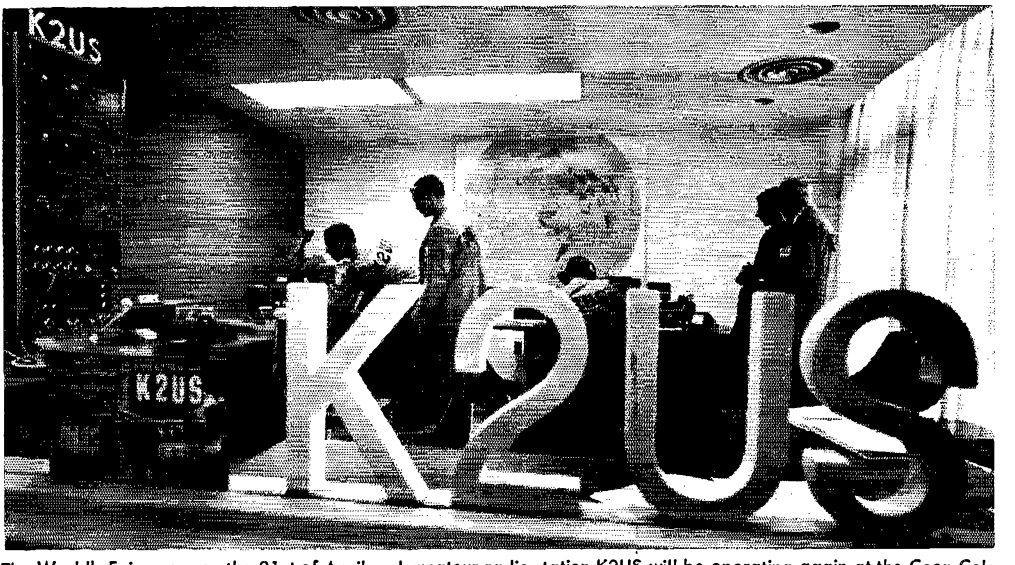
Wisconsin — The Ozaukee Amateur Radio Club Hamfest is scheduled for May 15 at the Belgium Recreation Center, Belgium, Wisconsin. For details write David Riedel, The Ozaukee Radio Club, Inc., Box 13, Port Washington, Wisconsin.

K2US Opens April 21



Operating positions are manned in this view of K2US.

All of the guests visiting K2US are requested to sign the visitors' log. The QSL display can be seen in the background.



The World's Fair opens on the 21st of April and amateur radio station K2US will be operating again at the Coca-Cola Company Pavilion. Last year, over 10,150 licensed amateurs visited the station and more than 7,000 QSL cards were sent in response to those received. The members of the Hudson Amateur Radio Council have the welcome mat out again this year and invite everyone to drop in and visit the station. Be sure to bring your original FCC license with you.

YL news and views

CONDUCTED BY JEAN PEACOR,* K1IJV

World-wide Friendship

"Look to the amateur for world peace, for through no other medium has there ever been so much closeness." André Peterson, WA2VMT, expressed this meaningful thought, one which every radio amateur could pause and think about.

Seventy years ago when Marconi successfully proved that radio signals could be transmitted without wires, the friendships strengthened were limited to those within his home. The upstairs to downstairs distance lengthened quickly — first to the backyard and within six years signals stretched across the Atlantic. Could he possibly have envisioned amateur radio as we now know it in 1965, or ever imagined the strong world-wide friendships that would develop? Today's radio amateur is offered tremendous opportunities merely by flicking the switch to the right band at the proper time.

Miss Kiyoko Miyahara, JA6DKT.

André first became interested in amateur radio in 1958 and credits Roger Quail, W8DW, for stirring his interest in a hobby that has prompted him to express the sentiments quoted above. Most of his years as an amateur have been spent as an American DX operator, as he has held licenses to operate in Manila, Guam and Germany. Through his work with many foreign speaking people, he has come to know how similar all peoples' interests are. In fact, this has resulted in his meeting his fiancé, Miss Kiyoko Miyahara, of Kityakushu City, Japan.

Donna Lane, WB6AUB, of San Francisco, Calif. is the 13-year-old granddaughter of WA6QZA and WA6PTU. Active on c.w. daily from 5 to 6 P.M. and often on 40 or 20 meter s.s.b., she also enjoys traffic work. She's anxious to hear from other YLs aged 10 to 14.

Several years ago when André first met Miss Miyahara in Japan, she was interested in amateur radio. Today she is JA6DKT, and very appreciative of the assistance she received from radio station JA6YAX, the club station of Mitsubishi

Susie Oswell, K1PQE, of Newington, Conn. is the popular 21-year-old YL familiar to all who have heard her as NCS of the Friendly Ragchewers Net, or handle traffic on the Texas Tower Net, Boston Region P. O. Net and Conn. Phone Net. Susie tunes her DX100 with the audio tuning meter, see QST April 1963, which enables her to enjoy both c.w. and phone.

Sue Forman, WA2HLQ (left), of Great Neck, N. Y. is a 17-year-old high school senior who has been licensed for 5 years. Sue is active on 6 meters and is ready to ragchew anytime. Barbara Barnard, WØHLQ (center), age 17 and from Des Moines, Iowa, is hoping for contacts with other teenagers, or news of teenager nets. Active mostly on 40 and 75 meters a.m. for the past 5 years, she has just recently added s.s.b. to her station. Sheri Zeigler, W9AAP (right), is a senior at Michigan State where she is Pres. of their radio club. K9PTQ and W9SCH of Winnetka, Ill. recommend Sheri as ham gal of the day, month and year. After college, her goal is to manage either a broadcast or TV station. When time permits, she operates 40-meter s.s.b. and c.w.

Chemical Ind. Ltd., whose purpose is to encourage interest in ham radio in Japan.

Miss Miyahara and André realize what a major role amateur radio has played in bringing them together. Their mutual interests have surmounted any difficulties caused by language barriers and have proven to them that there is no other medium quite like amateur radio.

K5YIB de K2UXW

When you find two Den Mothers who are also hams, the result can be a very unique Den Meeting for a lot of Cub Scouts. This was the case at a meeting in February, when Trudy Forbes, K2UXW, of West New York, N. J. and Barbie Houston, K5YIB, of Richardson, Texas decided to commemorate Scout Week by having their Dens meet via the airwaves. The Cubs from both Dens delighted in exchanging greetings and comments with other boys across the country.

As a new Den Mother, Trudy has embarked on a program to orient and train her Cub Scouts on amateur radio operations. To be able to actively participate in this on-the-air Den Meeting certainly increased their interest and plans are already underway for future schedules with other amateur radio stations throughout the world. This sounds like a fine start toward an all-ham Cub Scout Den, thanks to Trudy's ingenuity.

YL Clubs

The Chirps from the Camellia Capital of Sacramento, Calif. announce their officers for 1965 as follows: Pres., Judy McClendon, WB6AOJ; V. Pres., Jan O'Brien, K6HHD; Secy., Marcia Rast, K6DLL; Treas., Velma Lohner, WA6DGH; Pub., Bev Petterson, K6GUQ. QST

An on-the-air Den Meeting held at the QTH of Trudy Forbes, K2UXW. Her son, Clifford, is seated in the front row right.

First-Day Covers Still Available

When the Amateur Radio First-Day Covers were processed in Anchorage on December 15, 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 amateur radio 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.

16th Armed Forces Day

THE Department of Defense is ever mindful of the unique communications potential inherent in the amateur radio fraternity. Each of the services has a firm and long standing policy of encouragement and support of amateur radio activity. As a tangible demonstration of their active amateur radio programs the separate military departments join each year in conducting the Armed Forces Day Communication Tests. This year's tests will be conducted on 15 May 1965.

These tests provide amateurs throughout the world with the opportunity of working crossband with designated military stations and to participate in c.w. and RTTY receiving contests. The plans for the event are a joint effort of the three MARS (Military Affiliate Radio System) Chiefs for their respective services. The operating portion of the program is accomplished by active duty personnel and guest operators at the participating military stations.

Amateurs everywhere are invited to use this event as a means of demonstrating their skills and operating proficiencies. Once again all normal modes of emission will be utilized and it is hoped that every amateur will be able to work at least one of the military stations.

The theme for this Sixteenth Armed Forces Day will be, "Power for Peace." A large number of contacts will demonstrate to the world that there is indeed "Power for Peace" in the communications freedom enjoyed by the U.S. Amateur and that close partnership with the military can be healthy and mutually beneficial relationship in our society.

On 15 May 1965, you may qualify for the one-time QSL card from each of the military stations. Further, you may demonstrate your operating abilities and technical skills by receiving a certificate for perfect copy of the c.w. and/or RTTY message(s) from the Secretary of Defense. QSL cards can only be forwarded to those licensed amateurs who established a two-way contact with a station. Interception by short wave listeners (SWL) will not qualify for a QSL card. However, anyone that has the equipment and abilities may copy the Secretary of Defense messages and receive a certificate.

Military-To-Amateur Crossband Operations

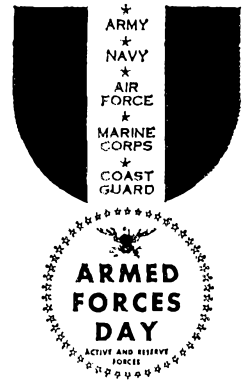
The military stations will transmit crossband on spot frequencies outside the amateur bands and establish radio contacts with amateurs in the appropriate sections of the amateur bands. This is a test of crossband operations, and contacts will consist of a brief exchange of locations and signal reports. No traffic handling will be permitted.

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 (25 w.p.m.).

★★★★★★★★★★★★★★★★★★★

POWER FOR PEACE



see page 172 for schedule of events

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.

RTTY Receiving Contest

A radioteletypewriter RTTY receiving contest will be conducted for any individual or station that possesses 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 that are becoming skilled in this method of rapid communications. The RTTY broadcast will be transmitted at 60 words per minute (60 w.p.m.) and will consist of a special Armed Forces Day message from the Secretary of Defense to all radioteletypewriter enthusiasts.

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 copied 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. The name and or call sign of the individual are mandatory if the certificate is to be awarded.

Competition entries should be submitted to the Armed Forces Day Contest, Room 5B960, the Pentagon, Washington, D. C. 20350 and postmarked not later than 31 May 1965.

(*Continued on page 172*)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

Oh could I fly, I'd fly with thee!
We'd make with joyful wing
Our annual visit o'er the globe,
Companions of the spring.
— JOHN LOGAN

Old Jack couldn't make it, but almost everybody else jammed into Long Hall for the annual May gathering of our DX Hoggery & Poetry Depreciation Society. After the traditional thirst-slaking with Old Haywire, plus lusty stanzas of the Wouff Hong Song, the meeting was reluctantly brought to order by chairman Madden Cardless. He promptly introduced guest of honor Cal Urhedzoff, CLØT, just back from his much ballyhooed DXpedition to Upper and Lower Bertha. Cal immediately began a pitch for contributions to pay his way to Middle Bertha, also virgin DXCC List territory, but M. T. Melbocks shouted him down with

Here's to one Casey O'Snake
Whose big DX score is a fake.
Can't hunt up his own
When on 20 phone —
Just runs around screaming BREAK-BREAK!

As CLØT was lamely explaining why he answered zero-beat lids, his first contribution came through, a year-old set of kumquat at eye level. Muntz O'Vigil avoided the goo and delivered

Most rancid of all, let me tell,
Is the nonsense of Bigsig von Smell.
We've piled up all day
For our first good ZK —
He calls to say TNX QSL.

Cal Urhedzoff next discussed his habit of suddenly QSYing to listen for anybody's phone or RTTY, collecting three particularly putrid pumpkins from last Hallowe'en square amidships. Noah Q. Essels sidestepped the slop to offer

A murderous, vile form of hex
On lunkheads from Extras to Techs
Who sit by the hour
And turn good bands sour
With nothing but CQ DX.

Our bespattered honorary visitor then told why he rag-chewed so tediously with certain buddies back home, earning a hosed coating of hot soldering flux. Waite N. Fume shunned the reeking stage to contribute from the floor:

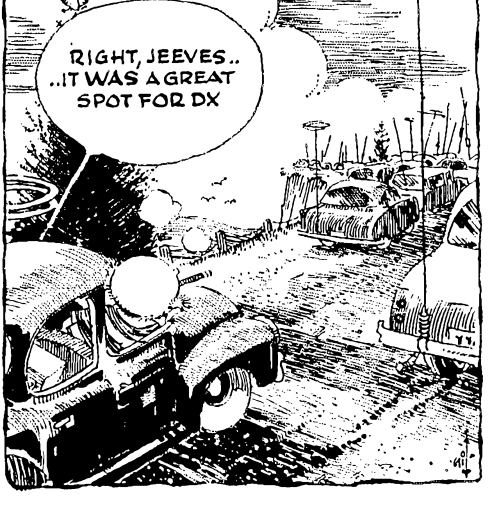
Good riddance to Ten-Amps McSpout
Whose spinner put out quite a clout.
Need a house warmer?
Go grab his transformer;
We've heard that McSpout must sell out.

Cal Urhedzoff finally tried to explain why he spent so much time sightseeing Bertha instead of sticking to 20. This was too much for the menacing mob. Gil D. Postman signaled for a DXHPDS Mark I pile-up salute. The stage shuddered under the impact of a dozen heavyweights in asbestos spacesuits armed with flaring solder torches. The second shock squad descended on cringing CLØT with a buckling roar wearing magnetic moonsuits and 10-kw. pack sets.

Jeeves & Co. were programmed to pile on with the third wave in lead armor bearing anti-matter Wouff Hongs but we called the whole thing off. CLØT, as usual, was hardly coming back to anybody.

What:

Sure, we hung around long enough to soundly jeer our new DXHPDS Smear of the Year, but then we hastily repaired to our BRD Cage to winnow a packed "How's" mailbag. . . . "My first DX, an SP2 on 20 c.w.!" — *WB2FPG*. . . . "Can't count on sunspots, so it's gotta be luck." — *WB6FMJ*. . . . "It's 20 in the daytime for Europe, 40 for Oceania at night." — *B. Bumm*. . . . "Forty was a January disappointment but 20 and 15 get better day by day." — *WA4TLB*. . . . "New 14-Mc. quad causes me to neglect other bands." — *W8TRN*. . . . "French test put a lot of Fs on 20, so I grabbed three." — *WA8MAT*. . . . "Openings are erratic but 21-Mc. Africans are workable without much competition." — *K1ZND*. . . . "February shook out a few good teeth-rattlers." — *W8ZCQ*. . . . "Paths to the U.S.S.R. have improved a lot." — *WA4JJY*. . . . "Feb. 2nd turned up a 'WAC' for me on 75 watts" — *K7QXG* . . . . Twenty is fine at 1200-1500 GMT but then competition builds up from the west." — *W1YNE*. . . . "Twenty slams shut here at 1700, and 40 is jammed with RTTY, commercial c.w. and BC bedlam." — *KA2TP*. . . . "Forty is alive with Europeans and Africans around 2200." — *WB2DZZ*. . . . "Not much DX time as a U. of Colo freshman." — *KØGVA*. . . . "Semester finals were rough on me, too." — *WB6CUU*. . . . "Conditions seem quite good, plenty of activity." — *K6OZL/ZS1/mm*. . . . "My new linear plows through on 20 much easier." — *W7VRO*. . . . "Twenty s.s.b. is a natural for anyone with a decent beam." — *K7ICW*. . . . "After so many wonderful Novice DX QSOs it's a shame to have to become a General." — *WN2NTJ*. . . . "Washington's birthday was a red hot DX date on 40." — *WA2FUL*. . . . "Never heard so much DX as in



*7862-B West Lawrence Ave., Chicago, Ill. 60656

7Z1AA (HB9AET) also did a rare stint as 4W1C last year and helps 4U1ITU stay workable on DX bands.

this year's ARRL Test." — *WB6ITM*. . . . "Thanks to friend WA6VAT, DX is now my favorite pastime when I'm not pushing traffic." — *WB6ILH*. . . . "Bands have picked up, especially 7 Mc." — *W7DJU*. . . . "JA1BRD is another rare 'BRD.'" — *W8YGR*. . . . "QRP plus my new quad equals DX!" — *WA9BGK*. . . . "I switched briefly from 160 to 20 but met with technical difficulties." — *W9PNE*. . . . "Rag-chewers just below 1825 kc. sure clobber reception of European DX on 160." — *WA8IJJ*. . . . "At least 45 countries were workable on 3.5 Mc. during the first Test week end." — *W1SWX*. . . . "Never heard so many loud local Threes as in this year's ARRL rat race." — *W3HNK*. . . . "Working the late shift cuts into my DXing." — *W. P. Kilroy*. . . . "Ice storm lowered my beam the night before the Contest." — *K3VPN*. . . . "Best 80-meter conditions I've observed in a long time." — *J. Hall*. . . . "If the bands are supposed to be at their worst we have a real DX ball coming up." — *WA6VAT*. . . . "There are no lids like DX lids." — *W9VES*. . . . "Conditions are fantastic at times but so are the pile-ups." — *WB6MEQ*. . . . Now let's throw the spot on 20, bearing in mind that an entry like "KV4AA (81) 20-21" means that Dick was noted on 14,081 kc. at 2000-2100 GMT.

20 c.w., where less than 100 kc. support perhaps one third of all DX traffic at this stage of the solar cycle, helps **Ws** 1ECH 1YNE 3HNK 3ZNB 6BCT 7DJU 7VRO 7WLL 8IBX 8TRN 8YGR 8ZCQ 9EXE, **Ks** 1MOD 1ZND 3VPN 4NFP 5MHG 7QXG 0GVA, **WAs** 2WIJ 4JJY 4PSA 4TLB 5HJK 5IPM 6VAT 8GGN 8MAT 9BGK 9FMQ ØUCA, **WBs** 2BEV 2DZZ 2FPG 2NCI 6CUU 6FWW 6ILH 6ITM 6MEQ 6NQS, **KA2TP**, **PY2SO** and XE1NNN to telegraph with **APs** 2AD (116) 13, 2AR (30) 13, 5B (81) 19, 5HQ (20) 14, **BVs** 1US (37) 22, 2A (60) 2, **CE0ZN**, **CM1AR**, **CN8s** BU CF (78) 18, **COs** 2JB 23, 5GG (30) 22, 7FC 5, 8HB, **CPs** 1EA (50) 23, 3CN (40) 23, 5EQ 5EZ (56) 0, **CRs** 4AD (40) 19, 4AG (40) 12, 4AJ 4BB (4) 21, 6AI 6CQ 6DA (72) 19, 6EI 20, 6ES 16, 6HG **7IZ** 9AH (53) 1-0, **CTs** 1CN (35) 21, 1GE (5) 2, 1IT (38) 13, 3AQ (43) 22, CX7AP (79) 22, **DMs** 2ACO 2AND 2BJD 3MEL 4PKL (34) 15, **DUs** 1OR (67) 1, 6TY, **EAs** 8DL (100) 17, 9AY (30) 20, **EL2s** AD AE (7) 22, AM (80) 8, AO (20) 19, AQ P (26) 21, **EP2s** BQ (36-50) 13-14, DM RC (39) 13-14, RV (26) 14, **ET3s** DR (20) 19, **USA** (7) 19, **FB8s** WW (30) 12, XX (41) 22-23, ZZ0, **FG7s** XP (80) 11, XX, **FK8s** AH (48) 5, BG (59) 3-4, **FO8s** AA (12) 22-23, BI (40) 3, **FR7s** ZD (36) 19, ZG ZI (81) 20, **FU8AG** (41) 10, **FY7YJ** (60) 22, **GC2s** FMV (40) 15, FZC (25) 17, **GD3s** FXN (22) 15, HQR (64) 16, **HAs** 1KSA 5DU 5KFR 6NI (5) 13, **HCs** 1LE 2RT (65) 22, **HH1TS**, **HIs** 3AGS (39) 22, 3PC 8NPI 2, 8XAL (54) 0, **HK0AI** (5) **HL9KA** (30) 23, **HM5BF** (22) 0, **HP1s** IE MN (84) 0, **HRs** 1RP 2FG, **HS1X** on ban list, **IT1AGA**, **JAs** 4BS (12) 23, 4BUT 5FQ (50) 23, 5GZ (65) 0, 5ZL ØXD 1, **JT1s** AD (71) 0, AG (46) 2, KAA (10) 0-1, KAE (65) 1, K3SWW/**KG6**, **KAs** 2CJ (52) 0, 2CM 2LD (53) 23-0, 8FS 8VB (34) 23, 7DR, **KCs** 4USX (50) 12, 6BO (2) 23, **KGs** 1AX 4AA (40) 15, 6AAY (17) 7-8, 6ALU 6AOX 6IF, **KRs** 6BQ (24) 23, 6FY (42) 1, 6JZ (2), 6NT (61) 6, 6SK 8CA **KV4AA** (81) 20-21, **KW6s** EF EI (10) 0, EK (40) 1, **KZ5s** AW (51), BA (68) 0, BC (1) 22, EH EM EV, **LAs** 2QJ/p 4EJ/p (57) 22 on Jan Mayen, far-south **LUs** 1ZC (50), 4ZA (39) 22, 6ZM, **LXs** 1CF 1CO (3) 17, 3BD, **LZs** 1KAB 1SP 2KSS (66) 13, **MP4s** BCO (56) 13, BEK (27) 14, TBJ, **OA4FM**, **OD5s** AX (70) 22, CY (34) 22, **OH0s** NF NH (5) 12-13, **OR4VN** 21, OX3AY (5) 14, **OYs** 2H 2Z 8KR (25) 17, **PJ2s** CE CP CX MI, **PZ1s** AO CM, **SLs** 2AD 3AJ 6BH (17) 13, 6CV 7AZ, **SU1IM**, **SV0s** WAA WCC (38) 14, WP (10) 15, **TFs** 2WIO 2WIV (10) 23, 3AB, **TGs** 6PB 9MO (49) 1, 9SB 9WF (48), **TI2s** LAB (100) 0, RK (47) 20, **TN8AF** (60) 18-19, **TL8SW** (51) 22-0, **TT8AJ**, **TU2s** AN AW, **UAs** 1KAE/1 (50) 23 of the Russian antarctic, 1KED of F.J.L., 2AC 2BJ 2KAK 2WJ (99) 13, 9FJ (55) 13, 9YH (17) 8, 0CQ (62) 7, 0EQ (52) 1, 0FC 0FM (45) 23, 0IE (54) 1, 0KAD 0KAE (20) 23, 0KCC (35) 1, 0KCO 0KFK (18) 5, 0KFS 0KIA 0KIF (80) 14, 0KJA 0KJJ 0KQB (45) 1, 0KYA (10) 0, 0KZB (18) 5, 0QR 0RD (34) 1, 0RL (18) 3, 0TD 0TX (18) 1, **UB5s** CD EF EW KAI KDS (35) 16, KEU KGL WF VE (40) 14, **UC2s** AR (10) 12, BF (60) 19, KAA KMZ (16) 14, LM WP (38) 14, **UD6**KAR, **UF6**FN (10) 13, **UG6**DL (90) 13, **UH8**AE (25) 13, **UI8s** LB (55) 13, LC (26) 13, **UJ8**KAA (7) 13, **UL7s** IP (60) 13, KBA (60) 8, KDM (20) 12, PS (45) 13, **UM8**AP (15) 13, **UN1s** AE BK, **UO5s** BM (52), SM 1, UPOL-12 'way up north, **UP2s** DU KBC KCA KCF OM, **UQ2s** AP (58) 15, AX GA KAE (15) 14, KCT KDD, **UR2s** AO IP KAA KAS 13, NN, **UWs** 3EH 1OL (82) 14, 0AP 12, 0FO (15) 1, 0IJ 0, 0IK (15) 23-0, 0IP, UT5EH, **UY5**OG 15, VEs 1AGT/SU (70) 17, 8BB (40) 22, 8CD (50) 23, 8GB 8YE 0NM (3) 22, **VKs** 4TE of Willis (63) 7, 9BW 9NT 9RB 0FB, **VPs** 2AX (53) 22, 2DAA (70) 23, 2KT 2LS (70) 22, 2VL (W0NWX), 4TR 4TK 4VU 20, 5BR (60) 22, 5SG (32) 2, 6BW 7NA 7NQ 8BL (10) 23, 8CW (10) 0, 8HD 8IIJ (48) 23, 8IB (11) 0, 9FV, **VQs** 8AI (27) 18, 9HB (11) 19, **VRs** 2DU 2EO (18) 21, 4OO (45) 1-2, **VSs** 6EY (61) 2, 6FF (85) 23, 6FK 9AJF 12, 9ARO (55) 19, 9ASP (69) 21, 9AWR 9MB (80) 13, 9MG (50) 19, 9OC (27) 14, 9SJF (42) 14, **VU2s** AJ (10) 15, GG GW (15) 14, LE, a dozen XEs, **YI3II** (27) 17, **YNs** 1SL (44) 18, 3KM, **YJ1**DL (70) 6-7, **YSs** 1RF (5) 22, 1RFE (3) 18, 2FM, **ZB2s** AE AK, **ZDs** 5M (55), 8BB (20) 22, 8DX (20) 1, 8FP 9BB, **ZEs** 1BF 20, 1BL 2KL 4IS 8JJ (3) 21, 8JO 8JR (23) 20, **ZK1**AR (68) 4, **ZL4**JF of the Campbells, **ZP5s** EC (40) 15, LS OG 3, **ZSs** 3EW (48) 20, 6XU/Ant., 4S7s DA (15) 13, NE (30) 14, RS (23) 14, **4X4**IX, **5II3JJ**, **5N2s** AAF 23, AFS (8) 21, JAB (34) 21, **5R8s** AB (30) 18-19, AM (54) 19, AN (8), BC, **5W1**AZ (35), **5Z4s** DW (32) 18, JX, **6O6**BW (81) 22, **6W8s** BF (55) 21, BL (48) 22, DN (37) 21, CQ, **6Y5**MJ, **7G1L**, **7Q7s** EX LC RM (18) 19-20, **7Xs** 2RW (45) 16, 3CT (50) 21, **7Z3**AB (14) 14, **9A1P**M (48) 19, **9G1s** EY FK (10) 0, FQ (8) 22, FR (10) 22, **9J2s** AB (75) 21-22, BD (65) 23, BO DT IE JC 14, IE W (18) 21, **9K2**AN (48) 17, **9L1**TL (32) 0, **9M4s** GZ (30) 13, LP (25) 13, **9Q5s** ES GS HD (10) 20, QR TH and TJ (5).

20 phone, with perhaps another third of the take, shows **Ws** 3HNK 3ZNB 7WLL 8YGR 8ZCQ, **Ks** 3VPN 7ICW, **WAs** 4JJY 4PSA 5AER 5HJK 5IPM 6VAT 8MAT 9BGK 9FZQ, **WBs** 2BEV 2FPG 6FMJ 6ILH 6NQS, XE1NNN, listeners B. Bumm, J. Hall, W. P. Kilroy and L. Stewart the way toward **AP2**AD (125) 13, **BV1USG** (254) 1, **CE9AN***, **CN8s** AW* BF*, **COs** 2JL* 8MA, **CPs** ICT (313) 12, 5EP 5ET 22, 8AB 8AW (288) 12, **CRs** 4AD 4AJ (114) 20, 6AB 14, 6AT 17, 6BX 6CN (270), 6GQ* 6IH 21-22, 6IJ* **7GF** (107) 20, 8AF* (210) 13, **CTs** 1JE* 1SQ 2AM* 3AQ, **DU1s** AA (130) 13, BSP EH (252) 23, JC (110) 0, **EAs** 6BC* (200) 14-15, 8CM 8CR* 9EB* (210) 16-17, 9EO (310) 14, **EIs** 4AK* 8II 14, **ELs** 1H* (230) 18, 2AH 2AI 2AQ 2S 2Y (200) 18-19, 2Z 3C (210) 19, 7B 7EB (115) 19, 8AF 8B 8D, **EPs** 1AU (246) 12, 2BQ 2DS 2NO 3RO*, **ET3s** DR (110) 17, FW (260) 8-9, RT (242) 20, USA (245) 14, F9RY/**FC** (126) 13, **FB8ZZ** 0, **FG7s** XL (110) 19, XT (130) 16, **FH8**CD (110) 17, **FK8**AU, **FM7**WQ (125) 17, **FO8s** AG BH (288) 4, BL (292) 3, **FY7s** YH YL 16, **GCs** 2AAO (245) 12, 2KCE (130) 15, 3MLR (137) 19, 4LI* 15, GD3GMH, HAs 4MX 5AM 14, 5KBB (317) 15, **HGs** 1CM* 17, 2JT 2LX 5CRC 5MW 8FN (124) 15, **HIs** 3JBR (130) 18, 4XAB* 8AMA 8XAL, **HK0QA**, **HL9s** KG 10, KK (247) 1, TY US (294) 3, **HMs** 1CD 9, 2BD (250) 23, 4AR, **HPs** 1FH 20-21, 1JR 1SH 21, 3FL*, **HRs** 1LM 1SO 2AEC 2FC 2JH GCGA (115) 18, taboo **HSIs** I HS (120) 16, **HV1CN** (293) 9-12, **HZ3TA**, **IS1s** KGI (220) 12, LOP 19, RUA* TDW* VAZ (175) 14, ZDT (282) 19, IT1s CKL* TAI, **JAs** 1AB 1CG 3MDB 8HK 0, K7MAH/**KG6** (280), KAs 2EB 2LD 2PA (247) 0, 5RC 8FS (252) 0, 9AS (250) 1, **KB6s** CP/KS6 CS (260) 5, EPN EPQ (265) 4, **KCs** 4USA 2, 4USH (265) 5, 4USP (280) 2, 4USX (278) 14, 6AA (252) 1, 6BU (252) 0, **KGs** 1BO (308) 21, 1FR 4AA 4AM 6AIG 6AKZ (259) 0, 6APJ 6IG (245) 0, 6SA (255) 21, 6SB (290) 12, **KH6**EDY (245) 3, **KJ6**DA (330), **KM6**BI (255) 1, **KR6s** BF CF (247) 1, DI DO (246) 1, ID MB PY UL (295) 8-9, **KR8**AC, **KS6**BK (256) 4, **KV4s** AC CF (285) 11, CQ (300) 12, **KW6s** EB (246) 2, EJ (290) 8, EQ, **KX6s** BU (298) 0-1, DP DR (289) 6, DQ (270) 8, **KZ5s** AA (320) 14, BO (270) 8, EX HD NS, **LX1**DO*, **LZ1UF***, **M1B***, **MP4s** BBC (242) 13, BCC (245) 19, BEK (115) 12, MAH (265) 14, MAO TBA* (320) 12, TBM, **OAs** 1T* 6AM, **OD5s** AI (130) 9, AX (230) 12, BZ (120) 13, CN (295) 5, CY (270) 14, **OH0NI** (225) 12, **OX3s** JV LP 20, WX, **PJs** 2AA 2CH (103) 16-17, 2CR 2MI (120) 11-12, 3AJ* 5CI/a, **PZ1s** AX BW (110) 12, CE, **SV1BL***, **SV0s** WF (235) 14-15, WG (125) 15, WGG WPP 7, WR, **TFs** 2WIA 2WJE 2WIR (242) 16, 2WHI 13, 3SG 5TP* (250) 18, **TGs** 5PC 9AD (130) 14, 9AL (115) 15, 9EL 9FP 9DR 9GZ (120) 17, 9PM 0AA 23, **TI2s** AWL DX JIC (115) 19, QKX (273) 23, RCJ USA, **TJ1s** AC 22, AD (125) 19, **TL8SW** (280) 23-0, **TU2s** AB (115) 18, AE, **UAs** 2AU 2AW 13, 2KAK* 9DN 9KCE (124) 13, 9TE 0EH (250) 0, 0EK 0KWA, **UB5s** BX* CK KKA 14-15, UF, **UD6s** BR (248) 13, KAR (235) 12, **UG6**AW, **UH8**BO (115) 13, **UI8**CT, **UJ8**KAA, **UM8**FZ, **UN1**CC*, **UO5**PK, **UP2**KAB 15, **UQ2s** AN (310)

12, KDD*, UR2s AK BL 14-15, KAH* KAW (315) 12-15, KBG*, UWs 3BV 13, 9AF 9CP* 0IN (115) 17, VEs 1AJR/SU (110) 15-16, 8CD* 8CO 8MC 8ML 8NB 0MY 17, VKs 9TG (250) 15, 9XI (118) 15, 0DS (110) 17, VOs 1AE 2GA, VPs 2AT 2AX 2KM (115) 18, 2KR 2LS (120), 2MJ 3HAG 4TI 4VP (244) 22, 6FO 6GT (130) 19, 6KL (200) 11, 6WR 7CC 7CX 7DI (110) 17-18, 7NY 8HZ* 1, 9BY 9DC 9DL 9WB, VQs 8AM (115) 17, 8BS (190) 16, 9HB (110) 17, VR2EK, VS9s AAD (101) 18, ABM ADD (130) 20, ASP (139) 18, AWR (250), MG (110) 17, OC PCZ (125) (125) 17, SJF*, VU2s AK (320) 12, ED, W8YNC/KW6, XW8s AL (105) 14, AX (250) 14, AZ (140) 14, YAs 3TNC (110) 14, 4A (105) 12, YK1AA (237) 14-15, YNs 1BN 1TH (303) 12, 6AQ 22, 8JUL, YSs 1IGM (125) 13, 1JMV 1MM 1O 1SAM 2MS 2SA (117) 0, YO2BB (175) 15-16, YV9BW, ZBs 1CE* 1RM* 1RS* 2AE* 2AK (120) 18, 2U (120) 17, ZC4GT, ZDs 5R (120) 17, 8BB (325) 21, 8CH (260) 22, 8JC (335) 18-23, 8WR (270) 22, ZEs 1BI 1JE 7JV, ZL4JF (110) 6, ZP7BJ (259) 23, ZSs 2MI of Marion isle, 3AA 3E (252) 7, 3HX 20, 8G (119) 19, 8H (115) 20, 9G 21-22, 3A2s CP DF, 4S7RS (120) 17-18, 4UIs ITU (125) 15, SU (107) 14, 4W1G (110) 12, 4X4s DK HI*, 5As 1TZ 1TI (242) 16, 5TR (304) 20, 5H3JJ (140) 19, 5N2s AAF 19, AWP JWC* (200) 19-20, 5T5AB (135) 18, 5U7s AC (300) 17, AG (120) 7-8, AH (115) 18, 5X5s FS (270) 17, 1U (270) 19, 5Z4s AA (205) 15, AQ (115) 21, DW ERR, 6O6BW (235) 20, 6W8s AG (105) 18, BL (272) 21, 6Y5s EM 20, MJ (280) 23, RV UC, 7G1s AZ H (245) 23, L (238) 22, 7Q7s GN (240), GS (120) 17, LA (100) 16-17, PBD (110) 17, 7Xs 2MD (120) 19, 2VP* 2VR* 2VW 17, 2WW* 3VW, 7Zs 2BB* 3AB (110) 15, 9G1s DY EO GN (120) 20, SC*, 9J2s BB BY FF FK 20, FT 19, JC (108) 17, SK (107) 20-21, VB (120) 7, WR, 9K2s AJ* AN (120) 14, 9L1JR, 9Ms 2CP (110) 22, 2DQ (125) 14, 2EE 2FR (240) 1, 4MB (125) 14, 4MF 4ML (105) 14, 8EB (250) 0, 8ED (243) 0, 9Q5s AA BB (246) 20, DL EA HD LW* (180) 21, QR (251) 20, TH (100) 18, 9U5s BB IB (270) 18, ID (265) 20-21 and KU 20, the scattered asterisks going for non-s.s.b. holdouts.

Next month we'll get the story on other bands from (15 c.w.) Ws 3HNK 4TVQ 5NSE 8YGR 8ZCQ 9EXE, Ks 1ZND 3CUI 4WVX 5MHG 7QXG, WAs 4PSA 6VAT 9AVT 0JCA, WBs 2FPG 6FWW 6MEQ, WNs 2NVJ 2PFD 7BOB; (15 phone) Ws 3HNK 8YGR, Ks 4NFP 5MHG 7QXG, WAs 4PSA 9BGK 9FZQ, WBs 2FPG 2BEV 6FRP 6FWW 6ILH; (40 c.w.) Ws 1YNE 3HNK 7DJU 8ZCQ 9EXE, Ks 1ZND 5JVF 5MHG, WAs 2FUL 4PSA 6VAT 7ASM 0JCA, WBs 2NLH 6CUU 6FWW 6ITM 6KVA 6MEQ, KA2TP; (40 phone) W1BU (W1FZJ), WAs 5IPM 7ASM, WB6s FRP ILH; (80 c.w.) Ws 1BU 1SWX 7DJU, Ks 3VPN 5JVF 5MHG, WA8MGD; (75 phone) Ws 1BU 3HNK; (160 c.w.) Ws 1BB 1BU 9PNE, K5JVF, WA8IJI; (ten c.w. and phone) WAs 6VAT and 9BGK, with assistance from s.w.l.s. Bumm, Hall, Kilroy, Stewart and other imminent "How's" reporters. Looks like a fine spring season under way!

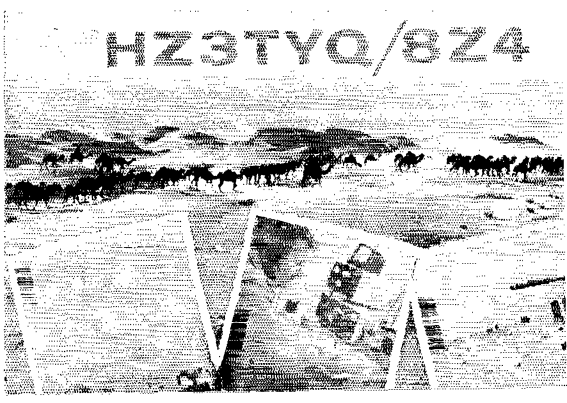
Where:

HEREABOUTS — W2GHK & Co.'s DXpedition of the Month QSL auspices (P.O. Box 7388, GPO, New York, N. Y., 10001) announce a change in policy necessitated by increasing volume: "Beginning April 15, 1965, QSLs received from W/K stations should be accompanied by self-addressed stamped envelopes (stamps or International Reply Coupons not required from stations in other areas). Since we now handle QSLing for over 35 stations, and we anticipate continued addition of new ones, this change in procedure will help confirm QSOs more quickly and accurately. By initiating this plan we expect to reduce delay in getting your QSLs into the mail. Our policy concerning cards received via QSL bureaus shall remain the same, all such being confirmed by way of appropriate bureaus." . . . . . Let's salute our "QSLers of the Month", namely CE5EQ, CO2CT, CR6s DU EI GO, DU1JC, EL2s AC AO, F9CC, GC2FMV, GM3s DPK SUZ, HC8FN, HIs 4ARM 8XAL, HP1IE, I1s NT SF, KA2EB, KC4USX, KL7PI, KP4s BQG BRH, KR6s BF JZ, KV4CF, KX6BU, LA6VC, LU9ACZ, OK3EA, PYs 1MCC 2SO 5OE, SM5s CBN KY, TG9WF, TU2AU/5U7, UAØKKB, VE4OX, VK9TL, VPs 1GFQ 2DAD 2KT 2LS 7BG 7CC, VQ9HB, YN1DT, YS1s JMV RFE SAM, YV9AA, ZE3JJ, ZL1ATW, ZS3HT, 5A3TX, 9G1s FK FQ, 9Q5s HD QR and TJ, plus QSL managers Ws 2CTN 4TAJ 6ZJY 9WHM, Ks 1IMP 5SGJ 6UTO 7UCH 9BPO, WAs 2WUV 8ECH and DJ6SI, all applauded for speedy QSL response to nominating Ws 1SWX 4WMQ 5NSE 6AR 7VRO 8TRN 8YGR 9EXE, Ks 3VPN 4WVX 7QXG, WAs 4PSA 6VAT 9BGK, WBs 2NLH 6FHH/7 6MEQ, J. Hall and L. Stewart. Got some candidates for such recognition here? . . . . . Help! The following italicized chappies plead for QSL tips regarding holdouts listed: *W4TVQ*, CN2BK, F9QV/FC, FK8AS, KX6BP, 4S7ZE, all 1958 QSOs; *W5NSE*, FA9RW, VP2s GAB GAQ GX, 5U7AD all '62; *W6AR*, CE3ZK, VP9VRE, ZS5QU; *W8TRN*, HI3PC, KC4USB, VP5WH, VQs 2IE 8BY, 6O6BW, 6Y5LK; *W9LNQ*, JT1CA '63; *W9WGQ*, CT3AI '58, W2EPS/KJ6 '59; *K1VKY*, HL9KG, OY8KR, PJ2MI; *K1ZND*, FS7MB; *WA2TGL*, FA9MT '63 claiming French Sahara locale; *WA9BGK*, KG4AM/KG4 '63 FD, PZ1BE; and *WA9AVT*, LUØGNX. We usually get picky and list only the more desirable and most tardy among these items. Space, you know . . . . . K1VKY, WB6s KVA MPH and J. Hall, RFD 1, Hornell, N. Y., offer to aid overseas DX ops in need of U.S.A. QSL managers . . . . . 6Y5RA warns that 6Y5RD receives many cards for unlogged QSOs. Chances are you worked the wrong one if your 6Y5RD confirmation doesn't show . . . . . "QSLs can come through either of my home calls, K4WVX or W5NSE," says HR3JP, specifying s.a.s.e. from W/K applicants . . . . . W1SWX finds that W2CTN's KG4AM QSLing arrangement terminated last year . . . . . VERON's *DXpress* indicates that CEØAG QSLing commenced in late March from home station VE3DGX.

ASIA — 7Z1AA remarks," There will be very few 7Z1 stations active because it is not easy to obtain licenses. But 7Z3s will be quite active because of U. S. people working for AraAmCo communications. 7Z1s are on the Red Sea coast, 7Z2s operate from capital city Rhiyad, and 7Z3s are located among the oil fields near Dhahran. HZ prefixes are still used by those who had licenses before the new regulations came up." . . . . . Ex-MP4BEQ-5A3CJ assures, "I'll be very glad to reply to all QSLs sent to [the address in the listings to follow] via bureau, or direct if International Reply Coupons are enclosed." Steve should be signing a new 5Z4 call by now . . . . . "I am VU2LE's QSL manager for W/K QSOs dating after January of this year," confirms W6BCT. Stan serves VK7SM in the same capacity . . . . . W7VRO thinks he may be able to help obtain deserved JT1CA QSLs. Dick manages W/K QSL matters for HM1AB, too . . . . . K8UZA, QSL aide for HL9KT, KA2AC, KR6ER and others, gives his address as 1104 Bren Mar Dr., Alexandria, Virginia, 22312 . . . . . "Must tip my hat to the JAs," commends K3SWW/KG6. "They've QSLd me 98 per cent." . . . . . VU2NRA's Andamans QSLs began getting around in early March courtesy W4ANE.

AFRICA — ARRL Assistant Secretary W1UED translates from 5R8CB: "I have found that about half my outgoing mail before December, 1964, has been lost. Those who have not received due QSLs should make new claims and I will send second cards." 5R8CB now ships out his QSLs through the 5R8 bureau, a slower but surer route. "Hams who desire cards returned direct can write to my Box 173 address but they do so at postal risk and peril." . . . . . K2IDF affirms, "I am QSL manager for ZD8C's activity on February 4-14, 1965, and will appreciate self-addressed stamped envelopes with all cards." . . . . . K1DFC may be of assistance in confirming ZD8TM QSOs . . . . . "I put 450 QSLs in the mail before departing Malawi in March," notifies 7Q7GN. "If they have not arrived by May, I can be reached thereafter at [the address in the list to follow]." . . . . . 9G1FQ writes W8TRN, "We receive many requests for 9G1FE QSLs but he was no QSLer. The Stateside boys are out of luck." . . . . . ZS8G tells W8HRV he handles all his own QSLing from the address given here last month, or via SARL . . . . . "S.a.e. plus IRCs will help considerably in disposing of QSL applications," advises ZS6YQ regarding last month's Bechuanaland business by ZS6s BBB/p and YQ/p . . . . . WGDXC hints that Togo's 5V4AB will respond on a prepared self-addressed QSL, at least until he obtains his own stock . . . . . W9WGQ desires the usual s.a.s.e. courtesy from W/Ks who seek QSL service from 9Q5s DL and RB. Greenwich Mean Time reference is a must, of course.

EUROPE — ON4UQ closes down for return to K2BKU where he will tidy up outstanding QSL business from



HZ3TYQ/8Z4's QSL, earned by some 1300 DXers in 71 countries this January, is a DXpeditionary pictorial all by itself. Vic, W1TYQ, had excellent Stateside liaison courtesy QSL manager W1RAN. Authorizational red tape, poor transportation and inclement weather should serve to keep the Saudi Arabia/Iraq neutral zone a rare item on the ARRL DX Century Club Countries List.

the address in the roster to follow . . . . . W1SWX finds that W2CTN knows naught about "9A1PM" . . . . . "I will QSL 100 per cent," declares TF2WIO (K8EVS) . . . . . WGDXC learns that ZB2B has been inactive for years, so scratch another recent one, lads . . . . . LIDXA *D X Bulletin* note: "Only individuals and societies affiliated with DARC can receive QSLs through the German bureau."

The DARC points out, however, that this isn't strictly true. DARC and other IARU societies *will* generally accept cards for non-members, if the non-members collect the cards or pay for forwarding, as provided for in the "Summary of Miscellaneous Rules Adopted by the Union". If some of your QSLs should bounce back stamped "non-member", it means the addressee is not a society member and is unwilling to pay the forwarding expenses for cards sent to him via the society QSL bureau. QSL DX stations via bureaus only when the operators specifically request you to do so.

OCEANIA — KW6EK's new QSL charge, W7WLL, requires the usual s.a.s.e., or s.a.e. plus IRCs, for direct response . . . . . K3SWW/KG6 solved his s.w.l. verification backlog by devising mimeographed QSLs for bureau shipment. Conrad is amazed at c.w.'s popularity among Czech listeners . . . . . "The 1963 VR1D was a pirate, according to Posts & Telegraph authorities out that way, so the boys might as well save their postage." This from W9EXE of former-VR5 renown . . . . . SM6AMD QSL help may come through W1YNE . . . . . Time to check a few individual recommendations, but remember that each listing is necessarily neither "official", complete nor accurate:

AC8H, Hammarlund DXpedition, Box 7388, GPO, New York, N. Y., 10001
CEØXA (via W4DQS)
CO2KG, Box 6996, Habana, Cuba
CP1EE (via W4KHL)
CP8AZ, Box 9, River Alta, Boliva
CR6EI (via LARA)
DL5AC (via K8UZA)
DU1OR (via W2CTN)
EL2AD (via K5SGJ)
EL2AN, % U. S. Embassy, Monrovia, Liberia
FG7XX, M. Bunel, Villa Vince, Vernou, Guadeloupe
FL8RA (via REF)
GB2DX, % E. Chilvers, 1 Grove Rd., Lydney, Gloucester, England
HI3JBR, H. Roy, Box 321, Santiago, D.R.
HK6LR (via W2CTN)
HL9KT (via K8UZA)
HM1AB (W/Ks via W7VRO)
HR3JP (to K4WVX or W5NSE)
K3SWW/KG6, G. Bluhm, 126 L.E. Sunset Blvd., FPO, San Francisco, Calif., 96637
K7GPN/VO2, H. Dean, P.O. Box 232, Goose Bay, Labrador
K8s MEG/mm TJZ/mm, R. Johns, K8TJZ/mm, OC Div., USS *Vermilion* (AKA-107), FPO, New York, N. Y.
KA2AC (via K8UZA)
KA4US (via FEARL)
KC4USB (via K1TWK)
KC6BU, USCG Loran Stn., Yap, W. Carolines, 96943
KP4BFF (via KP4UH)
KR6ER (via K8UZA)
KS6BO, L. McMillen, Educational TV, Pago Pago, Am. Samoa
KW6EK (via W7WLL)

K3SWW/KG6 dispatched some 1500 QSLs to 100 countries in his first ten months of DXing from Guam. Conrad's biggest DX-end surprise is the quantity of s.w.l. cards received for c.w. activity. "I can hardly afford to reply to all of them but I haven't the heart to turn them down."

ZB2AE (G3MRE) scored a handsome 160-meter first by QSOing W1BB in February. Peter tried a balloon-supported skyhook but frisky winds forced resort to a more conventional radiator. (Photo via W1BB)

M1AC (via K8UZA)
ex-MP4BEQ-5A3CJ, S. Gibbs, Box 19012, Nairobi, Kenya, E. Afr.
OD5BX (via W8ZCQ)
ex-ON4UQ, W. Cruikshank, K2BKU, Box 95, Burnt Hills, N. Y.
PJ5s BC BD (to KØs GZN GZO)
PY7BAL/Ø (via W2CTN)
TF2WIO, W. Gildone, ETN3 (K8EVS), Box 27, FPO, New York, N. Y., 09571
TI2RCJ, P.O. Box 3657, San Jose, C.R.
VK7SM (via W6BCT)
VP1GFQ (to WØGFQ)
VP1PV (to VE3BRG)
VP2AX, E. Phillip, P.O. Box 337, St. George's, Antigua, B.W.I. (or via W8EQA)
VP2GTA (to W2CQA)
VP2VL (to WØNWX)
VP4TR (via W2CTN)
VP4VU, F. Brooker, Instrument Dept., Texaco Trinidad, Inc., Pointe-a-Pierre, Trinidad, W.I.
VS9AWR (via RSGB)
VS9OSC, RAF Salalah, BFPO 69, Muscat, Oman
VS9PCZ (via RSGB)
VU2LE (via W6BCT)
XE1IME (via XE1NE)
XW8AX, USAID, FPO, San Francisco, Calif., 96352
YN1HTM, Box 1894, Managua, Nicaragua
YS1RFE (via K7UCH)
YV1PF, Box 19, Maracaibo, Zulia, Venezuela
YV5FS/4, O. Michelena R., P.O. Box 510, Valencia, Venezuela
YV9BW, Box 18, San Fernando de Apure, Venezuela
ZD3G (via K2IDF)
ZD8HL, H. Lund, RCA, Ascension AAFB, P.O. Box 4187, Patrick AFB, Fla.
ZD8TM, T. Merritt, RCA c/o PAA, Ascension AAFB via Patrick AFB, Fla.
ex-ZS3O (to ZS8G)
ZS6s BBB/p YQ/p (to ZS6s BBB YQ)
5U7AH (via DL3BK)
5V4AB, Lome Airport, Box 123, Lome, Togo
5Z4DW, G. Perrett, Box 660, Nakuru, Kenya, E. Afr.
6O6BW, B. Walton, P.O. Box 1393, Mombasa, Kenya, E. Afr.
ex-7Q7GN, G. Nelson, 5628 N. Lafayette Av., Fresno, Calif
7Z1AA (to HB9AET)
8F2ER, Box 405, Djakarta, Indonesia
9A1AC (via K8UZA)
9G1DY, N. Price, Box 2949, Accra, Ghana
9G1FK (via REF)
9J2BD, 4 St. Clair St., Kitwe, Zambia
9J2IE (via W2CTN)
9Q5DL (via W9WGQ)
9Q5RB (via W9WGQ)

Be grateful to **Ws** 1BGD 1ECH 1HNI 1IKE 1SWX 1UED 1WPO 1YYM 7VRO 8EQA 8GM 8HRV 8TRN 8WCD 8YGR 9EXE, **Ks** 1DFC 1ZND 3CUI 3VAB 3VPN 5JVF 7QXG, **WAs** 4PSA 6VAT 8MAT 9BGK 9FZQ 0JCA, **WBs** 2AMO 2NLH 6ITM, **KA2TP**, **KH6BZF**, J. Hall, L. Stewart, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), DARC's *D X-MB* (DLs 3RK 9PF), DX Club of Puerto Rico *D Xer* (KP4RK), Florida DX Club *D X Report* (W4LVV), International Short Wave League *Monitor* (12 Gladwell Rd., London N.8, England), Japan DX Radio Club *Bulletin* (JA1DMD), Long Island DX Association *D X Bulletin* (W2FGD), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston

Spa, N. Y.), North Eastern DX Association *D X Bulletin* (K1SHN, W1BPW), Northern California DX Club *D Xer* (Box 608, Menlo Park, Calif.), Puerto Rico Amateur Radio Club *Ground Wave* (KP4DV), VERON's *D Xpress* (PA0s FX LOU VDV WWP) and West Gulf DX Club *D X Bulletin* (W5IGJ). We could use *your* shoulder on this wheel, OM.

Whence:

EUROPE — The International Telegraphic Contest, an annual affair sponsored by Russia's Central Radio Club, takes place from 2100 GMT on the 8th of this month to 2100 the 9th, 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, 1965. 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 . . . . . Might also mark your operating calendars for the upcoming WAE DX Contest run by Germany's DARC and slated for (c.w.) August 14th-15th and (phone) September 11th-12th. Then, too, there's the WADM DX Contest backed by East Germany's society and scheduled for October 2nd-3rd. We'll brief you on participation specs in subsequent *QST*s . . . . . WN2PFD relays HAOH's c.w. plea for Mont., Nev. and Utah QSOs around 21,100 kc. He's been chasing WAS since 1945 and now sports a 6146 75-watter and TA-33 sprayer . . . . . ON4UQ (K2BKU) says his Antwerp lub will be signing LX3AA or LX3AB on 7- and 14-Mc. c.w. in July . . . . . Continental comments courtesy newshawks of the clubs and groups: HB9ZT expects to radiate from Liechtenstein on the 8th-9th of this month. Watch 14,245 kc. . . . WA6ZIQ (ex-KG6SZ) expects occasional DXpeditionary assignments during his two-year European tour. . . . LA5HE says Jan Mayen LAs have fresh s.s.b. equipments en route. . . . GB2DX's multiband '65 ARRL Test entry was contributed by the East Anglia Contest Club.

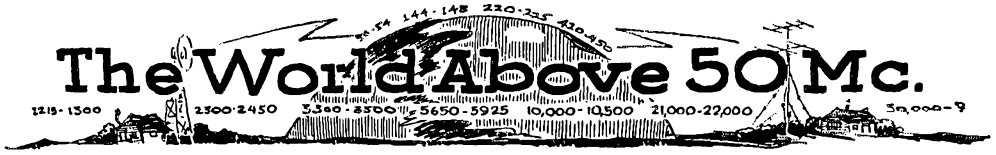
HEREABOUTS — RSB (Bermuda) invites U. S. and Canadian amateurs to frolic in its 1965 Bermuda Amateur Radio Contest, a single-operator shindig. Combine c.w. with phone on 3.5 through 28 Mc. from 0001 GMT, May 23rd, to 0200 the 24th, and June 6th-7th, same times (crossmode QSOs *are* encouraged in this one). W/K/VE/VOs give RS or RST reports to VP9s, while the latter send RS or RST plus parish names. Scoring for non-VP9s: Each Bermuda station worked per band counts 3 points, this total to be multiplied by the number of band-parishes contacted (watch for these parish abbreviations on c.w.: Dev., Geo., Nam., Pag., Pem., San., Smi., Sou., and War.). To be eligible for certificate awards of merit, plus a grand trophy guaranteed to get you a tan, GMT-only logs must be postmarked no later than July 15, 1965, and mailed to RSB Contest Committee, P.O. Box 275, Hamilton, Bermuda, together with a signed statement that all rules and regulations have been observed . . . . . "Let's not tinker with success," votes K9VQK, preferring the annual ARRL DX Contest duration as is . . . . . K6OZL/KP4 takes time out from his DXtensive Puerto Rico sojourn for a Navy shipboard assignment. Ron, listening off Africa, is struck by the preponderance of good 7-Mc. Novice signals . . . . . "I've enrolled eighteen engineers in a c.w. class sponsored by our new Society of Mexican Mechanical and Electrical Engineers," announces XE1NE. "I am responsible operator for our station, XE1IME, and we are busy installing the rig and antennae. Upon my return from a recent European trip I found more than twenty letters from my U. S. ham friends inquiring why I was not on 14,310 kc., my usual frequency." . . . . . Those DXy Wallaces, W6s AM and MA, enjoyed a world-wide whirlwind tour from February through April, eyeballing with a host of global ham friends . . . . . W2VCZ reports a lively DX round-up sponsored by North Jersey DX Assn. an March 20th whereat W9WNV displayed his outstanding color-slide DX odyssey . . . . . W2CQA performed as VP2GTA from Grenada's Spice Island Inn in March and April on 20 and 15 . . . . . WA9FZQ wonders if overseas DX men come any younger than TI2RCJ, thirteen. Vik has a TR-3 and dipole on 15 sideband . . . . . K8s MEG/mm and TJZ/mm tried 20 c.w. aboard USS *Vermilion* from Caribbean waters in March . . . . . K3VAB finally caught the DX virus and is now trying to catch up with buddy W8LKH who started in amateur radio with Dick many years ago . . . . . "Took time out from my v.h.f. activities to see what hams are doing in the world below 50 Mc.," comments K7ICW. "DX courtesy, operating skill and patience seem to be generally lacking." Al is especially annoyed by the continual exchange of unrealistic signal reports, plus "please listen for my pal on the frequency" routines . . . . . K7QXG knocked off DXing for a couple of years of concentrated criminology study. Bob reached a 90/79 countries worked/confirmed tally with no more than 75 watts of c.w. and phone. Hurry back, OM . . . . . WA6VAT stresses the view that pile-up discipline lies solely in the hands of the DX op. Failure of the "NCS" to crack down on the lid fringe can ruin promising DXpeditionary activity . . . . . K3VPN and the Erie gang have formed the Northwestern Pennsylvania DX Club . . . . . WB6FHH, temporarily DXing from Arizona, finds his QSOs much more in demand with "/7" appended to his call . . . . . HR3JP (W5NSE-K4WVX) enjoys long-hauling from La Ceiba with a DX-20, HW-32 and dipole on 40, 20 and 15. "Hope to get more HR3s on s.s.b. soon." . . . . . KP4BL, W8SH, K4FTZ and WA4WAO are new members of the DX Club of Puerto Rico . . . . . W4LVV inherits editorship of FDXC's *DX Report* after a bang-up job by W4HKJ & Co.

ASIA — W6BCT and the Orange County (Calif.) DX Century Club conclude that it's much more pleasurable to transmit than to receive. Stan writes, "DXers who have worked everything and are looking for new horizons might take an example from my club. We've launched ourselves on a mission of good will toward hams of other nations where gear is very hard to come by. VU2LE has just been sent a converter to permit use of his BC-348 receiver on 15 meters, also an audio filter. We also send *Callbooks* and technical literature to less privileged overseas DXers. This is one way to help promote the brotherly love so necessary in this world, much more effective than merely taking up collections for DXpeditions." . . . . . KA2TP reports, "KA2CM of FEARL put KA4US on the air for the first three days of March, working some 100 stations in 24 countries on 14 Mc. Maybe we can do more of this if there's enough demand for contacts with normally inactive KA districts. Anyone interested?" . . . . . "Just hit all JA call areas on 7 Mc.," remarks W7DJU, "JA4 seems to be the toughest; just don't hear many." . . . . . HB9AET observes, "Conditions were just nil when I operated 7Z1AA from Djeddah some months ago. Despite this I worked a number of W/Ks with my SR-160." . . . . . More Asiagrams via the clubs press: YA1AN has a KWM-2 and vertical on 14,280 kc. in Kabul, YA1YL uses an HT-37, HQ-170A and dipole on 14,250 kc. at Khandahar, YA3TNC employs a KWS-1, 75A-4 and 3-el. beam on 14,105 kc. from Khandahar, and YA4A has a 75S-3, 32S-1 and vertical at Kabul usually on 14,110 kc. at 1230-1500 GMT. Other Afghanistan actives include YA1s AG AW and BW, mostly c.w. . . . Lebanon licensing was liberalized in February, turning loose other OD5s to help AX and LX carry the DX load around 14,030-14,050 kc. . . . YI3II, 14,027 kc. at 1700, ducks pile-ups. . . . AP2AR also prefers a good rag-chew to a dogfight any old time, especially near 14,035 at 1300-1400. . . . 4S7RS was reported active on 20 s.s.b. from the Colombo Industrial Exhibition in March at a booth sponsored by RSC. . . . Some UA3s are said to be itching for a DX tangle with Wrangel isle this month or next. . . . The Trucial States could use DX imports after MP4s TBK and TBL shipped to Aden, and TBJ took off to England. . . . New or renewed FEARL memberships are held by KAs 2IJ (KH6-IJ), 7DM (WA6UPI trustee), 7WM (W1IIG), 8JM (K1LLU) and 9AS (WA0GSA). . . . Check with 8th U. S. Army Amateur Radio Club, c/o EUSA Sig O, APO, San Francisco, Calif., 96301, for scoop on the Kimchi Award, a diploma premised on QSOs with five HL9 stations.

AFRICA — "I'm always happy to contact U. S. stations," declares 5R8CB through W1UED. "I usually work 21 Mc. High-powered best wishes to all." . . . . . "Just finished my two-year tour with the Peace Corps in Malawi," advises 7Q7GN. "I intend to keep an interest in amateur radio from California where I'll work in public relations." . . . . . "ZD8TM will be on Ascension isle for a year or so," guarantees K1DFC K2IDF

(Continued on page 170)

DU1TA, lately a regular on 40, gives the Yank breakfast-time c.w. gang a lively target. (Photo via W7DJU)



CONDUCTED BY SAM HARRIS,* W1FZJ

Oscar III Makes Successful Journey

ON March 9 at 1839 GMT the Project Oscar Association hitched a ride for Oscar III and started one of the biggest flurries of activity the amateur radio world has ever seen. Within hours of the successful launch reports were coming in from all over the world. Ascension Island, ZD8HL (ex VP7CX) had a beacon going on the first day of the launch. VK7's in Tasmania, UP2's in Russia, KL7's in Alaska, KH6's in Hawaii and W's from Maine to California were patiently combing the band for the first signal to get through. Awaiting confirmation by Project Oscar Headquarters is the information that the first signal heard was on Orbit No. 6. W0MOX's c.w. signals were recorded by the East Coast VHF Society station, WA2WEB. On Orbit No. 9, scarcely 15 hours after launch time, the first confirmed contact was established between HB9RG and DL6-EZA and K9AAJ recorded the signals of KL7-CUH in College, Alaska. The first U.S.A. two-way contact was established on Orbit No. 13 between K9AAJ and K2IEJ. On Orbit No. 20 WA2WEB contacted K9AAJ and on the same orbit HB9RG's c.w. signals were received at W1BU. On Orbit No. 21 the first transcontinental signals were received by W4FJ. He recorded the signals of W6GDO and W6DEE. On the same orbit W6GDO recorded the c.w. signals of W1JSM. At the time Don was running 60 watts into a dipole 10 feet high. On Orbit No. 22 K1AII operating KL7CUH reported reception of K9UIF, K9AAJ, W0IC, W4WNH and K2IEJ. On Orbit No. 23 he recorded K5TQP, WA6MGZ, W7EGN, K7SDK and K7ICW. The heard and contact reports during the period following were too numerous to itemize in their entirety. The second European signal heard was during Orbit No. 33 when G3LTF was heard calling CQ by W1BU. On Orbit No. 34 W1BU logged SM7OSC and on Orbit No. 37 DL3YBA. On the European side, HB9RG established the first reported two-way s.s.b. contact on Orbit No. 19 with DJ4ZC. Hans went on to work DL9GU, SM7OSC, DJ4-AU, G3BAR, DJ3ENA, OK1CG, OZ9AC, DL3-YBA, G6AG on c.w. and DL3YBA on two-way s.s.b. On Orbit No. 74 he contacted W1BU for the second Europe to U.S.A. Oscar contact. On Orbit No. 86 he contacted DL6TU and on Orbit No. 87 another two-way s.s.b. contact with DJ4-ZC as well as a c.w. contact with OZ9AC. On Orbit No. 88 EA4AO was contacted.

DL3YBA established the first transatlantic Oscar contact with W1BU on Orbit No. 61. On Orbit No. 74 HB9RG and G3LTF were contacted by W1BU and a 50% contact with DL3YBA was completed. Meanwhile G6AG had been recorded on the eastern seaboard on several occasions.

The W6 contingent was not inactive. While the east coast was shooting for Europe, they were shooting for Hawaii. Honors for the first transcontinental two-way work go to K6HMS and K4IXC, and W6NLZ and K2GUG, both contacts apparently having been made on the same orbit. On Orbit No. 64 WA6MGZ completed a contact with KH6AQL for the first Hawaii to the continent QSO, but this has not been confirmed. On Orbit No. 65 WA6MGZ completed a contact with KL7CUH. KL7CUH had been hearing signals since Orbit No. 22 and his signals were first reported heard on Orbit No. 9 by K9AAJ. On Orbit No. 69 W6QJW completed a contact with LU3DCA. This contact far exceeded any expectations as far as distance is concerned and at this writing considerable efforts are being made across the country to explore the mechanism by which this contact was completed. On Orbit No. 36 the first contact using a dipole antenna was reported by W6GDO. Jay contacted WB6KAP using a dipole mounted on a stepladder. It is reported that the night breezes blew over his installation soon after the contact was completed. The first Australian contact reported was during Orbit No. 38 between VK7DK and VK7LZ. These two boys were using 10-db.-gain antennas and 25 watts of input to their transmitters. On Orbit No. 79 VK3ATN received signals from VK7PF but did not establish a two-way contact.

Reports from Canada have not been received, however signals from VE3DIR were received by W1YQI on Orbit No. 102.

A complete orbit by orbit rundown is being compiled by the Project Oscar Association and will appear elsewhere in this issue.

Equipment Used

Apparently the type of equipment used by various stations is a matter of some interest. Many stations such as W4WNH, K2IEJ and K2GUG put in such consistently strong signals that an investigation was made to determine what was the secret. Shelby, W4WNH is using a 16-element colinear array. K2IEJ is using a circularly-polarized array capable of following the satellite to a fair degree. K9AAJ is using a 12-db.-gain stacked skeleton slot type antenna. DL3YBA who reportedly has the most consistent

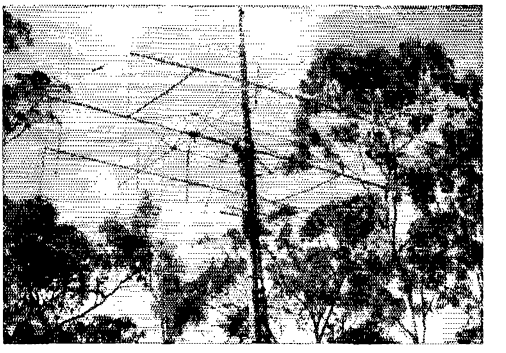
* P.O. Box 334, Medfield, Mass.

signal in Europe is using a 48-element array. HB9RG who has the most impressive list of contacts completed in using a 15-db.-gain tracking Yagi. Power outputs range from 300 to 800 watts. It didn't take more than a very few passes to make it obvious that an antenna which could only track the horizon was not of much value for making contacts in the local area. The long distance contacts made at the extreme end of the range were easily accomplished but as the Oscar III rises above the horizon, the better your beam, the poorer your signal. There is reason to believe after examing the signals coming from the relay transmitter that a circularly-polarized transmitting antenna would be of considerable help in maintaining a constant signal level through the satellite. Many, signals were received calling CQ with strengths up to S7 and S8 which never completed their call and abruptly disappeared and abruptly came back saying "K ARK" with no call received. This abrupt disappearance and reappearance of signals is only explainable by assuming that the tumbling of the satellite presents polarization aspects which do not receive your signal for the instant that you are not there. Hopefully circular polarization would greatly eliminate this type of fading. Obviously the second half of the fade path is on the receiving antenna and circular polarization should be used there also, for optimum results. The one minute and five second CQ recorded at W1BU from DL3YBA had only one fade point during the entire transmission. However, this fade point was completely down into the noise and back out again and there is some reason to believe that had we both been using circular polarization the fade might not have occurred. In general it is safe to say that it was much harder to get a signal into the satellite than had been anticipated. Our first efforts were made with 200 watts input and a 32-element colinear beam and no response was obtained on any pass despite the strength of the signals which we received. Raising our power to a somewhat more respectable value, 600 watts, resulted in immediate answers. This, of course, was the result of not being able to track the satellite. The near passes were completely out of our beam pattern and the extra power hardly made up for loss in antenna gain.

144-Mc. DX

We recently received the following letter from VK4ZEK. "I would like to know whether you could organize some moonbounce skeds for us. I've just written to W6DNG regarding two-meter moonbounce skeds but would like to know of anyone else interested. We would be available all weekend once things are going, and most nights, our time. The reason I've chosen now to write is because we've finally overcome what we considered would be our biggest stumbling block, the aerial. We finally decided on 16, 10-element yagis on 12-foot booms, horizontally polarized. This is now finished and erected at the portable location and now it's a matter of getting the gear installed in the shack. This will probably take anything from a fortnight to three weeks, but we should be on by the end of that time (approximately April 1st). Frequency will be 144.000 to about 1 cycle, transmitted. We can receive over the first 100 kc. of two meters. Transmitter will be pulsed initially to approximate 2 kw. peak, 150 watts average, to comply to local regulations, but a high power license for 1 kw. continuous c.w. is probably well on the way." This group of Australian VHFers consists of VK4ZAX, VK4ZCS, VK4ZPL and VK4ZEK. Congratulations fellows! Hope you get lots of replies to this letter and have lots of two-meter contacts via the moon.

VE8BY writes that although it may be too low power he has put a Senoca on 144.100 running about 50 watts into the antenna. "As it will be too cold to tune antennas for a while (the low was −50° last night, 2/15) I have had to build a non-directional antenna, and ended up with a ground plane. The beacon is keyed De VE8BY and is running 24 hours a day as of February 16. For receiving things are a bit better so if the aurora keeps away we are all set for Oscar III." Hope you had some Oscar contacts, Pete. All that work and weather sure makes you eligible.

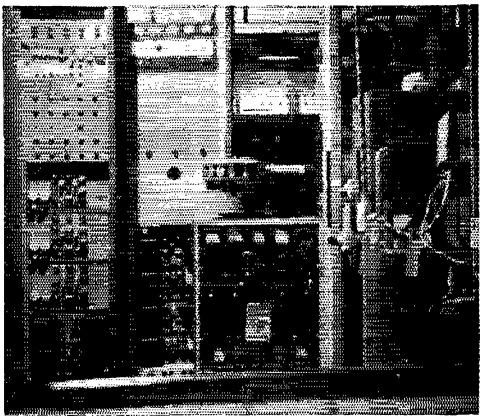


Sixteen (count 'em) 10-element Yagis on 12 foot booms to be used for 144-Mc. moonbounce work in Australia. Location is 15 miles north of Brisbane.

144 Mc. and Up

Not too many reports are received concerning the higher frequencies but Rolly, W1QKA at Nashua, New Hampshire has written to inform us of some local activity at 2415 and 2300 Mc. W1DUB is now equipped with a four foot dish and is holding one-way trial skeds with K1JIX on 2415 Mc. Rolly, W1QKA, has completed repairs and reinstallation of his 2300 Mc. dish feed and also completed modification of the thyratron (3C45) grid circuit in his 2300 Mc. modulator for improved keying. He seems to be well tied up with projects at the present time with the following projects "in the works": Modification of APG-5 cavity for 2300 Mc. pulsed oscillator, debugging crystal mixer/30 Mc. preamp for 2300 Mc., modifying SPR-2 I.F./Video/Audio unit for 2300 Mc. use; 432 Mc. parametric amplifier. The 1215 Mc.-band also seems to be getting attention. WB2-GKF sez he's looking for QSO's on 1215 Mc.; K4-FJZ tells us that K4DJU has almost finished converting his APX-6 which will be used with John's (K4FJZ) parabola. However activity along those lines has stopped temporarily what with preparations for "Oscar". A 96-element colinear for 1296 Mc. is in the works at W8PT's QTH, and WAØBRU is setting up a 2C43 tuned cavity for 1296 Mc. work. Hal sez he still needs a small compressor to force cool the cavity but it won't be long now. At Galion, Ohio, K8ZES sez his 1296-Mc. converter is in the tune up stage and transmitter for that band has been started. Sid sez: "1296 activity in the Columbus area every night with W8CSW, K8HRR and one other station holding QSO's. All equipment is crystal controlled and a.m. maximum distance is approximately 10 miles."

Stan, WB2GKF is trying to set up a Northern New Jersey round table on amateur TV. He tells us



Three racks holding TV gear at K3ADS. Left: Power; Center: Transmitter; Right: Sync. Generator and video equipment. In front is slide projector shining into slide camera.

that WA2IGF will soon be on Ham TV with 500 watts; that K2ISK has completed a TV camera; that WB2GKF is converting another transmitter for TV with 400 watts; and that K2HUD will also be checking into the TV net. W2MPT is also working along these same lines, having exhibited his new ATV cameras at the Fort Monmouth Radio Club. At Syracuse, New York WB2OSA writes that he has completed modification of his APX-6. "The receiver section is also modified for video reception. Excellent picture quality. Video modulator will be added later. Finished a transistorized TV camera for portable use. Runs from a 12-volt battery. This camera will be used with the APX-6 for 1225 Mc. or a Nuvistor transmitter for 432 Mc., both for portable use." Sounds most interesting Karl. K2AOU has finished his video modulator and is working on the power supply for his 432 Mc. final. WA2KIX is operating with two cameras at his base. WA2TQT sez he hopes to be on 432 A5 by June and is presently working on a converter and transmitter for 432 Mc. The ATV camera is also a present project. Larry Will, K3ADS sez he's back in the Philadelphia area again and back to experimenting. "The amateur TV unit is progressing. I'm feeding my 100-watt transmitter into a dummy load and applying modulation and tuning, and tuning and tuning. A lot of bugs!" Keep it up Larry, and you too will come up with a working rig.

Seems that our neighbors to the north are also active on 432 Mc. VE3BQN and VE3AIB are active every Sunday night at 8:30 P.M. and they look over the band every night at 8:30 and 10:00 P.M. C'mon fellas, look up that way once in a while! Up in Nashua W1QKA monitors conditions on 432 by the radar interference straight from the southwest. He sez that conditions have been average on Wednesday and Friday nights, but that K2GRI is heard in New Hampshire during his contacts with K1JIX. Rolly also notes that 220 Mc. activity is limited with conditions average. In New Jersey K2RDX sez that his 500-watt amplifier for 432 Mc. is finished and he's now working on a varactor frequency multiplier for that band. K2ACQ writes us that he and WA2ODR have been holding regular skeds on 432 Mc. since last December, and that two-way contacts have also been made with W2FAN, W2RUI and VE3-BQN. "More activity on 432 Mc. in this area will be welcomed by the above stations." sez Doug. At Salisbury, North Carolina, K4QIF tells us that his parametric amplifier on 432 Mc. is now in operation and working fine. Howie is still using the 250-watt rig on 432 but a kw. is in the making. He's open for skeds on 432 Mc. The grapevine, via WA4LTS, tells us that W4TLC is still going strong on 432 and 220 Mc., and that WA4STI has gear on 220 and is working on the 432 Mc. gear. From *The VHF-UHF Spectrum* we hear that K5QPV, W5YI, W5YXG, WA5KGQ and WA5GDZ are all receiving 432 Mc. signals. Only WA5KGQ and K5QPV are transmitting but the others are working on it. Good luck, fellas. Let's make that activity pick up! Our Michigan observer, W8PT, tells us that all v.h.f. and 432 (?) was open to 300 miles on March 1. Stations worked were WA9HUV, W9OKB, W9BTI, W8HCC and W8VOZ, all on 432 Mc. phone. Jack sez he has a 4X150A amplifier, 400 watts c.w. and NFM phone for 220 Mc. and is almost "ready to go". He also tells us of the auroral session of February 6 and 7 from 2300 to 0200 when stations in Iowa, Illinois, Kentucky, Ohio and Michigan were heard. At Detroit, W8WNX tells us that local activity is practically nil on 432 with K8OGZ and K8AIY being his only contacts during February. Larry monitors the band every night at 2000 EST. K8WXO sez that his 416B preamp is a whiz. Stations previously unheard in the Detroit area are now 5-9. Sid, K8ZES, tells of the good conditions on March 1 when he worked W8VOZ in Van Buren, Ohio and W8PT at Watervliet, Michigan. Ken Bell, W9OKB, writes that he has rebuilt his rig and is now running 500 watts s.s.b. and c.w. He's listening with a 416B and 32 elements (soon to be 64) and is looking for 432 Mc. skeds particularly with Ohio, Kentucky, Missouri and Minnesota. And in Minnesota KØOST has given up on 220 Mc. until summertime but is working on the 432 Mc. rig. "Exciter is nearing completion and exciter power supply just started" sez Jim. In Westwood, New Jersey, WA2JVO is looking for skeds on 220 Mc. in Pennsylvania and New England. Lyle tells us that the NNJRA 220-Mc. net is going strong and meets Sunday mornings at 1100 EST for those who'd like to call in. Frequency is 220.59. K1OYB in Portland, Maine, is about ready to go on 220 Mc. Martin will put up an 11 over 11 for this band. "600 watts finished for 220 Mc." So sez W2SEU. "Hope to change the 4X150's in the final to 4X250's soon to push it to a full kilowatt. Have hopes of moonbounce soon and will be putting up another 44 elements in addition to the 44 already up." Sounds like "projects in the making," Fred. Good luck! K2USA running 12 watts to ten elements on 220 Mc. recently made 8 contacts in one evening on that band.

S.s.b. is still growing on 144 Mc. K1OYB has finished his 144 Mc. s.s.b. mixer and 6360 final. Marty sez that two has been fairly good recently and he frequently hears W2LVQ on s.s.b. RTTY also seems to be growing in popularity on the v.h.f. bands. Jane, WA2VYN writes that two meter RTTY is regularly scheduled four nights a week in Monmouth County. From Staten Island WB2PGW is now operating 144 Mc. and would like skeds with stations in Virginia, West Virginia, Rhode Island, Vermont and New Hampshire and Maine. To date George has worked eight states and would like to "push on up". That popular Delaware station, K3OBU sez that on February 14 conditions on 144 Mc. were a little better than normal and he worked a number of 2-land stations, five of them being on s.s.b. Joe is now working on his own s.s.b. rig and hopes it won't be too long 'til he's in there with the rest of the sideband ers on 144 Mc. W3BDP, also in Delaware, has

raised his two-meter beam from 15 feet to 45 feet and hopes to have a high power driver on the air on c.w. in March. W4WNH reports no openings on 144 Mc. during February. "The usual six or eight guys from Kentucky, Ohio, Indiana, North Carolina, West Virginia and New Jersey heard about every night," sez Shelby. And in North Carolina K4QIF mentions that good tropo conditions prevailed on the night of February 15 to the north when stations in Ohio and Michigan were worked. Other than that, nothing special heard or noted in Salisbury. Word received from Paul Wilson, W4-HHK, gives the sad news that his 50 foot self supporting tower (Cover March *QST*) was felled by 60 mph winds in mid-February. No damage to the dish, six or two meter antennas. "The 144 Mc. array will be 12 years old this Spring/Summer, twelve years of continual use and never down once for repairs. Am changing the dish feed from 432 to 144 Mc. for Oscar III." Sorry to hear about the tower Paul, but glad to know the antennas are safe. Out in New Mexico K5TQP observed somewhat above average tropo conditions on skeds with WØEYE on February 11 and 18. Fred sez that copy from WØEYE continues to improve slowly with slight improvements in equipment and techniques at both ends of the circuit. "Always exchange reports, and most skeds have many minutes of R4 and even R5 readability." A complete meteor scatter contact was made with KØCER on February 26 with frequent pings and short bursts. One burst up to S3. Fred goes on to tell us that K7NII is now in operation on 144.089 using a new 600-watt homebrew final. This has improved his signal on regular tests from an average R2 to R3, up to R4 and R5. Sounds like the boys way out thar are spending a lot of time improving their 144 Mc. signals.

A most interesting letter was received from WA7-AFQ in Missoala, Montana and we think it worthy of printing in its entirety. "Have noted with much interest your accounts of two meter activity, especially the moonbounce efforts. We have a bounce affair going on here in Montana which might be of interest to your readers. Missoula, Montana and Whitefish, Montana, two mountain valley locations separated by 140 miles of road up and down and around many big peaks, are connected daily via two meters by W7EGN in Whitefish and W7CJB in Missoula. W7EGN is running 200 watts input to a 9-element yagi pointed north at Glacier Parks Towering peaks. W7CJB runs 80 watts input to a 3-element beam, also pointed north, and bounces off various mountain peaks and down into Whitefish. Very F.B. c.w. rolls back and forth nightly at 0130 GMT on 144.150 Mc. Funny though, those mountains seem to be pretuned to that frequency. Several attempts have been made to use other frequencies but usually with a much lesser degree of success. Due to the seeming frequency response of his Glacier Park peaks, W7EGN comments that he's 'in tune with old Smokey'. Don't know how this torturous path compares to the moonbounce efforts but this one out here seems to me to compare with skipping a rock the width of Lake Michigan. (Think you're more than right!) Should also mention that both ops are using homebrew converters, rigs and antennas." Thanks, Don.

Out in Las Vegas K7ICW continues his skeds on two meters with W6NLZ and m/s skeds with WØ-EYE. On the 14th of February Al had his first two-way s.s.b. contact with W6YVO and on the 21st the first two-way s.s.b. with K6JYO. K7NII at Scottsdale is trying the southern California route along with Al, and K7RKH and W7PRM are doing a lot of listening. K7RKH recently worked state #3 on 144 Mc. when he worked K6JYO on February 21.

W8IBB at East Lansing is building for two meters and sez the first step in the u.h.f. direction has been to assemble the i.f. channel for a good stable receiver. The SB300 is in operation and ready for the converter which should be in operation soon. Work on the transmitter is progressing slowly. At Ypsilanti K8PBA sez conditions on two were average during February except for the night of the 7th when they were good into central Indiana. Dean, K8RXD in Ohio has been keeping skeds nightly with K2LGJ at 0300 GMT over a 280-mile path. Frequency is 144.07 at K8RXD and 144.010 at K2LGJ. According to Jerry, K8YWF, February 11 was real good for ground wave conditions to the north. On that date he worked VE3EYX, VE3CJX in Ontario and K8YZK and WA8IPG in Flat Rock and Carleton,

220- and 420 Mc. STANDINGS

	220 Mc.				*420 Mc.*		
W1AJR	12	4	480	W1AJR	12	4	410
W1AZK	9	3	412	W1BU	11	3	390
W1BU	14	5	600	W1HDQ	10	3	250
W1HDQ	12	5	450	K1JIX	9	3	230
K1JIX	11	4	615	W1MFT	8	3	170
W1OOP	12	4	400	W1OOP	11	3	390
				W1QWJ	10	3	230
W2AOC	15	5	530	W1UHE	10	4	430
K2AXQ	9	3	240				
WA2BAH	4	2	167	W2AOD	6	4	90
K2CBA	16	7	660	W2BLV	12	5	360
K2DIG	4	3	140	K2CBA	8	4	220
W2DWJ	15	5	740	WA2DTZ	6	3	200
W2DZA	12	5	410	W2DWJ	10	4	196
K2DZM	12	5	400	W2DZA	5	3	130
K2ISA	11	4	300	K2DZM	10	4	390
K2ITP	10	5	265	WB2EGZ	9	4	260
K2UTQ	11	5	265	WA2EUS	7	3	130
K2JWT	8	3	244	K2GGA	4	4	383
K2KIB	12	4	300	WA2HQE	8	4	280
W2LRJ	10	4	250	K2KIB	4	2	100
W2LWL	12	4	400	W2NTY	3	2	100
W2NTY	12	5	300	W2OTA	10	4	300
K2PPZ	11	4	400	K2UUR	9	3	280
K2QJQ	13	5	540	W2VCG	9	4	280
K2SEU	12	5	450	W2YPM	6	3	300
K2UUR	6	3	210	WA2TOV	5	3	140
				K3CLK	9	4	
W3AHQ	4	3	180	K3EOF	6	3	250
W3FEY	11	5	350	W3FEY	8	4	296
K3IUV	9	3	310	K3IUV	8	3	310
W3JYL	8	4	295	W3LCC	3	2	
W3JZI	4	3	250	W3RUE	7	4	410
W3KKN	10	4	255	W3SZD	5	4	300
W3LCC	10	5	300	W3MMV	5	3	240
W3LZD	15	5	425	W3UJG	4	2	350
W3RUE	10	5	480				
W3UJG	13	5	400	W4HHK	9	4	550
W3ZRF	5	4	112	W4TLV	6	2	500
				W4RFR	5	2	665
K4TFU	8	4	400	W4TLV	4	2	500
W4TLC	5	1	315	K4QIF	3	1	210
W4UYB	7	5	320				
				W5RCI	14	4	725
W5AJG	3	2	1050	W5AJG	6	2	665
W5RCI	8	5	700	W5HTZ	5	3	440
				W5SWV	7	3	525
K6GTG	2	1	210	W5UKQ	3	2	500
W6MMU	2	2	225				
W6NLZ	3	2	2540	W6FZA	1	1	280
				K6GTG	1	1	180
K7ICW	3	2	250	W8TYY	9	5	580
W7AGO	2	1	160	W7LHL	2	1	180
K8AXU	11	5	1050	W8PT	11	5	400
W8LJG	9	5	475	W8VIO	9	5	450
W8LPD	6	4	480	W8IFX	8	5	470
W8NRM	8	4	390	K8AXU	5	3	660
W8PT	10	5	660	W8HCC	3	2	355
W8SVI	6	4	520	W8HRC	3	2	250
				W8JLQ	6	3	275
W9JCS	6	2	340	W8NRM	3	2	390
W9JEP	9	4	560	W8RQI	6	3	270
W9OVL	6	3	475	W8UST	3		25
W9UED	4	4	605				
W9ZIH	10	5	500	K9AAJ	9	5	425
				K9UIF	9	5	390
KØDGU	5	3	425	W9AAG	8	4	525
KØITF	6	3	515	W9GAB	9	4	608
KH6UK	1	1	2540	W9OJI	6	3	330
VE3AIB	7	3	450				
VE3BPR	3	3	300	WØIDY	7	3	430
				KØITF	3	2	158

The figures after each call refer to states, call area and mileage of best DX.

Michigan all S9. The 28th was another good one when WA4ELH in Kentucky and K9CHV in Indiana were heard 10 over 9. K8ZES contributes his information that March 1 produced an excellent opening to the northwest when many stations in western Michigan and Wisconsin were copied. WA9HQP noted good conditions on February 27. A number of Ohio stations were heard but no contacts. WAØBRU writes that activity on two-meter f.m. is constantly increasing in the Des Moines area. Frequency 146.940 Mc. KØCER is another v.h.f.er who is kept busy keeping skeds. Bill sez that his skeds with W9OII (400 miles) always produce signals but not always enough to QSO; skeds with K9AAJ (365 miles) produce contacts 90% of the time; skeds with WØENC (340 miles) show a lot of QSB but usually with fair signals. Skeds with WØEYE in Colorado (500 miles) have been producing pings, short bursts and very weak tropo background at times. On the Thursday night skeds kept with K5TQP (1000 miles) enough pings and bursts are heard for ID but no QSO as of 2/19. Bill (KØCER) is looking for skeds any night out to about 1000 miles, and for M/S skeds with anyone who'd like to work South Dakota on two. To date Bill's total states worked on 144 Mc. stands at 13 states with New Mexico (K5TQP) finally being added on February 25.

50 Mc.

Word has been received from ZD8HL (ex VP7CX) on Ascension Island that he's rarin' to go on the v.h.f. bands. Hal sez he'll have an excellent v.h.f. antenna location toward the States but very mountainous in other directions, particularly toward South Africa. He'll have an eleven element six meter beam pointed permanently toward the U.S. and probably a code wheel on c.w. "We have permission to operate six but not two. The Island Administrator needs proof that two is an allocated ham band. I have the proof but it's packed with other things still on the way to this location. There is a possibility of some 432 Mc. work and I'm trying to get permission to use it now." Hal promises to work someone on v.h.f. while he's on Ascension so we'd probably all better get ready for that unfamiliar DX with the familiar voice.

VE4RE writes that he monitors 50 Mc. most evenings between 1700 and 2300. Russ has just completed a six-meter linear running 750 watts input so he'll undoubtedly be putting in a beautiful signal when conditions improve on 50 Mc. "Tests have just been concluded with VE4GI at 50.1 Mc. over a 250-mile path (blocked by mountains at one end). Power was 700 watts, s.s.b. and c.w. Results were not too encouraging. Signals Q5 about 40% of the time. S.s.b. almost as good as c.w. Besides the usual QSB evident on long tropospheric scatter paths, there were brief (2-5 second) periods of signal reinforcement. This was noticed at both ends. Path seems a little short for meteor signal reinforcement, although it did seem like meteors. Hope to try the same path on two meters in a few months." Looks like the VE boys are really in there working, building, experimenting!

From New York City WA2TQT reports excellent ground wave on 50 Mc. during February when he worked consistently into Massachusetts, Rhode Island, Delaware, Pennsylvania, southern New Jersey, Washington, D.C., Connecticut and upper New York. On the 28th stations were worked in Florida, Alabama, Missouri and Arkansas. K3QCQ reports exceptionally good groundwave conditions at Lebanon, Pennsylvania between February 6 and 12, when stations in New England, Western Pennsylvania,

(*Continued on page 174*)

2-METER STANDINGS

W1REZ	32	8	1300	W5WAX	11	5	735
W1AZK	28	8	1205	W5VY	10	3	1200
W1JSM	26	7	1330	W5BEP	9	3	1000
W1AJR	25	7	1130	W5EDZ	8	5	1375
W1KCS	24	7	1150	W5YYO	7	4	1330
W1MEH	24	6	1000	W5UNH	6	3	1200
W1MMN	22	8	1200				
W1HDQ	22	6	1020	W6W8Q	15	5	1300
W1IZY	20	7	1080	W6NLZ	12	5	2540
W1AFO	19	6	920	W6DNG	9	5	1010
K1CRQ	19	6	800	K6HMS	8	4	1010
K1AFR	17	6	675	W6AJF	6	3	800
				W6ZL	5	3	1400
W2NLY	37	8	1390	WB6KAP	5	3	1300
W2CXY	37	8	1360	K6GTG	4	2	800
W2ORI	37	8	1320	W6MMU	3	2	950
W2BLV	36	8	1020				
K2LMG	32	8	1200	W7LHL	10	4	1170
K2GQI	35	8	1365	K7NII	8	4	1220
W2AZL	29	8	1050	W7CJM	5	2	670
K2IEJ	27	8	1060	K7ICW	4	3	1236
K2CEH	25	8	1200	W7JIP	4	2	900
W2AMJ	25	6	960	W7JU	4	2	235
W2ALR	24	8	1100				
W2RXG	23	8	1200	W8PT	40	9	1260
W7PUA/2	23	8	1150	W8KAY	39	9	1210
WA2PZF	23	7	1200	W81FX	39	8	1225
W2SMX	23	7	1090	W8SDJ	37	8	1220
W2LWI	23	7	1050	K8AXU	34	9	1275
K2HOD	23	7	950	W8SFG	34	8	1040
W2DWJ	23	6	860	W8MVE	33	9	1155
W2PAU	23	6	753	W8YIO	32	8	1270
W2ESX	21	6	750	W8LOF	32	8	1060
K2KIB	21	5	700	W8GGH	32	8	1180
W2UTH	20	7	880	W8BAX	32	8	960
W2WZR	19	7	1010	W8RMH	32	6	910
W2RGV	19	8	720	W8NOH	31	8	1090
WA2EMA	19	6	1010	W8EHW	31	8	860
WA2PZE	18	6	750	W8SVI	30	8	1080
W2RLG	17	6	980	W8LPD	28	9	850
WA2YXS	17	6	720	K1CRQ/8	28	8	690
K2OEI	16	6	1010	W8WRN	28	8	680
WB2CCO	16	6	780	W8DX	26	8	720
K2JWT	16	6	550	W8ILC	25	8	800
				W8WNM	25	8	900
W3RUE	33	8	1100	W8GFN	23	8	540
W3SGA	31	8	1070	W8LCY	22	7	680
W3GKP	31	7	1180	W8BLN	21	7	610
W3TDF	30	8	1125	W8NRM	17	7	550
W3KCA	28	8	1110				
W3BYF	28	8	1070	W9WOK	42	9	1170
W3FPH	22	8	1110	W9KLR	41	9	1160
W3LST	22	6	800	W9UIF	41	9	1150
W3LNA	21	7	720	K9AAJ	36	9	1200
W3NKM	20	7	730	W9AAG	35	9	1050
W3LZD	20	7	650	W9GAR	34	9	1175
K3OBU	19	7	930	W9OII	32	8	1090
W3MFT	19	6	600	W9REM	31	8	850
K3OBU	17	7	930	K9SGD	30	8	1100
W3HHC	16	6	550	W9ZIH	30	8	830
K3CFA	16	6	500	W9PBP	28	8	820
K3HDW	12	6	1015	W9LVC	27	8	950
				W9OJI	27	9	910
W4HJQ	39	8	1150	W9IFA	26	6	1000
W4HHK	37	9	1280	W9BPV	25	7	1030
W4WNH	35	9	1350	W9CUX	24	7	1000
WA4LTU	34	8	1160	K9AQF	24	7	900
W4ZXL	34	8	954	W9WDD	23	7	900
W4MKJ	34	8	1149	W9LF	22	7	825
K4QIF	28	8	1000	W9KPS	22	7	690
K4IXC	27	8	1255	W9ALU	18	7	800
W4MNT	27	8	1170				
W4FJ	27	8	1050				
W4LVA	26	8	1000	WØBFB	43	9	1350
W4EQM	25	8	1040	WØLFE	33	9	1040
W4RFR	24	9	820	WØIHD	31	8	1030
W4TLV	23	7	1000	WØSMJ	29	9	1075
W4JC	23	6	725	WØENC	28	7	1250
W4RMU	21	7	1080	WØQDH	27	9	1300
W4OLK	20	6	720	WØDQV	27	8	1100
K4YYJ	20	6	720	WØRUF	23	7	901
W4LNG	19	7	1080	WØMOX	23	6	1150
K4MHS	20	5	800	WØIC	22	7	1360
K4VWH	18	6	590	WA9DZH	21	7	1170
W4MDA	17	6	775	WØTGC	21	7	870
				KØITF	21	6	940
W5RCI	39	9	1280	WØINI	21	6	830
W5AJG	33	9	1360	WØJAS	19	7	1130
W5FYZ	33	9	1275	WØAZT	18	7	1100
W5JWL	29	7	1150	KØAQJ	16	6	1120
W5DFU	29	9	1300	WØIFS	16	6	1100
W5PZ	28	8	1300				
W5LPG	25	7	1000	VE1CL	8	5	800
W5UKQ	24	8	1150	VE3DIR	37	9	1300
K5TQP	22	7	1250	VE3AIB	29	8	1340
W5SWV	20	5	960	VE3BPR	24	7	950
W5ML	16	6	700	VE3BQN	23	7	1180
W5KFU	15	5	1360	VE3AQG	18	8	1300
W5UGO	13	4	635	VE3DER	17	8	1340
W5F8C	12	5	1390	VE3HW	17	7	1350
W5CVW	11	5	1180	VE6HO	1	1	915
W5NDE	11	5	620	KH6UK	2	2	2540

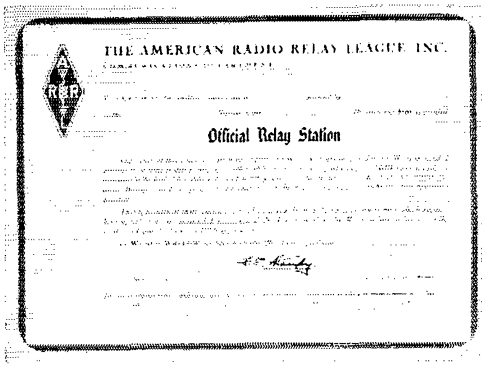
The figures after each call refer to states, call area and mileage of best DX.

Operating News

F. E. HANDY, WIBDI, Communications Mgr. GEORGE HART, WINJM, National Emergency Coordinator
ROBERT L. WHITE, WIWPO, DXCC Awards ELLEN WHITE, WIYYM, Ass't. Communications Mgr.
GERALD PINARD, Club Training Aids PETER CHAMALIAN, WIBGD, Communications Asst.
LILLIAN M. SALTER, WIZJE, Administrative Aide

No WAS or Contest Credits for QSOs by Repeater. So far we've had several questions from hams who wished to know if satellite-relayed signals could count in contests. Of course the answer had to be "No". The v.h.f. SS and other activities have it *spelled out in a rule* that contacts made by retransmitting either or both stations do *not* count for contest purposes. Nor do they count for awards like WAS and DXCC. Fine technical accomplishments; don't get us wrong, we're all for harnessing every item the future holds to the service of amateur radio and mankind! But the basic idea must remain that such awards and points are *personal achievement*. Such must be based on what one can do from *his own rig*, without boosts in the signal by either operator or equipment "relay action." When results involve satellites and man-arranged repeaters beyond ones control the accomplishment becomes meaningless. Contacts relayed by radio through an intermediate point do *not* legitimately count for our current ARRL awards or contests.

Which Appointment for You? Cordial invitation is extended to all active amateurs to become identified with the ARRL station appointment that best fits your activity and interest. See the detailed descriptions of these posts in *Operating an Amateur Radio Station*. This booklet is sent gratis to members on radiogram request. The application forms for appointments and decisions on applications also come from your own elected operating-administrative ARRL official, the Section Communications Manager. Find his address on page 6 of *QST* each month. The scope of each station and leadership post is indicated in the following:



The appointment that best fits you, as described above, is certified by your Section Communications Manager with one of these handsome newly styled certificates now becoming available as old stocks are depleted.

LEADERSHIP AND STATION APPOINTMENTS

ORS — Official Relay Station. Noted for reliable traffic service, high procedure standards. Includes a 15 w.p.m. c.w. requirement. Net operating is a helpful background that recommends you to the SCM for this recognition. But this does not mean you have to make the net *every* day. Dependability in handling the traffic you handle is the thing.

OPS — Official Phone Station. For h.f. voice operators; exemplary operating procedure expected. Appointment is identified with reliable traffic work when mainly accomplished on voice. Report activity to the SCM. As above, belonging to a voice-operated net group while not an absolute requirement, is in your favor for this SCM recognition.

OES—Official Experimental Station. The post recognizing work in the v.h.f. regions, 50 Mc. and above. May involve reports on propagation data and experimenting but also for participation in v.h.f. nets, traffic handling or individual schedules that build up or demonstrate communications service, for the public or amateur radio itself (as ORS or OPS do in h.f. frequency ranges).

These are the three basic ARRL *station* appointments made by ARRL SCMs. That OES post is the recognition and responsibility for active, outstanding v.h.f. workers and while the newest in the official family has been growing in recent years. Responsive to a survey of the holders and in deference to the expansion of v.h.f. nets into the traffic-coverage and support by OES holders, the title may be changed administratively to be called the Official VHF Station (OVS) instead of the Official Experimental Station (OES) post one of these days.

Stations consistently reporting activity at 50 Mc. or above including Technicians and Novices, are eligible for OES posts. A Novice is eligible for other appointments as soon as he gets his General Class license and is sufficiently experienced in appropriate operating activities. Technician members also can apply for OBS (v.h.f. bulletin station) or VHF-PAM posts where there are vacancies. The latter post is one in the leadership category. Plans are to expand the number of v.h.f. nets, where there are none. Also to extend *coverage* systematically to more towns and cities in areas that already have a good v.h.f. net operating. Whenever there are VHF-PAM volunteers and of course enough supporting v.h.f. netting to make it possible SCMs are ready to make these appointments in order to sponsor, expand and maintain useful section v.h.f. net facilities. If, as a member, you work v.h.f., and take pride in your communication results, your help is needed to create, maintain or extend v.h.f. nets, or for reporting propagation results. Report what you do to your SCM and ask him how you can earn an OES appointment or other posts when you meet the established qualifications.

ORS (Official Relay Station) is the designation by which the traffic post mostly identified with 3.5 and 7-Mc. c.w. traffic workers and netters is known. The OPS (Official Phone Station) post is the parallel recognition that SCMs extend to consistent phone netters who conduct their traffic and other work mainly in these same bands. ORS and OPS posts are open to Conditional, General, Advanced and Extra Class FCC and equivalent Canadian amateur licensees. Other leadership and special assignments help provide different kinds of services for amateurs (1) Phone Activities Managers to manage, promote and maintain voice nets. SCMs have openings right now for VHF-PAMs to form and extend v.h.f. nets. (2) Route Managers likewise to manage, promote and maintain c.w. nets (3) OBS

for dissemination of radio bulletins to amateurs for reliable over-the-air information ahead of any printed word. (4) SECs and ECs to sponsor emergency communications recruiting, training, organization operating exercises and planning for standby radio provisions in disasters in their areas of operation. (5) Official Observers to watch over the bands and send alerting notices to keep operators with defective signals from getting into FCC difficulty. This takes four year's licensed experience and special OO know-how to assure all those amateurs receiving their friendly advisory cards that the OO is no neophyte.

Recognition to active amateurs plays a large part in an SCMs action to appoint you OES, ORS, or OPS, if one meets the qualifications. In the service categories the SCM's approval for the post has to be based on whether a post is filled and on what in his opinion will give the best "service to the membership" rather than the accommodation or wishes of the applicant. In the three basic station posts there's recognition for every consistently active operator, furthering these objectives that give amateur radio meaning and service values to each other.

Operating Faults to Avoid. This month we propose to excerpt from this bulletin some excellent comment relative to operating faults. Full credit to K2PI and WA2ABF for the following: "Faults as noticed in c.w. QSOs are appalling. To list a few: everlasting CQ's, a sloppy fist, excessive verbiage, mistakes compounded by correction or repetition, unnecessary repetition, failure to use common abbreviations, lack of anything to say other than routine RST reports and exchange of rig data. We could go on and on. . . . There is no sure guide to tell what you may get into when you send or answer a CQ.

AFFILIATED CLUB TRAINING AIDS

With the eyes of amateurs fixed on the problems and status of our Amateur Service, looking to the next International Telecommunications Conference, your affiliated club will be most interested in information to get the full picture of what goes on. If you haven't already had one or both of our following tapes, we suggest your affiliated club plan to loan-book one or both at the first opportunity. There's T-5, THE GENEVA CONFERENCE and T-8 THE HISTORY OF AMATEUR RADIO REGULATION. These help explain the technical-administrative background quite fully; also the important role of our government and all concerned. One or both of these tapes should make a timely and interesting contribution to any club meeting and help answer a lot of questions.

Once in a while you get a rare treat from an unusual and interesting contact. If you get a stereotyped 'back to you' or 'QRU' there's always the graceful out of saying 'time for chow' or 'the XYL is calling!' Eighty c.w. seems to have the best reputation for quality of operating. In operator criticisms of each other we heard two basics in good operating. (1) Don't say 'RR' unless you get *all* my xmsn. (2) Why don't you *listen* before calling CQ." . . . A final observation, how many names appear on your FCC license. If there is more than one you have a clear cut mandate to use *we* in all your QSOs. If only your name appears, you could possibly leave yourself open to the charge of allowing unauthorized persons to operate your rig."

— *F. E. H.*

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for February Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	155	3892	3522	314	7783
K6BPI	103	2378	2231	103	4815
W1PEX	38	947	904	33	1922
WA4IJH	27	875	853	16	1771
WØLGG	24	818	759	28	1629
W8UPH	13	664	569	93	1339
W7DZX	14	595	533	9	1151
WA2UZK	122	498	437	20	1077
WA2RUE	42	509	442	41	1034
W4DFU	17	507	469	17	1010
K4MCL	16	474	447	16	953
W4URX	6	470	416	52	944
K4VFY	131	377	365	12	885
W3EML	16	463	370	6	855
W7BA	12	416	387	26	841
K2KQC	7	391	355	38	791
KØONK	34	401	333	5	773
WB2HWB	137	332	270	26	765
WA2TQT	116	320	21	299	756
W5OBD	17	368	347	0	732
K7FER	200	300	200	30	730
K6EPT	76	324	276	48	724
K9KZB	22	341	326	15	704
K2TXP	11	343	310	24	688
WA2GPT	20	329	266	51	666
K7JHA	19	333	301	1	654
K6MCA	8	346	281	8	643
WA5GHF	200	222	87	111	620
WB6BBO	38	299	267	4	608
WA9CCP	57	279	255	4	595
WØZWL	0	395	2	187	584
WA4BGW/4	15	285	278	3	581
W9MM	3	288	283	5	579
WB6JUH	29	264	227	37	557
K4YSN	258	149	149	0	556
WA4AGH	15	274	262	4	555
WA2VYS	16	274	224	40	554
KØGSY	26	271	240	0	537
WA5IMU	175	244	60	56	535
W4FX	1	225	298	4	528
W6ZJB	11	258	253	5	527
W1TXL	87	243	176	17	523
W9YHZ	3	257	254	3	517
W1BGD	15	254	179	66	514
WA4OBG	12	251	245	6	514
K3ZYP	175	123	89	123	510
W6VNQ	11	249	244	6	510
W6RSY	22	250	152	85	509
W8DAE	59	225	172	48	504
WA4BMC	171	192	118	22	503
Late Reports:					
K4VFY (Jan.)	189	377	353	24	943
W7WST/6 (Jan.)	9	253	247	6	515
K1WKK (Oct.)	14	245	237	7	503

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W4LEV	135	1774	1774	118	3801
W6IAB	709	1238	893	345	3185
W4NTR	63	246	73	181	563
K6WAH	59	203	252	10	524

BPL for 100 or more *originations-plus-deliveries*

W7NPK 341	VE3DRF 128	WB2AEK 108
WA4IMC 262	K3RZE 123	WA4OAO 106
WA8KUW 188	W2OE/6 122	K4CDZ 105
WA1AFP/4 182	WA4LMD 121	WA6DFT 105
K4ADD 158	K2UBG 120	W6JXK 104
WA9CNV 140	W2EW 115	WA8JWD 104
WA6TWS 135	WA8FIC 112	W9NZZ 103
WA4BSC 131	WA4QLZ 111	Late Reports:
WA4NEV 130	W6GYH 110	WA8FIC (Jan.) 110

More-Than-One-Operator Stations

KR6GF 356	KR6DI 177	KR6MH 126
WA4ECY 261	KR6MB 151	KR6MD 123

BPL Medallions (see Aug. 1954, p. 64) have been awarded to the following amateurs since last month's listing: K1BQB, K2TXP, WA2UWA, K3OWS, K4FLR, WA8CXY, WA9CNV, WØEMX.

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.

A.R.R.L. ACTIVITIES CALENDAR

May 7: CP Qualifying Run — W6OWP
May 15: CP Qualifying Run — W1AW
June 10: CP Qualifying Run — W6OWP
June 12–13: V.H.F. QSO Party
June 15: CP Qualifying Run — W1AW
June 26–27: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

May 8–9: International Telegraphic Contest, USSR Federation of Radio Sports (p. 103, this month).

May 15: Armed Forces Day (p. 98, this issue).

May 15–17: Georgia QSO Party, Columbus Amateur Radio Club (p. 156, this issue).

May 16–17: Special operation from 4U1ITU (p. 84, this issue).

May 22–24: Alexander Volta RTTY DX Contest (p. 15, this issue).

May 23–24, June 6–7: Bermuda Contest, RSB (p. 103, this issue).

W1AW SCHEDULES

(Effective April 25)

Operating-Visiting Hours

Monday through Friday: 7 P.M.-1 A.M. EDST.
Saturday: 7 P.M.-2:30 A.M. EDST.
Sunday: 3 P.M.-10:30 P.M. EDST.

The ARRL Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent on request. The station will be closed May 31 in observance of Memorial Day.

Operating Frequencies

C.W.: 1805 3555 7080 14,100 50.7 145.6
Voice: 1820 3945 7255 14,280 50.7 145.6

Frequencies may vary slightly from round figures given, they are to assist in finding the W1AW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in GMT:
C.W.: Mon. through Sat., 0000; Tues. through Sun. 0400.
Voice: Mon. through Sat., 0100; Tues. through Sun., 0330.

Caution: Note that in the U.S. and Canada bulletin hours usually fall on the evening of the previous day by local time.

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.
WIDE-BAND F.M. 52.525 146.94 Mc.

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 15 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 7 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 15 becomes 2130 EDST May 14.

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 0130—0220 GMT practice on those dates:

Date Subject of Practice Text March *QST*.
May 3: *It Seems to Us*, p. 9
May 6: *Oscar III Orbital Predictions . . .*, p. 11
May 11: *Single-Band Combos*, p. 32
May 19: *Hamming From Your Fallout Shelter*, p. 44
Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition
May 21: *Impedance Transformation*, p. 28
May 28: *Impedance Matching*, p. 29

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 in recognition of their extra skills and courtesies:

W2RG	WN9NGB
WA2WHE	WØCZ
W3IF	KH6AOL
W3JW	KH6ATS
K4HPR	VE6AMW
W5BV	I1FO
WN6MEX	OA5AO
W7NPK	VK3RP

W1AW NOTE

W1AW now transmits bulletins and code practice on 160, 80, 40, 20, 6 and 2, as above. Additional equipment under construction is to be installed as fast as it becomes available. Note elsewhere on this page the frequencies and times for bulletins and for the two daily sessions of tape-sent code practice so as to make full use of these services. Additional operating bands will be reinstituted as new equipment becomes available and is installed.

C. D. ARTICLE CONTEST

A new Communications Department article contest, a continuation of the very successful *QST* Article Contest during the 1964 anniversary year, needs your best ideas (in 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 1965 *Handbook* or (b) a *QST* binder, League emblem and the ARRL DX map. Our second winner, Paul E. F. Morey, K1PNB (E. Mass. Novice Net Mgr.), has chosen traffic as his subject, and the article appears below.

"AMATEUR RADIO OPERATORS"—A COMMUNITY SERVICE

By Paul E. F. Morey, K1PNB

AMATEUR Radio today is not only a hobby through which one may improve his technical ability but is also a means of providing valuable service to the community. The coast to coast radio network of the League's National Traffic System (NTS), provides a most helpful service to the public free of charge. This network may some day play a very important part in the nation's emergency communications system.

One of the best ways of serving people in your community is by joining the local Section Net of the (NTS) which already exists in your area. Secure a copy of the Net Directory from ARRL and look up the net which covers your community. Check the day, the time and operating frequency, and plan to be on this frequency listening to your Section Net. Just remember, there may be no station in the net covering your community and messages arrive in the net for your town, from time to time, so you will be providing a service to your community. There are doubtless many people in your locality who would be glad of the opportunity to send a radiogram to their son in the service, or other relative, if only they knew you existed.

There are phone and cw nets, both servicing their respective areas well, and many nets also operate s.s.b. so there is ample opportunity to operate in the mode of your choice. A real problem exists for the cw operator since most cw nets operate at about 20 w.p.m. and many cw operators do not feel up to checking into a net which operates at this speed. There are, however, low speed cw nets in some areas which operate in the novice band to enable novices to check into the net. These nets should operate at the speed of the receiving operator, sending net call at about 13 w.p.m.

If you would like to participate in this activity, or join any NTS net, secure copy of the ARRL booklet "*Operating an Amateur Radio Station*" and study Section V, particularly the QN signals, since these are used extensively in all NTS nets. Also note the ARRL message form and be sure all your messages are sent in good ARRL form. When you feel familiar with the procedure, and have listened to operation of the net long enough to have gained the "know" of their procedure, then QNI (check into the net) giving your call, and town followed by QRU (if you have no traffic to send) or QTC followed by listing the number of messages you have for each town of destination: that is, 1 Boston, 2 Waltham, 1 Thru. (Note that Thru signifies messages going out of the net or ARRL section in which the net operates). Procedure used by these NTS nets is the most efficient to be found anywhere in the world, and we can be very proud of them. These section nets are always in need of more operators, especially if there is no station which checks into the net regularly covering your community. Even if there is a station in your town which covers your QTH, contact him. Have a chat with him to determine how you may best fit into the operation with your mode of transmission. He will usually welcome assistance from a neighbor, and may give you much valuable information about the nets operations.

Even while you are working for your ticket you can gain valuable experience by practice copying these nets. Try to make perfect copy. Learn the procedure and get with it! These traffic people are fast and efficient and YOU CAN BE ALSO — IF YOU PRACTICE.

There are those who *CAN* and *DO* — as well as those who *CAN* and *DO NOT*. — This is for all those who *CAN*. Anyone with a receiver can copy the W1AW code practice sessions to gain code proficiency and also earn a certificate by submitting copy to ARRL.

If you would really like to perform a public service, then get into the traffic game. If no slow speed traffic net exists in your section, then why not start one yourself. Contact your SCM and let your thoughts be known to him concerning this effort. A slow speed cw net which operates regular sessions at an appointed time and sticks to procedure is one of the most valuable assets any SCM may have in his section. SO WHY NOT ACT NOW?

Lack of public understanding is the result of long overdue public relations. You will have to perform this function in your own section. Many people and perhaps various organizations, such as the American Red Cross and your Civil Defense Director, will be glad to know of your activity. Many CD Directors are in need of a good Radio Officer, so you may find opportunity there for service to your community. Think — make plans — but do not wait to act — operators are needed now, and you may never know results of the good you may be doing by getting into the traffic game.

Make your station as small and efficient as possible in order that you may be in a position to move operations to a portable QTH if necessary. Have some means of emergency power available and some type of portable antenna to cover the bands you plan to operate.

It is hoped this article will be of help to some aspiring traffic operator who may have "what it takes," but may not know it. You never know what you can do until you can say in truth — "I have tried my best." When you have accomplished this (not only the first try), new horizons may appear, making what you thought you were capable of doing unrealistic. QST

DX CENTURY CLUB AWARDS

Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date and time of receipt. All totals shown represent submissions received through February 28, 1965.

W1FH.....313/339	W9NDA....312/336	W4AIT.....310/333	W2UVE.....308/326	WØPGI.....306/321
W4DQH....313/337	W9YFV....312/336	W8LKH....310/330	WØNTA....308/328	W7AC.....306/330
CX2CO....313/334	W7PHO....312/330	OE1ER....310/332	W4VPD....308/325	W2HTI.....306/321
W2AGW....313/337	W4QCW....312/329	W3JNN....310/334	W7ENW....308/332	W1MV.....305/322
W3GHD....313/337	G4CP.....311/335	K2DCA....310/327	W5UX.....308/323	W9GIL.....305/322
W1GKK....313/338	G3AAM....311/335	W5KC.....310/333	W6CYY....308/326	DL6EN.....305/320
4X4DK....313/331	W8KIA....311/335	W5ABY....310/327	W3JTC....307/330	HB9MQ.....305/322
W8PQO....313/330	W8DMD....311/333	WØBBB....310/328	W5CKY....307/326	PA0FX.....305/325
G2PL.....313/336	W4LMA....311/333	W7GBW....310/334	W2WZ.....307/330	W4OM.....305/327
W9RBI....313/338	W6AM.....311/336	WØAIW....310/333	W2FXN....307/321	DJ2BW.....305/322
W2TQC....313/332	W2ZX.....311/330	WØELA....310/333	WØSYK....307/325	I1AMU.....305/324
W8BRA....313/336	W2SUC....311/328	W6GPB....310/331	K6ENX....307/324	W4MR.....305/325
W8UAS....313/334	W2BOK....311/328	W6EBG....319/334	W2TP.....307/316	W7WVE.....305/322
W8JIN....313/338	G3FKM....311/328	K2BZT....309/326	W8IRN....307/325	WØQGI.....305/321
W6CUQ....313/338	K3UPG....311/335	G8KS.....309/327	W3GAU....307/330	W1HX.....305/325
W7GUV....313/336	DJ1BZ....311/329	5Z4AQ....309/327	W4GXB....307/328	VK3KB.....305/328
W4GD.....312/333	DL3LL....311/327	W4TM.....309/331	K6EVR....307/324	W6WWQ.....305/322
W8HGW....312/337	CE3AG....311/335	W2ZGB....309/325	W9AMU....307/324	DL3RK.....305/322
W2LV.....312/331	W1CLX....311/334	W5AFX....309/334	G3FXB....307/325	K2GFQ.....304/325
W2JT.....312/331	W5MMK....311/332	WØQDF....309/326	W2FZY....307/320	W5ADZ.....304/326
W2BXA....312/336	W9LNM....311/334	W4LYV....309/329	W3RNQ....306/324	G3YF.....304/326
HB9J.....312/336	W1BIH....311/335	W2OKM....309/327	W3WGH....306/321	W2HMJ.....304/324
W2LPE....312/333	W8KML....311/332	VE7ZM....308/332	W1ZW.....306/323	K2OEA.....304/320
W8BF.....312/333	WØQVZ....311/332	LU6DJX....308/332	W4PLL....306/321	W2NUT.....304/320
W3KT.....312/336	W8JBI....311/330	W2LAX....308/325	W3ECR....306/323	W9KOK.....314/328
PY2CK....312/335	W4ML.....311/331	W2TVR....308/326	K4AIM....306/320	K4RID.....304/318
W8EWS....312/336	WØDU.....311/333	W8DAW....308/332	W8NGO....306/323	W2PCJ.....304/321
W9HUZ....312/332	KV4AA....310/334	W2AYJ....308/327	K2LWR....306/319	WA2IZS....304/321
W8MPW....312/330	W2DEC....310/326	K4LNM....308/322	W2GUM....306/328	W2SAW.....304/321
W1JYH....312/335	W1ME.....310/333	W4QPM....308/323	W8PUD....306/323	W2YTH.....304/322
W6YY.....312/332		W1HZ.....308/326		W5KBU.....304/322

Radiotelephone

CX2CO....313/334	W8GZ.....312/335	W6YY.....311/331	W3JNN.....309/330	W4OGW....305/318
W3RIS....313/338	W7PHO....312/330	W8KML....310/331	WØAIW....309/330	I1AMU.....304/323
W9RBI....312/335	W8HGW....311/333	W1FH.....310/331	W9JJF....309/326	W9NDA.....304/324
W8BF.....312/333	W4DQH....311/333	W2JT.....310/324	W2BXA....308/330	K4AIM.....303/317
4X4DK....312/330	W2ZX.....311/330	PY4TK....310/327	W6AM.....307/331	G8KS.....303/315
PY2CK....312/335	5Z4ERR....311/333	W8PQQ....309/326	TI2HP.....305/327	G2PL.....303/323

New Members

From February 1, through February 28, 1965, DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

OK2KMS...203	WA6QWN...137	W4MRT....112	OK3KFF...106	OK1KKH...102	ZS1O.....101
OK2NN....168	UA2KAK...130	EA3KT.....112	WA4DAA...105	UB5KNF...102	K7RJK.....100
DL9JF....164	DL8AM....125	F3TK.....112	SM6CMU...105	K1ZS1....101	K8EDQ.....100
OK1AVD...160	OK3CDP....119	OK2PE.....112	UA4KCC...105	WA2UXC...101	K9VYT.....100
WA4SUR...159	WB2AYU...117	UA4YG.....112	DJ2YH....104	K4SCL....101	DM3RM.....100
KP4AZ....159	YV2AH.....117	XE1OE.....109	OK1RX....104	K5LIL....101	DM3ZCG....100
OK2KJU...154	DM2ATD...116	WB6CFO...108	W7ULC....103	W8TRN....101	I1BAK.....100
YU6FA....148	W7FUL....113	SM6CAW...108	UA3DI.....103	WAØEMS...101	JA1UT.....100
OK1KAM...147	DJ6SI.....113	K8GIM.....107	DM3XSB...102	DM2AGH...101	OK1KMM...100
UA6MF....140	OK3CBN....113	OK1FN.....107	DJ9HA....102	G3RJB....101	UD6BW.....100
OK2OQ....139	OK3EM.....113	HB9ADO...106	G3PVL....102	OK2KFF...101	9L1NH.....100

Radiotelephone

G2BOZ....211	WA6QWN...137	WB2HXD...108	WA4SUR...102	K2PIU....100	EA3KT.....100
OE3CL....158	W3EPV.....126	OK3CDR...106	W9QQN....102	WØOMH/5..100	YN1LH.....100
UD6KAR...140	KØYEF.....122	K3CRV.....104	G3MTB....102	WA6GLD...100	5X5IU.....100
K9LKA....139	K4DI.....113	VE3ACD...103	W1YLB....101	K8BIT.....100	

Endorsements

G3AAE....322	W4AVY....290	W8KIT.....251	OH2FS....200	WB2HXD...160	W1WLZ....131
W2DOD....321	ZS1RM.....289	W5VA.....250	ON5ZO.....199	K9OYD....160	K4MOJ.....130
W6BZE....321	ZS1OU.....287	W8EVZ.....250	ZE3JJ.....191	OK3EE....157	W4VPM.....130
W3EVW....320	WA2OJD....282	W1IKE.....240	W1ECH....190	SM7VX....157	W6RGG.....130
W4LVV....320	W2MJ.....280	K2JFV.....240	K1LPL....190	DJ2IB....155	WA6SLU....130
W6PUY....320	K2ZKU....280	WA6GLD...235	WB2CKS...190	W4KN.....151	W7VRO.....130
W6TS.....320	K4HYL....280	WA2CBB...230	K4RZK....190	K4PVZ....151	K9CZV.....130
IT1TAL....311	W4NJF....280	W9VZP.....230	W5MUG....186	OK1AFC...151	VO2NA.....126
W4BJ.....310	K8OHG....280	K6EXO.....224	W3DYU....182	K1AQI....150	G3JFF.....124
WØBMQ....310	W5VSQ....276	PA0EAB....224	KH6COB...182	W8LZV....150	DL9FM.....122
K4JVE....305	W8CUT....275	W2ZTV.....221	DJ4HR....180	JA1EM....150	K1VSK.....120
W2SHC....303	ZL1PV.....273	K7ADL.....221	K4EZ.....175	W7OQO....149	W6IVZ.....120
KL7P1....301	W9TKD....272	W1FJJ.....220	W9QQG....175	WB2APG...144	W9NNC.....120
W2FXA....300	W1HPW....271	WØUCQ....215	K2OOS....171	W9MCJ....142	W1MND.....116
W6IBD....300	JA8AQ.....266	SP4JF.....213	UH8DA....171	W4MF.....140	W3MCH.....114
W6KG.....300	W3LPF.....263	HB9PL.....210	W4OMW....170	WB2BAL...140	VE3ACD.....111
W7AQB....300	K2YXY....260	G3JLB.....209	W9QQN....170	SVØWAA...140	UQ2CC.....111
W2WMG....292	W3AYS....260	KØEZH.....208	PY2BGL...170	JA8ADQ....139	W4HAE.....110
SM7MS....291	W2UZF....259	W3JNM....206	VE7BW....169	W8FRM....133	WA6QNN...110
W1JNV....290	W2UFT.....253	W1WAI.....201	ZE4JS.....167	K9JJS.....133	K9YBC.....110
W2ZVS....290	VK3AHQ...252	W4VMS.....200	VE3DDR...162	VE3FAW...132	

Radiotelephone

DL1IN....317	TG9AD....270	W8IJZ.....242	W8EVZ.....200	W9TKD....172	OZ7BG.....140
W1JHG....303	W4CWV....263	W3VSU.....241	DL2UZ.....200	SM5MC....172	K8AJK.....136
ZS6Q.....302	W4NJF....261	W8HBI.....240	W6USG.....193	W2MOF....170	VE3CJX.....136
G3FXB....301	W4UWC....261	OA4CV.....240	W4ASW....192	WØQUU....167	VE3EUU.....135
W6RKP....293	K8ONV....261	K4ASU.....232	W3BSC....191	W2NQR....165	K9JJS.....133
W6BAF....292	WØPGI....261	W5JJA.....229	EA4GZ....191	W3RT.....162	W9PBY.....130
W2BQM....291	K8LSG....260	EA1GH.....223	W2LEC....190	W3JNM....161	W5VBE.....122
WØBMQ....285	PA0SNG....251	IT1TAI.....222	G6TA.....187	K4CAH....151	K2IDF.....120
W8QJR....280	YV5BBU....250	K6EXO.....221	W8CUT....180	K8VDV....150	K4FTZ.....120
W6MBD....273	YV5BFT....244	DL7AA.....206	W8GUZ....180	WA5EFL...142	WA2OJD.....111
W9JYJ....272					K3HHY.....111

ATLANTIC DIVISION

DELAWARE—SCM, Roy A. Belair, W3IYE—SEC: K3NYG. PAM: W3CFA. V.H.F. PAM: K3OBU. RM: W3EEB. DEPN meets Sat. on 3905 kc. at 1800 local time. DSMN meets Tue. on 50.4 Mc. at 2100 local time. Appointments: K3OBU as V.H.F. PAM; K3NYG as SEC. Renewals: K3OBU as OES, K3KBA, Civil Defense Radio Officer for the City of Wilmington, badly needs amateurs to man RACES circuits. He may be reached at the Office of Civil Defense, Wilmington, Del. K3NYG hopes to have a first-class AREC organization going in Delaware and your participation will help him towards his goal. K3OBU is going s.s.b. on 2 and W3BDP is running 1 kw. on 2-meter c.w. WA4PKE has returned to W3-Land and was reissued his old call, W3CZK. He is going amateur TV and would like to hear from others with like interest. W3EEB spent a week in Louisville, Ky. and still had a very good traffic total. Traffic: W3EEB 175, K3YZF 78, W3JJ 26, W3HKS 6, W3IYE 6, K3NYG 4.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML, K3MVO, K3YVG. PAMs: W3SAO, W3SGI, K3CAH. The E. Pa. C.W. Net had 496 QNI with QTC of 366. The Pennsylvania Training & Traffic Net celebrated its first anniversary. PTTN had QNI of 303 and QTC of 216. W3AIZ is now an ORS. K3EZJ is the new Montgomery County EC. W3AHZ has resigned after a very fine job. K3RZE made the BPL the first time around. Lehigh County is represented in the PTTN by K3ZUN running a T-150. W3MPX is now in 3RN and thought the roof caved in when the net went into high gear. W3ELI is State MARS director; his XYL is WA3BJQ. W3EU, W3-UMK and W3AXA have been keeping the pill-peddlers busy with cases of colds and virus. W3VR had a 10-day rest with a bad leg burn. K3LSV erected a new 6-meter antenna and is Assistant EC in Delaware Co. Time! That is what W3ID says he is lacking most. New club officers: Delaware Valley ARC—W3IVS, pres.; K3SZK, vice-pres.; K3SWD, secy.; K3TRF, treas. Father and son, K8ZZR and K8ZZS, operated 20-meter mobile in our area. W3QDW, Lackawanna County EC, is now an ORS and has been checking out the Field Day gear. How about you? Its' only a few short weeks away. We welcome back W3UIU, a former ORS, to our section. New Gear Dept.: W3RV an SB-200 linear. W3NOH moved to a new shack. W3KEK erected a 10-15-20-meter quad. New Novices are WN3CTW, WN3CUK and WN3-CUN. Anyone needing Bradford County for WAPC can hear K3ABC, W3TOD, W3KXR and W3MFD on 3804 Sun. mornings. K3EAP is organizing an amateur club at Mansfield State College. Net certificates were issued to the following E. Pa. Net members: W3AXA, W3BFF, W3BUR, WA3CKA, WA3CKX, W3ELI, W3EML, K3-FRH, K3HNP, K3HTZ, K3JHF, K3JKX, K3KTH, K3-MNT, K3MQE, K3MVO, K3MHD, K3OMP, W3OY, W3PDJ, W3PWM, K3PIE, W3QDW, W3RV, K3RZE, K3SFP, K3YQJ, K3YVG, W3ZRQ. Traffic: W3CUL 7783, W3EML 855, K3MVO 394, K3MYS 233, W3QDW 173, K3FHR 158, K3RZE 147, K3YQJ 139, K3PIE 123, K3-RUA 94, K3YVG 94, W3ZRQ 73, W3VAP 68, K3WEU 67, K3HNP 59, K3KTH 59, W3OY 46, K3HKW 44, K3ZUN 41, W3MPX 40, W3ELI 38, W3RV 35, W3JKX 34, W3AXA 28, K3NOX 25, WA3CKA 22, W3AIZ 21, K3PWM 21, W3CBH 20, K3MNT 17, K3MHD 15, W3BFF 12, W3ADE 11, WA3BYH 11, K3LSV 7, W3ID 3, W3BKF 2.

MARYLAND—DISTRICT OF COLUMBIA—SCM, Bruce Boyd, W3QA—SEC: W3CVE. RMs: K3JYZ, W3-QCW, W3UE, W3ZNW. PAMs: W3JZY, K3LFD.

Nets	*kc.*	*Time*	*Days*	*Sess.*	*QTC*	*Ave*
MDD	3643	0000Z	daily	28	324	11.6
MEPN	3820	2200Z	M-W-F	22	11	0.5
MEPN	3820	1700Z	S-S			
MDDS	28100	0130Z	daily	28	61	2.
MSTN	50150	0100Z	daily		27	

The upswing in net operation is very encouraging and the increase in inter-net liaison permits better distribution and deliveries. W3ZNW advises that MDDS will use 28,200 kc. leaving 28,100 kc. clear for NCEF. The section will be sorry to learn that personal affairs made it necessary for W3RKK to suspend his much-appreciated PAM and MSTN work. K3IPX/3 will manage MSTN and is looking for new stations to increase coverage, especially in lower Eastern Shore and Southern Maryland. Welcome to K3LFD as a new PAM. W3WTW is a new OPS and EC for Montgomery County. K3ZYP heads the traffic total and made BPL for the second consecutive month, this time the hard way with 510 messages. Avi also is a new OPS and handled important emergency traffic from Venezuela. W3QCW reports MDD attendance is climbing. He has a stand-by rig on NCEF, 3550 kc. *Clubs*: From WA3AZI—The Hartford County ARC invites visitors to its meetings every 2nd Wed. at 7:30. K3ORP reports ARRL affiliation of the new Easton ARS at Easton, Md. From WA3BFX—The Perry Point ARC of Chestertown, Md., has applied for ARRL affiliation. *V.H.F.*: K3DNO and W3EAX are working on 220 Mc. K3NCM is on 2 meters with the Frederick ARC. K3GZK has his Gonset 1II on A2 to stir up some A1/A2 action on 2 meters. *General*: Guess most of us would like to listen to U.S. sigs from a DX point. W3HQE monitored the DX Contest from Rota, Spain. W3CDQ handled reservations for the very successful QCWA dinner at Olney, Md. Traffic: (Feb.) K3ZYP 510, K3UQU 225, W3PQT 192, W3PQ 103, WA3BNL 72, W3QCW 64, K3UFV 63, W3UE 58, K3GZK 56, W3ZNW 53, K3TJE 50, K3VHS 49, K3JYZ 38, K3IPX/3 36, K3LFD 32, W3EOV 26, K3QDD 20, K3LLR 19, W3LBC 13, W3CDG 7, W3WTW 6, W3ZUH 6, K3ORP 3, K3ONU 2, K3PEN 2, W3QA 2, W3VVP 2, K3NCM 1 (Jan.) K3UQU 115, K3URZ 34, K3KMO 30, W3MCG 18, K3NCM 5, K3VCG 1.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RM: WA2BLV, W2QPO, Bridgeton, K2SHE, Crosswicks, and W2MMD, Monroeville, have earned net certificates for participation in the N.J. Phone & Traffic Net. N.J Phone & Traffic Net totals for Feb. QNI 620, sessions 28, traffic 270. W2BZJ, Pennington, is on s.s.b. with a TX-1 and an SB-10. WB2PHV, Atlantic County EC, is soliciting ARRL membership in his county. W2LVW, Gloucester County EC, made over 11,000 points in the recent V.H.F. SS Contest. WA2OZQ, ex-SCARA pres., has been appointed chairman of the club's TVI committee. WA2WLN, Linwood, was recognized as one of the Amateurs of the Month. WB2GUK, Atlantic City, received a 35-w.p.m. Code Proficiency certificate. The Cherry Hill Amateur Radio Club set up a station at the school's Science Fair with WB2GPH, WB2NPY, WB2MPH and WB2EHY taking part. In the recent V.H.F. SS Contest SJRA members WA2EMB, WA2-KOK, WB2BNE and W2OSD each scored over 10,000 points. W2PAU, formerly of Westmont, is presently located at Buena Park, Calif. The SJRA is making plans for this year's Hamfest. It probably will be held at Molia Farms after Labor Day. More information later. The Burlington County Radio Club enjoyed viewing color slides taken by W2UA, Moorestown, on a recent European trip. W2ZVW, is the club's president. Check the expiration date of your appointments and keep them up to date to avoid cancellation. Traffic: WA2VAT 142, W2RG 137, WA2KIP 135, WB2GUK 123, W2VXW 52, W2MMD 32, K2RXB 30, W2ZI 24, W2BZJ 11, W2BEI 4, W2GIW 4, WA2KAP 4, W2IU 2.

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 3903 kc. (s.s.b.) at 0900 Sun. and 3510.5 kc. at 1930 Wed., TCPN 2nd call area on 3970 kc. at 0045 and 2345 GMT, NYSCN on 3510 kc. Sun. at 1000 and 3670 kc. at 1700 Sat. Congratulations to BPLer K2KQC. Appointments: WB2-

• 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.

JQS as ORS, WB2NZA as OPS. Endorsements: K2RYH as ORS, W2WUX (Utica ARC) and W2VJB as OBSs. The Rochester ARA will hold the Western New York Hamfest on May 22 at Vinces 50 Acres, Rte 15, West Henrietta Rd. New York State RACES has announced a 'backbone' network on 6 and 2 meters, n.b.f.m. voice and RTTY, with each county reporting to its respective area district office and unmanned repeaters at such places as White Face Mt. The system is to be operational by Aug. and estimated cost is approximately $600,000. Each c.d. jurisdiction will be expected to purchase compatible equipment. This will give N.Y. State a 24-hour full duplex v.h.f. net for RACES use. FCC has approved the Syracuse 6-meter amateur and RACES repeater system (n.b.f.m.) Erie and Wyoming County have their applications in for 2-meter wideband f.m. repeater (already in operation). Allegheny and Cattaraugus County have 2-meter f.m. nets for RACES also. I am using this space to emphasize a fast-growing trend to dependable network communications using fixed frequency crystal-controlled f.m. gear with multi-channel capability. One hundred or more stations are now active in the Niagara frontier area alone. VE3ESE, W2EUP, K2ECQ, W2RUI, W2ISO, K2HUK and many others representing various groups have voluntarily worked out a frequency sharing and allocation plan. Except for one minor instance the state network will not interfere. All amateur 2-meter f.m. centers around 146.94 Mc., the international calling frequency, and channels are spaced at 60 kc. intervals to 146 and above 147 for Canadians who have no Tech. band. More than half of the stations so far are mobile. Mobiles have priority and can use the repeater freely. Base stations are expected to move to a working channel after contact is established with another base to leave the channel clear for mobiles and calling. The system works fine and is a tribute to all the individuals and groups who have solved their differences in a gentlemanly and democratic way. Traffic: K2KQC 791, W2GVH 201, W2RUF 165, WB2GAL 155, W2HYM 139, WB2HLV 115, WA2TVI 84, WB2IJF 75, K2AYQ 73, W2FEB 66, K2KTK 56, K2JBX 49, W2RQF 45, K2OFV 42, K2QDT 42, K2MQN 40, W2MTA 37, W2FCG 35, K2RYH 33, WA2IHP 32, K2IMI 31, K2MIP 31, WB2FPG 27, WB2ERK 19, K2BWK 14, WB2NZA 13, WA2ANE 12, K2DNN 11, WB2FHR 8, W2PVI 5, WA2GLA 4, WB2MLK/2 3.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—Asst. SCM: Robert E. Gawryla, W3NEM. SEC: K3OTS. PAM: W3TOC. PAM V.H.F.: K3VPI. RMs: W3KUN, W3MFB, W3UHN, K3OOU. Traffic nets: WPA, 3585 kc. 0000 GMT each evening; KSSN, 3585 kc. 2330 GMT Mon. through Fri. This column regrets to record the passing of W3PUX. The Two Rivers ARC of McKeesport plans a hamfest for July. W3NWB attained DXCC and CP certificate for 30 w.p.m. K3FDN made General. Via the Etna Radio Club *Oscillator* comes news that W3GSI has a new 32S-1, W3VPK a new 75S-1, W3PDP and W3KKX new SB-400s. Election news: Nittany ARC—K3OOU, pres.; K3CBF, vice-pres.; K3PIF, secy.; K3LVA, treas.; K3AHY, act. mgr.; W3NEM, Farmhouse C. Mgr.; K3ONK, Mtn. Top C. Mgr.; K3EEX, pub. mgr.; K3-CBF, K3LVA, W3NEM, K3ONK, K3EXE, K3PIF, K3OOU, K3AHY, W3SAY, board of directors. Coke Center ARC—K3BTF, pres.; W3TTV, vice-pres.; K3-NOU, treas.; K3PLW, secy. K3RTG has moved to Delaware. WN3BLD needs 11 more states to complete WAS. We welcome new licensees WN3CLK, WN3CEN, WN3CIR and WA3CRS, who is the father of WA3ABS. WA3CHZ is the new call of Berhend Center University. K3QCS sends code practice nightly on 50.550 Mc. using A-2 from 2200 to 2230 EST. The South Hills BP&M ARC elected W3LDB, pres.; K3MDY, vice-pres.; W3-WFR, secy.; K3AJQ, treas.; W3HND, W3LYC, W3-QNI, board of directors. Details are being worked out for this summer's South Park Hamfest. The McKean County *Hamletter* advises that WA3CBD has a new Drake receiver, K3SID graduated from Tech. to General. W3OCR is the newly-appointed EC for the county. Its 6-meter nets meets at 2300 GMT each Wed. on 50.4 Mc., and the 2-meter net follows on 145.23 Mc., K3QBR is NCS and K2SPD alternate. From the Somerset County ARC comes news that new Novices are WN3CMO and WN3CLH, who is the OM of K3PQK and Dad of K3PQL. On s.s.b. K3BGI has a new SR-150. W3WDZ uses a new HT-37 and K3UMB a new SB-10. The Foothills Radio Club bulletin shows new hams, KN3CRB and WA3BFS. K3HSP is now WØFJX. WA3AKX is attending West Virginia U. Keep your station log complete, you never know when the FCC inspector will pay you a visit, and watch the expiration date on your license. Traffic: (Feb.) W3NEM 431, K3-PYS 153, W3KUN 148, W3MFB 124, K3TEZ 111, K3-ZMH 53, W3LOS 49, W3JHG 32, W3GJY 31, K3SOH 28, W3SMV 17, W3IYI 16, W3YA 16, K3SMB 12, W3UHN 11, W3OEO 10, W3LOD 8, W3TOC 8, W3RUL 3, K3TCT 2. (Jan.) W3SMV 48.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: George Nesbed, W9LQF. SEC: W9RYU. RM: WA4DXA. PAMs: W9VWJ, WA9CCP, WA9KLB. Cook County EC: W9HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CDST. K9EWV, K9TOL, WA9AFO and K9HEA are the new officers of the Teletype Employees Amateur Radio Society. W9ZAB's new QTH is Butler, Pa., with the call W3BIH. WA9FEI is NCS for the new 2-meter c.d. net in Joliet which meets Tue. at 2100 CST on 145.260 Mc. K9EWB now is WØ-HAW/6 and is participating in the Mariner IV launch at Cape Kennedy. The new officers of the Lane Tech. High School Radio Club are WA9EBT, K9DEG, WA9-EMN and WA9HQJ. The Ninth Regional Net had a traffic count of 498 messages during February. K9KZB and K9AXS are net manager and secretary of the North American 20-Meter Net, not the 2-meter net as reported in the March issue of *QST*. W9YYF's XYL is now WN9NVH. The St. Clair County Amateur Radio Club's new officers are WA9GKC and WA9JBW. The winter snows destroyed W9LNQ's antennas and he hopes to be back on soon. W9NWK reports that the Interstate Single Sideband Net's traffic was 1089. WA9BYF has installed a 60-ft. tower with an eleven-element 6-meter beam and an eight-element 2-meter beam to bring in the DX. WA9KGV and K9KLA have moved from Chicago to Santa Barbara, Calif. WA9AJF was nominated as Operator of the Month in March *QST*. The Illinois V.H.F. Post Office Traffic Net is now on twice each week, Mon. and Thurs. at 8:00 P.M., with a frequency of 50.9 Mc. WA9NKT is on 432 Mc. with 400 watts. This column's sympathy is extended to the families and friends of W9CSW, WA9HIY, K9IYP, WA9EYT and W9TT, who recently passed away. W9CSW, "Father Bill" Roell, was the originator of the North Central Phone Net and active NCS for many years. WN9NSG is a new call in the Dekalb area. WA9LCE has moved from Streator to Rochelle. The Joliet Amateur Radio Society is celebrating its 25th anniversary. K9REL is the new Radio Officer of the Villa Park Civil Defense. New appointments for the month include WA9CCP as PAM and WA9KLB as V.H.F. PAM. Also appointed were WA9EBT and K9DQU as OBSs and K9IFE and W9VBV as OOs. The North Central Phone Net handled 905 messages and the ILN count was 102. K9KZB, WA9CCP, W9YHZ and WA9CNV are recipients of the BPL award for Feb. Traffic: (Feb.) K9KZB 704, WA9-CCP 595, W9YHZ 517, WA9CNV 330, W9AXR 151, WA9IXA 138, WA9EBT 72, K9BQQ 68, K9BTE 40, W9NXG 31, W9DOQ 30, K9HSK 30, W9MAK 22, K9-CYZ 21, K9MDN 16, WA9AJF 11, WA9KKA 11, W9IDY 10, W9LNQ 10, W9PRN 10, W9SKR 8, WA9FIH 6, K9-EIV/9 2, W9HPG 2, WA9NFS 2. (Jan.) W9GFF 45, W9-DOQ 26, W9YYG 4.

INDIANA—SCM, Ernest L. Nichols, W9YYX—Asst. SCM: Donald Holt, W9FWH. SEC: K9WET. New appointments: WA9BWY as RM, K9MAN as Class I OO.

Net	*Freq.*	*Time*	*Feb*	*Tfc.*	*Mgr.*
IFN	3910	1330Z daily, 2300 M-F	315	K9IVG	PAM
ISN	3910	0000Z daily, 2130 M-Sat.	556	K9CRS	PAM
QIN	3656	0000Z daily	107	WA9BWY	RM
RFN	3656	1200Z Sun.	22		

K9GLL, PAM of the Hoosier V.H.F. Net, reports Feb. traffic of 45. W9QLW, RM of 9RN, reports 100 per cent representation by Indiana for Feb. BPL winners: W9MM and W9NZZ. QIN honor roll: WA9AVT, K9-VHY, K9KTL, WA9FDQ, WA9BWY, K9HYV, W9QLW and W9ZYK. K9EFY reports IPON traffic of 58 for Feb. WA9AVT put up an eight-element 2-meter beam. WA9NYW is the call of the new Jay ARS station. K9-KTL now has RTTY on 10-80 meters. The Central Indiana V.H.F. Propagation and Contest Net meets Tue. at 2100 EST on 50.85 Mc. WA9BWY has a new R-4 receiver. WA9BGI is installing a Galaxy III. W9FJR has been keeping RFN going as net control. Five mobiles were put on 52.525-Mc. f.m. in the Brazil area. Have you checked your license for expiration lately? Renew your RACES license at the same time. Amateur radio exists because of the service it renders. Traffic: (Feb.) W9MM 579, K9IVG 267, WA9BWY 258, W9QLW 238, W9NZZ 173, WA9AVT 164, WA9FDQ 143, W9ZYK 82, K9CRS 68, K9HYV 67, W9BUQ 62, W9YYX 60, WA9IZR 49, WA9AUM 48, K9VHY 48, K9EFY 46, W9-CLY 32, K9KTL 30, W9SNQ 25, W9RTH 24, W9YB 24, W9DZC 20, WA9BGI 19, W9FWH 19, W9DOK 14, K9-ILK 14, W9FJR 13, K9UEO 13, W9URQ 13, WA9BRD 12, W9FZW 10, K9YFT 10, K9AJC 9, W9FJI 9, K9QVT 9, K9UXX 9, K9SNQ 8, K9WET 8, W9ZZR 8, K9UHQ

7, W9CC 6, K9FPA 6, WA4RQR/9 5, K9BSL 5, K9FHQ 5, K9IIV 5, W9TKK 5, WA9AXF 4, K9DHJ 4, W9HWR 4, WA9GKF 3, W9IGW 2, W9BDP 1, W9JSV 1. (Jan.) K9HYV 58, WA9IZR 31, K9SNQ 12, W9DOK 8, WA9-IQO 8, K9YFT 4.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: K9ZPP. PAMs: K9HJS, K9IMR, W9NRP. V.H.F. PAM: WA9EZT. RM: W9IQW. New appointments: W9ZPV as EC for Waukesha County, W9CFS as EC for Portage County, W9DKU as ORS. Renewed appointments: W9NRP as EC; W9GFL, W9KCR and W9VSO as OOs; K9IMR as OPS and K9KJT as OBS. Net reports:

Net	*Time*	*Days*	*Sess.*	*Ck-ins*	*Offered*	*Cleared*	*Time*
BEN M	1300Z	M-Sat.	23	144	35	28	9:18
BEN N	1800Z	daily	28	479	170	156	13.48
WSBN	2315Z	daily	28	1142	276	244	19:00
WIN	0045Z	daily	28	308	94	77	11:55

BEN and WSBN nets meet on 3985 kc., WIN on 3535 kc., SWRN on 50.4 Mc. Mon. through Sat. at 0300Z. Wisconsin has 397 AREC members listed with ECs. Are you? Coming events: Hamfest sponsored by Ozaukee ARC at Belgium, Wis. May 15; WNA Picnic at Neenah July 11. Newly-elected officers of the Point ARC are: K9WVM, pres.; K9MAR, vice-pres.; W9BCC, secy.-treas W9KQB took over WIN in March while W9IQW was absent. Officers of the Washburn Co. ARC are W9QEX, pres.; K9REC, vice-pres. W9VSO led the OOs with 9 notices in Feb. W9YT received the UN award. W9QQQ has a new emergency generator. Traffic: (Feb.) W9CXY 287, W9DYG 257, K9HJS 223, W9AOW 208, K9IMR 135, W9IQW 94, WA9CJU 90, W9YT 67, K9AIF/9 61, W9-NRP 53, W9CBE 41. W9HWQ 32, W9KQB 30, K9KPS 28, W9GOC 18, W9IRZ 16, K9GSC 15, W9QQQ 9, W9-EFX 8, W9ONI 8, K9QKU 8, K9ZMD 8, W9OTL 7, WA9EDZ 2, K9ZPP 2, WA1BWF/9 1. (Jan.) WA9AKE 19, K9DGY 17, W9FNT 3.

DAKOTA DIVISION

MINNESOTA—SCM, Mrs. Helen Mejdrich, WØQPX—Asst. SCM: Herman Kopischke, Jr., WØTCK. SEC: WAØBZG. RMs: WAØEPX, KØJFJ. PAMs: KØFLT, KØVPJ. MSSB PAM: WØHEN. V.H.F. PAM: WAØ-CQG. MSPN meets M-S on 3820 kc. at 1800Z and 2300Z; MSSB M-F on 3805 kc at 1730Z; 3812 at 0045Z; MSN (c.w.) M-S on 3595 kc. at 0030Z; MJN (slow-speed c.w.) 3595 kc. at 0300Z; Six-Meter Net S-F on 50.25 Mc. at 0430Z., Sat. 0200Z; North Star YL Net on 3820 kc. at 1500Z each Tue. Appointments issued: KØVMW as EC. KØOST as OES. New officers of the Hi-banders Radio Club (Minneapolis) are KØAPO, pres.; WAØ-FDH, vice-pres.-treas.; WAØFOV, secy. The Mankato ARC members monitor 52.525 Mc. (f.m.). Mobiles in the area call in. WAØIZP will be on the air shortly in St. Paul to repeat 6- and 2-meter f.m. signals. EC WAØFUR reports increased interest in the AREC in St. Paul. ECs WAØEDN and WAØCQA held midwinter AREC drills in their respective areas with a number of stations participating. KØIKU and his XYL returned from a trip to California. The Waseca Co. AREC group supplied communications for the annual Waseca Sleigh and Cutter Parade. It proved to be good experience and also presented amateur facilities to the public. We want to thank Helen, WØQPX, for her devoted service as SCM these past two years and wish her and her family well at their new location in California. Traffic: (Feb.) WAØIIJ 104, WAØEPX 76, WØ-HEN 69, KØZZR 58, KØSRK 53, KØVPJ 49, WAØ-DOT 41, KØFLT 40, KØZRD 40, WØTCK 39, WAØ-EDN 35, KØZRC 32, WAØDKP 29, WAØIEF 29, WØ-ATO 26, WAØJKT 26, KØQBI 26, WØMXC 24, WAØ-HMW 22, WØUMX 22, WAØAAM 18, WØGRW 18, WØRA 18, WAØBZG 16, WAØFUR 16, WAØCQA 15, WAØIAW 15, WAØJDG 14, KØIGZ 13, WAØJPR 12, WAØGVW 11, WØKJZ 11, KØLWK 10, WAØFCJ 9, KØEGE 8, KØICG 8, KØJFJ 8, WAØEZQ 5, WØFKC 5, WAØDYC 3, WAØACI 2, KØIKU 2, WØSZJ 1. (Jan.) WAØJPR 7.

SOUTH DAKOTA—SCM, J. W. Sikorski, WØRRN—Asst. SCM: Jene H. Melton, WAØDEM. SEC: WØ-SCT. RM: KØGSY. A new call in Sioux Falls: WAØ-LFM. WØDJO is organizing a 10-meter emergency net in Spink County. Thanks to those who assisted in eliminating House Bill 600 from state legislature. Traffic: WØZWL 584, KØGSY 537, WAØAOY 104, WØSCT 89, KØVYY 46, KØYNR 28, WAØBWJ 24, WØDVB 24, WØHOJ 24, WØDJO 22, KØYGZ 20, KICAU/Ø 14, KØTXW 5, WØIGG 4, KØZBJ 5, WAØFJG 2, KØFKJ 2, KØHQD 2, KØKOY 2, WAØFPR 1, KØJCE 1.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: W5NPM. RM: K5TYW. PAM: WA5GPO. NMs: K5IPS, W5NCT, WA5IEQ. W5OBD qualified for BPL again. WA5CBL has DXCC 231/209. New ORSs are WA5IIS, Brinkley; WA5BDU, Subiaco, and W5NND, Snowball, Arkansas AREC membership is up to 228. Are you a member? Why not? The RACES program is getting new life in Arkansas. Do you assist your civil defense director? He needs your help. KØTPM will have a station active at the JBU Engineer's Fair. WA5-IIS is giving his new TR-3 a good workout on OZK and RN. W5WEE has WAC and Boone County amateurs have formed a sheriff's patrol. ARCUA finally made *The Traveler!* The Arkansas Phone Net meets on 3885 kc. Mon.-Sat. at 6 A.M. Net reports for Feb.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Ave. T/c.*
OZK	3790	0100Z	Daily	28	82	259	2.6
RN	3815	0000Z	Daily	28	102	458	3.6

Because of lack of support, QAN is being discontinued, and will meet only when traffic loads justify. Why not join one of our traffic nets today? You can have a lot of fun and better still you can perform a public service. We are sorry to report that K7RWI has moved back to Arizona. Traffic: W5OBD 732, WA5HNN 325, W5DTR 109, W5NCT 74, K5TYW 55, W5NND 37, W5-YM 16, WA5GPO 12, WA5CSJ 10, WA5CBL 5, KØTPM/5 5, WA5IIS 3, K5NCN 2, K5AKS 1.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: W5CEZ. PAM: W5TAV. V.H.F. PAMs: WA5KHE, W5UQR. We now have two PAMs. Please send them your monthly reports. WA5KHE covers North Central Louisiana and W5UQR covers Southeast Louisiana. WA5ITW, new OBS, transmits Official Bulletins nightly on 3615 at 0030Z. Don't forget the Baton Rouge Hamfest May 2. The BRR Club has put out a very nice brochure covering its entire 1965 activities, standing committees, etc. A postal to WA5DRP will get your club a copy. New officers of the BRRC are WA5DRP, pres.; W5LHZ, vice-pres.; W5WXQ, rec. secy.; W5DPM, fin. secy. Yours truly would like to humbly thank all of you for the get-well cards. WA5-KHE reports the Natchitoches RC has started a training program for beginners and is encouraging the CB gang to turn amateur. WA5LTF, a new OBS, sends Bulletins on the Novice frequencies. W5JFB has completed his own design of a 50-Mc. s.s.b. heterodyne exciter. W5CQR has built a two Skew-Planar Wheel for Oscar monitoring. George is on 6 meters at 0800-0900 Sat. and Sun. mornings. K5WOD reports the Spring Hill gang is active on 28.8 Mc. K5PGS says his ham activities are nil because of school work. WA5DRP is active on 2 meters Mon. and is the Baton Rouge anchor man for the Eye-Bank Net. W5FMO says the Jefferson RC is planning outside activity as soon as the weather permits. Tom has been busy running his 4-400 grounded grid and participates in ARRL FMTs. WA5DES transmitted 21 Official and Special Bulletins on 40 meters in February. WA5HRD, WA5FNB, K5OKR, WA5BLO, W5MXQ, W5EA and WA5ITW are active in LAN, which boasts of 29 participants during February. W5GHP, Louisiana's outstanding traffic-handler, is now NCS for RN5 Tue. and Alt. NCS Sat. WA5EID received his 20-w.p.m. sticker. W5CEZ has trouble working across town with his 2-meter rig. WA5ITW had a ball in his first CD Party. W5TAV is hard at work with plans for the Louisiana Phone Net that is being organized. WA5JOL is busy handling traffic. W5TAV reports there will be no hamfest in Jonesville this year. W5KC still is busy plugging DX and leads the state in the Honor Roll and is second high in W5-Land. W5BV helps W5-SWS keep 3900 hot each morning. W5BUK, SEC, has contacted each EC in the state. Traffic: W5CEZ 217, W5GHP 113, WA5FNB 112, WA5BLO 106, WA5DES 21, WA5HRD 19, W5EA 18, K5OKR 18, WA5ITW 17, W5-MXQ 16, W5PM 11, W5TAV 9, WA5EID 8.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC/RM: W5JDF. Certainly enjoyed presenting the charter to the Columbia Amateur Radio Club at the banquet recently. WA5EHZ drove me down and we worked K5TJG. WA5ETL and many others mobile. Officers of the club: K5UAK, pres.; K5IQO, vice-pres.; WN5KMF, act. mgr.; K5TAH, secy.-treas. K5TJG is a new OO. W5JDF reports he is sending out net certificates for "Miss." Glad to have K5YTA back on c.w. WA5GHF made the BPL. WA5INZ is doing a fine job from Ocean Springs. W5MUG, as new president of the Jackson ARC, is planning a big hamfest this summer and the club is conducting code classes twice a week. WA5FII has a new Marauder with a fine signal. Glad

(*Continued on page 126*)

WE'VE JUST RECEIVED word that our NCL-2000 amplifier was chosen for inclusion in *INDUSTRIAL DESIGN* Magazine's Annual Design Review. We think this is a rather significant achievement, since only eight electronics manufacturers (including IBM, Hughes, and Minneapolis-Honeywell) were selected for this honor.

WHAT WE particularly appreciate is the fact that *INDUSTRIAL DESIGN's* selection was governed primarily by appearance, construction, and "human engineering" factors rather than by actual performance — and *performance* has already been separately recognized by the fact that the National NCL-2000 is the most popular and highly-regarded amplifier on the market today. We've spent a great deal of time and effort to package the National line as attractively and efficiently as possible . . . an area generally given little emphasis, or even ignored, in the amateur industry. It's nice to know that the NCL-2000 successfully competes in the areas of appearance and human engineering with sophisticated equipment costing ten times its price of $685.

APPEARANCE ASIDE, what makes the NCL-2000 packaging so good that it fits with such high-priced company? It is a conservatively rated 2000 watt amplifier which is totally self-contained with power supply in a compact desktop cabinet. Meters, power switches, and tuning controls are located in three well-defined separate groups to eliminate confusion. Safety features for protection of the equipment (and the operator) are unusually complete — primary line fuses, a time delay relay and a 1000 ma. overload relay for the equipment, and both a fool-proof electrical lid interlock and a spring-actuated mechanical shorting bar for the operator. Front-panel construction and finish (like the NCX-3, NCX-5 and HRO-500) is quite unusual — the front panel is a solid aluminum extrusion for light weight and extreme rigidity — one-eighth inch minimum thickness. Instead of paint, the panel is hydro-etched and then anodized for maximum protection against wear and scratches. Even the knobs are National's *Prestige* type — Mil-spec with aluminum inserts.

BUT AS MENTIONED earlier, *performance* is the reason for the success of the NCL-2000 — output as high as 1400 watts on all bands . . . ability to be tested (into a dummy load) at *2000* watts D.C. input . . . 800 watts of plate dissipation capability . . . ability to be driven with any exciter delivering 20 to 200 watts output . . . low distortion . . . all relays built in for use with transceivers or transmitter-receiver combinations. . . . In short, more amplifier in terms of power, features, and performance than it is possible to buy at any price — and in a self-contained box the size of the HRO-500 solid state receiver.

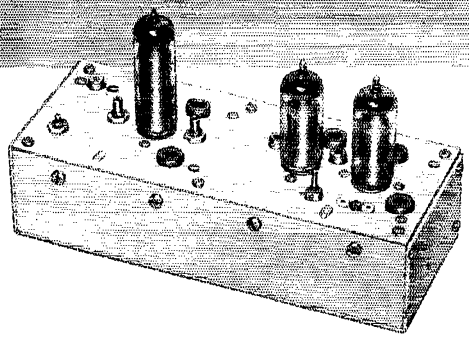
OUR THANKS to *INDUSTRIAL DESIGN* for selecting the NCL-2000 as one of 1964's best-designed products, and our thanks to our amateur customers for *their* selection of the NCL-2000 as the highest-performance amplifier on the amateur market.

MIKE FERBER, W1GKX

National Radio Company, Inc.

NEW FROM

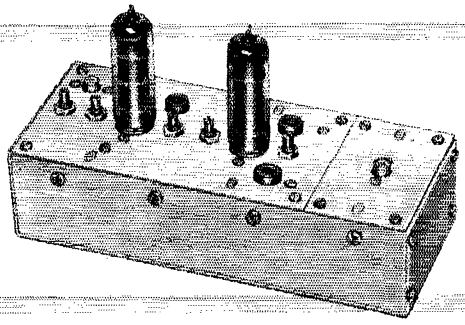
VHF/UHF UNITIZED TRANSMITTERS
50 mc — 420 mc



AOD - 57
DRIVER/TRANSMITTER FOR 50 OR 70 mc

The AOD-57 completely wired with one 6360 tube, two 12BY7 tubes and crystal (specify frequency). Heater power: 6.3 volts @ 1.2 amps. Plate power: 250 vdc @ 50 ma.

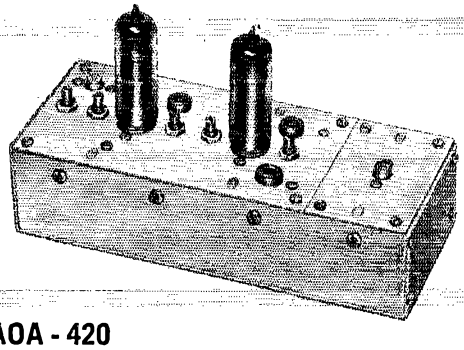
AOD-57 complete **$69.50**



AOA - 144
MULTIPLIER / AMPLIFIER FOR 144 mc

The AOA-144 uses two 6360 tubes providing 6 to 10 watts output. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate power: 250 vdc @ 180 ma.

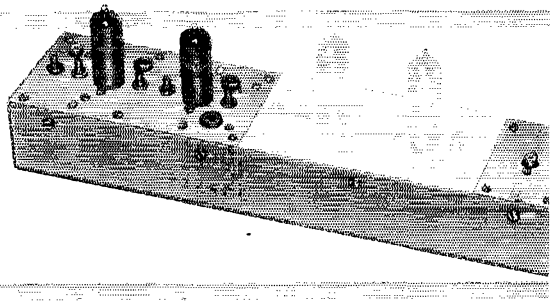
AOA-144 complete **$39.50**



AOA - 220
MULTIPLIER / AMPLIFIER FOR 220 mc

The AOA multiplier / amplifier uses two 6360 tubes providing 6 to 8 watts output on 220 mc. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate: 250 vdc @ 150 ma.

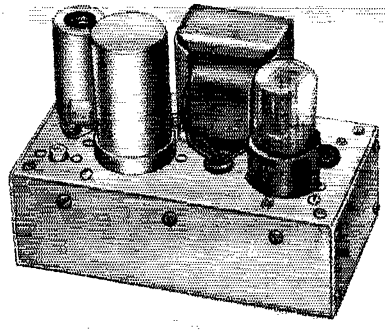
AOA-220 complete **$39.50**



AOA - 420
MULTIPLIER / AMPLIFIER FOR 420 mc

The AOA-420 multiplier / amplifier uses two 6939 tubes providing 4 to 8 watts output on 420 mc. Requires AOA-57 plus AOA-144 for drive. Heater: 6.3 volts @ 1.2 amps. Plate: 220 vdc @ 130 ma.

AOA-420 complete **$69.50**



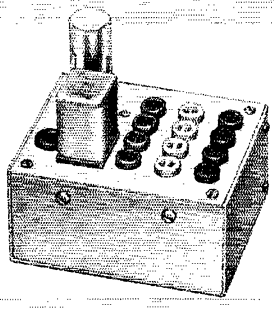
AMD - 10 MODULATOR:

The AMD-10 modulator is designed as a companion unit to the AOA series of transmitters. Uses 6AN8 speech amplifier and driver, 1635 modulator. Output: 10 watts. Input: crystal microphone (High Impedance). Requires 300 vdc 20 ma, no signal, 70 ma peak: 6.3 vac @ 1.05 amps.

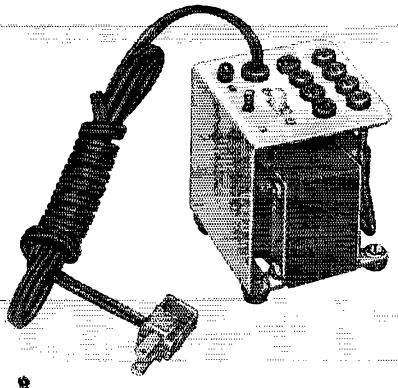
AMD-10 Modulator complete **$24.50**

INTERNATIONAL

International's new unitized VHF/UHF transmitters make it extremely easy to get on the air in the 50-420 mc range with a solid signal. Start with the basic 50 or 70 mc driver. For higher frequencies add a multiplier-amplifier. All units are completely wired. Plug-in cables are used to interconnect the driver and amplifier.

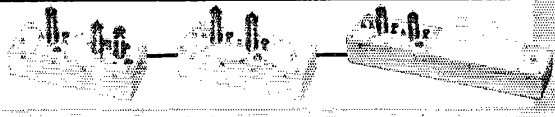


ARY-4
RELAY BOX
Four circuit double throw. Includes coil rectifier for 6.3 vac operation.
ARY-4 Relay Box complete.....$12.50



APD-610
FILAMENT SUPPLY
The APD-610 provides 6.3 vac @ 10 amperes.
APD-610 complete $9.50

COMPLETE TRANSMITTER

6 METERS	**50 mc**	**AOD-57**	
2 METERS	**144 mc**	**AOD-57 PLUS AOA-144**	
	220 mc	**AOD-57 PLUS AOA-220**	
	420 mc	**AOD-57 PLUS AOA-144 PLUS AOA-420**	

INTERNATIONAL
CRYSTAL MFG. CO. INC.
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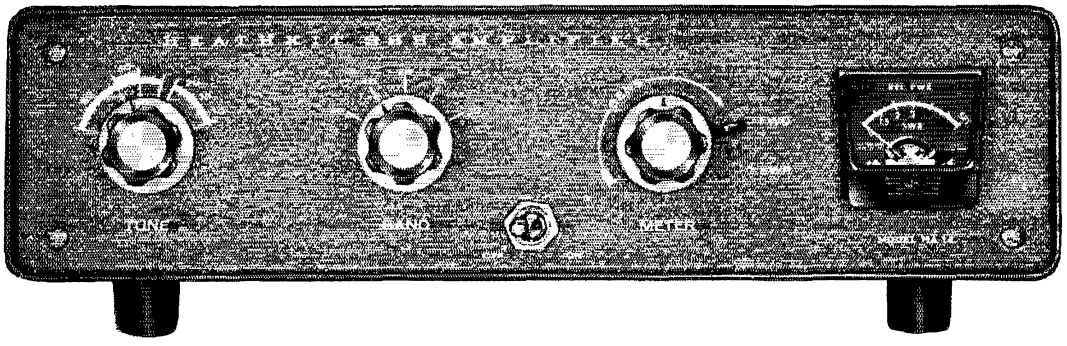
Order Direct from International

THE WORLD'S SMALLEST KILOWATT LINEAR



NEW HEATHKIT "KW KOMPACT"
1000 Watts—1 Foot Wide—$99.95
Operates Fixed Or Mobile

Heathkit "KW KOMPACT"...The World's Smallest Amateur Band SSB Kilowatt Linear Amplifier

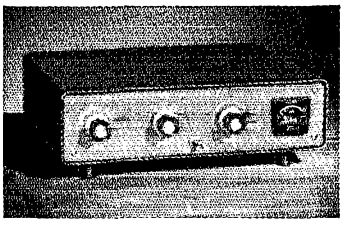
• Provides 1000 watts P.E.P. input power • Tunes 80 through 10 meters • ALC output to exciter • Built-in antenna changeover relay • Built-in SWR meter aids antenna adjustments on the road & monitors for maximum efficiency • Pretuned broad-band input circuit requires no tuning • Engineered with a pair of rugged tubes ideally suited to mobile operation (572-B's or T160L's) • Full provision for control of "remotely" located AC or DC power supply

Here's A Kilowatt SSB Linear Amplifier That Sets New Standards For Size And Price! It can be installed under the dash of nearly every model of car with your exciter, providing a complete under-the-dash mobile station. This full KW SSB linear measures just 3 3/16" H x 12 3/16" W x 10" D. What's more, the *KW Kompact* goes for only $99.95!

Heath Engineered To Set The Pace For Both Mobile And Fixed Amateur Stations . . . A kilowatt in a car means real sock for mobile and emergency communications—where antenna efficiencies are normally low. In fact, we've included a panel-mounted SWR meter, enabling on-the-spot antenna checks and adjustments . . . a real convenience feature! But the *KW Kompact* is not just a mobile rig . . . Picture it on the top of your operating desk. Nice? Then order yours today. Priced less power supply options below.

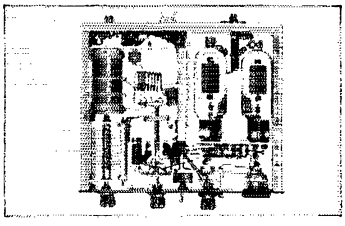
Kit HA-14, 9 lbs.....$99.95

HA-14 SPECIFICATIONS—Band coverage: 80, 40, 20, 15, and 10 meters. **Maximum power input:** SSB, 1000 watts P.E.P. **Driving power required:** 100 watts P.E.P. **Duty cycle:** 50% (SSB voice modulation). **Third order distortion:** —30 db or better at 1000 watts P.E.P. **Output impedance:** Fixed at 50 to 75 ohms unbalanced. SWR not to exceed 2:1. **Input impedance:** 52 ohms unbalanced; broad-band pretuned input circuit. **Meter functions:** 0-6 relative power & 1:1 to 3:1 SWR. **Front panel controls:** Tuning, band switch, relative power sensitivity control, meter switch (FWD & SWR), power switch (off, on). **Tube complement:** Two 572-B (or two T160-L) in parallel. **Power requirements:** 2000 VDC at 500 ma SSB peak, —110 VDC at 60 ma, and 12.6 VDC at 4 amperes. **Cabinet size:** 12-3/16" W x 3-3/16" H x 10" D. **Net weight:** 7 lbs.



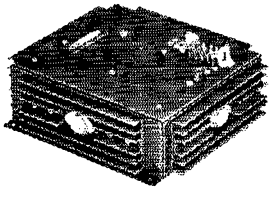
Picture a "KW Kompact" on your operating desk. Handsome design, small size. Ideal for portable operation, too!

A kilowatt in a car? The "KW Kompact" leaves room to spare.



Inside, a neat layout that makes assembly easy . . . quality components for dependable operation.

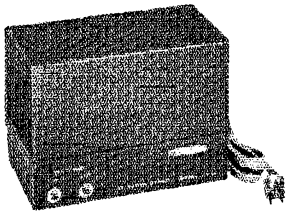
A Choice Of Power Supplies For Fixed Or Mobile Operation



Heathkit HP-14 Mobile Power Supply

The HP-14 Mobile power supply uses all solid-state circuitry. Switching frequency is 1500 cps. A toroidal core transformer for efficiency and regulation. Recommended for operation only with 12 V alternator equipped cars. Circuit breaker protected. The HP-14 provides all necessary operating voltages for mobile operation of the HA-14. Input voltage 12 to 14.5 VDC, negative ground, 25 amps average, 50 amps peak. 8¾" W x 2⅝" H x 7¾" D.

Kit HP-14, 10 lbs.....$89.95



Heathkit HP-24 AC Power Supply

The Heathkit Model HP-24 AC power supply is controlled from the HA-14 SSB Amplifier, permitting it to be conveniently placed in any location. Provides all necessary operating voltages for the HA-14. Features complete circuit breaker protection. All solid state. 120 or 240 VAC, 50-60 cps operation. 9" W x 6¾" H x 4¾" D.

Kit HP-24, 21 lbs.....$49.95

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CONVENTION OF THE DECADE

'65 NATIONAL

JULY 2

REGISTRATION BEGINS AT 3 P.M.

◆

GOLF CHAMPIONSHIPS

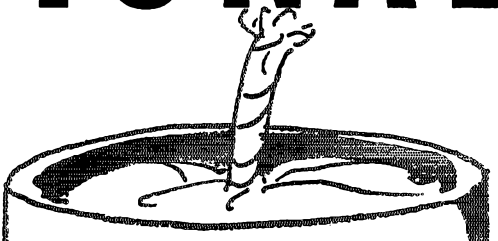
◆

PRE-CONVENTION GROUP ASSEMBLIES
HOMEBREW CONTESTS—
ALL PHASES

◆

CONVENTION STATION
ON THE AIR:
W6UW SAN JOSE

75 METERS	3825	Kc
40 METERS	7225	Kc
2 METERS	145.3	Mc.
	145.8	Mc.



JULY 3

A. R. R. L. FORUM

◆

TECHNICAL TALKS

◆

OPERATIONAL TALKS

◆

EXHIBITS OPEN

◆

LADIES' BUS TOUR

◆

Y.L. PROGRAM

◆

DANCING IN THE
EMPIRE ROOM
AT 9:00 PM, ST. CLAIRE HOTEL

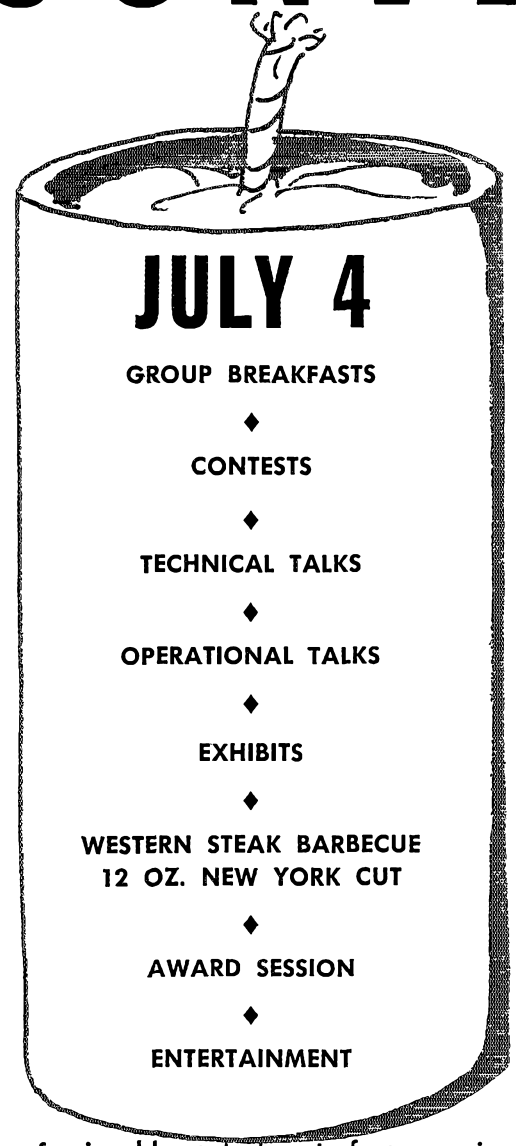
◆

TOASTMASTER
HERBERT HOOVER, JR., W6ZH
PRES., ARRL

The 1965 National launches A.R.R.L.'s second half-century of service to Amateur Radio from th Vacationland of California. Convention activities have been designed to help you get the mos out of amateur radio in the years ahead. It will be worth your time to attend as many of the ses sions as you can. Select from technical talks that will bring you up to date on receiver techniques transmitter designs, and antenna refinements. Choose operational talks that will introduce you t the best operating techniques and give you hints and habits to develop to get the maximum num

SAN JOSE, CALIFORNIA, SCV

CONVENTION



JULY 4

GROUP BREAKFASTS

♦

CONTESTS

♦

TECHNICAL TALKS

♦

OPERATIONAL TALKS

♦

EXHIBITS

♦

WESTERN STEAK BARBECUE
12 OZ. NEW YORK CUT

♦

AWARD SESSION

♦

ENTERTAINMENT

JULY 5

GROUP BREAKFASTS

♦

TECHNICAL TALKS

♦

OPERATIONAL TALKS

♦

EXHIBITS

♦

LOCAL TOURS

♦

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FOR
SAFE TRAVEL HOME

ber of enjoyable contacts out of your equipment. Be sure to bring your spouse so that both of you can enjoy the "Valley of Heart's Delight" during vacation time. Pre-registration deadline is JUNE 1, 1965. Convention dates are JULY 2, 3, 4, 5, 1965. For information and tickets at **$9.50** each, write:

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P. O. Box 6
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EXCLUSIVE FROM

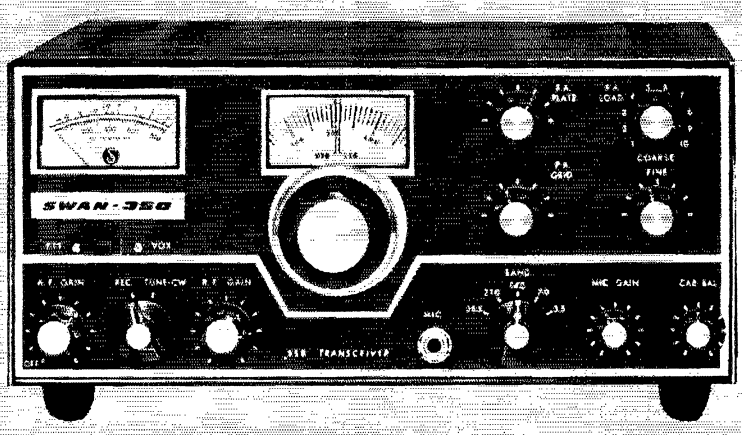
DUAL VFO OPERATION AND WITH THE NEW MODEL 22 DUAL

USE THE MODEL 22 ADAPTER WITH EITHER SWAN 5 BAND 400 WATT SSB TRANSCEIVER.

SWAN 350

Built-in VFO, optional crystal calibrator and sideband selector.

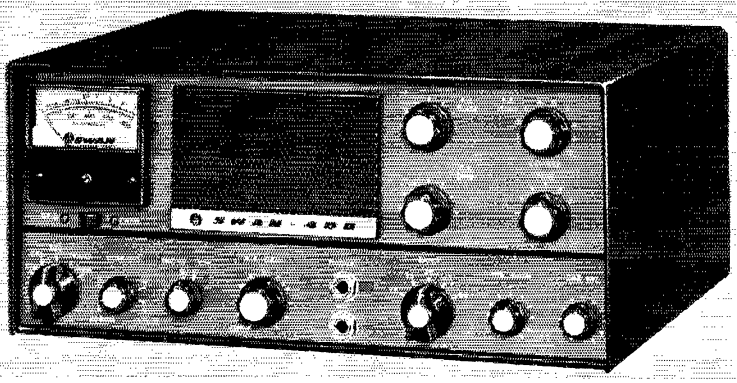
$395



SWAN 400

Built-in crystal calibrator and sideband selector. Requires external VFO.

$395



- Transistorized VFO, temperature and voltage stabilized.
- Precision dual-ratio tuning.
- Crystal lattice filter.
- ALC . . . AGC . . . S-Meter.
- 5½ in. high, 13 in. wide, 11 in. deep.

ACCESSORIES:

- AC power supply, matching cabinet with speaker. Model 117-C..... **$85**
- 12 Volt DC Power supply. Model 412 **$130**
- Plug-in VOX. Model VX-1..... **$35**

SWAN ELECTRONICS CORP.
Oceanside, California

(Continued from page 116)

W5BW is now so active. The Meridian ARC had an organizational meeting. Nets: "Miss" on 3647 kc. Mon. through Sat. 6:45 P.M. CST; Gulf Coast Sideband, 3925 kc. 5:30 P.M. CST daily; Magnolia, 3890 kc. 7 P.M. CST. Traffic: WA5GHF 620, WA5IMU 535, W5JDF 357, WA5INZ 131, WA5FII 45, W5BS 22, W5EMM 6.

TENNESSEE—SCM, William A. Scott, W4UVP—SEC: W4RRV. RM: W4MXF. PAMs: K4WWQ, WA4AIS, W4RMJ.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
TN	3635	1900C	M-Sat.	24	172	113
TSSB	3980	1830C	M-Sat.	24	743	71
ETPN	3980	0640E	M-Fri.	18	284	12
TPN	3980	0645C	M-Sat.	28	880	178
		0800C	Sun.			

Sorry to hear of the passing of W4GVZ, of Memphis. The Tenn. Slow Net meets M-W-F, 1800E. Volunteers are needed for the State Six-Meter Net, especially those with over a hundred-mile capability on a regular basis. The Frye Club reports over 50 in its annual school. WA4IRX is adding a speech compressor to the sideband exciter. Congrats to W4FX on making the BPL for the first time in several years. ECs are needed in many parts of the section. See W4RRV. W4CVG received a fine letter of thanks from the U.S. Mission in Santo Domingo for his many skeds. Davidson County Red Cross is giving excellent cooperation with EC W4KAT. Traffic: W4FX 528, W4OGG 188, WA4IBZ 143, W4MXF 109, W4AJVU 101, K4SXD 96, W4WBK 60, W4UVP 40, W4PFP 29, W4TZJ 29, WA4MCC 26, W4VTS 21, W4CAT 16, K4WWQ 14, WA4NUJ 13, K4EWI 12, WA4OXD 12, K4UMW 12, W4RMJ 10, WA4EWW 9, K4LTA 8, W4TYV 8, WA4BXH 5, W4IGW 5, W4LLJ 5, K4NRZ 5, W4VNU 5, WA4KOG 4, W4BV 2, WA4NIV 2, WA4REJ 2, W4VJ 2.

GREAT LAKES DIVISION

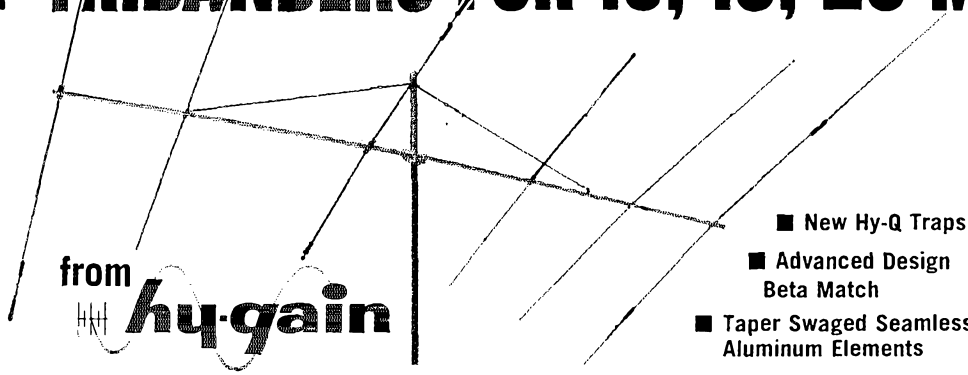
KENTUCKY—SCM, Mrs. Patricia C. Schafer, K4QIO—SEC: K4URX. PAMs: W4BEJ, WA4RDE, K4YZU. V.H.F. PAM: WA4IUM. RM: WA4LCH. Appointments: WA4AGH as OBS.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
EMKPN	3960	M-F	0630	20	245	83
MKPN	3960	Daily	0830	28	562	99
KTN	3960	Daily	1900	27	726	176
KYN	3600	Daily	0900	57	586	412
			1900			

The Louisville and Jefferson County Area Net Section 2 held 12 sessions with QNI 156 and QTC 119 on 50.7. W4CTZ and WA4IBG are recuperating from surgery. Ky. was represented 96.4% in 9RN in February with WA4LCH high QNI followed closely by K4IDZM and K4OZG. WA4LMD is active on the higher frequencies providing 3rd-party communications. He has been appointed asst. chairman for the Red Cross Communications Committee in Louisville. K4PNG is using a new TR3 on 75, 40 and 20. W4CDA is running a code class in his radio club. WA4CZP was injured in an automobile accident Jan. 27. While convalescing he is active on 6 with the help of WA4AGF, W4JQB, WA4EFX and WA4MXY. Two new Generals in Louisville are WA4RVP and K4KZH. Romance for K4KZH and K4ZZK; the wedding date is set for May. Traffic: (Feb.) WA4AGH 555, WA4LCH 395, WA4DYL 207, WA4BSC 197, W4BAZ 161, K4OZG 150, WA4LMD 126, K4YZU 114, K4IDZM 90, WA4RDE 76, K4QIO 74, WA4QLK 38, W4KJP 30, K4PNG 27, WA4MEX 24, WA4GMA 23, WA4ELK 22, W4CDA 20, WA4KFO 20, W4ZXV 17, WA4GHO 14, K4LOA 14, W4BTA 10, WA4VEC 9, W4PLN 8, K4VDO 8, K4HOE 6, W4YYI 5, W4JUI 2, K4ZIQ 2. (Jan.) W4ISF 24, K4LOA 15, K4ZIQ 2.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8EGI, K8QLL, W8ELW, K8KMQ. PAMs: W8CQU, K8LQA, K8JED, V.H.F. PAM: W8PT. Appointments: W8CKK, W8EST, W8PDF as ECs; K8LNE, K8LNV, K8PKU as OPSs; K8EBX, K8PKU, W8SWF as OBSs; W8TBP as ORS; W8IBB as OES. Michigan stations are needed for the new "Intruder Watch" being set up by ARRL Hq. New officers—Detroit ARA—K8AMH, *pres.*; W8JKD, *vice-pres.*; W8MGQ, *secy.*; W8LEU, *treas.*; W8MOB, W8GTL, board. Old Timers' Nite is May 8 at Henry Ford Museum. Thanks for reelecting "Ol Tate" as SCM. The Michigan PON is turning in some nice scores, with traffic handled on its nets. K9ZII/8 is in the hospital after a nasty auto accident—the safety belt saved his life. WA8BLU is home after a stomach operation. Silent Keys: Ex-8ATT and W8VZQ. Knew 8ATT since 1921.

4 NEW THUNDERBIRD TRIBANDERS FOR 10, 15, 20 M



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- New Hy-Q Traps
- Advanced Design Beta Match
- Taper Swaged Seamless Aluminum Elements

Famous Hy-Gain Thunderbird Tribanders have been improved...to give you even greater total performance. Each new Thunderbird is equipped with separate new Hy-Q Traps for each band—to give you peak performance on each band whether working phone or CW. New advanced design Beta Match insures optimum transfer of all available energy—allows precision broadband matching and a high degree of electrical and mechanical reliability...comes to you completely factory pre-tuned. Mechanically, new Hy-Gain Thunderbirds are rugged...large diameter, heavy gauge aluminum boom...taper swaged seamless aluminum elements...heavy gauge, machine formed boom to mast and element to boom brackets...non-corrosive full circumference compression clamps at tubing joints. They're available in four models...

1 ALL NEW 6-ELEMENT THUNDERBIRD DX MODEL TH6DX

Superb DX performance. Features wide spaced elements on a 24 ft. boom. New Hy-Q Traps provide true full-sized performance. Feeds with 52 ohm coax—Beta Matched for optimum gain—maximum F/B ratio without compromise. SWR less than 1.5:1 on all bands. Longest element, 32 ft.—weight, 47 lbs. Model TH6DX, **$139.95** Net.

2 NEW, IMPROVED 3-ELEMENT THUNDERBIRD MODEL TH3Mk2

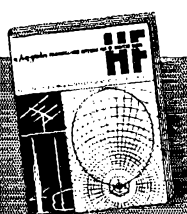
Outstanding performance on 10, 15 and 20 meters. Separate and matched new Hy-Q Traps for each band. Feeds with 52 ohm coax—Beta Matched for optimum gain—maximum F/B ratio without compromise. SWR less than 2:1 on all bands. Boom length, 14 ft. Longest element, 26 ft. Weight, 36 lbs. Rotates with heavy duty TV rotator. Model TH3Mk2, **$99.75** Net.

3 NEW, IMPROVED 2-ELEMENT THUNDERBIRD MODEL TH2Mk2

Compact...installs almost anywhere... delivers excellent performance. Features new Hy-Q Traps. Feeds with 52 ohm coax—Beta Matched for maximum gain. Rugged lightweight construction compatible to rotating with standard TV rotator. Boom length, 6 ft. Longest element, 26 ft. Weight, 21 lbs. Model TH2Mk2. **$69.95** Net.

4 IMPROVED 3-ELEMENT THUNDERBIRD JUNIOR MODEL TH3JR

A compact 3-element beam that delivers outstanding performance. Excellent directivity. SWR less than 2:1 at resonance. Hy-Q Traps—Beta Match—seamless heavy gauge aluminum construction. Rotates with standard TV rotator. 12 ft. boom. Longest element, 27'6". Turning radius, 15'11". Model TH3JR, **$69.95** Net.



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HY-GAIN ELECTRONICS CORPORATION
8411 N.E. Highway 6 - Lincoln, Nebraska

Detroit area hams are trying to establish a 2-meter repeater station. The Michigan Six-Meter Club will hold a "Swap & Shop" June 6 at K. of C. Hall, Lesure and Gd River. K8LZS is recovering from an auto accident. Muskegon put on a good convention—its first. WA8MOM made General there. New officers of the Midland ARC are W8AGQ, pres.; WA8KJR, vice-pres.; WA8EZB, secy.; K8NIE, treas. K8YEK (OO), K8YCW and K8YRV all work together at the Ford Tractor plant. Wayne county EC K2VRQ/8 now has a 2-meter AREC net going on 146.94 Mc. with 30 members. WA8IGY made General. K8NTE now is RTTY and W8KBI has a TH-6. WA8GBN operated 15 hours in the U.P. March of Dimes Telethon. W8EJR and W8IWF still are working DX. K8JED and K8IIN were reelected as pres/vice-pres. of the Mich. Council of Clubs. W8EGI is moving. K8BZL has a new s.s.b. transceiver. WA8FSU bought his YF. WA8FSV, a nice Valentine—a new Chevvie. WA8OLT, at Kincheloe AFB, has a new NCX-3 and WAØFDJ, same base, has a new FPM-200. W8CAM has a KWM-2 and is now s.s.b. WA8CVH's XYL is now WA8KZW. Traffic: (Feb.) WA8FJC 473, K8KMQ 338, WA8ECN 241, K8QKY 236, K8LNE 190, WA8CXF 150, K8GOU 145, W8JYJ 144, WA8BQK 133, K8HLR 125, K8NJW 118, WA8JWD 117, W8ELW 113, K8TJG 107, W8BEZ 101, W8EU 87, W8EJR 79, K8EBX 60, WA8KXO 60, K8VCB 50, W8FX 43, WA8LRC 42, K9RHU/8 41, WA8CTE 37, K8QLL 37, K8KQV 30, K8TFE 29, W8WVL 28, WA8ENW 27, K8LQA 25, W8DSE 24, W8RTN 24, W8IBB 22, W8YNY 20, K8JED 18, W8HKT 16, W8TBP 16, WA8HGE 14, W8IUC 14, W8FWQ 10, W8AUD 9, K8VDA 8, K8BYX 7, W8DRQ 6, W8EGI 5, K8BZL 4, K8GJD 4, WA8MEE 4, WA8GBN 1, W8ZHB 1. (Jan.) WA8ECN 216, K8NJW 77, WA8ENW 18, W8DRQ 17, W8EGI 6, WA8DZP 4. (Dec.) K8NJW 222.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE and K8LGB. PAMs: W8VZ, K8BAP and K8UBK. Another month with very little news because to give news I must get it from the club bulletins I receive. When these bulletins don't give me much news I am behind the eight ball. No news. Hi. I used to get a lot of news, but now I am lucky to get a line. Columbus ARA's *Carascope* says the club held a blind auction, W8QQ gave a talk and a presentation of pictures on TVI, the county AREC formed a ten-meter s.s.b. net, the club started its new code and theory classes while graduating 42 from the 1964 classes. The Six Meter Nomad's *The Amateur Extra* informs us that WA8NIL is soaking up the Florida sunshine and K8KKO was released from the hospital. W8RIO and K8IXV joined the Silent Keys. The Seneca RC did trouble-shooting at a meeting. The Babock & Wilcox ARC heard W8PAL speak on Sophisticated Antennas Reflected Power and Standing Wave Bridges and saw two movies. Canton ARC's *Feedline* tells us that Hugh Fultz, of Ohio Bell, spoke on Space Communication. VE4TJ and VE4XZ received their Hall of Fame certificates. W8RNL and W8TTJ are in the hospital. Tusco RC's *Beam* says the club saw slides and heard tapes on the Story of DX and the History of Amateur Radio. Toledo's *Ham Shack Gossip* starts out by telling us that W8AIV and K8TUN have joined the Silent Keys. W8WM is spending the winter in Florida. W8VDR is recuperating from surgery. W8RZQ took a trip to Arizona. W8ZXJ vacationed in California. K8GIJ and K8NQJ vacationed in Florida, the Toledo Mobile RA held its tenth annual auction. SEC, W8HNP gave an interesting discussion of safety aspects of primary voltage wiring in the ham shack at the Toledo RC meeting. K8RZB has a new rig on s.s.b. Warren ARA's *Q-Match* says that K8ZNB has a new 2-meter rig on the air. K8GVY has a new Drake R-4. Parma RC's *P.R.C. Bulletin* tells us that W8ZAH described an inexpensive small test instrument for use in measuring the impedance of your antenna system and the second speaker LU1BB/LU2AFP/LU5HBC described amateur radio conditions in Argentina. V.H.F. High Banders' *The High Banders Log* informs us that K8BSO and K8TFL have new HQ-145X receivers. Springfield ARC's The *Q-5er* states that W8OKB showed the club the construction of printed circuit boards. K8VBX reported that K8IXV has joined the Silent Keys. The Buckeye Net held 25 sessions, handled 838 messages with 6.6 per cent. The Ohio S.S.B. Net held 52 sessions, handled 884 messages with 17 per cent. W8JGW joined the Silent Keys. W8ERD has a Hi-Gain trap vertical for 20/15/10. Appointments made in Feb. were W8EWP as OBS and K8DHJ as ORS and OO. W8DAE and W8UPH made the BPL in Feb. K8LVN moved to California. W8VTD has a new HW-12 transceiver. Traffic: (Feb.) W8UPH 1339, W8DAE 504, W8RYP 324, K8VBO 240, K8DHF 224, WA8CXY 211, K8VBH 205, WA8CFJ 185, W8BZX 17, K8DIU 106, W8QCU 96, K8UBK 88, K8PBE 84, W8DDG 75, W8FSM 69, W8MGA 69, K8ZCZ 63, WA8AUZ 56, K8YDR 49, K8BYR 45, WA8FTX 34, WA8AJD 28, WA8JXM 25, K8DHJ 23, W8LZE 20, WA8-

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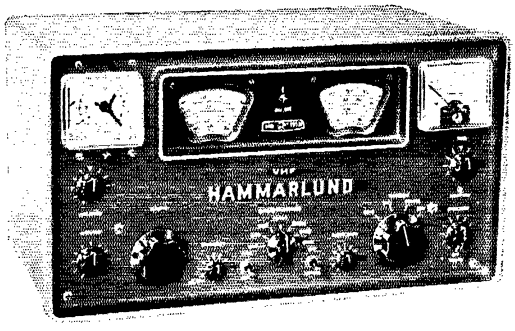
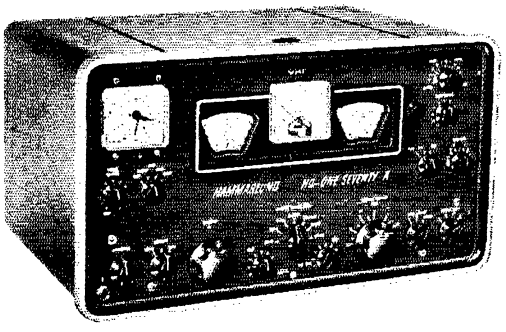
Careful, hams! Smoke can get in your eyes. When you shop for ham band receivers, the toy manufacturers might get you with their chrome, flashing lights and front-panel showmanship.
Hammarlund asks you to kindly step inside.

Inside their complete frequency range sets, where construction is tight as your fist. Where everything is heavy because Hammarlund builds receivers like a rock. Where engineering is exquisite because Superpro engineering goes into every Hammarlund set.





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16-tube, multi-conversion HQ110A-VHF includes 4 nuvistors
20-tube, multi-conversion HQ170A-VHF includes 4 nuvistors

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- Linear detection for superb SSB and CW reception.
- Exclusive Hammarlund auto-response automatically adjusts audio passband to best meet receiving conditions.
- HQ170A-VHF has extensive range of available selectivity curves for optimum performance under adverse conditions.
- HQ110-VHF costs $299.95. HQ170A-VHF costs $419.95.
- Timer clock optional—$10 extra.

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TOTAL COMMUNICATIONS SINCE 1910: COMMERCIAL, AMATEUR, CONSUMER, INDUSTRIAL COMMUNICATIONS EQUIPMENT / VARIABLE AIR CAPACITORS

AJZ 13, K8YWF 11, K8DDG 8, W8WUO 8, K8LGB 7, W8EEQ 4, W8WEG 4, K8RXD 3, K8BXT 2, W8GIU 2. (Jan.) K8LGA 76, WA8MJD 11.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RMs: W2PHX and 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: WB2PEN as OES. Congratulations to our three BPL winners for Feb. traffic: WA2UZK, K2TXP and WA2VYS. WB2HZY has a new HT-37 and reports activity during the NR. A new RACES member in White Plains is WB2FVD. K1QIM/2, of Navy MARS, is installing RTTY gear. Norm is a Navy recruiter in Albany. Movies on "First Aid" and "Civil Defense" featured the meeting at the Albany Club. WA2WGS has a new Hytower beam. A fallen tree took out all the antennas at WB2HYA. The ARPSC Net No. 2 in Westchester is looking for new members, according to WA2-OOO. W1JTB/W2GHR spoke at a Poughkeepsie Club meeting on his 2-meter repeater station at Mt. Beacon. WA2NVG described amateur skills and equipment used as a bio-chemist in a N.Y.C. hospital at the New Rochelle Club. WB2MMR is the call of the newly-organized club at New Rochelle H.S. Among its members are WB2FSO, WB2HZY, WB2LSZ and Advisor K2PXQ. At Schenectady, WA2SFP of *G.E.'s Research Laboratory*, spoke on propagation and how to work DX. The Schenectady Club recently passed the 200 membership mark. W2IR was awarded a 50-year certificate in the OOTC. W2URP received a BPL medallion. The Westchester ARA had a guided tour of the new county control center for civil defense. Traffic: WA2UZK 1077, K2TXP 688, WA2VYS 554, K2SJN 123, WB2CPU 101, WA2JWL 101, WB2FXB 84, WB2NKN 59, W2URP 38, W2ANV 35, WB2DXL 30, W2PKY 20, WB2FVD 16, WA2WGS 14, WA2OOO 11, WB2HYA 9, K2VCZ 9, WA2DXB 5.

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	WB2IHWB	— PAM
NLS (slo)	3630 kc.	1845 Nightly	WA2RUE	— RM

NYC-LI AREC nets: *See Dec. 1964 column for schedules.* Manhattan AREC/RACES nets now meet every Mon. at 2000 on 28.58, 50.48 and 147.18 Mc. BPL certificates were awarded to WA2RUE, WB2HWB, WA2-TQT, WA2GPT, W2EW, K2UBG and WB2AEK. WB2-HWB received a TCC certificate from the director of the Eastern Area Net. A brand-new 75S3B and 32S3 arrived at WA2GPT's on St. Valentine's Day, courtesy of the OM. A hearty welcome to YLs WB2OGP and WB2PYI, who just moved in from Washington, D.C. WB2GAL, skipper of the Tug *Canal Cities*, visited with WA2GPT. The Mike Farad Net, on 3925 kc. at 1800Z daily, has arranged with "NASTAR" to issue Oscar III bulletins. Alas, WB2OTT got two keyers built then discovered there is only one rig! WB2LGR, the wrestler, is now becoming a La Crosser. K2VGD finished the 300 watter, but the ¼-wave vertical on 80 is waiting 'til this land is becalmed. Hey, the Queens 10-Meter AREC Net has openings for additional members! Get ahold of W2IAG and he'll fix you right up. WA2DTY has gone and replaced the 6-and-2 with an SR-42, you know it? Congratulations to WB2QFT, who got his General and also was elected secy. of the Bayside HSRC! Boy, are you 2-meteorites lucky. W2EW has announced that new openings exist on the V.H.F. Net. Learn traffic procedures on v.h.f. it's fun! Apply *now!* Congratulations to WB2PBA, who received his General! His dad, WB2-QBS, is now a Tech. and is closing in fast. C'mon, Pop! Appointments: W2DBQ as OPS, WB2PUK as OBS, K2DGI as OO, WB2LXQ as OES. WA2TKS has a new 6-Meter Hilltopper up on top of an AR-22. Try this: W2KW, alias K2KW, alias W2CCD, who spent a month in St. Thomas as W2KW/KV4, is now building his shack there for KV4KW!, so sayeth W2PF. Remember WB2AWX up there on the 13th floor? He reports that his line of sight vision is far superior to the DX he's been able to garner. WB2BKS has a new 14AVQ antenna up about 100 feet. W2AKB (ex-W4NWN) and WB2DNY are new members of the Nassau 10 AREC Net. WB2EXI is using a Knight T-150 while the NCX-3 is recuperating. WA2KSP reports that his son, WA2SAR, just made "Top Kick" in the Air Force down So. Carolina way. Polytechnic Institute of Brooklyn is offering a certificate (WPIB) to anyone working five club members and its station, W2BXK. Listen, the public thinks you're part of that corps of trained commu-

When you head for the wide open spaces . . .

take SB-34 with you

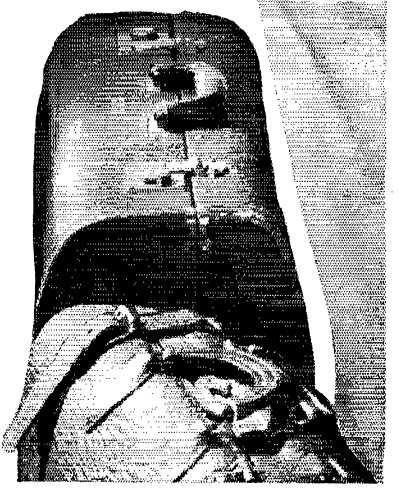
Vacation, at last! Now time to head for the wide open spaces. You'll be busy during the day—hunting, fishing, tennis, golf, swimming, boating—trying to crowd in all those activities you've planned during the year. But at night, pleasantly tired—relax—turn on the **SB-34.**

Here's where you will begin to appreciate how good your judgment was when you selected **SB-34** as the SSB transceiver that offered you the most for your money.

Operate **SB-34** from hotel, motel, station wagon, camper—your boat or plane. And of course from the family car. Built-in supply for 12V DC **and** 117V AC makes this varied operation possible. Change from AC to DC is easy. Just use the AC or DC patch cable. (Both are provided).

Very low drain (500ma) on receiver standby is important for portable operation. Almost complete transistorization, (just 3 tubes are used in RF output and driver stages) makes this low drain possible.

The SBE concept . . . "a complete station in an exceptionally small and lightweight package" proves its worth convincingly on vacation or—for that matter—at **any** other time when you have occasion to take SB-34 with you.



Please send data on **SB-34** transceiver

Name _____

Address _____

City _____ State _____

SBE

317 Roebling Road, So. San Francisco, Calif.

RAYTHEON

$395 Including built-in power supply.

Power input: 135W P.E.P. input. (slightly lower on 15). **Frequency range:** 3775-4025 kc, 7050-7300 kc, 14.1-14.35 mc, 21.2-21.45 mc. 23 transistors, 18 diodes, 1-zener, 1-Varactor, 2-6GB5's PA, 1-12DQ7 driver. **Speaker built-in.** Prewired receptacles on rear accept VOX and Calibrator—both units optionally available. **Size:** 5"H, 11¼"W, 10"D.

Export sales: Raytheon International Sales & Services, Lexington 73, Mass. U.S.A.

nicators called ham radio. If disaster strikes, you're the guy next door who can get a message to Aunt Murgatroid in Sassatrass Springs, Wyo. Honestly now, can you? Stop and think. Do you really know how? Will you be embarrassed when they ask and have to say, "Me? Oh nay, I'm not a message-type handler." Or, could you find out what it's all about simply by devoting less than three or four half-hour sessions a month to one of the traffic nets listed above. You don't need to become a dyed-in-the-wool traffic buff to belong to a net, you know. And, since it's our public image to be trained communicators, we owe it to the public to be ready to pass traffic when the time comes without lousing up a smoothly run network with our bumbling and inexperienced ways. Traffic: WA2RUE 1034, WB2HWB 765, WA2TQT 756, WA2GPT 666, W2EW 310, K2UBG 302, WB2AEK 227.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM, L. J. Amoroso, W2LQP. SEC: K2ZFI. NNJ ARPSC nets:

NJN	3695 kc.	7:00 P.M.	Daily	WA2BLV-RM
NJ Phone	3900 kc.	6:00 P.M.	ExSun.	W2PEV-PAM
NJ Phone	3900 kc.	9:00 A.M.	Sun.	W2ZI-PAM
NJ 6&2	51.150 kc.	11:00 P.M.	M-W-Sat.	K2VNL-PAM
NJ 6&2	146.700 kc.	10:00 P.M.	Tu.-Sat.	K2VNL-PAM
NJNN*	3725 kc.	7:20 P.M.	WTWTh	WB2KXG-RM
16N	1814 kc.	6:30P.M.	Tu-Sat.	WA2UOO-RM

*Novice & Slow Speed. All times local. AREC net sked information is available from K2ZFI. New appointments: K2KDQ as EC Passaic, WB2FIT and WB2KSG as ORSs. Congratulations to WB2IKW, WB2KGE and WB2OOK on the receipt of their General Class licenses. WB2HLH spoke on message-handling to his AREC group. WA2UOO has three new antennas for 80, 40 and 20, plus a rebuilt coupler. WA2PWI has a new SB-200 linear and HO-10 scope. WA2SRQ now has full break-in with a homebrew t.r. switch. WB2MAT has a new eight-element 2-meter beam. New officers of the Jersey City RC are W2ECO, pres.; K2ONE, vice-pres.; K2-SST, secy.; W2ZAL, treas. WB2PLK has a new SB-33 and an SB1-LA. WB2LDE has joined the ARRL and reports 10 states on 2 meters with 20 watts. WB2KNS has joined the Army. The DVRA held its 18th Old Timer's Nite Apr 24. WA2HGL has a new Swan 400 transceiver and now holds USA-CA No. 446. The State Line Radio Club is 100 per cent ARRL and has for its club project the construction of transistorized compressors. The club net meets on 146.7 Mc. at 8:00 P.M. local time Tue. An informal luncheon group meets at the Colt's Neck Inn at 12 noon each 2nd Tue. of the month. W2NSA is pres. and W2ENM is treas. All in Monmouth County or elsewhere are invited. WB2FBC has a kw. and inverted vee in operation for the low bands. A 10-meter net has been established at Ft. Monmouth. WA2-PWI has been appointed president of CHC for 1965. 146.46 Mc. is the new club frequency of the Raritan Bay RA. Congratulations to WB2DRB on the award of a 35-w.p.m. code certificate. WA2UDT got 199 QSOs in 7 sections in the V.H.F. SS. The Morris Radio Club conducts a net every Wed. at 8:30 P.M. local time on 146.5 Mc. WN2QPE and WA2LLD, son and father, have a new Ameco TX-62. WA2OQP has a new RME VHF-152A. New officers of the South Amboy ARA are WA2-CGI, pres.; WA2NJB, vice-pres.; WA2TKD, secy.; J. Arnold, treas.; WA2FWD, act. mgr. The Third Annual Pre-SET Exercise will be held Sat. May 22. Simulated action will be a hurricane. Sign up in AREC or NTS now. Contact your EC or K2ZFI or W2CVW. *Remember Amateur radio exists as a hobby because it performs a public service.* Traffic: (Feb.) K2VNL 305, WB2AEJ 173, WA2VID 144, WB2ALF 140, WB2HLH 132, WA2-TEK 107, WB2KSG 84, WA2UOO 70, WB2DEP 57, W2-CVW 52, WA2PWI 50, WA2SRQ 48, WB2FIT 32, WA2-ZKT 32, WB2ICH 31, WA2GQZ 28, K2ZFI 26, W2PEV 16, WA2CCF 15, WB2KLD 15, WB2MAT 15, WA2KVQ 14, W2ZAL 14, WB2KXG 13, WA2TWS 12, W2DRV 9, K2JTU 8, WA2WHZ 8, W2EWZ 7, WB2FVO 7, WB2GFY 7, W2TFM 6, K2MFX 5, WB2PUL 3, W2CFB 2, WB2-MXZ 1, K2VVL 1. (Jan.) WB2DEP 30, WB2FVO 25.

MIDWEST DIVISION

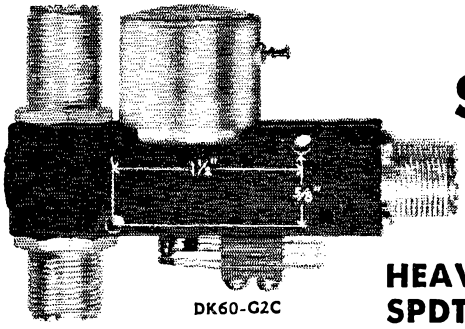
IOWA—SCM, Dennis Burke, WØNTB—Asst. SCM: Ronald M. Schweppe, KØEXN. SEC: KØVBM. RMs: WØLGG, WØTUI. PAMs: KØBBL, WØLSF. New OBSs: WØCXN and WØJAQ. Sioux City. New OO: KØVEJ, Sioux City. Our greatest need in the section is for greater participation in the AREC, especially in the northeast and southwest quarters. There is great need for OOs in the Des Moines area and also we need a few experienced operators to help WØTIU with our TLCN C. W. Net. This net is a great place for the beginner to learn proper procedure in net participation

DK

Industrial — Military Relays By

DOW-KEY

For Most Every Switching application



DK60-G2C

DK60 SERIES

Size: 2¾ x 3¾ x 1⅛. Wt. 9 oz.

HEAVY DUTY SPDT COAXIAL RELAYS . . .

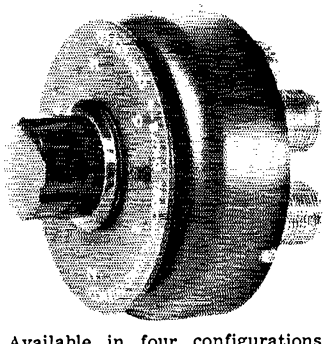
4 Standard Models, AC or DC, UHF, N, BNC, TNC or C Connectors.

SPDT 50 ohm impedance. 1 kw rating. Life expectancy over 1 million operations. VSWR less than 1.15:1 from 0 to 500 mc. DK60-G and DK60-G2C feature patented automatic receiver protecting connector for positive isolation of r.f. from receiver — greater than 100 db isolation between receiver and transmitter lines from 0 to 500 mc. Model DK60-G2C has external contacts for switching auxiliary circuits (rated 5 amps @ 110 VAC).

Guaranteed One Year

DK60 r.f. Switch	$12.45
DK60-G with "isolation" Conn.	$13.70
DK60-2C with DPDT Auxil. Contacts	$14.35
DK60-G2C with "isolation" connectors and Auxiliary contacts	$15.65

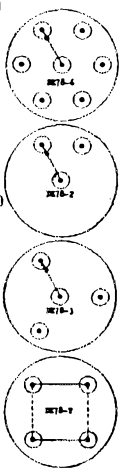
Industrial and military requirements modified and built to specifications.



DK78 SERIES

NEW MANUAL COAXIAL SWITCHES

(not wafer switches)

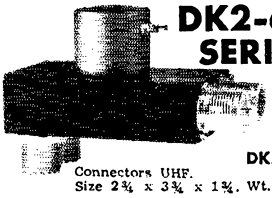


Available in four configurations — DK78-2 single two throw; DK78-3 single pole three throw; DK78-6 single pole six throw, and Crossover switch DK78-T.

New manual DK78 series coaxial switches with excellent r.f. characteristics (not wafer switches). r.f. rating, 1 kw. 50 ohm impedance. VSWR less than 1.05:1 at 150 mc. Isolation greater than 50 db @ 500 mc. and greater than 80 db @ 30 mc. With dial plate and knob. Wt. 10 oz. Size: 3" dia. x 1⅛" deep.

Available: 1P2T, SP3T, 1P6T and crossover switch ..... **from $12.75 ea.**

DK60, DK2-60, DK2-60B, DK71, DK72 DK78 available with BNC, TNC, N & C connectors.



DK2-60B SERIES

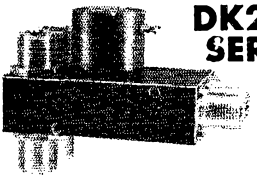
DK2-60B

Connectors UHF.
Size 2¾ x 3¾ x 1¾. Wt. 12 oz.

A DPDT SWITCH INTERNALLY CONNECTED IN DE-ENERGIZED POSITION

Ideal for switching in and out a power amplifier between an exciter and antenna. Frequency range 0 to 500 mc. Power rating 1 kw. VSWR less than 1.15:1 from o to 500 mc. Isolation greater than 30 db @ 500 mc. Loss less than 0.03 db @ 30 mc. Life over 1,000,000 operations. 50 ohm impedance.

Available in all standard AC, DC voltages ..... **from $19.00 ea.**

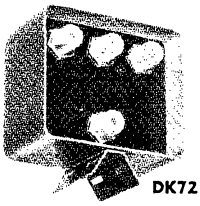


DK2-60 SERIES

A DPDT SWITCH for SWITCHING 2 COAXIAL LINES SIMULTANEOUSLY

Frequency range 0 to 500 mc. Power rating to 1 kw. VSWR less than 1.15:1 from 0 to 500 mc. Isolation greater than 30 db @ 500 mc. Loss less than 0.03 db @ 30 mc. Life over 1,000,000 operations. 50 ohm impedance. Size: 2¾ x 3¾ x 1¾. Wt. 12 oz.

With UHF COAXIAL CONNECTORS ..... **from $19.00 ea.**



DK72

DK72 SERIES

1P3T COAXIAL RELAY FOR REMOTE SWITCHING of r.f. SOURCES

Weatherproof. Frequency range 0 to 500 mc. Power rating 1 kw. VSWR less than 1.1:1 at 100 mc. Isolation greater than 40 db at 100 mc. Life over 1,000,000 operations. 50 ohm impedance.
Size: 4 x 3½ x 2⅝. Wt. 1 lb. 8 oz.

With UHF CONNECTORS ..... **$22.95 ea.**

DK71 SERIES

1P6T COAXIAL RELAY FOR SWITCHING of r.f. SOURCES

Size: 5¾ dia., 2¾ deep. Wt. 3 lbs.

Weatherproof. Common connector may be switched directly to any one or combination of six positions. Frequency range 0 to 500 mc. Power rating 1 kw. VSWR less than 1.1:1 at 100 mc. Isolation greater than 40 db at 100 mc. 1,000.000 operations. 50 ohm impedance.

With UHF COAXIAL CONNECTORS ..... **$49.50 ea.**

Dow-Key products available at your distributor or write:

Manufactured by DOW-KEY COMPANY, Thief River Falls, Minnesota

with a special emphasis on message-handling. Election is only a few weeks away. If you are a member of ARRL you will receive a ballot in the mail. Be careful you do not throw it away. Vote according to your convictions and I hope to see much more than the forty per cent participation we had in the last election. Net reports for Feb.: 160-Meter—QNI 1071, QTC 16, sessions 28. 75-Meter Fone—QNI 1252, QTC 175, sessions 24. Hamilton County Emergency—QNI 276, QTC 5, sessions 28. TLCN for Jan.—QNI 154, QTC 5, sessions 22. Traffic: WØLGG 1629, WØNTB 80, WØUSL 29, KØQKD 24, WAØDYV 20, WØAMZ 17, WAØGBM 13, WØGPL 11, KØKBX 9, KØTDO 8, WØYDV 8, WØPTL 7, WØBKR 5.

KANSAS—SCM, C. Leland Cheney, WØALA—SEC: KØBXF. PAMs: KØEFL, WØBOR. V.H.F. PAMs: KØVHP, WØHAJ. The following are net reports for the month of Feb.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Avg.*
KPN	3920	1245Z	M-W-F	14	32	219	15.6
KPN	3920	1400Z	Sun.				
NCSs: WØORB, KØEUR, KØGII, KØEFL							
QKS	3610	0030	Daily				
NCSs: WØBYV, KØBXF							
HBN	3880	1805	Daily	20	94	826	41.6

NCS: WØGQR, KØHGI, WAØHWJ, KØJKA

Traffic: KØHGI 171, KØGII 101, KØBXF 36, WAØCCW 27, WØBYV 15, KØLHF 14, KØJDD 9, KØJKA 7, KØEFL 6, WØZUX 5, WAØDZI 4, KØLPE 4, KØVQC 4.

MISSOURI—SCM, Alfred Schwaneke, WØTPK—SEC: WØBUL. PAMs: WØBUL, WØBVL, WØOMM, KØONK, WAØFLL. (v.h.f.) RMs: KØONK, WØOUD. WØHTO has been appointed EC for St. Louis and St. Louis County to fill the vacancy left by the resignation of WØANT. WAØILQ is a new ORS and OBS; KØYGR is a new OES. Appointments renewed: KØONK as ORS and WØQWS as OO. January marked the beginning of the 40th year for St. Louis ARC. KØJPS operated in the Hobby Show at St. Joseph and got pictures in the local newspaper and on TV. WNØKZT is a new call in Independence. WAØLEQ, formerly WNØHRO, is a new Gen. Class licensee. Other net members filled in for WØOUD on MON, MNN and SMN while she was off the air for a week while at the hospital for a check-up. To complete the recognition of NCSs for section nets started last month, the net controls for MoSSB are WØORB, KØTCB, KØTGU, KØOYV, WØHTO, WØCZU, WAØECH and KØWOP. New members of MON are WAØILQ and KØYGR. WØFHV is out of hospital and operating from son's QTH. WAØEMS got his DXCC and is the first WAØ to qualify for the award. WA9JDR/Ø put up a 20 and 40 long wire but burned out the receiver. KØONK is back in the BPL list again. Net reports for Feb.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2345Z	M-W-F	12	301	57	WØBUL
MON	3580	0100Z	Tue.-Sun.	24	138	101	WØOUD
MNN	3580	1900Z	M-Sat.	24	81	31	WØOUD
SMN	3580	2200Z	Sun.	4	22	14	WØOUD
MoSSB	3963	2400Z	M-Sat.	24	516	151	WØOMM
PHD	50.4	1245Z	Wed.	4	48	1	WAØFLL
PON	3810	2100Z	M-F	20	299	160	WØHVJ

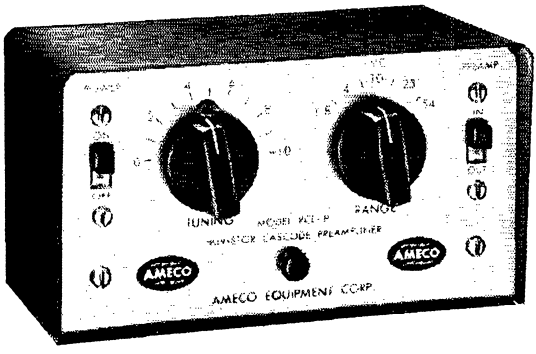
Traffic: (Feb.) KØONK 773, WØOUD 131, WØZBR 119, WAØFKD 109, WØHVJ 58, KØEQY 55, KØYGR 40, KØTGU 39, KØTCB 34, WØEEE 30, WØZLN 28, WØBUL 27, WØTPK 23, KØJPS 18, WAØDGT 16, WAØILQ 16, WØBVL 14, KØWOP 13, WØRTO 7, WAØFLL 6, WØGQR 6, WØOGC 4, KØFPC 3, WA9JDR/Ø 2, WØKIK 1. (Jan.) KØJPS 18.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØJXN. Monthly net reports for Feb.: NEB C.W. Net, WAØGHZ, 1st session QNI 291, QTC 89, second session QNI 124. NACN, WAØEEI, QNI 60—QTC 2. West Nebr. Net, WØNIK, QNI 582, QTC 49, WX 280. AREC Net (Sun.) WØIRZ, QNI 121, QTC 1. Nebr. Morning Phone Net, KØUWK, QNI 578, QTC 44. Nebr. Emergency Phone Net, WAØBID, QNI 1327, QTC 134. Nebr. Storm Net, KØJXN, 1st sessions QNI 707, QTC 21; 2nd sessions QNI 850, QTC 18. The Storm Net now meets at 0030Z and 0130Z at 3982.5 kc. The 160-Meter Net, with WØYFR, reports about 25 QNI per night. Nebraska State-Wide AREC Calling and Emergency frequencies listed by KØJXN. SEC. are 3982.5 kc., 28.6 Mc. and 145.35 Mc. AREC in Nebraska turned out en mase Mar. 1 and 2 to give valuable assistance during a crippling snowstorm. Congratulations to all who took part in a job well done. Traffic: WAØDOU 172, WØLOD 152, WAØGHZ 124, WAØBID 62, KØFJN 51, KØRRL 49, WAØEUM 44, WØNYU 32, WØNIK 31, WØ-

AMECO *Leader in Compact, Quality Ham Gear*

Improve your receiving Capability with the

NEW ALL BAND NUVISTOR PREAMPLIFIER



Model PCL-P (shown above) with built-in power supply—wired and tested $32.95

Model PCL is identical in all respects to model PCL-P except that it does not contain a power supply. (Power can be taken from receiver or from the Ameco PS-1 Supply) wired and tested $24.95

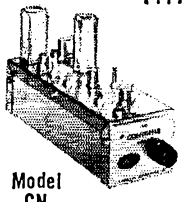
- **6 thru 160 meters**
- **With built-in power supply**

Two nuvistors in cascode give noise figures of 1.5 to 3.4 db. depending upon the band. The weak signal performance of ALL receivers as well as image and spurious rejection are greatly improved. The PCL's overall gain is in excess of 20 db.

Panel contains bandswitch, tuning capacitor, an "on-off" power switch and a switch that transfers the antenna directly to the receiver or through the Preamplifier.

The addition of the preamplifier to the ham station will enable the ham operator to hear signals that he was not able to hear before. The improved noise figure will allow reception of signals that were previously lost in the noise.

NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE

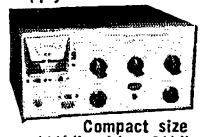


Model CN

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**

NEW 2 & 6 METER TRANSMITTER

With built in modulator & solid state power supply



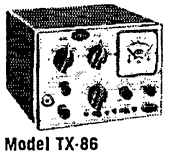
Compact size — 11½" wide, 9½" deep, 6" high.

The new Model TX-62 is easy to tune because all circuits up to the final are broadbanded. There is no other transmitter on the market like it.

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.

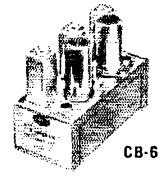
Model TX-62 wired and tested $149.95

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
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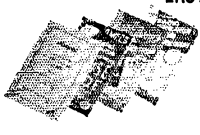

Amateur Radio Theory Course	$3.95
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NEW ENGLAND DIVISION

CONNECTICUT—SCM, Fred Tamm, K1GGG—SEC: W1EKJ. RM: W1ZFM. H.F. PAM: W1YBH. V.H.F. PAM: K1RTS. Traffic nets: CN, daily at 1845 on 3640 kc.; CPN, Mon. through Sat. at 1800 on 3880 kc. Sun. at 1000; CECN (EC), Sun. at 0900 on 3880 kc.; CTN, Sun. at 1800 on 3640 kc. All nets welcome new stations and what better way is there to improve your operating and code proficiency than to participate in an organized message-handling circuit. Pick the net of your choice and QNI with or without traffic. You will enjoy it. K1QNF spent the month setting up W1AW for Project Oscar III. K1YGS is busy keeping skeds with HC2EH. K1OQG, a regular on CN and CPN, has a new HA-1 and K1QYM has a new Drake 2B. K1UYZ is on CN with an FB new rig. K1QPN is using his new TA-36. WN1CBW is interested in a slow Novice net. K1UFL, Groton Sub. Base Med. Research Lab. Club station, is active with W1WAZ, K1VII, K1WLX and WA1AQZ as operators. New officers of the Meriden ARC are W1OWD, pres.; K1WYD, vice-pres.; K1WKH, treas.; K1WJL, secy.; K1QAH, sgt. at arms. Norwalk AREC's officers are K1UTV, pres.; K1YCC, vice-pres.; K1FJV, secy.-treas. K1UDT, trustee. New appointments: K1STM and K1OQG as ORSs; K1OQG and K1YGS as OPSs; WA1CPU as OES. Endorsements: W1WPR, W1CUH and K1ZND as ORSs; W1PRT as EC; K1QPN as OPs and OBS. Net reports; CN, 28 sessions, 242 messages, average, 8.6 messages, and 9.8 stations. High QNI: W1ZFM, K1OQG, W1RFJ, K1FQT and K1WKK. CPN, 28 sessions, 178 messages, average 6 messages and 11 stations. High QNI: W1LUH, K1OQG, K1LFW, W1YBH, W1GKF, K1SRF, K1EIC and K1OJZ. K1PJQ reports CNEN held 46 sessions during Jan. and Feb. with an average of 28.8 stations per session. New stations on CPN: K1YGS, W1FVU and W1ZUQ. Traffic: (Feb.) W1BGD 514, W1ZFM 231, K1LFW 222, K1OQG 215, W1GKF 169, W1NJM 154, K1STM 117, K1EIR 101, K1EIC 88, K1GGG 66, W1YBH 50, K1FQT 36, K1WKK 35, W1RFJ 27, K1WXN 24, K1SRF 21, K1QPN 15, W1BDI 11, W1BNB/1 9, W1OBR 8, WA1BER 6, W1CUH 5. (Jan.-Feb.) K1EIC 94, K1EIR 68, K1UYZ 42. (Jan.) W1EFW 229, W1NJM 110, W1YBH 17, W1CUH 10, K1SRF 10. (Oct.) K1WKK 503.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC received reports from K1s PNB, ICJ, QAM, W1JVZ. W1TBX is the new EC for Norwood. W1ALP spoke at the Norwood Club and saw its new c.d. set up in a new building. W1TNQ now is in Norwood. Silent Keys: WA1ACQ and K1LVG, pres. of the North Shore RA. W1PJE spoke on gravity at the Middlesex ARC. W1HWK is going to speak on Antarctica. W1AFD and W1CK retired and moved to Florida. W1NF is working lots of DX on 80-meter c.w. WN1DOD is on 15-meter c.w. W1HHG is on 75. K1VFY is secy. of the Needham HSARC, K1UGO. K8CMP now is working in this area. W1QV presented W1OOP with a placque for his article in Dec. QST. W1s ALP and EAE were present at the Waltham Club. W1DEI spoke on propagation recently. W1QXX is pres. EM2MN held 20 sessions, 229 QNIs, traffic 151. The T-9 Radio Club met at W1RCA's. W1PEX made the BPL. K1DZG is working DX on 20-meter c.w. mobile. K1EZX built an s.s.b. rig for 6. The Needham Emerg. Net had 4 sessions, 19 QNIs, 5 traffic. WA1CRK has a TCC traffic appointment and an A-1 Operator Club certificate. WA1DAG is working air mobile week ends on 6 and has an NCX-5 and an NCL-2000. W1JDP is on 6-15 and 80. W1IIP is on 80 and 6 and is building an s.s.b. rig. WA1DJC has 60 watts on 80. W1AKN has an SB200 linear amplifier. WA1DLT is ex-WN1AVT. K1DZG has a VERON code certificate for 40 w.p.m. W1SGL has been made an honorary member of the So. Eastern Mass. ARA. K1O1C is in the hospital. W1KHV has an electronic parts store. W1ONK had an operation. W1AEC is now on 6. W1AOG has an HW-12. The 6-Meter Crossband Net had 20 sessions, 359 QNIs, 36 traffic. Net certificates have been issued to K1s UZA, ZBZ, WA1CEV. K1FEV is on 6. New officers of the Massasoit ARA are W1NZP, pres.; W1GRN, vice-pres.; K1HNP, treas.; K1DSU, secy. W1MMC gave a talk on Simple Test Equipment. Wellesley ARS had an ARRL

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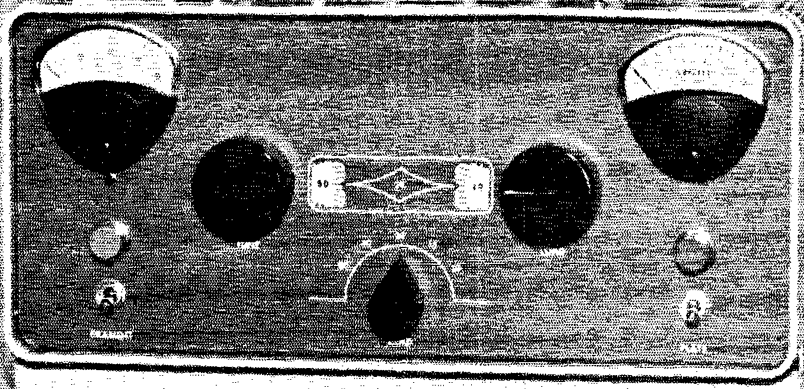

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movie. Waltham ARA, W1MHL, now meets in the American Legion Home in Waltham the 2nd and 4th Wed. K1JBL is secy. W1KKB moved to N.H. W1EMG has a TCC certificate from W3EML, director. W2QHQ, treas. of M.I.T. RS, W1MX, says they are looking for RTTY gear. W1CTW spoke on Wide Band F.M. at the Quannapowitt RA. The Danvers Club, through W1ZMO, is going to have code practice on 10. K1PNB sent out a nice EMINN bulletin. K1YSJ and WN1CJJ have net certificates. Appointments endorsed: W1s LVK, HKG, K1AQI and K1VCO as ECs; W1NF and K1LPJ as OOs; W1AOG as OES; W1MX and K1YKT as ORSs, W1s AOG, MX and AAR as OPSs. W1OFK has been endorsed as OBS. W1ZWQ is working in West Hartford. The Milton ARC 10-Meter Net is back on 28.6 Mc. Mon. at 8 P.M. K1JLV is N.C. K1VCO gets on the air some Boston College HSC. W1BCH, is on the air with an HT-32A, an HT-33B, an SX-101A and a TH-3 tri-bander 60 feet up. Members are K1TTY, K1VGM, WN1CRT and WN1DHP. W1DBR became a General in just six months. K1BPJ is on 20-meter s.s.b. every A.M. from 6 A.M. EST until 0700, using a barefoot TR-3 and works many /MM stations. Navy and Merchantmen 12AVS Vert. He says congrats to W1PEX on his traffic-handling. Traffic: (Feb.) W1PEX 1922, WA1CRK 257, W1DOM 227, K1VPJ 174, WA1DAG 147, W1OFK 81, W1ZSS 72, K1PNB 61, W1LES 51, K1ESG 40, W1SIV 36, K1BGK 29, K1WHM 19, K1WJD 16, K1GKA 14, W1JDP 14, W1ATX 12, W1CTR 11, W1IIP 11, K1LCQ 11, K1FJN 10, W4YAC/1 10, WA1DJC 9, WN1CRR 7, K1FZE 7, W1AKN 6, WA1CLR 6, K1VOK 6, WA1DLT 4, W1AUQ 3, K1DZG 2. (Jan.) WA1DAG 40, K1WJD 20, K1YKT 8. (Dec.) K1YKT 53, WN1CYX 9. (Nov.) K1YKT 17. (Oct.) K1YKT 4. (Sept.) K1YKT 124.

MAINE—Acting SCM, Herbert A. Davis, K1DYG—SEC: K1DYG. PAMs: K1BXI, K1ZVN. RM: WA2NPU. V.H.F. PAM: K1QIG. Traffic nets: Sea Gull Net, 3940 kc. 1700 to 1800 and 2000 to 2100 local time Mon. through Sat. Pine Tree Net, C.W., daily on 3596 kc. Two-Meter Net, Phone and Traffic, 145.08 Mc. Thurs. 1930 to 2030. C.d. nets meet on Wed. and Sun. A meeting of the Kennebec County AREC was held in Waterville at the QTH of K1NFL's business with twenty hams present and included a county talk by K1BZD, a state talk by K1DYG and a technical talk by K1PMR. A belated tribute to a Silent Key, W1HSW, of Woolwich, Maine. He started in amateur radio in 1918 and worked c.w. only until 1947. He held the ARRL Code Proficiency certificate for 25 w.p.m. and converted many surplus jobs over for himself and others. He always had time to help a friend in need and through his work many got to where they now are. In 1947 he received an award for meritorious radio contact work in connection with the Maine Forest Fire Emergency and was a member of the Rag Chewers Club. With his ability in c.w., low pleasing voice on a.m., quiet personality and desire to help others he is going to be sadly missed by all who had the pleasure of knowing him along the way. Traffic: (Feb.) K1TMK 193, K1NAN 142, K1TVT 79, K1DYG 14. (Jan.) K1TEV 4.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: W1ALE/W1TNO. PAM: K1APQ. RM: W1DYE. Granite State Phone Net meets on 3842 kc. (alt. 3845) Mon. through Fri. at 2400Z and Sun. at 1430Z. VTNHN meets on 3685 kc. Mon. through Fri. at 2400Z. New appointees: W1BXM and W1DUB as OES. Endorsements: W1TFS, K1NBN, W1PYM and W1SWX as OOs, W1BYS as OPS and K1FXM as OES. Yours truly enjoyed a visit to the Midstate Amateur Radio Club. Your SEC, W1ALE, gave a fine talk on the AREC. W1IIQ was elected EC for Belknap, Carroll and Coos Counties. The Contoocook Radio Club has the following officers: K1OXO, pres.; W1JXZ, vice-pres.; K1VWM, treas.; K1BGI, secy.-trustee. GSPN certificates have been issued to K1GQH and K1YSD. The Manchester Radio Club's new officers are K1ISJ, pres.; WA1BGR, vice-pres.; K1WPM, secy.; W1YHI, treas.; K1FXM, act. mgr.; K1WPM, control chairman. The club meets the 1st Fri. of every month at 8 P.M. at the South Main St. Fire House in Manchester. For information contact K1FXM, c/o W1HPM. The GSPN, with K1APQ at the helm, reports 388 check-ins and 14 traffic. K1NBN has a new 32S-3. W1YMJ is now on 6 meters. The VTNH Net reports 81 check-ins and 27 traffic. W1AXW, of Dover, is now a Silent Key and will be missed on the bands. Also a GSPN member from Mass., W1KWW, is now a Silent Key. The 6-meter gang is handling a lot of traffic. How about more news from you folks? Traffic: K1BGI 68, W1DYE 19, W1SWX 11, K1IIK 5, W1JB 4, K1AEG 2, W1EVN 2.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE. PAM: W1TXL. RM: W1BTV. V.H.F. PAM: K1TPK. Endorsements: K1NKR as ORS. RIN

Clegg APOLLO SIX METER LINEAR AMPLIFIER

The Clegg APOLLO SIX linear amplifier provides big station six meter performance when driven by the outstanding Clegg VENUS transceiver. A whole new area of amateur experience awaits you with the clean, powerful sideband signal from this matched pair, and with the further aid of the Clegg SS BOOSTER, the resultant signal is without equal on six meter sideband. The APOLLO may also be driven by other SSB exciters to full output and by AM exciters such as the 99'er at reduced output levels. Many unusual features are included – the result of years of successful Clegg experience in the design of VHF amateur equipment.

SPECIFICATIONS AND FEATURES

- Power input is 675 watts peak DC.
- Parallel final tubes pi-network coupled for 50-70 ohm output.
- RF Power Output

SSB (PEP)	350 W
CW	350 W
AM	75 W carrier with 180 mil. plate current

- Power supply built in, using the latest solid state techniques.
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  Grid Current Relative Output Plate Current
- Instant Exciter/Linear selection when used with the VENUS (other units require plug-in accessory relay).
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- No neutralization is necessary.
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- Physical Dimensions: 15" wide, 7" high, 10½" deep.
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report: 20 sessions, 107 QNI, 74 traffic. RISPN report: 28 sessions, 589 QNI, 109 traffic. The NCRC Club of Newport had as its guest W1QV, N.E. Division Director, who spoke on the activities of the League and appointed W1TXL as Asst. Director. Your SCM also was guest of the club and presented W1TXL with his 52nd BPL card. The club will hold an auction May 17 at the clubroom in the Seamen's Church Institute. New members of the club are WA1GDB, WN1DOJ, W1RDH and W1VQP. The W1AQ Club of Rumford attended a meeting of the W1DDD Club in Woonsocket on Laser Transmissions. WRI certificates: No. 60 issued to K1-UXS and No. 61 to FG7XL. The XYLs of W1BMG and K1AGA presented them with new harmonics. K1-NKR was elected secy. of W2SZ, the RC of Rensselar Institute. W1YKQ has a new converter for 6 meters and also is building a rig for 6. W1BTV and K1YYI request any slow-speed c.w. operators interested in net operation to contact them. Net operation will be on 80 meters. Traffic: W1TXL 523, W1YNE 141, W1BTV 84, W1-YKQ 80, K1TPK 62, K1YYI 37, K1YEV 34, K1USD 33, K1VYC 32, K1BRJ 13.

VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA. RM: W1WFZ. Feb. net reports:

Net	*Freq.*	*Time*	*Days*
Green Mt. Net	3855	2130Z	Daily & Sun.
Vt. Fone Net	3855	1300Z	Sun.
VTNH Net	3685	2230Z	M through F
Vt. CD RACES Net	3993	1400Z	Sun.

QNI	*QTC*	*NCS*
653	60	W1VMC
153	—	W1UCL
81	27	K1UZG
37	0	W1AD

All nets are operating on summer time. Note the new frequency for the VTNH Net effective Mar. 1. Hope this will allow more rigs to be more efficiently loaded on net frequency. K1IJJ is having a ball on s.s.b. The CVARC had a record meeting in Feb. with 43 in attendance to hear W1ICP, from ARRL Headquarters. W1FRT received local publicity, good and otherwise, when he answered QRRR from a ship near Azores. We appreciate all stations which have filled in as net control during W1VMC's absence. Traffic: K1BQB 497, K1-UZG 46, K1LLJ 20, K1MPN 19, W1KJG 5.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—C.W. Route Manager: K1IJV. The West. Mass. C.W. Traffic Net (WMN daily at 7:00 P.M. 3560 kc.) handled 98 messages during February. Stations in the net in order of activity: K1IJV, K1WZY, W1-ZPB, W1BVR, W1DVW, K1LBB, K1SSH, K1ZBN, K1-YMS, W1DWA, W1ZEL, W1MNG, W1MND, K1VPN, K1ZZI, W1AMI, K1YST and W1MEW. EC W1OY reports that Westover AFB will have a trailer operative on all ham bands with a power of 1000 watts early this spring. K1RYT reports that there are seven new hams in the Williamstown area with more on the way. K1-WZS is moving to Rhode Island. K1KBQ/8 is participating in an engineering training program. K1DGA, was the speaker at the monthly meeting of the Berkshire County Club. W1GTO has completed a 6-meter transistorized converter. W1FXO is on 160-meter c.w. K1VPS, DDB and OPG handle MARS traffic. W1GTO worked VP1PV and 4UITU on 80. K1MRP still is butting out the DX. W1WF hooked CE0AG for a new one. Watch for Gus, AC5H, on 14.035, 14.065 and 14,110 on s.s.b. daily at 1300Z. Speakers at the 10th corporate anniversary meeting of the Hampden County Radio Association were W1LVQ and W1HDQ from League Headquarters, and 18 club past-presidents minus one. W1JWV presented the entire club history. Traffic: W1-BVR 68, K1IJV 65, K1SSH 58, K1LBB 41, K1RYT 35, W1ZPB 28, W1DWA 20, K1ZBN 11, W1DVW 7, K1WZY 2.

NORTHWESTERN DIVISION

IDAHO—SCM, Raymond V. Evans, K7HLR—PAM: W7GGV. The Lewiston-Clarkston Club's new pres. is K7THX; secy.-treas. is W7VOU. New plans include disaster communications for the area. W7GMC still is holding down the NTS TCC spot. New Gear Dept.: K7ZPQ a TR-3, K7UAE an NCX/3 and K7KBV an SB-33. W7FMP and K6KWX/7 are building new s.s.b. exciters. FARM Net traffic: 27 Traffic: K7HLR 257, W7GMC 53, W7GGV 6.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—Asst. SCM: Harry Roylance, W7RZY. SEC: W7KUH. PAM: W7YHS.

Montana S.S.B. Net 3910 kc. M-F 1800 MST

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"I am very delighted with the first V80 and want another for a different location." A. C., California.

CASE HISTORY #159
"I ordered a Gotham V40 Vertical Antenna and found it so successful that several others are wanting them, too. Will you please send me four more." W. A., Alaska.

CASE HISTORY #248
"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/43, a WAC of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

CASE HISTORY #111
"The V160 did a beautiful job on a VE1 for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when I bought it." D. S., New Jersey.

CASE HISTORY #613
"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success — i.e., DL4s, ZS3, etc., all solid copy." R. D. S., Penna.

CASE HISTORY #483
"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

CASE HISTORY #146
"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. I., Nebraska.

CASE HISTORY #555
"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

CASE HISTORY #84
"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

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- Non-corrosive aluminum used exclusively.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price.

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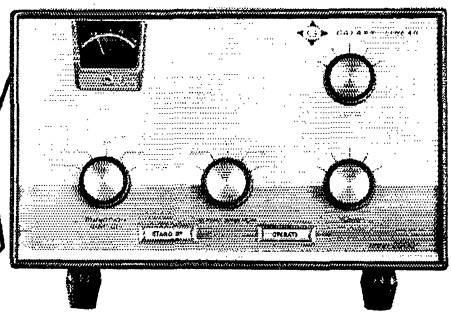
News from the Billings Area brings word of a new SR-160 for the club down there. K7YEM has a new SB-200. K7TZZ's recent DX was TG9DR. W7RYZ, ex-W4MUH, is back in Butte after being away for a few years. W7EGN, at Whitefish, has a new final on 2-meter c.w., 400 watts. 21 Section Net certificates were sent to outstanding members of the Montana S.S.B. Net during February. K7KOK has returned to Bozeman from Thailand, where he was HS1L. KN7VRH has a new SB-300 receiver. New officers of the Butte Amateur Radio Club are W7NML, pres.; K7GVJ, vice-pres.; K7-TZZ, secy.; K7NDV, treas.; W7CJN, W7CDW, W7FSP, trustees. Officers of the Yellowstone Radio Club, Inc., are K7VSS, pres.; K7TGR, vice-pres.; K7QLP, secy.-treas.; W7YHS editor. Officers of the Anaconda Amateur Radio Club are K7YNZ, pres.; W7EQP, vice-pres.; W7TUO, secy.-treas.; W7BKB, act. mgr. K7-PKW and K7ECF have new SW-350s. W7ZKA is now on RTTY. W7FSP is getting on 2 meters in the Butte area. Traffic: K7EWZ 52, W7NPV 37, K7SVR 25, K7-UPH 10, W7F1S 9, W7OIO 2.

OREGON—SCM, Everett H. France, W7AJN—SEC: W7WKP, RM: W7ZFH. Oregon State Net Mgr. K7IWD reports OSN sessions 20, attendance 92, high 8; traffic 45, high 19, average 2.25, BRAT awards to W7ZFH, K7IWD. In looking over old records of this net, we would like to give you some facts that many amateurs of Oregon do not know. The Oregon Emergency Net (OEN) sponsored this net as the Oregon Slow Net for purposes of beginners and phone operators who might want to brush up on code and prospective traffic operators, etc. The first session started Sept. 12, 1949, and was directed by W7ESJ, who was well known as a traffic-handling expert. Certificates of membership were issued to members as soon as they were qualified, No. 1 to W7MQ, No. 2 to W7ESJ. Others included late W7-ADX and W7GNJ, and many others who were very active on OEN. W7AJN holds OSN certificate No. 15. OEN also has a fine record as tiles indicate. A report on Oregon's December storms and floods were received from K7PHP. Here are a few highlights: Between Dec. 19 and Dec. 27, 1964, amateurs went into operation on 2 and 75 meters setting up a network for the Red Cross. A partial list of 59 hams took part for over 5 days. No station activity reports were received this month. Traffic: K7IWD 272, W7ZB 110, W7ZFH 63, K7DVK 14, W7JHA 12.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—Asst. SCM/SEC: Everett E. Young, W7HMQ. RM: W7AIB. PAM: W7LFA. V.H.F. PAM: W7PGY. Some thirty persons attended the 18th Annual Banquet of the Puyallup Valley Amateur Radio Club at which the following were elected: W7MCU, pres.; W7DNU, vice-pres.; W7IYU, secy.; K7LVS, treas. The ARAB of Bremerton is proud of the results of the first class in its code and theory school with one General, ten new Novices, one Technician and one awaiting his General Class license. K7GQJ, new pres. of the West Seattle Amateur Radio Club, has made space available in his basement for a code and theory class and at present is QRL installing new test gear. W7WPR and his XYL, WN7BJR, moved to Bremerton vicinity. K7VUS and W7DND have new mobile rigs. K7VVB soon will be operating from the Antarctic. New officers of the Puget Sound Council of Radio Clubs are W7MEU, pres.; K7-JBZ, vice-pres.; W7HMJ, secy.; W7EJD, treas. K7OUX has purchased an Apache and an SB-10. A new EC appointee is K7NZO for the YLRL. W7SAP reports 130 messages handled to and from patients at the V.A. Hospital in Vancouver. K7KJB, K7KFT and W7s CTS, DQM, GUJ, HMQ, SAP; UWT and YFO are all filing annual reports to Headquarters. Have you sent yours in yet? The VARC is busy with code and theory classes in Puyallup High School with 11 to graduate. A new net, the Washington Teen-Age Net, has been formed and is operating at 1700 PST on 3935 kc. WN7AUP exchanged his WN for a WA and is active on 80, 75 and 20 meters. W7SAB is lining up contacts for testing ham TV. K7KSE was active in the Oscar III program. ZB2BB was heard by many W/K stations in the Spokane area recently. K7TCY has a new NCX-5 transceiver. The Puget Sound AREC Net is active every Mon. at 2000 PST on 50.85 Mc. with K7PZX as NCS and K7WTG as ANCS. K7CHH is QRL school and only has time for Bulletins. The Noon Time Net had 1313 pieces of traffic with 1161 check-ins for Feb. with a high of 378 pieces for 1 session. K7OFX is active on Navy MARS RTTY. K7JOA has his Valiant going with the sideband adapter. The Northwest Slow Speed Net had 28 sessions with 201 QNIs and 71 QTCs for Feb.

BREAK THROUGH



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This is my final report as SCM for Washington, a privilege I have had the honor to hold for the last seven years. Once again I want to thank each and every one of you who have contributed so much to making our station activities stay up where they rightfully belong. One final item: Wanted, 1 EC for Skagit County and 1 EC for Island County. Contact W7HMQ in Puyallup. Traffic: W7DZX 1151, W7BA 841, K7JHA 654, W7NPK 356, W7IBR 261, K7CTP 199, W7APS 128, K7TCY 95, K7ZPM 94, W7BTB 54, K7IAE 38, W7AMC 26, W7AIB 20, K7URU 20, W7JEY 12, W7OEB 4.

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—SEC: WA6OLF. WB6ILH has an Eldico SSB-100. W6TYM made 470 C.W. QSOs in the Jan. CD Party and participated in the Feb. FMT. From WA6WNG: A plea for more QNIs to NCN, which meets every night at 0300Z on 3.635, especially from Alameda County. K2RDP/6 operated W6BB from the Activities Fair at U.C. W6CBF is quite active on 20-meter s.s.b. working such stations as KC4USG and KC4USH. WB6ETY is now in Livermore. WA6PTU provided communications from WA6AHF to his XYL, who was in the hospital. WA6WNG has his TA-33 up on a 40-ft. tower. WB6CSD, WA6PYP and K6UJS are Asst. ECs under K6TFT in Napa county. From the NBARA Paper: "Every government degenerates when trusted to the rulers alone. We cannot be ignorant and free." T. Jefferson, no call. W6OJW got his 2-meter gear set up for Oscar III. W9KFG, new at VOA/Dixon, operates a Ranger and an SX-117 to a Hy-Gain vertical. WA4GNZ also is new at VOA. His specialty is RTTY. The ORC is planning 5-band operation for FD. Bouquets to the gang at K6NCG, who put on code practice Mon., Tues., Wed. and Thurs. at 0300Z on 3.785. WA6UHO has enlisted in the army for a 4-year hitch. K6LRN has a 75A-4. WB6JGS bought my Swan and will be mobile on 75. WA6MIE bought WA6ERU's 50-ft. tower and 20-meter beam and with the help of K6LRN, WA6NFF, W6LNK, WB6BSD, WN6NUI, W6HOF, WB6JGS and SWL W. Harwell installed same at his QTH with one slight casualty, WA6NFF's 2-meter beam. Thanks to the many clubs who send me their club publications each month. I wish I could use more of the information but by the time it reaches me it is a month old and has been read by the people who are really interested. Most of the news used in this column is from Form 1 cards. I am quite sure that more than the 34 hams mentioned here are active in this section. The NBARA is working on a RACES plan. WB6JQO has a TR-3 and an RV-3. W6TYM and WA6KLL are active OOs in the Livermore area. Don't forget the NCN, 0300Z 3635 kc. every night and the as-yet-unnamed 2-meter net on 145.5 Tue. and Thurs. at 1930, which may be merged with the SCVSN to provide coverage of almost all of northern Calif. A card or letter will notify all hands. Traffic: (Feb.) K6TFT 254, WA6WNG 122, K6LRN 68, K6GK 45, W6BB 31, W6IPW 12, WA6PTU 9, WA6QZA 5, WB6ILH 3, W6TYM 2. (Jan.) K6TFT 230, WA6WNG 128, W6IPW 32.

HAWAII—SCM, Lee R. Wical, KH6BZF—Asst. SCM/SEC: Ernie J. Kurlansky, KH6CCL. PAM: KH6ATS. RM: Vacant. V.H.F. PAM: KH6ECT. EC: KH6FJL. OOs: KH6KS, KH6BZF. OPS: KH6ATS. OBSs: KH6ATS, KH6DXB, KH6EIT. OESs: KH6BAS, KH6UK. KH6 QSL Mgr.: KH6DQ. This is the latest complete list of your Hawaii section ARRL field appointees. Our kudos and alohas to departing OES, K6QKL/KH6, who is returning to W7-Land. Upcoming events: ARRL Field Day . . . June 26,27. National ARRL Convention . . . July 2,3,4,5 at Civic Auditorium, San Jose, Calif. Write WA6YDF, Box 6, San Jose, for advance info/accommodations, etc. KH6BIH made the "500" USA-CA Honor Roll. The No Ka Oe Net meets at 1230 HST Sat. 7290 kc. only with KH6EXR on as NCS. The 50th State Net meets Mon.-Sat., 1900 HST, 3895 kc. The Friendly Net meets daily at 1030 HST on 7290. KH6BWE and KH6BZF, to name a few, did their ARPSC chores during the recent Keapuka Flood—behind shovels, however. KH6ENJ/KH6 has been down with a bad back. KH6BJF is back on 40 after a much-noticed absence. KH6FIL is on 75 running his "afterburner" as he calls it. KH6AT's 1965 Official Bulletin sked: Mon. 7260, 1630 HST; Tue. 7260, 1630 HST; Wed. 7260, 1600 HST; Fri. 7260, 1600 HST; Sat. 7260, 1130 HST; Sun. 7260, 1130 HST. I just received a number of ARRL Form 1s for all stations interested. Send requests to me. See page 6 for address. Traffic: (Feb.) KH6ATS 22, KH6BZF 5, W4EXM/KH6 1. (Jan.) W4EXM/KH6 1.

NEVADA—SCM, Leonard M. Norman, W7PBM—SEC: W7JU/K7JU. The Western States Emergency net on 7225 kc., under the leadership of K7UDG at K7FER as NCS, is now under new leadership of W4UJX/6 operating WA6MOV as the NCS. Thanks a lot, Jim,

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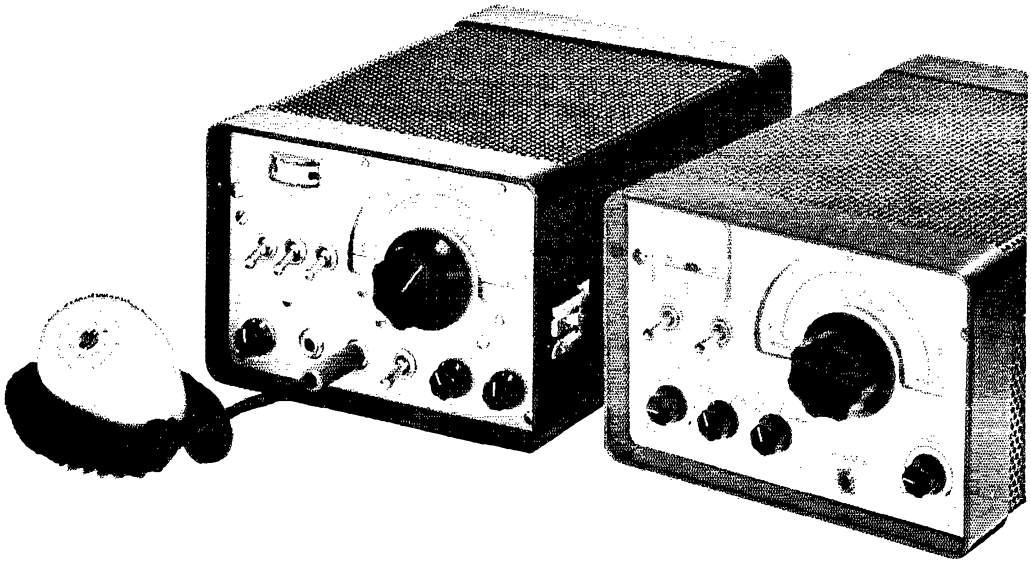

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for a job well done. Members of the NARA presented ARRL books and study guides to various libraries in Reno. W7THH, K7VYT, W7QHH, K7BSE, K7QPX, K7UDG, K7SFN and W7PC assisted with emergency communications and traffic for the c.d. during the flooding conditions in downtown Reno at Christmas. W7CTK gave a talk to the SNARC members on RTTY which was enjoyed by all. K7RKH also gave an interesting talk on 2- and 6-meter s.s.b transverters. W7YDX, W7VYC, W7PRM, K7RKH and W7PEV are working on 6-meter f.m. units. W6JUZ/7 is a new 2-meter station in the Las Vegas area. The RTTYers on a.f.s.k. are about ready to go f.s.k. K7RKH worked K6JYO on 2-meter s.s.b. 225 miles. Traffic: (Feb.) K7FER 730, W4CJD/7 42, WA7BAV 4, K7RKH 3, W7PBV 2 (Jan.) K7FER 310.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—This is my first report as your new SCM. I am short of badly-needed appointees such as SEC, RM and PAM. I need an EC for Del Norte County. W6JDN, active on the Mission Trail Net, still is receiving letters of thanks for messages delivered during the Northern Calif. floods. WA6TQJ reports the Yolo County C.D. ARC is in the process of repairing and improving the capabilities of its rigs. Representatives of the club, WB6AQR and WA6TQJ, met with C.D. officials Feb. 12 and planned a public demonstration for May. K6ORT says the North Valley Radio Amateur Club is active in Redding with about 30 members. The Sacardep Radio Club (Army MARS) is planning code classes at W6SIG. Contact K6VXN or your SCM for details. New officers of the Chirps: WB6AOJ, pres.; K6HHD, vice-pres.; WA6DGH, treas.; K6DLL, secy., K6GUQ, pub. The RAMS had a potluck at its Feb. meeting with CCTV provided by WA6YZO and W6TEE. The RAMS Feb. rabbit hunt was won by W6GDO with W6QHP, the rabbit, hiding at Antelope. WA6QYD is building a 160-meter mobile rig. WA6FWM is on ATV in Chico. K6VOO broke his leg skiing. The NHRC meets on the air Wed. at 1930 on 148.7 Mc. Everyone is welcome. DX men! Let W6NZS, our DX news reporter, know your latest hot ones. New AREC members: WA6FWU, Soda Springs, and WB6DNW, Paradise. Your SCM wishes to be placed on club mailing lists. Don't forget the convention in San Jose this July. See you there. Traffic (Feb.) K6YBV 44, WB6MAE 14. (Jan.) W6JDN 10.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC: W6KZF, W6DEF, of the Northern California Net, is looking for outlets in Marin and Sonoma Counties. The Marin Club *QSA5* was quoted in the ARRL Affiliated Club Bulletin this year, the third time in the year that *QSA5* has been quoted by a national publication. W6CYO has ordered an SB-34 with linear to update his station. W6IFO operated portable from KH6-Land while on a vacation there. W6BYS still is running weekly schedules with KG6SE on Saipan for Fred Goerner, of CBS, who has been investigating there for clues on the disappearance of Amelia Earhart back in the "30s." K6OJO is the new TVI chairman for central and southern Marin County. Too much signal in his frequency meter gave WA6NDZ trouble in the last FMT. An attenuator helped. W6GQA has turned in his old second-hand receiver for a new second-hand receiver. W6SBD is the new treasurer of the Tamalpais Radio Club. WB6GVI reports activity nightly in the Eureka area on 28.8 Mc. at 2000. W6SLX, the EC in Eureka, continues to send in reports on the devastation caused by the Christmas floods in that area. W6GHI insisted on clean and polished mobiles and operators in suits with ties for the HAMS who supplied communication on 6 meters for the Chinese New Year Parade in San Francisco. W6ARQ is a new OES appointee at Santa Rosa. John is building a 432-Mc. converter. W6CUB, of San Francisco AMRADs, spoke on coaxial lines at the February meeting of the Tamalpais Radio Club. K6LHN is going sideband with Heath gear. WA6ULH is in the Hawaiian area on the USS *Atlanta* for special Navy tests. K6TZN tells of being the only communication into the High Rock Conservation Camp during the winter floods. WB6FBS is on a.f.s.k. and plans 2-meter activity. WA6YNL is doing most of his operating at the Petaluma Club station and is active on the No. Calif. Traffic Net and Golden Bear Net. Traffic: WA6YNL 41, WB6GLD 24, WB6GVI 19, WA6AUD 12.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—W6SJJ, who is now in Alaska, is holding regular skeds with WA6EDQ. W6BYY is active on phone. WA6OQE had his equipment stolen out of his car. New officers of the Trowel Radio Club are W6JPU, pres.; W6FKL, vice-pres.; K6ACO, secy. WB6LXI is rebuilding. W6SMS had a hernia operation and is now on the mend. W6BJI is the proud owner of an HW-12. WA6RDY has a 4-1000 on 6 meters. WA6JUB has a

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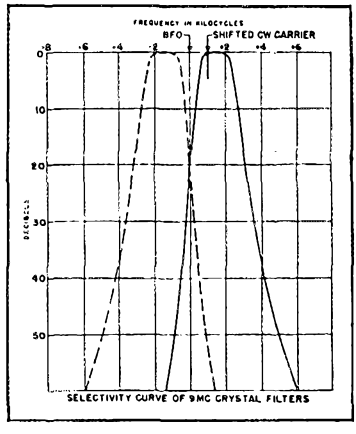

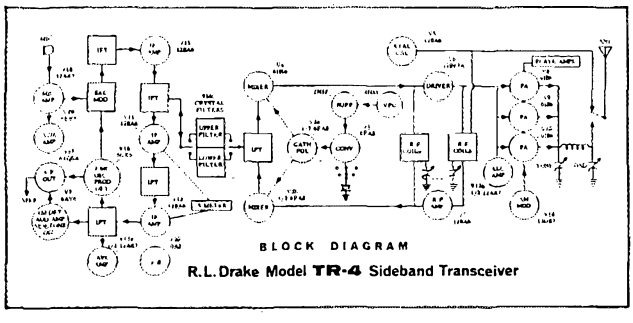

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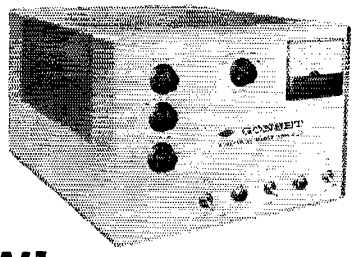
BC-221 to do some frequency measuring. WA6IPZ's new QTH is Dinuba. WA6NCA is thinking of buying an s.s.b. transceiver. W6QFR is putting together an SB-200. K6KEP is on 2 meters with a Heath twoer. W6FIR is operating portable in Meadow Lakes using a IJEO filter s.s.b. rig. W6PSQ is building up an a.f.s.k. for RTTY. W6TZJ is thinking of building a solid state s.s.b. exciter. WB6HVA is the new editor of *Skip*, the Fresno Amateur Radio dope sheet. W6TZJ has a 27-ft. dish for 1296 Mc. W6ADB is handling traffic on NCN and RN6. There doesn't seem too much activity or I'm missing some of it, so if any of you are reading this, please send me news of what you're doing or building. Traffic: (Feb.) W6ADB 146, WA6VPN 126, WB6HVA 57. (Jan.) WB6HVA 68.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM, Ed Turner, W6NVO. SEC: WA6HVN. RM: W6QMO. V.H.F. PAM: WA6RRH. The Santa Clara Valley Section Net reported 5 sessions, check-in of 16 and traffic of 6. The net meets daily at 8 P.M. local time on 146.7 Mc. WA6RRH again is net manager and V.H.F. PAM for the section. The Northern California Net, combined section net, NTS, for this section, is now being reported by W6DEF. Hal put out a fine bulletin for February, *Short Skip*, the Santa Cruz Radio Club paper, edited by Don Ward, lists K6EUR as the speaker for March, talking on propagation. The club claims membership from Watsonville to Hawaii. *Paaragraphs*, the paper of the Palo Alto Amateur Radio Association reports the club hosted W6RH as speaker during February, speaking on the early days of radio. Ralph's XYL W6SH also attended the meeting. *Standing Waves*, bulletin of the South County Amateur Radio Society, reports that the February meeting featured a rummage-auction sale. *The Juke Box*, of the Santa Clara County Amateur Radio Society, reports that the February meeting featured K6CME, who spoke on "technical materials." That is the extent of the club bulletins sent to the SCM this month. If your club is not mentioned, it is because no news has been received of your club's activity. If your club or group wants mention in the SCV column, be sure to have your secretary contact your SCM, or send along a copy of your club paper. My address is listed in *QST* page 6. W6IBW, EC for Palo Alto, sends a nice newspaper clipping of the activity of the radio club at Cubberley High School. Also mention of an award to amateurs John Collins, H. A. Thompson, Herbert Kesler and William Townsley by Moffitt Naval Air Station for work in handling traffic to sub-hunter squadrons. W6JXK made BPL on originations plus deliveries and didn't even notice. W6YBV suggests improvements for NCN including suggestion for an earlier meeting time. K6DYX reports the RATTS Net time changed to 0400Z, Tues., Thurs., Fri. and Sat. Smitty's OBS sked also is changed to 0330 Tues., Thurs. and Sat. on 3625 and 146.7-Mc c.w. immediately following. W6QMO reports NCN certificates were issued to W6AGR and W6JXK. Jeri is busy on NCN and with the National Convention. W6PLS is busy with the QCWA Annual QSO Party. W6YHM now is on RTTY to fulfill his New Year's resolution. W6AUC is active as OO and OPS/ORS. W6JSA is a new ORS. Frank is in Sunnyvale and works with the Oscar traffic group. K6PJW, EC for San Mateo, reports that the San Mateo net frequency has been changed from 28.7 Mc. to 14.225 Mc. at 2000 PST Wed. Traffic: (Feb.) W6RSY 509, W6JXK 225, W6YBV 204, K6DYX 145, W6AGR 133, W6QMO 108, W6DEF 105, W6PLS 63, W6ZRJ 58, W6HC 36, W6YHM 20, W6AUC 14, W6RFF 7, WA6JSA 6. (Jan.) W6YBV 256.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK. RM: WA4FJM. PAM: W4AJT. V.H.F. PAM: W4HJZ. Congratulations are in order to WA4PDS on her TCC certificate, to K4CDZ and W4LEV for making BPL again and to K4BGX, new net manager of THEN. WA4ICU says that now the basketball season is over and he has a new transmitter and has overhauled the antenna farm he is going to be more active on the net. W4EVN has four stacked halos now on 2 meters. W4ACY has a new 6&2 Viking Thunderbolt finished and a new TR-3 mobile. W4HJZ says his 2-meter gear is ready for Oscar III. According to W4WUW, WN4UXU and WN4TUC were active in the Novice Roundup, and W4WYV is on 80 with 400 milliwatts. New appointments: W4BDU as ORS; K4CDZ and W4WUW as OOs; K4CVJ, K4HZP, K4TTN and WA4VTV as OPSs; WA4FJM as OES; K4CWZ and WA4GMB as ECs.

POWERFUL BIG NEWS



NEW!...2 METER–6 METER RF POWER AMPLIFIERS

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Amateur Net Price $299.00

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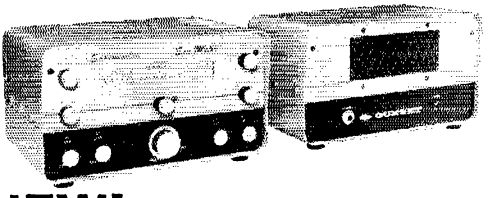

NEW!...GONSET SIDEWINDER 6 METER SSB-AM-CW TRANSCEIVER

The new Gonset Model 910A *Sidewinder* offers coverage of the entire 6 meter band in 1 mc segments. Like its mate—the Model 900A 2 meter *Sidewinder*—this ultra-compact transceiver features all-transistor receiver and power supply and partially transistorized transmitter (except mixer, driver, and final stages). Designed for mobile or fixed communications, the unit operates with separate AC (shown above) or DC power supplies.

...COMES IN POWERFUL LITTLE PACKAGES from GONSET

SIDEWINDER SPECIFICATIONS:

TRANSMITTER:	
Power Input:	20 watts PEP (SSB) 6 watts AM 20 Watts CW
Spurious Mixer Product Suppression:	—50 db
Carrier Suppression:	—50 db on SSB
Unwanted Sideband Suppression: VFO or Crystal Control	—40 db
RECEIVER:	
Frequency Stability:	Highly stable incremental tuning utilizes same VFO as transmitter
Sensitivity:	½ μv or better for 10 db $\frac{S+N}{N}$
Selectivity:	Lattice crystal filter for both receiver and transmitter
Spurious Rejection:	—50 db or better
Image Rejection:	—50 db (both receiver and transmitter utilize double conversion)
AMATEUR NET:	$399.50
AC Power Supply	$ 67.75
DC Power Supply	$ 79.50

ANOTHER NEWSWORTHY NOTE: *the Gonset GSB-201 Linear Amplifier was recently increased from 1500 to 2000 watts PEP (SSB). For those who operate on 10 to 80 meters—the GSB-201 is a natural companion for any of today's exciters.*

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Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
NCN(E)	3573 kc.	2230Z	Daily	220	K4CDZ
NCSSBN	3938 kc.	2330Z	Daily	129	WA4LWE
NCN(L)	3573 kc.	0300Z	Daily	91	WA4ANH
THEN	3865 kc.	0000Z	Daily	41	K4BGX

Traffic: (Feb.) W4LEV 3801, K4CDZ 238, WA4PDS 234, W4LWZ 215, W4EVN 131, W4IRE 130, WA4LWE 85, W4BDU 65, K4CWZ 59, WA4ANH 35, WA4VTV 30, W4BNU 27, WA4PYJ 26, K4TTN 22, W4AJT 20, WA4-FJM 19, K4GNX 17, K4EO 15, WA4ICU 15, K4IEX 14, K4QDO 6, W4ACY 4, WA4GEU 4. (Jan.) W4AJT 6.

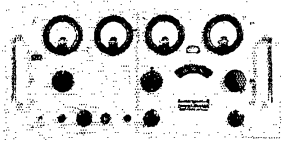
SOUTH CAROLINA—SCM, Charles N. Wright, W4-PED—SEC: WA4ECJ. RM: WA4PFQ. PAMs: K4LNJ and K4OCU.

Net	*Freq.*	*Time*	*Sess.*	*QTC*	*QNI*
SCN	3795 kc.	Daily 0000Z-0300Z			
SCEN	3820	Daily 0000Z	28	16	174
SCSB	3915	Daily 0100Z	28	146	986

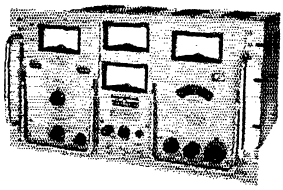
Don't forget the Sideband Supper May 1 and the Greenville Hamfest May 2. The Anderson Club received a nice write-up, featuring WA4HFA and WN4YAW, in the local paper. WA4HFA reports that 2-meter activity is increasing in Anderson. The Rock Hill Club sets 100 per cent Extra Class licensees as its goal and is conducting classes toward this. The Palmetto Club has published a directory of all hams in the Columbia area. WA4NIG, WA4GVZ, K4NHN, W4NZK and others QSO nightly between Aiken and Columbia on 6 and 2 meters. Statewide communication on these bands is possible on a consistent basis if you'll try it. Traffic: K4LNJ 75, W4PED 53, K4BMI 36, W4WQM 36, K4OCU 21, W4NTO 18, WA4QKQ 16.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM and SEC: Harry J. Hopkins, W4SHJ. PAM: W5-VZO/4. RMs: W4ZM, WA4EUL, W4SHJ, W4QDY. VSBN Mgrs.: K4SCL and W4OKN. VSAM: WA4UXL. W4DKP has stepped down as PAM. Thanks, Bill, for an FB job! WA4EUL is sporting a new 14AVQ vertical for c.d. and DX. WA4IVM is now pres. of the VPI Club, K4-KDJ. W4KRT and his XYL have a new jr. operator named Andrew. W4NTR has new skeds with W6ZJB, K6MCA and KH6BGS. Former Va. trafficker W4DLA wishes his friends to know that he has his old call, W2-ESI, back. K4GRZ is enjoying going to EAN as the Fri. 4RN rep. Chazz also says that the BRSN seems to be coming along with its training program. K4LMB has a new 15- and 20-trap dipole which she shares with OM W4TE. W4UIS acquired a Clegg Venus for s.s.b. and is a regular member of the ODSBN (Old Dominion Sideband Net). K4AET is revamping the station and antennas. W4PTR says that his 50-ft. tower fell on the house during a windstorm the day before the C.W. DX Test. W4DVT now has a Heathkit SB-200 on the air. WA4KUI reports a DX-60 driving an HB linear at about 340 watts. K4IKF spent most of Jan. checking VA. QSO Party logs but did get into the CD Party with a new amplifier and pair of 813s. W4JUJ received the WAMC Award and now has YLCC/400. He says not to forget about the VA. CWC Award—it expires May 31, 1965. WA4AYP is performing the liaison stint for the ODSBN. K4WUM worked XE3 on 20-meter mobile! W4YZC is filling in as NCS on VN in the vacant spots. W4MXU reports a fine trip to Hawaii. W4KFC had 133 QSOs in the January Phone and C.W. Parties. He worked ZD8CI for a new country. Traffic: (Feb.) W4NTR 563, K4SCL 224, W4DVT 190, K4LJK 169, W4NLC 152, WA4EUL 138, W4RHA 126, K4FSS 116, K4NCP 106, K4GRZ 99, WA4TZF 92, WA4AYP 91, W4SHJ 82, W4OKN 76, K4YCH 76, W5VZO/4 76, K4ITV 72, K4MXF 57, W4MXU 47, WA4DAI 34, W4-ZAU 28, W4TE 25, K4LMB 23, K4WUM 22, WA4JRY 20, W4ZM 20, WA4KUI/4 19, K4MKO 19, W4QDY 19, WA4JXO 16, WA4FSC 15, W4JUJ 15, K4SDS 12, W4YZC 12, W4UIS 11, W4MK 8, W4BZE 7, K4PIK 5, WA4KVR 3, K4NOV 3, WA4HBC 2, K4IKF 2, W4PTR 2. (Jan.) K4JDK 12, W4BZE 8, K4SDS 7, W4KFC 3.

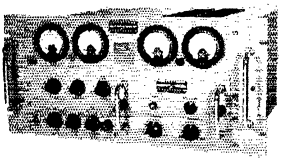
WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. RM: W8LMF. PAM: K8CHW. S.S.B. Net Mgr.: W8EEO. West Va. Nets meets on 3570, 3890, 3903 and 3905 kc. The Grafton Radio Club will issue an attractive certificate to all working a club member during Mother's Day. W8HZA has 31 states on 160 and was quite active in OO work during the Novice Round-up. WA8FIC comes up with BPL again! K8CHW reports WVN Phone had 20 sessions, 507 stations and 84 messages. K8TPF for WVN PON reports 27 sessions, 193 stations and 226 messages. W8JM attended meetings of the Charleston and Huntington Radio Clubs. WA8-BUM is a new OPS in Princeton. WA8JWM is pushing v.h.f. work in the Newell area. The Tri-State ARC will



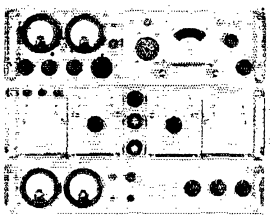
- **TMR-2A:** 215 to 265 mc Tuning Range; VFO or XTAL controlled. FM or PM.
  FM demodulators—Wideband, Narrowband, Phase lock.
  Phase Demodulators—Short loop.
  Pre-D: Plug-in record and playback modules.



- **TMR-5A:** 55 to 2400 mc; Tuning Units VFO or XTAL controlled. AM/FM, PM.
  FM Demodulators—Wideband, Narrowband, Phase lock.
  Phase Demodulators—Short loop.



- **TMR-6:** 50 to 1000 mc; Fixed Frequency XTAL controlled RF Tuning Units. AM, FM or PM.
  FM Demodulators—Wideband, Narrowband, Phase lock.
  Phase Demodulators—Long loop.
  Pre-D: Plug-in record modules.



- ***TR-101:*** *100 to 2400 mc; Tuning Units VFO, XTAL controlled* and Automatic Phase Control. AM, FM or PM.
  Dual Data Channels.
  FM Demodulators—Wideband, Intermediate, Narrowband.
  Phase Demodulators—Long loop, Short loop.

- **TR-711:** 100 to 2300 mc; Tuning Units VFO, XTAL controlled and Automatic Phase Control. AM, FM or PM.
  FM Demodulators—Wideband, Intermediate band, Narrowband.
  Phase Demodulators—Long loop, Short loop.
  Plug-in display unit or Pre-D record and playback modules, or oscilloscope.
- These receivers are compatible with TDC and DC series Diversity Combiners and the PRU-1 and PD-101 Predetection *Record/Playback units. Plug-in IF bandwidth determining* modules and plug-in demodulators are used in these receivers.

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hold a club picnic at Camden Park in Huntington June 6. WA8KUW is interested in finding some chess-playing amateurs. W8SSA has a new antenna and is active on 75. W8LMF, the new pres. of the Tri-State ARC, reports for WVN C.W., 23 sessions 107 stations and 69 messages. The West Virginia State ARRL Convention will be held at Jackson's Mill, July 3 and 4. Contact W8DUV for information. W8MIS is active in c.w. DX on 3.5 Mc. Congrats to W8PQQ, trophy-winner in the World-Wide DX Contest. Traffic: (Feb.) WA8KUW 224, K8TPF 213, WA8FIC 178, K8WWW 72, W8CKX 63, K8KST 37, W8HZA 28, W8LMF 20, W8AVW 11, K8CHW 10, K8WMQ 9, WA8DAU 6, W8DUV 3, W8JM 2. (Jan.) WA8FIC 170.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØTTB—SEC: WØSIN. PM: KØFDH. Tentative dates of July 17 and 18 have been set for the ARRL Convention. The place has not been determined yet. KØATZ, "Slats" Council, will be convention chairman. The place and dates of the South Fork Hamboree will be June 4, 5,6 at Moon Valley Lodge, South Fork, Colo. KØKUP will be convention secretary. These are the only Colorado ham doings we have record of at this time. Skip has shortened some making traffic a little faster and easier to handle for the nets. High Noon Net traffic: 273. Traffic: KØDCW 106, KØZSQ 100, WØSWK 49, WØSIN 36, KØLCZ 11, WAØJEV 4.

NEW MEXICO—SCM, Newell Frank Greene, K5IQL—Asst. SCM: Kenneth Mills, W5WZK. SEC: K5QIN. Reports show the AREC is making slow but steady growth, thanks to the efforts of W5ROH and K5HTT. Our SEC is now on 50-Mc. s.s.b. with a new HX-30. V.h.f. activity is looking up. A 6-meter club in Alamogordo and the Las Cruces-El Paso-Alamogordo 2-meter group are spreading out. W5AGX finally is getting his TDQ on in Carrizozo. The Caravan Club held a test on c.w. Feb. 22. K5OQM is new president of the Albuquerque ARC with K5JGV, vice-pres.; K5WZA, secy.; K5KTQ, treas. W5ZHN, in and out of the hospital, still is recovering at this writing. W5QKG, who was a shut-in for several years, joined the Silent Keys. Neal was active on 40 and 15. Traffic: W5WZK 116.

UTAH—SCM, Marvin C. Zitting, W7MWR/W7OAD—Asst. SCM: Richard E. Carman, W7APY. SEC: W7WKF. There is a new net in the state, the Utah AREC RACES Net (UARN) which meets each Sat. and Sun. at 1500Z on 3987.5 kc. Net mgr. W7LQE says that amateurs throughout the state are invited to creek in. K7COM is the new RACES officer for Utah. Traffic is moving smoothly on BUN despite skip problems. W7VSS reports that 2-meter activity is growing in Ogden. The Ogden ARC also is becoming more active. WA7ADK has a new 250-watt 6-meter rig. W7POU was busy in the NR and has been working DX on 40, 20 and 15. W7NPU has made DXCC. K7RAJ is getting close to making DXCC. W7BAJ is handling traffic on RTTY. K7SDF, K7HFV and K7HCR displayed amateur radio during the U. of U. Engineering Week. Traffic: W7OCX 97, W7LQE 61, W7VTJ 37, W7BAJ 15, W7MWR 8, K7SDF 6.

WYOMING—SCM, Wayne M. Moore, W7COL—SEC: W7YWE. RM: K7IAY. PAMs and OBS: W7TZK and K7SLM. Nets: Pony Express, Sun. at 0800; YO, Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1230 on 3920. New officers of the Shy-Wy Radio Club: K7VTM, pres., K7HAW, vice-pres., WØUHS, secy.-treas. Good to hear W7PVN back on the air with a new rig. WA7BFV is a new ham on the air in Casper with a transceiver on 75. Let me urge all clubs or organized groups to participate in Field Day and compete for the trophy being offered by your SCM. Also, try to get photos of Field Day setups so they may be submitted to ARRL. Don't forget the Wyoming Hamfest July 3-4 to be held on Casper Mountain. Traffic: K7IAY 70, K7POX 42, K7ITH 27, K7SLM 23, K7OWT 12, K7TFW 8, K7WNF 8, K7VTM 5, W7TEL 4, W7TZK 4, K7WRS 3, WA7CGK 2, W7NKR 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: William C. Gann, W4NML. RM: WA4EXA. PAMs: K4NSU and K4WHW. WA4EXA had the top traffic score in 1964. K4PFM has been 100 per cent QNI AENP (morn) the last 3 months in a row. A new club has been formed at Marion Inst. and offers code and theory classes. K4WHW reports FB work by AENH during the recent WX alert. K4HJX and K4VPP are mobile again. WA4EXB is on s.s.b. WA4GNK has a new 6-er, K4WWN the new S/Line, W4WGI a three-element 20-meter beam and a TR-3, K4RSB a TR-3.

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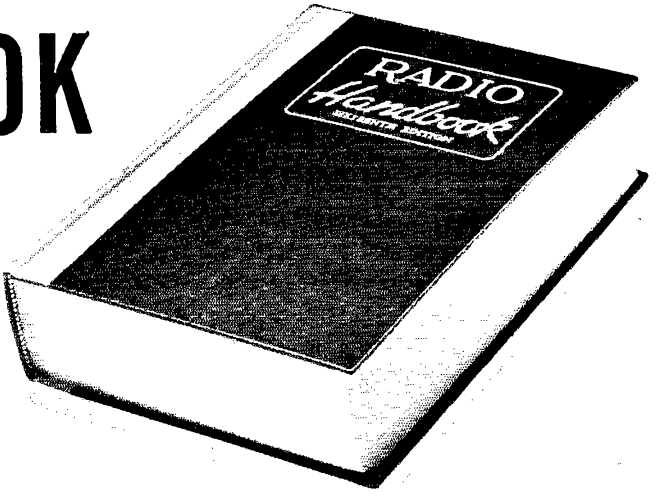

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K4FJZ is building linear. CU at the Birminghamfest May 1-2. Feb. net reports (times GMT):

Net	*Freq*	*Time*	*Days*	*Sess.*	*Ave. T/c.*	*Ave. QNI*
AENB	3575	0100	Daily	31	4.4	8
AENM	3965	0030	Daily	28	5	48
AENP	3955	1230	Mon.-Sat.	26	2.16	11.8
AENP	3955	2400	Daily	32	1.2	13.9
AENR	50.55	0115	Wed./Fri.	8	.5	22.25
AENT	3970	2230	Daily	31	1.83	6.09

If you do not see a section net listed it is because the NM did not get in a report. Maybe you wonder why your local AREC net is not listed. There isn't space for all of them so we just list the section-wide nets. Traffic: (Feb.) WA4HFE 84, WA4JWS 80, WA4EXA 76, K4BSK 68, W4NML 66, K4KJD 49, K4NUW 41, WA4-EXB 39, WA4FJF 24, K4ANB 23, K4WHW 22, WA4HKZ 14, K4NSU 14, K4GXS 10, W4YER 10, WA4EBS 3, W4YRM 3, W4DGH 1, W4YFN 1. (Jan.) WA4SSB 91.

EASTERN FLORIDA—SCM, Albert L. Hamel, K4SJH—SEC: W4IYT. RM: C.W.: W4LUV. RM RTTY: W4RWM. PAM S.S.B.: W4OGX. PAM 40: W4SDR. PAM 80: W4TUB. PAM V.H.F.: WA4BMC. This SCM wishes to correct a statement made regarding the Dade Emergency Net where it was announced that they would go into operation only during emergencies. The error was in accepting the information without checking with the boss-man on its accuracy. I apologize and assure you it will not occur again. W4TRS, the "ham with a new life," dropped by for a chat and to show me that he really is doing fine. That ticker sure does sound funny but it works and that is what counts. Stay with us, Bill. Looks like WA4IJH, that displaced PA citizen, has really done it this time, racking up a total of 1771 pieces of traffic for February. Must be the W3CUL influence. W4EXM writes from Honolulu that maybe the quad will do the trick getting back home. Listen for him, fellers. This is honestly all the news sent in to this office. Follow up your radio reports with a Form 1 so I can have some material. Once again I can report to you a continuing satisfactory increase in our activities in all directions. Keep up the good work and thanks mucho for your assistance. Traffic: (Feb.) WA4IJH 1771, W4DFU 1010, W4URX 944, WA4BGW/4 581, K4YSN 556, WA4OBG 514, WA4BMC 503, K4ADD 464, W4KIS 409, WA4NEV 386, WA1AFP/4 290, K4BY 216, W4LUV 204, WA4OAO 160, K4SJH 149, WA4CIQ 145, W4TUR 135, WA4QLZ 123, WA4VZD 110, WA4FGH 103, K4COO 100, WA4NBE 100, W4SDR 90, WA4JYB 86, K4YOQ 85, K4KDN 82, W4AKB 71, W4-OGX 57, K4DAX 55, W4TRS 53, WA4PDN 48, K4BNE 41, WA4BAW 40, WA4IWO 39, W4FP 37, W4NUH 37, W4EHW 36, K4ILB 35, WA4RXG 33, W4MVD 31, W4AYD 24, W4SCY 19, W4TJM 19, WA4KSC 18, WA4-NBT 18, W4IE 16, WA4IYG 14, WA4FEO 13, WA4FVP 13, W4BAV 12, W4IEI 12, K4MTP 11, K4EBE 9, WA4RHL 9, WA4DEV 7, WA4JZT 7, K4TQL 7, WA4-PWF 6, K4VNF 5, K4MZR 3, K4JZI 1. (Jan.) WA4JYB 64, W4BAV 8, WA4PAS 1, W4WVL 1.

GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: W4SAZ. RM: W4DDY. PAMs: WA4EHT, K4-YZE. A fine collection of club bulletins was received again this month from Atlanta Radio Club, Savannah, Augusta, Lanierland, Georgia Single Sideband Assn., Confederate Signal Corps and a new one from the Greater Atlanta V.H.F. Society. K4NFP is handling traffic from Young Harris. WA4MPD is working at WCHK in Canton. WA4TRP and WA4MPD now are QSO on 420 Mc. K4YZE sends glowing reports from the Cobb County AREC Net. W4DOC, club station, is getting a spring house-cleaning and repainting preparing to install new 2- and 6-meter gear. Advanced radio classes are in progress jointly sponsored by the V.H.F. Society and Atlanta Radio Club. WA4PXB completed WAS. WA4JXL has a new SB-300 and joined MARS. WA4UYT has solved his TVI. WA4KRU has a new homebrew kw. WA4GAY reports that school interferes with ham radio. WA4VMV is Asst. EC. WA4PSA worked in the Phone/C.W. DX Tests. K4TKM has interesting visitors. W4-FRO is s.s.b. with an SB-400. The Georgia State ARRL Convention will be held June 5/6 in Atlanta. An interesting display of ham TV and RTTY is planned by the v.h.f. society as well as equipment clinics and many other features. Traffic: K4MCL 953, K8PWE 224, W4-SAZ 222, W4DDY 187, W4NSO 90, W4RZL 86, W4FOE 78, W4PIM 54, WA4GAY 51, WA4KRU 44, WA4LLI 44, WA4UYT 36, WA4CJN 33, K4YZE 21, K4TKM 19, WA4-JSU 13, WA4VMV 6, WA4PXB 5, K4FRM 3, K4KHH 3, WA4BVD 2, WA4JXL 2, WA4TYW 2, W4VIM 2.

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SX110	89
SX111	149
S38E	39
S108	79
S119	32
S120	44
SR150	395
SR150 AC SUPPLY	69
FPM200	975
HT32	289
HT33	249
HT37	279
HT40	49
HT41	249
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Rules: (1) *Time:* 2300 GMT Saturday, May 15 to 0500 GMT Monday May 17. Any or all of the 30 hour period may be utilized. (2) All emissions and bands may be used, but a station may be contacted only once per band. C.w-to-phone is permitted, but crossband contacts are not allowed. (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, province, or country. (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, provinces, and countries worked. 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:* 1805 3590 3995 7060 7260 14060 14230 21060 21310 kc. SSB 3975 7220 14290 and 21410. 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 10, 1965, should be sent to CARC, c/o Rusty Epps, K4BVD, 1638 Forest Ave., Columbus, Georgia 31906.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: K4NMZ. RM: W4BVE. Section net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*
WFPN	3836 kc.	2300Z	Daily	28	159
QFN	3651 kc.	2330 & 0300Z	"	56	781

Pensacola: W4AXP is out of the hospital. WA4WKL uses an HT-37 and an SX-111. The PARC sponsors regular bunny hunts on 29,560 kc. K4YYG is a local TV sports announcer. WN4VZM is on 2 meters with 50 watts and an eleven-element beam. He is awaiting General. Milton: K4NMZ keeps WFPN traffic up with regular weather reports. K4HOX is going mobile. Fort Walton/Eglin AFB: W4TFL has moved here from Crestview and has a 50-ft. tower and beam up. He joins W4BVE, W4MMW and K4HXS in the same neighborhood! W4SRX has a new 2-meter vertical up 70 feet. W4RKH overhauled the EARS Club's 32V-2/75A-2. W6RTD gave an FB talk on Supermodulation at the Annual EARS Dinner. Defuniak Springs: W4ECM has his HW-12, donated by WFPN members, on the air regularly. Panama City: The 2-meter net now meets Thurs. at 7:30 P.M on 146.97 Mc. New hams on 2 meters include WA4WVM and WA4WVO. Tallahassee: W4MLE is the section's most active OO. Madison: W4RDQ is recuperating from major surgery. Traffic: (Feb.) K4VFY 885, WA4IMC 492, WA4ECY 300, W4MLE 102, W4BVE 92, K4NMZ 90, WA4EOQ 65, WA4NRP 8, WA4NYG 7, K4SOI 7. (Jan.) K4VFY 943, W4TFL 48. (Dec.) W4TFL 77.

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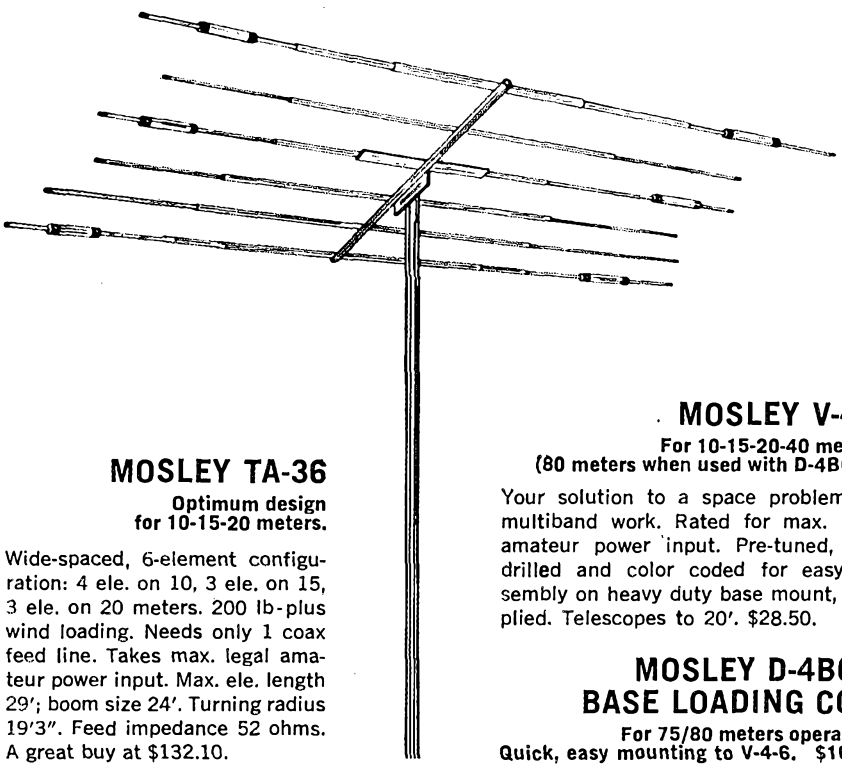

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SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colvar, W7FKK—SEC: K7NIY. PAM: W7CAF. RM: K7TNW. It is with deep regret that we report W7WIQ, of Phoenix, as a Silent Key. New Novices in the Tucson area are KN7YQF and KN7ZAI. K7PLO is proud of his National NCX-5, as is W7YWF and K7QWR of their new Drake R-4 receivers. W7CS is enjoying his National NCX-3. K7YAM is on 75 meters with a Heath HW-12 transceiver. W7EH, K7GPZ and K7MJC assisted in a large antenna installation at the residence of Barry Goldwater, K7UGA. K7TJN and K7IVU have new Heath SB-200 linear amplifiers. K7RGG blasts the bands with a new Swan SW-350 transceiver. A new signal heard from Bowie is keyed by W7ROK. Congratulations to K7PFV on earning the Worked All Arizona Counties certificate. W7AYY is working on a 6CW4 Nuvistor preamplifier for 144 Mc. W7BBW is back on c.w. after a 15-year absence. WN7AHU, WN7BPF, WN7AWR/7, W7AWH and W7AYY were all active in the recent Novice Roundup. K7RUR is off the air because of loss of the power transformer in his exciter. The QCWA meets Sun. on 3930 kc. at 1630 GMT. Please keep club bulletins coming. Traffic: WB6FHH/7 230, K7NHL 194, WØWHE/K7VTY 71, W7FKK 69.

LOS ANGELES—SCM, John A. McKowen, W6FNE—Asst. SCM: John A. Vaidean, WB6JGA. RMs: W6BHG, W6QAE, WB6BBO. PAM: W6ORS. Congratulations to the following BPLers: K6EPT, K6MCA, WB6BBO, K6WAH, W6GYH and WA6TWS. Appointees K6YCX, W6VOZ, W6CK and W6JQB are now in the new Orange section. Keep up the good work in your new section, boys. Even though W6GYH was tripping through Northern California he still made the BPL. K6GIL is sporting a new TR-3. WB6JGA reports company contest is interfering with traffic. WA6CXB is enjoying 2-meter transmitter hunts, he did win one of them, too. W6YRA, the UCLA Radio Club, reports more activity, getting 15 new members. WN6NCF reports working San Diego and Imperial Beach on a 19" whip on 2 meters. W6VOZ is back in the house again operating remote to the garage! W6SRE got a new TX-62 for the Oscar III program. W6AM is operating mobile on 14,035 kc. WA6YKP has an extra receiver for 2-meter monitoring purposes. W6ORS is at a new QTH. W6NAA's activity has been slow since he has been keeping house while the XYL is recuperating from surgery. WB6BOW is at a new QTH with new tuners for v.h.f./u.h.f. K6ODJ reports interesting openings on 10 meters and taking time off from work to go to LB State. W6NKR got in some licks at DX during the contest in between OBS skeds. K9ELT/6 reports that JA1AEA is visiting in Los Angeles. K6DDO is back from England. W6RW has a track on the pole for tre 40-meter antenna to avoid damage from high winds. WN6MPF is trying to get rid of images in the 2-meter converter. The Southeast Radio Club installed new officers: K6LOP, pres.; W6SAU, vice-pres.; K6MHE, secy.; WB6CIX, treas. WA6ORJ is back from Cape Kennedy/mariner shots. The Marina Club is sporting a new club QTH atop Hermosa Biltmore. WA6WAR finally is off to the "wild blue yonder." W6QAE issued another top-notch bulletin for the Southern Calif Net. New directors of the WSBBA are W6BNK, WA6MLW and W6BE. The Lockheed ARC still is providing excellent code/theory courses under WA6VTL. New officers of the UARC of Wilmington are W6WPH, pres.; K6LKH, vice-pres.; WA6YUX, treas.; WB6AIL, secy. The Southern California Edison Amateur Radio Net is developing rapidly with 2-meter f.b. statewide on 146.82 and 147.48 Mc. Code practice station are W6OZ, Mon. through Fri. 0100Z/2200Z on 3750.0/7198.2 kc.; Sat. and Sun. at 2200Z on 3750.0 and 7001.25 kc. with the Sun. run as proficiency run 10-50 w.p.m. K6USN, Mon. through Fri. at 0300Z on 3580 kc.; WA6JXG, Covina Club station, 0400Z-0500Z on 146.82 Mc.; W6KMJ, Tue., Wed. and Fri. at 0400-0500Z on 3757 kc. 5-15 w.p.m. OBS skeds are on phone, c.w. and RTTY on 80-40-10-6 and 2 meters. Have you checked into the AREC/ARPSC program lately? There is always a spot open for an extra opera-

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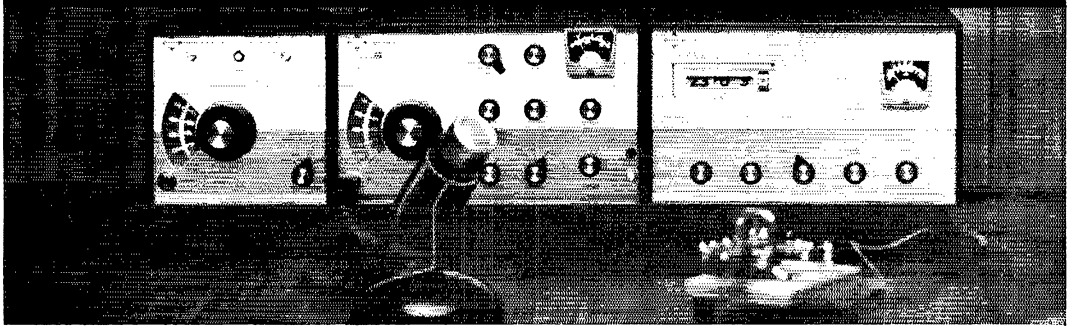

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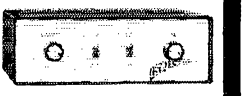

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tor or station. Contact the SCM. Traffic: (Feb.) K6EPT 724, K6MCA 643, WB6BBO 608, K6WAH 524, W6GYH 491, W6WPF 454, K6IWV 293, K6MDD 244, WA6TWS 173, W6FD 161, WB6KGK 103, K6GIL 97, W6QAE 90, W6MLZ 76, WB6JGA 42, W6BHG 35, W6CK 23, K6HV 19, K6LJ 12, WA6CXB 11, W6PCP 10, W6YRA 6, WA6KVA 5, WN6NCF 4, W6AM 2, WN6MPF 2, W6SRE 2, W6VOZ 2. (Jan.) K2PHF/6 39, WN6MPF 6. (Dec.) WN6MPF 3.

ORANGE—SCM, Roy R. Maxson, W6DEY—Asst. SCM: Albert F. Hill, Jr., W6JQR. SEC: K6YCX. ECs: K6SML, W6HKD, K6GGS, W6VAA. RM: K6IME. OBS: W6WRJ. Orange section embraces Inyo, Orange, Riverside and San Bernardino Counties. We are new and eager; all amateurs are urged to participate in all phases of ARRL activities. Our potential is unlimited and united we can accomplish anything we choose. My personal thanks as SCM are extended to Ed Handy, our ARRL Communications Manager, and to Don Stansifer and Pete McKowen, SCMs of San Diego and Los Angeles, for their kind assistance in getting this new section started off. The San Bernardino Microwave Society, Citrus Belt ARC and Riverside ARC have been visited and others will be attended as often and as soon as time and distance permits. Traffic: W6ZJB (opr. WA6QYU) 527, WA6DFT 198.

SAN DIEGO—SCM, Don Stansifer, W6LRU—K6ENX, top DXer in the section, is now in his new home in Vista. W2OE/6 made the BPL in Feb. while visiting in San Diego on vacation. W6BGF is NCS on the San Diego Section Net, which meets each Sun. at 8:30 A.M. on 3795 kc. on c.w. This is a fine net on which to clear San Diego County traffic. A new OES in Imperial Beach is WB6JLC, who recently became a Technician. WA6TBY is again active from North Island. New officers of the Palomar Club are WB6MAIO, pres.; WB6BRN, vice-pres.; W6YZV, secy.; WA6HYC, treas. A dinner was held in March to honor John Crews, retired FCC Engineer from the San Diego office. W9WNV/DX was the featured speaker at the March meeting of the San Diego DX Club, held at the home of K6EC. WB6KNN needs only two QSLs for his WAS. The featured speaker at the San Diego VHF Club meeting in March was Vice-Director W6ECP. The V.H.F. Club set up portable operations in the Grossmont Shopping Center in April to handle Easter traffic as a public service. New Orange section SCM W6DEY was a San Diego visitor in March. All clubs in the area report good preplanning toward Field Day this year. Traffic: K6BPI 4815, W6IAB 3185, WB6JUH 557, W6NVQ 510, W6EOT 278, W2OE/6 164, K6IME 75, W6LRU 27, W6BKZ 24, WA6ZWR 17, W6WRJ 15, K6LKD 14, WB6KNN 8, WA6TBY 8, WB6JLC 1.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—RM: W7WST/6. WB6DBD is a new OBS in Santa Barbara. All appointees are reminded to examine their certificate dates. If more than a year has elapsed, they must be returned to your SCM for endorsement or your appointment will be cancelled. Your SCM is compiling a current list of all clubs in the section. Please forward your club's mailing address and a list of present officers. The new officers of the Arroya Grande ARC are WA6KMG, pres.; WB6CRN, vice-pres.; WA6RYJ, secy.-treas. The Point Mugu ARC, under the leadership of WB6ELH, hosted a Sunday breakfast with 70 hams and friends present. Capt. Olsen, also a ham, represented the Navy. K6AAK had an accident while attempting to raise his Christmas tree array and the project again is on the ground. WB6BII is building a home in Thousand Oaks and the ham shack is something else. K6MIM is back at work after a bad cycle accident. His registered nurse was K6MIL, the XYL. K6VBC has a new Loudenboomer linear. Traffic: (Feb.) W7WST/6 235, WB6DPV 19. (Jan.) W7WST/6 515, WB6KWI 4.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—The Dallas ARC has just issued a new club roster because of the addition of 31 new members. DARC members were conducted on a tour of the Texas Instrument Manufacturing Facilities Mar. 5. Norman Budd, president of the T I Ham Club, was host for the tour. The DARC has started a Workshop of short courses of various technical subjects. The first course was on semiconductors and the next course on Diodes. The date of the Big "D" Hamboree has been tentatively set for Aug. 14, to be held in the Woman's Bldg., Fair Park. The Arlington ARC is making plans to bid on the West Gulf Convention for 1966. If any of the other clubs have intention to bid they had better get started because the Arlington Club is really working. The Panhandle ARC has a fine program for its 5th Annual Golden Spread Hamfest with lots of fine prizes. The

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Type 52B Headsets (same as above, but comes with 15' long retractable cord). Ideal for TV Camera crews or for private intercom systems. **$26.00** (Wall jacks for type 52 headsets @ **$2.00** each.)

G-1 Handsets, with press-to-talk push button on side of receiver, with 4 conductor retractable cord. **$10.80.**

G-2 Handset — same as above, but instead of push button, it has convenient press-to-talk Bar in the middle of the handset. **$13.25.**

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G.E. Filament Xfmr. Pri. 115 @ 60 CPS. Sec: 11.5 VAC @ 11.3 Amps. **$4.95.**

Silicon Rectifiers 600 PIV @ 1 Amp. @ **36¢**; 800 PIV @ 750 Ma. @ **56¢** 400 PIV @ 750 Ma. @ **30¢**. In lots of 40 . . . deduct 10% (may be mixed).

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Jones Micromatch Model 536.80 Bi-directional DC output coupler. 1500 Watts (4 to 30 Mcs.) **$75.00.**

Illumitronics Air-Dux Pl #195-2 (KW size) **$15.50** net.

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PARC also is offering an award for working five or more Amarillo stations. A new ham in Sudan is Don Ham, WN5LVI. W5NFO has a new ham in the family, granddaughter Judy, WN5LWA. W5FIR is the proud owner of a new Drake R-4 receiver. WA5EVS and K2-EIU/5 have qualified as ORSs. K5ABG is on s.s.b. with a new HT-32. Don't forget the West Gulf Division Convention in Oklahoma City, July 9-10-11. Traffic: (Feb.) W5HFU 150, K5DBJ 145, W5NSK 100, W5VFM 82, W5CVB 77, WA5EVS 37, W5EGZ 35, W5LR 17, K2-GKK/5 15, K2EIU/5 9, W5BNG 7, W4OSG/5 5, (Jan.) WA5HFU 66.

OKLAHOMA—SCM, Bill F. Lund, K5KTW—Asst. SCM: Cecil Andrews, W5MFX. SEC: K5DLP. RM: W5QMJ. 75-Meter PAM: K5MTC. PAM for OPEN: W5PML. We had the pleasure of having our Director Best, W5QKF, at the Valentine's Banquet in Oklahoma City and at the Lawton Hamfest. Doc gave a very interesting talk about the functions of the ARRL. The hamfest was attended by about 400. We also were honored to have Vice-Director W5UYQ and my good friend from south of the Red River, Northern Texas SCM W5BNG. We are always happy to have our friends from the south of us come to the Oklahoma hamfests and conventions. WØGFQ attended the Lawton Hamfest and announced his DXposition down in VP1-Land. K5OCX advises that the Oklahoma City v.h.f. group is building up for a big Field Day. K5PIA has changed receivers and now is running his v.h.f. converters into a Collins 75A-2A. W5NTL has an NCX-5 transceiver, K5YJJ has a new SB-34. K5VWQ has a new rig on 50 MHz. W5UZX is in the hospital in Temple Tex., for an operation. W5EHC has his new Ameco TX-62 going and his 50-MHz and 144-MHz beam up and turning it with a new TR-44. The Electron Benders in Tulsa had a two-page spread in the Tulsa Sunday paper showing its new home with the Red Cross. Traffic: K5TEY 308, W5QMJ 59, K5OCX 33, K5KTW 31, W5UYQ 30, W5DRZ 28, K5DLP 21, WA5BTQ 16, W5EHC 10, WA5EQP 10, K5LZF 10, K5CBA 8.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5-AIR—SEC: K5RDP. PAM: W5ZPD. RM: K5ANS. Activity reports have started to filter in for Southern Texas. Come on, gang, let's have the dope. Ex-Director W5ETA is recuperating from recent surgery. Grady was MC for the HARC Old Timers Night. W5ZPD, chairman for the Old Timers Night at Houston Amateur Radio Club, Feb. 19, reports over 200 guests and members present. Of those amateurs attending 30 received certificates for being licensed 4 years or more. W5RIH received a certificate as the oldest licensed ham since 1911. Among those present were Clifford Vick, ex-5ZO, and W5AE, both members of the original Houston Amateur Club in 1915, also ex-5EC, 5AE, 5ZO, 5PO, 5VA, 5OX and 5JN, members of the reorganized club in 1919 after WW 1. Some are still active with the same calls. Regular paid-up members of the Houston Amateur Radio Club received a Life Membership certificate after being licensed 40 years or more. K5ZSC has all new S/Line equipment, WA5JUM has a new Galaxy III, W5AQN has a new HT-37 exciter. Shelley passed his HW-12 to K5ETI and got a new TR-3. WA5KMY is a newcomer in Corpus Christi with a good working homebrew rig. W5ACK is NCS for 7RTN, RTTY Traffic Net on 7140 kc. Sun. 1815Z. For real fun join in on RTTY. Newcomers to the TEX Traffic Net are WA5FPE and WA5GVQ/5, both in Houston. W5ABQ reports the San Antonio Amateur Radio Club is making big plans for the 1968 Hemis-Fair. Also watch for a big noise from K5SRO, the San Antonio Police Amateur Radio Club. K5MZH did a lot of operating while ill with the flu. K5ANS wants to get in touch with anyone with facsimile equipment. Until he can get some FAX going he is sending his photograph via RTTY. He says he makes the tape by use of 5 x 7 photo and some graph paper. Traffic: W5AC 112, K5HZR 95, K5-ANS 69, K5UPB 19, W5AIR 13, W5ZPD 6.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAM: VE6PV. ECs: VE6SA, VE6SS, VE6-AFJ, VE6HB, VE6ALL. RM: VE6AEN. ORS: VE6BR. OPSs: VE6CA, VE6PV, VE6HM, VE6SS, VE6BA, VE6-ADS. OOs: VE6HM, VE6NX, VE6TW. OBSs: VE6HM, VE6AKV. OESs: VE6DB, VE6AKV. Thanks, fellows, for getting your reports in on time. We now have liaison on different nets. APN: VE6ADS, VE6FK. Sask. Phone Net: VE6AHT, VE6SS. Montana S.S.B. Net: VE6AIF. North West S.S.B. Net: VE6FK. Montana PON: VE6-FK. Several of the boys check the B. C. Net so, fellows, instead of holding traffic get in touch with some of the above. We would like to see more traffic counts coming in. While VE6PV has been having so much trouble VE6SS has been taking over APN and doing a very

good job. More and more of the boys are becoming interested in the emergency groups. Keep up the good work, fellows, you never know when our services will be required. Don't think of it as your hobby, but as a very important *public service*. Listen to the Calgary group and you may get some ideas. I would like to thank all of you who have made my job a little easier for the past two terms in office. Traffic: VE6HM 175, VE6FK 19, VE6ADS 11, VE6SS 9, VE6AFJ 5, VE6TG 5, VE6SU 4.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —This is the start of my sixth year in office as SCM. It is the cooperation and hard work of the appointees and those who send us monthly reports that makes the duties as SCM of B.C. so much pleasure. Our SEC, VE7OM, is also pleased with the reports from his ECs: VE7ABK, VE7BJV, VE7BMR, VE7BLA, VE7ABS, VE7BEX, VE7CB, VE7BBB, VE7AJK, VE7APF, VE7ANE, VE7AMW, VE7BAH, VE7BOZ VE.7BHH, VE7ACE, VE7AAJ, VE7ALU, VE7QQ and all their helpers. Have you filed a Form 7 lately? Our RM VE7QQ also is pleased with his ORSs: VE7DBP, VE7AAF, VE7AC, VE7AMW, VE7BDJ, VE7BJV. Our PAM, VE7AOI, is conducting a good net on 3755 kc. and the ARPSC has really proved its worth in the last few months with real emergency working. There are many more hard-working appointees such as OOs, OBS, and others. To you all, thanks. VE7JI is home again after three months in the hospital. VE7BHW is 1965 president of the OK International Hamfest, this year at OK Falls, July 31 and Aug. 1. VE7BCT, White Rock, is a member of the VLRL. The West Kootenay ARC's monthly paper is well received here. Thanks, VE7VM. This is the club that is working so hard for 2-meter repeater stations and also is preparing a phone directory for the Southern Interior. B.C. PENTICTON Civil Defense ARC elected the following: VE7APV pres.; VE7VX, vice-pres.; VE7BNU, secy. Traffic: VE7BHH 37, VE7BJV 22, VE7BHW 7, VE7AMW 5, VE7BCJ 4, VE7DH 4.

MANITOBA—Acting SCM, M. S. Wetson, VE4JY— Because of ill health VE4HW, has resigned as SCM and left on a visit to Vancouver and West Coast points. We look forward to your return in improved health, Bill. Nominations and elections if need-be are in progress. Our popular editor of *SPARKS*, VE4KN, has returned home after a few weeks' illness in Brandon hospital and is reported making a rapid recovery. VE4UM (University of Manitoba) with 6 operators report, along with other AREC members, helping out in the St. John's Boys School march. VE4MB, of Rosebank, has just written his Advanced ticket. VE4HB has been Acting SEC in the absence of VE4OL. In spite of the frigid weather VE4HS, of Miami, has erected an FB downspout vertical antenna. RM VE4JT, of Brandon, keeps up net affiliations with MTN, TEN and VE4UM and has a c.w. net roster of 16 stations checking in. Traffic: VE4JT 119, VE4QX 30, VE4UX 20, VE4EF 12, VE4ON 10, VE4JY 6, VE4IW 5, VE4SC 5, VE4JA 4, VE4NE 4, VE4QJ 4, VE4AN 2, VE4EG 2, VE4FX 2, VE4HS 2, VE4LG 2, VE4LQ 2, VE4LT 2, VE4EX 1.

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM: A.E.W. Street, VE1EK. Deepest sympathy is extended to the relatives and friends of VE1UF, who has joined the ranks of Silent Keys. Top scorers in the recent VE1 Contest are: (c.w.) VE1ALQ 1995, VE1PM 1980; (phone) VE1PM 6480, VE1XN 2256. Planning your summer activities? Dates to remember! *July 4*, St. Stephen, N.B. International Picnic sponsored by the St. Croix Valley Club. *Sept. 4 and 5*, Convention and Hamfest at Digby Pines, sponsored by the Annapolis Basin Club. VEIs AGH and LZ have been very busy providing message service for the boys on VEØMN, VEØMY and CEØAG. Good work, lads. Congratulations to VE1SF and his XYL on the arrival of a new jr. operator. VE1UB is active on 50 Mc. from Halifax. VE2JJ/VO2 has his old call again. VO2AW, VO2AH is transferring to Moncton. VE1DB and VE1OM were active in the recent QCWA QSO Party. VOIs DC, DO and EK are active in Scouting. VO1AP is transferring to Nova Scotia. Welcome back to VO1CF and VO1DF, both off the air for some time. VO1EY has a new NCX-3. VO1HU has been working/MM as VEØMA. Traffic: VE1DB 36, VE1HE 33, VE1ABS 15, VE1OM 2.

ONTARIO—SCM, Richard W. Roberts, VE3NG— VE3HW and VE3DIR were successful in their bid to become Advanced ticket holders. With regret we announce the passing of VE3TR, of Port Credit. VE3DUU is in the Northwestern Hospital in Toronto and may be there for some time. Cards and letters would be welcome. VE3WW is on vacation in Europe for the next three months. VE3EUM, of Hamilton, is the new SEC for Ontario. All AREC members please note. All ECs have been advised. VE3MG was awarded a Public Serv-

ice award during the Sportsman Show in Toronto. The award was made by your SCM on a local T.V. show. The setting was in the amateur radio booth at the Coliseum. VE3HE, VE3DRF and VE3CWR were the lads in charge of the display. VE3DJK/XE3 reports all O.K. from Mexico. VE3BD will do likewise in April. VE3FYZ is now in the Pembroke area. VE3YX was a visitor to Toronto. VE3SZ works FB DX during daytime hours. VE3CO is now the corr. secy. for the RSO. His QTH is 38 Grenview Blvd., Toronto 18. The gang in Sudbury is getting in high gear for the ARRL Ontario Province Convention to be held in Sudbury Oct. 1 and 2. The Renfrew County ARC has a fine club paper but no copy was received here by the SCM. VE3FFU is secy.-treas. The York V.H.F. Society of Toronto is in the near final stages of completing a repeater station in the 2-meter band. 146.94 Mc. is the frequency mostly for f.m. mobiles. The Windee Net of Windsor is on 146.430 Mc. VE3DGX, ex-CEØAC, VEØNM of Easter Island DX fame, is now home. VE3AJA, of North Bay, was a recent visitor to Toronto. Belleville elected VE3FGD, pres.; VE3ELO, vice-pres.; VE3FWH, treas. VE3EGF is now in Cornwall. Traffic: (Feb.) VE3DRF 157, VE3NG 96, VE3CYR 93, VE3AWE 57, VE3DPO 54, VE3BZB 53, VE3FQU 48, VE3GI 45, VE3BUR 36, VE3TT 36, VE3BMU 35, VE3EHL 35, VE3DU 32, VE3EBC 32, VE3BLZ 28, VE3WW 21, VE3EGG 19, VE3BWM 17, VE3ETM 17, VE3AKQ 15, VE3BLL 14, VE3DVE 7, VE3DWN 7, VE3VD 4, VE3OT 3. (Jan.) VE3BLL 11.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Michel St. Hilaire, VE2BEZ. An apartment explosion near Montreal, killing 27 people and injuring scores of others, brought out the AREC fraternity in force, led by SEC VE2AUU. Many vital emergency communications were handled efficiently by the group, which included VE2s ABV, AXU, AFM, AUV, AAK, AYD, AKK, BMS, IS, KM, FY, NI, HV, XO and JE. The quick response of local amateurs showed a great spirit of cooperation. The Annual South Shore Club Dinner/Dance was well attended again this year. Two new OO appointees are VE2AXT and VE2AXU. Please give them your cooperation. We welcome newcomers VE2AAV, VE2AOG and VE2BRH. The St. Maurice Valley Amateur Assn. is a going concern with well-attended meetings. VE2BLT is busy instructing new hams-to-be in the Makinonge County. VE2DR acquired a Valiant transmitter. Our DX brigade worked hard and successfully during various recent contests. The boys are looking over fishing gear, camping equipment and discussing Field Day, which proves that another long winter is behind us. VE2ER sports a new TR3, which sounds very powerful. VE2BR made his usual safari to sunny Florida. *Important*: The dates of the RAQI Summer Convention have been advanced one week to July 16-18. Traffic: VE2DR 115, VE2BRD 74, VE2BJC 48, VE2TA 27, VE2BG 20, VE2AUU 18, VE2EC 13, VE2UN 11, VE2BMS 9, VE2SD 9, VE2BOC 8, VE2CP 7, VE2AAW 6, VE2ANY 6, VE2HV 5, VE2BBY 2, VE2WM 2.

SASKATCHEWAN—SCM, Mel W. Mills, VE5QC—The Second Sectional AREC Test exercise of the '64-65 season took place Mar. 7 at 1335 CST under the direction of Saskatoon EC VE5FC. The disaster was the collapse of the big Outlook Dam with the resulting floods, loss of public services, health hazards and needed rescue operations. Three bands were used in the disaster headquarters at Saskatoon. A local area met on 40 meters with net control of VE5AJ, connected to a 10-meter s.s.b. net to provincial net headquarters at VE5QC with VE5YY and VE5BX helping. VE5LG and VE5LQ assisted the Prov. Net on 80 meters. EC VE5BO had his own local AREC crew in operation which included VE5PA, VE5JH/m, VE5JY and VE5DD. Also represented were ECs VE5AX, VE5NX, VE5WM, VE5KZ, and VE5IL. VE5LJ also checked in along with VE6SS. The Regina gang under EC VE5VD had VE5JW on emergency power with the fixed and mobile stations including VE5HP, VE5TP, VE5HG, VE5SC, VE5DP, VE5JI, VE5HP and VE5FA. Also heard was VE5OT at Kerrobert. In Saskatoon on 40 meters were VE5TX, VE5HZ, VE5VS, VE5EE and VE5SM. Also on 10 was VE5UD and VE5AO, who assisted at VE5LG's. Once again congratulations, guys and gals on a job well done! Sorry about the grave illness of VE5YF but we understand she wants to try and take part in the Hamfest '65. Speaking of Hamfest '65 get those associate membership tickets in *now* and make final plans to be in Saskatoon for the Canadian Western Hamfest July 2, 3 and 4. Get your reservations now for the Bessborough Hotel, Hamfest '65 headquarters. Traffic: VE5HP 95, VE5NX, 40, VE5LM 27, VE5IG 12, VE5BO 7, VE5VD 6, VE5HO 5, VE5YR 5, VE5KZ 4, VE5CB 1, VE5IA 1, VE5PU 1.

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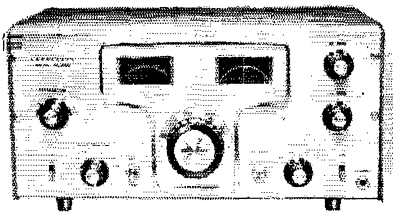

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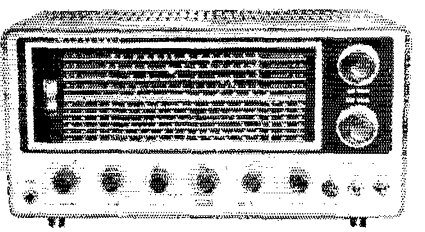

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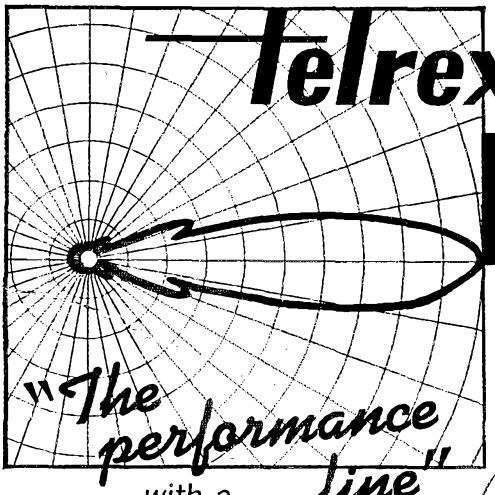

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WA1ABA, Bertrand A. Carpenter, Woonsocket, R. I.
WA1ACQ, Earl E. Vallier, North Saugus, Mass.
W1AGG, Richard T. Rogers, New Bedford, Mass.
W1AJZ, Rienzi B. Parker, Harwich Port, Mass.
W1FNG, Dana E. Peary, Strong, Maine
W1HSW, Charles E. Haley, Woolwich, Maine
W1KWW, Chester A. Knight, Methuen, Mass.
K1RRU, Frank J. Perkins, Waterford, Conn.
W2BUM, Robert W. Miklaw, Ledgewood, New Jersey
W3CWN, Charles A. Clouser, Harrisburg, Pa.
W3FRZ, Merriwether L. Roylance, Gaithersburg, Md.
K3ODG, James R. Mellor, Schuylkill Haven, Pa.
K3ZHS, Harold W. Coble, Milesburg, Pa.
W4DXA, Abram Levy, Atlanta, Ga.
W4GVZ, William E. Bledsoe, Memphis, Tenn.
W4LR, John Rochelle, Washington, N. C.
W4OT, Harold C. Sever, Ft. Pierce, Fla.
K4RGF, Charles H. Mee, Lakeland, Fla.
W5BQ, Willard L. Anspach, Monroe, La.
K5EMO, Anson A. Marsh, San Antonio, Texas
WA5FLN, Harris S. Johnson, Victoria, Texas
K5WQE, Albert H. Prince, Tulsa, Oklahoma
W6FZD, Richard L. Mockbee, Los Angeles, Calif.
W6GCV, Andrew J. Detsch, Jr., Menlo Park, Calif.
K6HJA, Elmer W. Ross, San Mateo, Calif.
W6JJE, Harry C. Kimball, Lemoore, Calif.
WA6PKO, Frederick M. Wall, Millbrae, Calif.
W6QJR, John Jakosky, Newport Beach, Calif.
W6WCI, Lance A. DuMouchel, San Clemente, Calif.
W6YYH, Robert C. Higgins, Redwood City, Calif.
W7ENR, Byron Ashenbrenner, Hoquiam, Wash.
W7HGA, Thomas S. Lym, Pocatello, Idaho
W7MZP, Newton B. Smalley, Reno, Nevada
K7OQY, Hubbard E. Newlin, Tucson, Ariz.
W7WIQ, Harold A. Christensen, Phoenix, Ariz.
W8AIV, Dewey G. Chesebrough, Toledo, Ohio
K8AYY, Raymond C. Huron, South Point, Ohio
W8EOF, Lloyd I. Baker, Wilmington, Ohio
K8IXV, Charles T. Woodall, Youngstown, Ohio
W8JGW, Hugh C. Leitch, Akron, Ohio
W8QBJ, Byrum E. Henry, Cincinnati, Ohio
W8QV, Ellis A. Smith, University Heights, Ohio
K8TUN, Donald L. Boyd, Toledo, Ohio
W9EJ, Carl S. Swanson, Chicago, Illinois
WA9EYT, Robert Herman, Skokie, Illinois
K9IYP, Wade P. Drawhon, Monticello, Ill.
W9LUC, Alex Brzuszkiewicz, Milwaukee, Wis.
K9SEF, Jethro L. Baker, Portage, Indiana
W9SZD, George J. Burba, Chicago, Ill.
WØEQV, George N. Adams, Lead, S. Dak.
WØKOM, Alonzo R. Kieffer, Jr., St. Louis, Mo.
WØUDU, Marjorie Church, Okoboji, Iowa
G6UT, T. A. St. Johnston, Herts, England

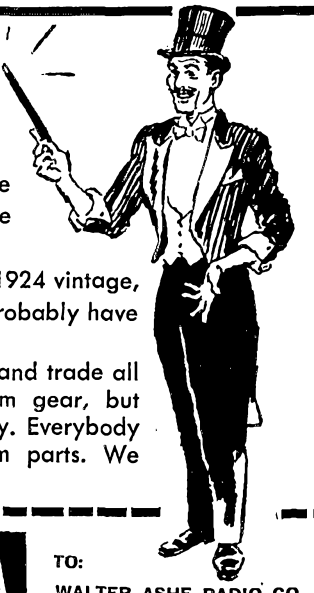
What the ARRL Means To Me

(Continued from page 50)

other means have failed. For, ARRL means "Service" . . . the act of assistance, or kindness to another. Few of us ever think of that side of this wonderful hobby in that light. None of us ever think of it as something we do for rewards, or other compensation as the word service might connote. Not even when we are dizzy from hour-after-hour of emergency operation, and so tired that our fingers can hardly operate the "bug" do we do it from some exalted sense of being knights-in-shining-armor. Rather, we do it because we love to do it, because there is something that is

(Continued on page 170)

Vanishing Act...



No, we are not in the magic business, but we are in the amateur radio parts business, and believe me, that type of radio distributor is VANISHING.

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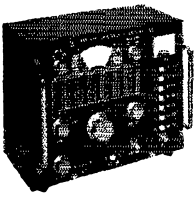

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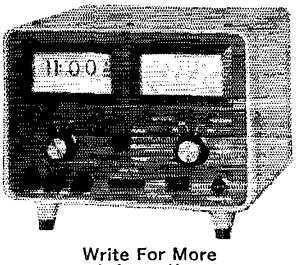

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(Continued from page 168)

wonderfully satisfying in the act of handling traffic whether it be the nightly, run-of-the-mill activity, or the high-tension urgency of emergency operation.

This, then, is my personal definition of ARRL: the ability to turn a hobby of casual enjoyment into a service to help others whom we have never seen, and will never know, but at whose service it has become our tradition to place our resources when they need it — because we *want* to do it.

The headlong rush of Sweepstakes; the friendly warmth of a CD Party; the limp exhaustion after Field Day; and, the exhilaration of logging some hard-to-find prefix. The midnight mysteries of a Wouff-Hong initiation; a rainbow of certificates; the bright red letters of BPL on a white card; and the breathless thrill of A-1 Operator membership. The simple "well done" of an EC after a nerve-jangling emergency operation: the shining pride, and excited chatter of a Novice who invades my living room to say he has just passed his General Class — this, too, is what the ARRL means to me. QST

How's DX

(Continued from page 103)

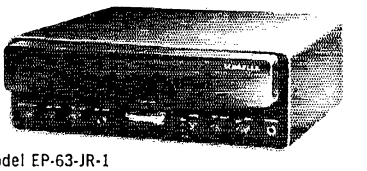
informs, "ZD3C, active for about ten days in early February, traveled to Portugal with hopes of an early return to Gambia." . . . . According to ARRL's W1ECH, K1QHP of ET3USA has been invited back to Djibouti for an FL8AK encore later this year . . . . "9Q5RB, a missionary in the Congo, started hamming last December and will be active till July," learns W9WGQ. "Ron operates a.m. on 15 or 20 but answers s.s.b. callers with a good signal around 1800 GMT, Wednesdays and Sundays." . . . . Club literature discloses other Africa DX developments: 9G1DY succeeds 9G1CW as administrator of the Ghana Award and welcomes inquiries at the address in "Where". . . . Loads of paraphernalia, a field of antennas and a custom-built ham shack serve a dozen or more ZD8s, all U. S. personnel on Ascension. . . . CR5AJ likes 20 c.w. and 15 a.m. from Portuguese Guinea. . . . 9U5s ID and JE frequent 20-meter sideband but IB usually favors a.m. on 15 around 1100 GMT.

OCEANIA — "I'm still operating plenty of c.w. and low-power single-sideband," states K3SWW/KG6. "There are very few c.w. stations active on Guam, KG6-AOX is one of them but the Navy has him on deployment for a few weeks. I hear many W/Ks calling CQ DX without responding to answers. They'd be better off with less power and better receivers. I've passed the 100-worked mark here but have only about 75 countries confirmed." . . . . Club periodicals supply more Pacific perusables: CR8AE (ex-CR7EJ) of Portuguese Timor commands limited English on 15- and 20-meter a.m. . . . ZL4JF of the Campbells fired up his 150-watt linear and should have a more selective receiver by now. Next comes a quad. . . . VK9TL (VK3TL) managed 3021 QSOs with 127 countries from Norfolk isle in January and February. . . . KH6EDY pops up from Kure now and then, 14,215 and 14,279 kc. at 2300 GMT. . . . KC6BU schedules the east coast daily, 14,319 kc. at 2030 GMT. . . . Cocos-Keeling's VK9CR tries 14,250 kc. at 1200-1300 while awaiting arrival of more effective apparatus. . . . VKØs TO (VK2TO) of Macquarie, GW (VK6ZBW) at Mawson base, KH and MC of Wilkes base will join the fun through '65. Still no good Heard news heard, though.

SOUTH AMERICA — W4KHL remarks, "CP1EE of La Paz, a Resurrectionist priest from Louisville, Ky., uses an HW-32 that I assembled for him and a quad antenna. WA4LMD schedules Fr. Ted on 14,295 kc. Saturday mornings so we can arrange shipment of medicines to his mission." . . . . "We've just received our Dutch Antilles licenses (PJ5s BC and BD) for operation on the island of Bonaire," notify KØs GZN and GZO, a popular OM-XYL DXing team. "We hope that when we go to the island sometime around Thanksgiving we will enable numerous amateurs to get their ABC certificates for contacts with Aruba, Bonaire and Curacao. There has been very little operation from the island to date." . . . . "Our VP1GFQ DXpedition in early February resulted in 1500 s.s.b. QSOs, including many W/Ks and a GI3 on 75 meters," recaps W5LDH. "We operated for about 100

(Continued on page 174)

ECHOPLEX...



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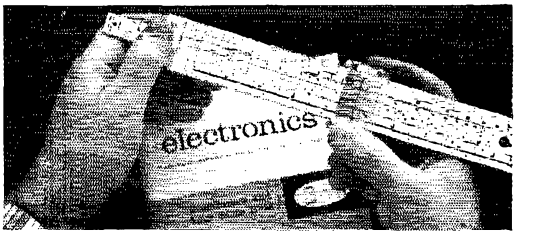

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16th Armed Forces Day

(Continued from page 98)

Schedule Of Events

Military To Amateur Tests

Military stations WAR, NSS and AIR will be on the air from 151400[1] GMT (0900 EST 0600 PST) to 160245 GMT (2145 EST 1845 PST). NPG will be on the air from 151800 GMT (1000 PST) to 160800 GMT (160000 PST).

Amateur contacts from NPG will be discontinued from 160245 GMT (151845 PST) to 160400 GMT (152000 PST) to allow the Armed Forces Day c.w. and RTTY receiving contests.

Station	*Military Frequencies (Kc.)*	*Emission*	*Appropriate Amateur Bands (Mc.)*
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 — 7.2
	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
	6970	c.w.	7.0 — 7.1
	7301	c.w.	7.1 — 7.2
	7380	RTTY	7.0 — 7.2
	14385	s.s.b./a.m.	14.2 — 14.35
	14440	c.w.	14.0 — 14.2
	14480	RTTY	14.0 — 14.2
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
NPG (Navy Radio San Francisco)	3357	c.w.	3.5 — 3.8
	4001.5	RTTY	3.65 — 3.8
	6835	c.w.	7.0 — 7.1
	7301.5	c.w.	7.1 — 7.2
	7375	RTTY	7.0 — 7.2
	13547	RTTY	14.0 — 14.2
	12975.5	s.s.b.	14.2 — 14.35
	49.692 MCS	a.m.	50 — 54×
	148.41 MCS	f.m.	144 — 148

C.W. Receiving Contest

Time	*Transmitting Station*	*Frequencies (Kc.)*
15 May 1965 160300 GMT (2200 EST)	WAR, NSS, AIR Army, Navy, Air Force Radio Stations, Wash., D. C.	3269, 3347, 3397.5 4015, 6970, 6992.5 7301, 13995, 14440 14405, 7315
160300 GMT 1900 PST	A6USA (Army Radio San Francisco, Calif.) NPG (Navy Radio San Francisco)	6997.5 3357, 6835 7301.5

RTTY Receiving Contest

Time	*Transmitting Station*	*Frequencies (Kc.)*
15 May 1965 160335 GMT (2235 EST)	WAR, NSS, AIR Army, Navy, Air Force Radio Stations, Wash., D. C.	3347, 3365, 4012.5 4560, 6992.5, 7315, 7380, 14405 14480
160335 GMT 2135 CST	A5USA (Army Radio Fort Sam Houston, Texas)	4025
160335 GMT 1935 PST	NPG (Navy Radio San Francisco, Calif.)	4001.5, 7375 13547
160335 GMT 1935 PST	AG6EA (McClellan AFB California)	4580, 7332
160335 GMT 2135 CST	AG3HQ (Scott AFB Illinois)	4590, 7540
160335 GMT 1935 PST	A6USA (Army Radio San Francisco, Calif.)	6997.5

[1] Six-digit times include date (15 or 16) and four-digit time (160245 is 0245 on the 16th).

How's DX

(Continued from page 170)

hours from a 3000-ft. location." . . . . . RCV will commemorate the 154th anniversary of Venezuela's independence with a world-wide DX contest July 3rd–5th. We'll pass along operating particulars here next month . . . . . Far-south items thanks to club periodicals: VP8IH left So. Orkneys but LU4ZA carries on near 14,046 kc. . . . VP8s GK IE IG and HY may reduce So. Georgia's scarcity, while LUs 1ZC and 4ZO try s.s.b. from So. Shetlands. . . . CE2HO was high man in the recent Panamericano Peru DX shindig. . . . Ws 4DQS 4QVJ 8FGX and 9EVI enlisted for last month's CE0XA outburst from San Felix and Ambrosio. Separate phone and c.w. installations were planned for a 'round-the-clock eight-day assault. . . . VP3BF skeds his family in England on 14,245 kc. or so after 1200 GMT.

World Above 50 Mc.

(Continued from page 108)

Ohio, New York and New Jersey were heard with S9 signals. Two of the Pennsylvania boys, W3OYS and K3MSG maintain a Sunday morning (11:00 A.M. EST.) c.w. sked at 50.040, and are looking for others to join them. WA4LTS writes from South Carolina *that "things should be different during the '65 E openings".* Activity has greatly increased in that area and it just shouldn't be so hard to get South Carolina in the future. According to Rick: W4SSP, K4AWB and K4JQY are now on AFSK, 50.118 Mc. in Greenville; WA4SSP, W4RCV, W4CPX and WA4LTS are all active on c.w., and a couple of the boys are looking on 50.115 Mc. on Sunday mornings for c.w. contacts; K4PXE now has 30 watts PEP on 50 Mc. and makes three in the Greenville area on s.s.b.; WA4LTS has completed his "big rig" for c.w. and a.m. and will soon be going on s.s.b. also. W4UIS in Virginia tells of good ground wave on a number of occasions during February and a one-hour opening on the 7th into Alabama and Florida. Cal is another new member of the s.s.b. fraternity. W5BBR, K5RYD and K5FOB all report a band opening on February 9 with stations heard in Louisiana and the west coast. West coast stations were heard working Colorado and other mid-west states. W8CVQ sends in the only report received of 50 Mc. aurora which was observed on February 6. From West Virginia and WA8JWM we hear of a band opening on the 23rd and 24th of February during which the southeastern U.S. was heard for about forty minutes. WA9KKA, K9FNB and WA9FIH all report an opening on February 7 into Florida, Mississippi, Alabama and Texas. W9RSV and WA9FIH also noted an opening on the 26th into Florida. In Ames, Iowa, W0PFP had a contact on the 4th with K4PDR and on the 14th while working WØWKB both stations heard WA5CQM. Jim, KØOST in Minneapolis sez that during openings of February 4 and 8 his c.w. CQ just below the phone band (50.088 Mc.) brought no results although he was hearing Alabama working 5's and 9's. QST

IMPORTANT NOTICE

Changes of Address

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

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 issue 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.

S.R.R.C. Hamfest: June 6, 1965. See Hamfest Calendar in May QST or write for details after April 1, 1965. Starved Rock Radio Club, W9MKS/W9QLZ, RFD #1, Box 171, Oglesby, Ill. 61348.

HAMFEST Announcement! The Hamfester Amateur Radio Club announces its 31st Annual Hamfest August 8, 1965, at Santa Fe Park, 91st and Wolf Road, nr. Chicago. Manufacturer and distributor displays, mobile contest, swappers row, food and refreshments, games for the whole family. A clown and balloons for the children. For maps to get to the hamfest and complete details, write: Hamfester Radio Club c/o John Chass, K9LOK, 5434 So. Bishop St., Chicago, Ill. 60609.

ROCHESTER, N.Y. is again Headquarters for Western New York Hamfest, Saturday, May 22. New location with expanded facilities. See May QST Hamfest Calendar.

7th ANNUAL Penn-York Hamfest Morrison's Restaurant, Big Flats, N.Y. (Between Elmira & Corning, N.Y.) June 19, 12 noon. Grand Award NCX-3 SSB xcvr. Pre-registration, $4.50-$6.00 at door. To Earl J. Foster, W3BKF, Chairman, RD #2, Gillett, Penna. Last day for pre-reg., June 12th. Speakers, swaptest, contests, etc. Smorgasbord dinner, all you can eat. Only 600 tickets available.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

WANTED: military or industrial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y.

WANT Callbooks, catalogs, magazines, pre-1920 for historical library. W4AA Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Sturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmandy 8-8262.

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SELL swap or buy ancient radio set and parts, magazines. Laverty, 118 N. Wycombe, Lansdowne, Penna.

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304TL tubes wanted. Also other xmttr and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

WANTED: Collins Parts. BC-610, GRC-27, Autodyne, Bethpage, L.I., N.Y.

HOMEBREW 2BPI monitor-scope, $13. K1IIK.

FOR Sale: Ranger I, $140.00; Hallicrafetrs S-40B, $50; Globe Scout 65-B, $40; NCX-3 with NCX-A, $350. All in excint condx. K1APA, 3 Sunny Acres, Brattleboro, Vt.

QSLS?? WPES?? Largest variety samples 25¢. DeLuxe, 35¢ (refunded). Sakkers, W8DED, Box 218, Holland, Mich. *Christian Ham Callbook, $1.00. Religious QSL samples 25¢.*

QSLS, samples 20¢. QSL Press, Box 281, Oak Park, Illinois 60303.

QSLS "Brownie" W3CII, 3111 Lehigh, Allentown, Penna. Catalog with samples, 25¢.

SORRY Fellas, recovery slower than I had hoped. Keep watching my ad for progress report. Thanks to all for patience. C. Fritz, C. Fritz QSLS.

QSLS-SMS. Samples 10¢. Maigo Press, Box 375 M.O., Toledo 1, Ohio 43601.

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

QSLS. See our new "Eye-Binder" cards. Extra high visibility. Samples 25¢. Dick, W8VXK, 1994 N. M.-18, Gladwin, Mich.

QSLS, SWLs XYL-OMs (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fatabulous, DX-attracting, prototypal, snazy, unparagoned cards (Wow!). Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

QSLS-SWLS 3-colors, 100 $2.00. Samples dime. Bob Garra, 414 Mahoning St., Lehighton, Penn.

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

QSLS Distinctive samples dime. Volpress, Box 133, Farmingdale, N.Y.

DON'T Buy QSLS until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

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QSLS. WA6QAY Press, Box 17112, San Diego, Calif.

QSLS, $1.75/100 up. 1965 Catalog-samples 10¢. Longbrook, Box 393-W, Quakertown, N.J. 08868.

QSLS, Samples Free. Blantons, Box 7064, Akron, Ohio 44306.

ZIP Code Rubber Stamp. Call, name, address, with ink pad. $1.00. K4ISA, Perry, Box 8080, Allandale, Fla.

SUPERIOR QSLs, samples 10¢. Ham Specialties. Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

QSLS. Samples 25¢. Rubber stamps: name, call and address $1.55. Harry Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

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

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

QSLS Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Cal decals. *K2VOB Press, 31 Argyle Terrace, Irvington, N.J.*

QSLS $2.50 per 100. Free samples and catalog. Garth, Box 51Q, Jutland, N.J.

½" Call QSLS $2.40/100, $2.90 (2 sides). Samples. Gariepy, 2624 Kromer, Ft. Wayne, Ind.

3-D QSL Cards have that prestige look, with glittering colors and metallics 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.

QSL Specialists. Distinctive Samples. 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago, Illinois, 60639.

QSLS-100 3-color glossy $3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64114.

AT Last! Something new in QSL cards! All original designs. Send 25¢ for samples to Yarsco, Box 307, Yorktown Heights 1, N.Y.

CUSTOMIZED QSLS with your autographed photo. Dime brings sample. Pic-Ur-QSLs, Rice Lane, Baltimore, Maryland 21207.

RUBBER STAMPS $1.00. Call and address. Clint's Radio W2UDO, 32 Cumberland Ave., Verona, N.J.

QSLS New cartoons. Top quality, fast service. Samples 20¢. Ed's Press, 3232 LeMoyne, Chicago, Ill. 60651.

ATTRACTIVE QSLS: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1033 Utica Ave., Brooklyn, N.Y. 11203.

QSLS, Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, WA4FJE, W2JME Edgewater, Fla. 32032.

PLASTIC Holder frames and displays 20 QSL cards, 3 for $1.00 or 10 for $3.00. Prepaid, Tepabco, Box 198, Gallatin, Tenn.

QSLS. 18 samples 10¢. Filmcratters, Box 304, Martins Ferry, Ohio.

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

"STANDOUT" QSLS with 1½" high call-letters. $2.40/100, $2.90 (2 sides). Samples free. Garieny, 2624 Kroemer Rd., Fort Wayne, Ind.

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., Philly, Penna. 19140

QSLS: Quality with service. Samples Free. R. A. Larson, Larson Press, Box 45, Fairport, N.Y.

QSLS: 100, $2.00. Samples. K5MHZ Press, P.O. Box 10183, Alameda, New Mexico

QUALITY QSLs. New designs monthly. Samples 10¢, 25¢ 50¢. Savory, 172 Roosevelt, Weymouth, Mass.

GOLDEN Call QSLs, (only QSL) crafted by Samcot for 1965. Sample 10¢. Samco, Box 203, Wynantskill, N.Y. 12198.

1000 Labels or 3-line rubber stamp with name, call, address, $1.00. Four ball-point pens with name and call, $1.00. Betty Harms, WA4FJY, (W1JWW), Mystery Hill, North Salem, N.H.

CANADIANS: Sell National NCX-3 with AC supply, $550; Mosley TA33 Jr, Delhi 40-ft. tower, CDR rotor, complete, $125.00. Johnson 100 Kc calibr., $12.00, Johnson 250 w. Matchbox built-in SWR, $90.00. Electro-Voice 729SR ceramic cardiod mike, $20. Louis Joe, VE3BJR, 1029 Laurier Cresc., Sarnia, Ont. Canada.

BUILD Transistorized battery power-supply 350V 100 Ma. under $10. Plans, $2.00. Herco International, Box 113, Willowdale, Ont., Canada.

CANADIANS: Central Electronics 100V, $475.00 VE3BUG, 99 Arlay Crescent, Toronto, Canada.

ELECTRONIC Tubes Top Brands Sold at substantial savings! (Minimum Order $15.00). Authorized GE, Amperex, Dumont & Eimac Distributor. Send for Free Buyers' Guide for all your Tube Requirements. Top Cash Paid for your excess inventory (New Only-Commercial Quantities), Metropolitan Supply Corp., 443 Park Avenue South, New York, N.Y. 10016. 212-MU 6-2834

COMPLETE Elmac mobile station. SWR Bridge, PMR6A and lots of goodies. All postpaid. W9WTY.

TELETYPE Machines, converters, R-388, R-390, R-390A receivers, mechanical filters for R-390A (455 IF). Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

LOOKING? Shopping? Trading? Trying to save money? Write Bob Graham for special deals on new and reconditioned used gear. Cash or Budget. Graham Radio, Dept. A, Reading, Mass. 01867. Tel: 944-4000.

WILL Buy pre-1925 QSTs, etc., etc. State condition and price. W6ISQ, 45 Laurel Ave., Atherton, Calif. 94025.

SALE: Thunderbolt Johnson 2 KW P.E.P. like-new condx: $290.00. K7SPH, Box 4099, Tucson, Ariz. Tel: PH-623-1278.

SR-150: AC and DC supplies; mobile rack. Never used. $650. K2VFW, 47-25 215th St., Bayside, L.I., N.Y. Tel: BA-9-2313.

KWS-1 Collins KW, Serial No. 1030. Excint condx. Will deliver within 300 miles, $650. L. M. Harris, W5RKE/4, Box 67, Lynn Haven, Florida. Phone 265-5479.

CRYSTAL Bargains. Free list. Nat Stinnette, W4AYV, Umatilla, Fla. 32784

WANTED: For personal collection: QST, May 1916, W1CUT, 18 Mohawk Dr., Unionville, Conn.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Tronics, Inc, 74 Willoughby St., Brooklyn 1, N.Y. 11201. Tel. UL5-2615.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-WAlker-5-7000.

COLLINS Amateur equipment bought, sold and serviced. Paul A. Reveal, W2DC, 129 Midland Ave., Glen Ridge, N.J.

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J. Tel. GArfield Area code 201-471-2020.

CASH For Your Gear. We buy, sell and trade. Send for free bargain list. H & H Electronic Supply, 506 Kishwaukee St., Rockford, Ill.

WE Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., P.O. Box 516, 199 Front, Hempstead, N.Y.

FOR Sale cheap. QSTs or CQs, any quantity. Send your list for quotation. Cash for Callbooks before 1942. Want early radio gear and publications. Evr Rasmussen, Box 612, Redwood City, Calif.

WANTED: 60 ft. crank tower wind load 10 sq. ft. W2UGM, 66 Columbus, Closter, N.J.

WANTED: FR-2409 bandpass filter. State price. Pete Chamalian, W1BGD, 111 Buena Vista Road, West Hartford, Conn. 06107.

DXER Beware: A real bomb. York 5000 transmitter, 1 kw, using 4-1000A, bridge power supply, vacuum tuning condenser. Size 33" wide, 24" deep, 6 ft. high. Further details. Bill Brown, W0SYK, 28 Marine Lane, Hazelwood, Mo. Tel.: HEmpstead 4-5440.

CASH For Callbooks, U.S. Government Amateur Callbooks wanted. W8EF, 801 Lakeshore, Grosse Pointe 36, Mich.

HAM-Radio Counselor, male, for co-ed camp in the Berkshires, Massachusetts. Able to instruct campers in fundamentals of ham radio. Equipped ham radio station. Write to Robert Kinoy, Camp Taconic, 451 West End Ave., New York 24, N.Y.

SELL: Eimac 4CX1000A, SK-810, SK-806, all together: $150. B&W 852A, $30. All new. Watkins, WA4NPA, Rte 1, Box 118, Melbourne Beach, Fla.

WANTED To Buy: Collins 399C-1, external PTO or Collins 312 B-5 VFO console. Kindly quote to Bob Anderson, W1LBA, 428 Central Ave., Milton 87, Mass.

NATIONAL SW-3 wanted. State price, condition. Reply via air-mail. Lt. Col. John Parrott, MAAG, Japan APO, San Francisco, 96390.

SELL: Heathkit SB-400 transmitter, $300; Drake 2-B, $200; Swan SW-175 75 M. Single band, $145.00; Jonson 6N2 transmitter, $90; Eico 730 modulator, $40. All f.o.b. Inquiries invited. Robert Pierce, K1TKZ, 57 Gifford, West Hartford, Conn. 203-233-6763.

FOR Sale: Plate transformers 3600-0-3600 VAC @ 1000 ma., CCS with 120/240 VAC primary, one year unconditional guarantee. $35. 4-1000A filament transformers 7.5 VCT @ 21 amps, $12. Peter W. Dahl Co., 401 4th St. S.E., Minneapolis, Minn. 55424 Tel: 338-9077.

WANTED: Collins mechanical filters. Give condition and price in your first letter. W. H. Robertson, W4NZP, 714 McConnell St., Memphis, Tenn. 38112.

WANTED: Parts for KW linear and p/s. Leo Severe, RR #2, Box #5, Wilmington, Illinois 60481.

WANTED: HT-32, HT-32A, HT-32B, HT-37 or 32S-1. Any condition. General Radio, 916-A HF bridge. Frank Stewart, 3217 Moon Drive, Mesquite, Texas.

GOT It started, now it won't stop, another harmonic due. Need the money and the room, everything has to go. Everything mint condx. Complete 2-meter station: Communicator III with Nuvistor preamp, Gonset 6N2 VFO, 6 element beam, AR-22 rotator, $200; SSB station consisting of HT-37, SX-117 revr, homebrew linear, $550; Eico 720, $50; Multi-Elmac three-way supply #1070, $25; Heath 11 Lab 'scope, $45, Mohawk 500 recorder and all accessories, $125; Grundig TK-64 stereo, 4-track recorder, $125.00; Hammarlund HQ-150, $140; Bozak P-800 Hi-Fi spkrs in sealed boxes (2); $37.50 ea.; Simpson 340 multi-meter $15.00. WA2LIM, 212-461-1779.

INTERESTING Offers galore in the new combined "Equipment Exchange", "Ham Trader". Next 12 issues $1.00. Sample free. Brand, Sycamore, Ill.

FIRST $185 buys Viking Valiant I transmitter kit, factory sealed carton. Original cost $349.50. W8BQH.

HEATHKIT Chippewa linear amplifier, 2 Kw. P.E.P. SSB, 1 Kw. AM, CW, with p/s and manuals $295.00. W. T. Roff, Jr., WA4AEB, Box 1246, Tryon, N.C. 28782.

BOOST My collection. Proud to display our old ham license plates. Tnx. Mike, WA4QED, Box 14, Milan, Tenn.

SELL: Central Electronics MM-2 RF analyzer, excint condx, $85. W2KIT, Box 28, Scarsdale, N.Y.

DRAKE 2-B Q-multiplier/spkr, xtal calibr., WWV xtal, shipped anywhere in original boxes, $255. F.o.b. Oklahoma City, Okla., 73122, Roy Gillett, 4732 Eastman Drive.

SPRING Auction of the Rockaway Amateur Radio Club will be held Tuesday, May 28th, at 8:00 P.M. at the American Legion Hall, 301 Beach 92nd St., Rockaway Beach, N.Y. Come to the best auction in the New York area. Donation one dollar at the door. WA2TAQ, Pres., P.O. Box 205 Rockaway Park, N.Y. 11694.

WANTED: Heath Monitor 'scope; two FM mobile-fixed transceivers; automatic constant voltage regulator over 2000 watts 50/60 cycles, complete VHF rig; sturdy beam rotor. Conchita Byrd, XE0YL, Lopez 13, Mexico City DF.

HARRISBURG, Penna. area hams! Globe Champion 300B transmitter 300w., all bands, $225.00; Viking II w/VFO, $125.00; Morrow Twins w/AC p/s, 50 w., all bands, $150.00. Like new condx. HG-303 Globe 75w. CW TX, $75. W3HLZ, Dan Antrim, 325 Blacksmith Rd., Camp Hill, Penna. Tel: 717-737-5404.

SELL: Battery radios, early electric radios; tubes, magazines. SASE. Krantz, 714 White Horse Pike, Stratford, N.J. 08084.

VALIANT, HQ-110C, spkr, Shure 444 mike, relay, homebrew keyer and paddle (from Handbook), $295.00. Also will sell BC-221, manual, no p/s; highest reasonable offer. Bill, K5QBN, St. Joseph Seminary, St. Benedict, Louisiana, 70457.

WANT: Antenna Couplers CU-286/FRR, R-391 receivers; R-278-B/GR receivers. Shepherdheim, Box 183, Millinocket, Me.

KWS-1 RF unit wanted. Electrically defective acceptable. Describe complete. W6BE.

SELL: 75A4, matching speaker, $375; Navigator, $60. Need: NCX-D, KWM-2 with MP-1. DeBard, 3384 Heights Dr., Reno, Nevada.

QUITTING. Collins 32S-1, $425.00; 75S-1, $325.00; 516F-2, $75 —all three $750.00; HB-811A linear in S/Line cabinet w/o P/S; $65.00; Ameco 6 M Nuvistor converter w/p/s, $35.00; AR-22, $15.00; Knight SWR meter, $15; BC-ARC-5 revr, $5.00; Heath HW-22, $25; HP-13, $45.00; HB AC supply, $15.00; Hustler antenna and mount, $15.00; E-V mike, $5.00; 14 AVS, $10.00; Cantenna w/oil, $8.00. F.o.b. KØYAB, Omaha, Nebraska, 3001 South 38th St.

SALE: QSTS 1957-1964, Gammill, 2559 Quidde Ave., San Diego, Calif. Tel: 453-2808.

FOR Sale: Valiant, in excint condx, in use now. Perf. c.w. and fone rig. Money-order for $145.00 takes. Ship collect. All inquiries will be answered. W6ZJW, 740 E. Sycamore, Willows, Calif.

HALLICRAFTERS: HT-44 xmtr, $300; AC p/s, $50.00. All transceive cables and Advance coax relay included. SX-117 rx, $270. SR-160 transceiver, $300. DC p/s, $60. Roger Halstead, K8ZKF, 2217 Virginia St., Midland, Mich.

WANTED: National NC-155 receiver. Must be in mint condx. W2VP, Rte 1, Milton, N.Y. 12547.

BOOST Reception. 3.5-30 megacycle SK-20 Preselector kit, $18.98. Boost modulation- AAA-1 clipper-filter kit, $10.99. Reduces noise, NJ-7 noiseJector, IF, wired, $4.49. Postpaid! Literature free. Holstrom Associates, Box 8640-T, Sacramento, Calif. 95822.

FOR Sale: Apache with D-104 mike. Both in vy gud condx. You make offer. W9DUJ, Lou Hefle. Rte. #1, Cedarburg, Wis.

EVERYTHING Must go! Thunderbolt, $275.00; Courier, $159.95; 5100B, $139.00; Valiant, $135.00; 32V-1, $125.00; DX-100, $89.00; Viking 11, $79.00; Globe 350, $129.00; SX-101 III, $169.00; NC-183D, $139.00; 6900, $185.00; Invader 200, $285.00; HT-32, $280.00; HT-37, $275.00, new, $395.00; 75S-1, $290.00; w/500 cy, $325.00; HQ-170C, $185.00; new NC270, $179.00; 75A-1, $135.00; 75A-2, $145.00; SX-62, $175.00; HQ-129X, $99.00; HQ-140XA, $129.00; KWM-1 w/AC, $375.00; Ranger $99.00; 2A, $169.00; SR-150, $349.00; AF67's, $45.00. Many others. Write for list. Howard Radio, Box 1269, Abilene, Texas 79604.

FOR Sale: Complete SR-150 station with AC and DC supplies, matching mobile mount. Also Hustler mobile antenna with 75-40-20 elements, and Master Mobile bumper mount. Best cash offer only, no trades, sry. Entire station has had little use, and is in excint condx. Prefer not to ship, but can deliver within about 200 mile radius within short time. Wm. C. Cash, WA4LNL, P.O. Box 302, Salisbury, N.C.

BAMBOO For quads. Highest quality calcutta bamboo. Cut to 14 feet. Straight, no cracks or splits. Set of 8, $17.95. F. o.b. Syosset, L.I., N.Y. George Faltin, K2PNR, Tel: 516-WA1-0059. P.O. Box 137, Syosset, L.I., N.Y.

MONITOR 'Scope, Heath HO-10, $38.00; OS-8 oscilloscope, $25.00; pair of Motorola handie-talkies, $10 ea; 6M Saturn w/mnt and xfrmr, $10; Heath HN-31 dummy load, $5.00. Hush E. Riggs. K1UDF, 106 Morris Dr., Laurel, Md. 20810.

FOR Sale: HQ-110C, perf. condx, $150.00. WA2RUB, 311 Blackheath, Long Beach, N.Y. Tel: 516-GE1-3565.

KWM-2, p/s, $775.00. In perf. condx. Dan Reid, Anderson College, Anderson, Ind.

WANTED: 800 and 6 Kc mechanical filters for 75A-4. Stan Talago, Rte. 5, Bridgeport, W.Va.

NATIONAL NC-109 for sale, $120. Used 3 weeks; stored 3 years. Superb condition. VE5NI/W6. C-7 Orchard Park, Davis, Calif.

SELL: BC-610 vy gud, $150.00; also homebrew 600 watts in six ft. rack-cabinet. VFO, xtal, 11 panel meters, built-in filter and antenna switch. You must see this to appreciate: $150.00. Also 14 AVS vertical, $10.00. Heath Q-multiplier, $5.00. You haul. Joseph Doczy, 54263 Northern Ave., South Bend, Ind. 46635.

BUILD A TV camera cheaper than ever! Send 10¢ for details. ATV Research, Box 396, South Sioux City, Nebr.

POWER Transformers rebuilt, 30 years experience, save. Kerla, 950 Metropolis, Marine City, Michigan 48039.

CHRISTIAN Ham Fellowship now being organized. Non-profit, Christian Ham Callbook, $1.00 donation. Write Christian Ham Fellowship, 5857 Lakeshore Dr., Holland, Mich.

HEATHKIT MT-1, $70; HR-20, $115 and HP-10, $35.00. Rcvr and p/s used approx. 40 hours. All for $200.00. K0CWD, Oakes, 8651 Oakwood St., Westminster, Colorado 80030.

FOR Sale: Complete Collins station: 75S-3, all filter 32S-1, 516F-2, 312B-4, 30S-1. SM-1 mike. Guaranteed A-1 condx. No trades, sry, $2400.00. W9EUQ. 808 Ridgely Bldg., Springfield, Ill.

WANTED: Collins KWM-2, 312B5 or 75S3B, 32S3, 312B4 and 516F2, 30L1. Cash waiting. Gommo, 37-20 75th St., Jackson Heights, L.I., N.Y. 11372.

WANTED: Collins 30S-1 linear. State condx, age and your best price. For personal use. WA8IJU. Vern Wagner, 2902 W. Central Ave., Toledo, Ohio 43606.

WANT KWM-2, 75S, 32S, as is, will repair. Sell: SB-34, $360.00; GPR 90 with product detector, $330; Gonset 76, late model, and 115V power 6-80 meters, $269.00; Dynakit stereo 70 and preamp, $165.00 perfect; SR-150 and PS 150-120, $535. F. Baker, Box 546, McComb, Ohio 45858.

WANTED: Tower Tri-Ex HZ or HZR model or equivalent, wind load 10 sq. ft. K2JMY, Bishop Drive, Rd 3, Poughkeepsie, N.Y.

SELL: Clegg 99'er and three xtals. Three months old. In excint condx. $125.00 or your best offer. WA2PRM, Box 234, Maplewood, N.J. 07040.

PACKAGE Deal: Johnson Viking II transmitter, Matchbox and low-pass filter, Hallicrafters SX-100 receiver, M-C Jones 261 coupler and 262 indicator, Heath VFO model VF-1, all for $300 cash. All items in excint condx, unmodified, all manuals included. Phil Garrahan, K2DDW, 2 Bernard Rd., East Brunswick, N.J.

BC-221AH and Dumont oscilloscope type 220. Both in excint condx. No shipping, sry. $60.00. each. Bill, 31 Lafayette St., Milford, Conn.

CE-20A, rack and cabinet, QT-1, manual, $120; 500 watt Gonset linear, cabinet, 3-10 watts drive, 80-10, $100. Rack 6 ft, semi-enclosed, $25.00. Sry, no shipping! K1KWV, Sleepy Hollow Rd., New Canaan, Conn.

QST Back issues 1931 through 1937 bound, 1938 through 1963, carefully wrapped. Price best offer or tax deductible donation to Grace Church Missionary Fund. Also Radio 1937 and 1938 plus 1940 through 1942. W3PYW, 2706 Harmon Road, Silver Spring, Md.

SALE: NCXD, Power supply, sealed carton, $80. G. H. Wayne, W1PFB, Box 26, Watertown, Conn.

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

30L-1 including connecting cables and new, unused, spare GE 811A. Wired for 220 volt operation: $395. B & W Matchmaster, Model 520: $25. Both for $410. Will prepay transportation to any part of U.S. except Hawaii. Need Collins 302C-3 wattmeter. L. A. Morrow, W1VG, 99 Bentwood Road, West Hartford, Conn. Phones: Evenings 521-0416, Daytime 666-1541.

KILOWATT phone transmitter, $175.00. 4300 revr/spkr $100.00. W8FBC, Rte #1, Lafayette, Ohio.

SACRIFICE: Brand new HQ-170-AC VHF. Owner deceased. Write Dossett, W9BHV, Box 291, Frankfort, Ind.

FOR Sale; NCL-2000 linear. Perfect condx, $475. William Sabin, 1400 Harold Drive, Cedar Rapids, Iowa.

SELL: 1000 watt surplus ground to aircraft transmitter, converted to a 1 KW ham band push-pull triode amplifier. Complete with commercial power supplies and 500-1000 watt C250THs modulatorr in a broadcast type rack cabinet with interlocked doors and 11 Weston meters. Bring truck or trailer or will dismantle parts for car. Bargain. Also SX-110 receiver. For more details write Dick Lasiuk, K9FVW, Thorp, Wis.

HRO-5 with all coils, speaker and p/s: $75; 4X500A, $40. K1NFD, Mark Hubelbank. 152 Ranchwood Dr., West Haven, Conn.

WANTED: 3-1000Z 3000-3000 volt 600 mil xfrmr. A Hesse, 431 Locust St., Brentwood, N.Y. 11717.

FOR Sale: HT-37 and SX-101 Mark IIIA in fine shape, $525. SR-160 with AC-DC power supply in fine shape, $425.00. Write KØHQV/Ø, 120-2 Chevy Chase, Minot AFB, No. Dak.

HQ-110AC receiver; DK 60-2C Advance relay, make an offer. K8UPC, 20515 Denby, Detroit, Mich.

SELLING: Viking Valiant II, FWT and HQ-170AC. Both one year old and in mint condx. Both: $500. Make offer separate. Evelyn Miller, 1109 Essex Dr., Lima, Ohio.

HEATH Comanche rcvr; Cheyenne xmtr; UT-1 AC supply, AK-6 mobile rack; AK-7 spkr, all cables. Factory aligned with comments. Manuals, mint condx. Never mobile. $140/00. William Shuster, 528 Clay, Niles, Mich.

FOR Sale: Model 28 KSR teletype, in mint condx. Write: John R. Niehaus, 208½ Church St., Doylestown, Ohio 44230.

WANTED: Collins eqpt. Model 270 G3-10" speaker in cab. Mech. filters, models F455J05 and F455J60. Give price and condx. K3RIY, 312 Owen Ave., Lansdowne, Penna. 19050.

FOR Sale or swap: Complete two meter station fixed and mobile. Eico 720, VFO, Mod., HE-30 receiver. Need SSB transceiver. K2CYH, Parlin, N.J. PA-1-6915.

LEAVING U.S.A. Must sell at once many years ham collection. Collins KWS-1 trans, and 75A-4 rec., all filters. BC610-E trans, with speech amp., Navy TDE-3 all-band trans, w/AC power supply; National HRO-50T rec, w/all coils; Eldico elec. keyer. AF-67 Elmac and PMR-7 mobile unit W/Honeywell trans. pwr. supply. Two BC-654 75 phone portables complete. All kinds of spare tubes, transformers, pyranol cap, and other parts too many to mention. A party taking all will buy for only $1,600. K7DZI, 1910 W. Burnside St., #217, Portland, Ore. Tel: 228-0846 Evenings.

ALL Band transmitter, receiver, Gonset G66B, G77A, mobile/fixed, p/s and modulator, "Hustler" antenna, 75M coil whip. $195.00. R. D. Lawrence, Thompsonville, Conn. RI 93906.

KWS-1 and 51J3 wanted. HB9AET, 87 Florissant, 1206 Geneva, Switzerland.

SR-150 with AC p/s, like new condx, used vy little, $500; HQ-170C gud condx, $150; KWM-2 mobile mount $45. Ray Bunnell, K2CBG, Star Route, Branchville, N.J.

UTICA 650, six meter transceiver and VFO plus AC/DC cables, mounting brackets, mike, Saturn 6 antenna, mount and transformer. Six months use. Excint condx. Price $160. USA postpaid. N. Denison, W1VCU, U.S. Naval Radio Station (R) Northwest, Chesapeake, Va.

CLEGG 99er, in excint condx. $95: Shure 440 microphone and stand, $10. Kellersman, Stony Brook Road, Darien, Conn.

RTTY Toroidal channel filters, octal mount, specify frequency. $3.00 each. WA6JGI, 3232 Selby Ave., Los Angeles, Calif. 90034.

200-V Central Electronics, extra set of tubes, $535; SX-101A, $220.00; Warrior HA-10, $150.00. Original cartons. Electrically and physically perfect. W6NCT, 612 Alston Road, Santa Barbara.

SB-33, DC supply, mount and mike, $320.00. You pay shipping. Will include all-band mobile antenna on pick-up deal. W2-RVY/4, Ray Megirian, Apt. 306-S, 230 North Federal Highway, Deerfield Beach, Fla.

TRADE 25-watt mobile rig, 6-volt for 2-meter transceiver. Bill Plante, K1PPN, 50 Mayo St., Portland, Me.

75S-3, vy clean, $450.00; Clegg 99er, $90; Heath 'scope OM-3, $25.00; Eico grid-dip meter 710, never used, $25.00. WA4JAY, Bill Miller, 207 Palm Ave., Auburndale, Fla.

TOROIDS, Uncased 88 mh 5/$2.50. Ppd. U.S.A. Humphrey, WA6FKN, Box 34, Dixon, Calif.

SELL: HT-37 and SX-115. Both in excellent condx. Reasonable offers considered. Jack Hotchkiss, 40 S.E. 2nd St., Boca Raton, Fla.

TELETYPE Model 15 page printer, Model 14 TD and typing reperforator, table, DC supply and junction box. First $225 takes all. 6 meter Poly-Comm, $125.00. W1IRH, Ray Pichulo, 172 Dent St., West Roxbury, Mass. 02132.

SELL: Hy-Gain DB-24 4 el. 20/40 m beam W/KW balun. Excint condx. $95.00. F.o.b. Brooklyn, N.Y. Ron Lumachi, 73 Bay 26 St.

WANTED: Commercial or military, airborne or ground. Equipment and test sets. Collins, Bendix, others. We pay freight. Ritco, Box 156, Annandale, Va.

HT-37, SX-111; 18HT vertical, R-48; Dow-Key Mic, coax bug. College! Must sell! Best offer gets it. Wayne Schmidt, Box 1063, Northern State College, Aberdeen, S.D.

SX-101A, almost new condx, $295.00. HT-32A, like new, $395.00. Both used very little. Package deal, $650. Horace Brokaw, W2ACC, Neshanic Station, N.J.

FOR Sale: 75S3B w/500 cycle mech. filter. Still in warranty. Same as new, $500. J. Book, 2032 Main St., Davenport, Iowa.

TRADE: Eico 723, never used. Want: Johnson Matchbox, A. A. Logue, WA9GZH, Box 424, Carbondale, Ill.

FOR Sale: 75S3B w/500 cycle mech. filter. Still in warranty. Electronics Model B Sideband Slicer with Q-multiplier; $159.50. WØHNG.

RANGER I, $90, vy gud; NC-183D, $125.00; gud condx. HP-10-20, $20; 2 PE-103 dynamotors. Assorted goodies and junk. List. K4LFR, 7609 Ensley Dr. SW, Huntsville, Alabama.

MANUALS For surplus electronics. Stamp for list. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

SELL: Mosley TT-31 Tote-Tenna (portable 10-40 M). Like new, $35.00 plus shipping. Dr. Francis Baluston, 39 Greenridge Ave., White Plains, N.Y.

ALMOST Giving away: Collins 75S-3 receiver; 32S-3 transmitter; 30L-1 linear, 516F power supply; 312B-4 station control; Hallicrafters HA-1 T.O. keyer and Vibrokeyer; will sell together preferably or separately. Write WA6ZME, Jon, 1035 Carolyn Way, Beverly Hills, Calif. 90210.

KWM-2 serial 13122, 312B-5, 516F-2, mobile mount. All in mint condx. Used less than 100 hours. All for $1190. Packing extra. W5JOB, 105 Northcrest, San Antonio, Texas 78213.

FOR Sale: One #MI-98, 47 ft. galvanized used Acromotor radio tower without anchor posts. $60.00. With a new set of anchor posts, $75.00. Original cost: $170.00. George N. DeLaplaine, P.O. Box 861, New Brunswick, N.J. 08903.

GOOD Collins 51J3/R-388 rcvr in new Collins cabinet, $400 f.o.b. Will consider trade for station of equal value or allow credit on general-coverage receiver such as HQ-145, HQ-180, GPR-90, etc. Also have Collins 3.1 Kc mechanical filter in plug-in adapter, type no. 353C-31, $25. A. Stephens, Box L-395, Myrtle Beach, AFB, South Carolina, 29577.

SALE: HW-12, new $140. Will wire any kit reasonably, radio hi-fi, etc. (20 years navy experience, retired). Will repair any of your gear. Lan Richter, 131 Florence Drive, Harrisburg, Penna.

SOME Surplus W1AW items: Used Hy-Gain 10-15-20 beam inc. new-style traps to install, 6CLS-5763-6146-4/400 10-meter exciter and final with diff. keying. Best offer, no shipping, srv. Complete Hi-Pwr AM modulator PP 6L6 PP 810s UTC, CVM5 mod. trans. on 13 x 17 chassis, 14" high panel. Includes p/ss and filter on 2 addtl. chassis. 866As, 625/500 ma. 1750-800 v. trans., $85 and crating cost, f.o.b. Hartford. Assorted meters and small items. Send SASE for list. ARRL, att: F. E. Handy, Main St., Newington, Conn. 06111.

MUST Sell: All in exclnt condx: SX-101 Mark III, $210.00; Viking 6-2 converter, $45.00; Viking Challenger factory-wired, $95.00; Heathkit VFO $10.00 with cable to fit Challenger. Ameco TX86 factory-wired, $80; Honeywell power supply 12-volts, $38.00; push-to-talk mike, $5.00; Gonset Super 12 converter, $45.00. Ameco noise-limiter, $5.00. W2MNB, 35 Henry Dr., Glen Cove, L.I. N.Y. Tel: 516-676-7046.

HUNDREDS Of old and scarce type receiving tubes, GE, new in original cartons, 80% off current list. Write WØEQN, 3818 5th Ave., Sioux City, Iowa.

FOR Sale: Johnson Invader, like new condx, $425; Drake 2B and 2BQ and 2AC, all like-new, $225.00. Take both for $600 including D-104 microphone, antenna relay and key. WA2UAO, Steven Rear, 62-60 99th Rego Park 74, L.I., N.Y. 11374. Tel: BR5-6831- after 7 PM.

FOR Sale: Swan Model 512 DC power supply, Swan model 406 frequency control unit, with instructions, in original cartons, very little used, $170 pp for both. Hustler 20 and 40-meter mobile resonators, $5.00 and $7.50. WA2HSB, 5 Addoms St., Plattsburgh, N.Y.

HW-12 with HP13 d.c. supply exc. condx. $125 for both. W4WEB, C. R. Lamberson, 143 Westcott Circle, Port St. Joe, Fla.

WANTED: B&W 51SB/32V3 tube adapter and cable assembly kit. WB6GJJ, Lee Osborne, 619 No. Willow, Compton, Calif. Tel: 631-5590.

HQ-110C receiver, in like-new condx. $110. K2MBZ, Hartmann, 39 Andrew Rd., Whippany, N.J. 201-887-2405.

FOR Sale: NCX-3 transceiver with National AC and DC supply. Newtronics Mobile 20-40-80 meters antennas. In mint condx. WA2KQX. Tel: CL-60685, Brooklyn, N. Y. 65 Bay 19th St.

JOB Available: Summer camp radio counselor; college student with general ticket and preferably gear. Contact Herman Schulman, 212 LW 1-3357.

WANTED: BC-348, state condx, cash price. Dan Lee, 3167 E. Green, Pasadena, Calif.

TRADE Or sell: 75S-3, in exclnt condx. For gud motorcycle. W1QVZ.

SOLA "Televolt" xfrmr, $20.00; National School TV course, $20; 80 M Field Day rig, Mon-Key, plate modulator, 6M pre-amp. K9RGH, 9600 S.W. Highway, Oaklawn, Ill.

PACKAGE Deal: Collins 75A-4, Serial 1926, KWS-1, Serial 382; speaker, tubes, Eico Oscilloscope, #460; best offer over $1200. Garner, W7EUU, 1000 Ingersoll, Coos Bay, Oregon.

WANTED: CR-88 or AR-88, unmodified. State price and condition. Ralph C. Cole, W9LCG, 360 Oakwood St., Park Forest, Ill. 60466.

EICO 710 G.D.O. $30; factory wired. Eico 1180 decade box, $18. Wired. Hy-Gain 12AVS vertical, $14 with radial kit. E-V 729 ceramic cardiod mike, $7. R. W. Campbell, W4KAE, 316 Mariemont Dr., Lexington, Ky.

SENECA VFH-1, 6 & 2 meter transmitter; factory aligned, in exclnt condx, $130; Telrex 2 meter, 8 element beam, $15; Channel Master antenna rotator, $19. Eico grid dip meter, $25. Johnson T-R switch, $15. Hy-Gain 6 meter halo, coax, $5. All in xclnt shape. WB2LBW, Harvey Silberstine, 49-17 Cloverdale Blvd., Bayside, N.Y. Tel: BA 5-7014.

MINT HQ-110A. Will ship in U.S.A. in original carton to highest bidder over $180. WA1AAY, Box 213, Brown University, Providence, R.I.

FREE! Blue Book List. Leo offers hundreds of bargains on reconditioned gear. Viking II, $97.70; NC-300, $189.00; Collins 62S-1, $625.50; King 500A, $259.00; SP600, $296.65; Heath MR1, $59.46; DX-40, $40.50, Cheyenne, $49.18; SX-140, $72.15; SX-101, $160.65; HQ-140XA, $134.10. Many more. Also, free 1965 catalog. Leo, WØGFQ, WRL, Box 919, Council Bluffs, Iowa.

HEATH Model MM1 VOM. $28; Hallicrafters S-82, 30.50 Mc. FM recvr, $32. Need: Lampkin PPM meter, WAØJUM, Box 59, Mobridge, S.D.

DRILL Holder, designed especially for "home-brewers". Attractive engraved panel. Holds: taps, body and tap drills. #2 through ¼/20. $2.95 pp. Photo, stamp. C. L. Carter, W9ZWN.

EXCELLENT Grundig TK-46 w/mike, $259.00. Gud 75A-1, $159. F.o.b. K1NNC.

GOING Mobile NCX-5, for sale: complete station (will not separate). Hallicrafters SX-117 w/WWV xtal, HT-44, PS-150-120 power supply, transceiver cable assembly, spare set of finals, all original cartons and in vy mint condx. Johnson TR switch, and Johnson Matchbox W/SWR meter. Same mint condx. All complete $695. Can be seen in operation W9HOG. Alan Kogerup, 25 W. Soffel, Northlake, Ill. 562-1575. Evenings after 6 PM.

SX-101A, exclnt, $220.00 F.o.b. Johnson 250-39 TR switch, $18; Heath V-7A VTVM, $15; GD-1B grid dipper, $10; semi-auto key, $5.00. Phil Hoover, WØFTS, 2726 Forest Road, Davenport, Iowa.

VERY Nice Hallicrafters HT-33A linear KW, $250; professionally assembled Heathkits, DX-20 Novice transmitter, $20; Drake TV-1000 filter, $10. W5VKC, 10939 Aladdin Dr., Dallas, Texas.

MEDICAL School and new baby force sale of NCX-3 and NCX-A. Guaranteed, $350. Murray Harris, K5WLY, 608 So. Cedar St., Little Rock, Ark.

COLLINS 30S-1 immaculate, little used. Sacrifice: $895. John Ashton, 1 Dew Lane, Darien, Conn. 203-655-9997.

MOBILE In Europe! For sale: Borgward Isabella TS Sport Coupe with Heath Pawnee 2-meter transceiver and squalo antenna, 3800DM or Pawnee only 800DM. Will deliver Frankfurt or Munich area. Also SW-240 Swan with Heathkit HP-23E 110/220v power supply, 1400DM. Neil Spencer, W4PC, Imhoistr. 11, 858 Bayreuth, Western Germany.

VACUUM Variable: Jennings Type-U, 50-250 mmf, 12 kv, $17 ppd. Jim Burkholder, K5UGU, Scholasticate, 2700 Cincinnati Ave., San Antonio, Tex. 78228.

SELL: Eico #720, $60; Eico #730/cover, $40; Elmac AF-67/M-1070, $115. Gonset Super 12, $40; K1NIJ, 217 Arthur, Springfield, Mass.

VHF Amateurs. Sell Polycomm 2B 2-meter transceiver, $180; Olsen 6-meter transceiver, $75; Heathkit HA-20 6 meter SSB linear amplifier, one of last made, $65; all equipment in guaranteed mint condx. Contact WB2GWU, New York City. Tel: 212-EV-8-1893 after 5 PM.

DX-60. HG-10 w/ps, xtals, prefer local, make offers. WB2JNS, 97 Mountainview Rd., Millburn, N.J. 376-5226.

2000B Hunter Bandit, like new; $375; Collins MP-1 mobile supply, $75; MP-2, $95; Sylvania TV camera, $250, complete; radio frequency lab #1946 RTTY converter, $125; VFO for 75A4-70E-24, new, $49; VFO 70K-1 for KWM1, new, $29; VFO for KWS-1, 70E-23, new, $39. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

HQ-170C and matching speaker, like new, $230. Robert Sherman, 2475 West 16th St., Brooklyn, N.Y. 11214.

SCIENCE Teacher, for Maine summer camp. Must have amateur license. Mrs. G. Krasker, 1125 The Parkway, Chestnut Hill 67, Mass. Tel: 617-277-5112.

TELETYPE Machines, converters, R-388, R-390, R-390A receivers, mechanical filters for R-390A (455 IF). Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

RTTY Gear for sale. Write for list. 88 or 44 mhy toroids, five for $1.75 ppd. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

CASH. Sony Transistor TVs, etc., swapped for G-R, H-P, L&N, etc. equipment, special tubes, manuals, military electronics. Engineering Associates, 434A Patterson Rd., Dayton, Ohio 45419.

"HOSS-TRADER Ed Moory offers demonstrator equipment: factory warranty. Cash and no-trade deals. New 2-B, $249.50; TR-3, $469.00; Swan 350, $329.00; SB-33, $249.00; Galaxy V, $369.00; New TA-33 beam and Ham-M rotor (demo) $169.00; Demo TH-6DX beam, $99.50; SB-34, $319.00; KWM-2, $849.00; 75S-3, $489.00; 2 left at old price, NCX-5, 585.00; NCL-2000, $585.00. Reconditioned gear: SB-33, $229.00; HT-37, $279.00; 200-V, $469.00; 100-V, $389.00; Factory reconditioned KWS-1 and 75A-4, $995.00; 75A-4, $425.00; GSB-100, $209.00; Johnson Ranger II, $219.00; 2-B, $195.00; SX-117, $249.00; Swan 350, $289.00; Drake R-4, $279.00. Available new Drake TR-4 transceiver, $585.00, also T4-X xmtr, Swan 240 Tri-Bander, $229.00; Swan 175, $139.00. Terms Cash. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone WHitney 6-2820.

DX-60, $60; R-100, $60; both in excellent condx. K9TVC.

AMPLIFIER Wanted: Medium power for c.w. rig. Factory wired. A. Lukach, 35 East 84th St., New York City 28.

N.Y.C. Police, fire, receiver. Monitoradio 152-163 McFM, 6-12VDC w/ant., manual, $40; 250V-500 Ma. regulated power supply, $20; 75A-4, $400; HT-33 KW linear, $275; PP813 KW linear $150; scintillator, optical densitometer, 14 track Magnecord tape recorder in 6 ft. rack, $100; Heathkit GC1A, $85 w/ACDCPS Dumont 304A 'scope, $115; KW surplus antenna tuner, $45.00; 6 ft. racks open, $7; enclosed, $10, double w/side doors, $15; all standard 19". Tom Perera, K2DCY, 410 Riverside Dr., NYC, N.Y. 10025.

WILL Swap new fifteen volume Britannica Junior Encyclopedia also large Britannica World Atlas for ham gear. Make offer. K3ZWA, Rte. 1, Elizabethtown, Penna.

PANADAPTOR, Heath HO-13, 455 Kc., exclnt, $75; AR-22 rotator, gud condx, $15. K5STL, 8516 James NE, Albuquerque, N.M.

VALIANT I, factory-wired. In mint condx. Not a scratch! $200. W3KRZ, 912 Sunnehanna Dr., Johnstown, Penna.

FOR Sale: SR-150 and AC power supply, in mint condx. Used about 5 hours. Priced $550. W. K. Kern, K9BEH, 1807 12 St., Bedford, Ind.

HEATH Pawnee 2 meter transceiver. New this year. Running in exclnt condx. Price, $195.00. Am going to low bands. Dave Steffens, K8YWS, 656 Cascade Rd., Cincinnati, Ohio 45240.

SELL: Plate xfrmr, 3600-0-3600 V. at 2.5 amps, $55; 4-250s, $15 ea.; Johnson lo-pass, $8. Want: Cardwell Variable TC-300 U.S. Bittner, 814 4th St. S., Virginia, Minn.

FOR Sale: Johnson Pacemaker, in excint condx, with manual, $150. G. Richard Cartledge, K4FGX, Rte. #1, Box 53, Abbeville, So. Carolina.

SELL: Ranger with sequency keying $100; spotless GPR-90 receiver, $235.00; Johnson electronic TR switch, $15. WA6HRS, Box 611, Sunnyvale, Calif.

SELL: Excess gear; Collins filters 455 Kc, 1.5, 3.1 6 Kc, $15 ea. matched pair USB-LSB F-25024, $25 ea. Airpax LPFO- 3 Kc., 500 ohm $20 WE 536K crystal lattice 100 Kc 600 ohms SSB 3 Kc $100. WE 124S 500 ohms 2975 cycles 150 cycles 124L 2125 cycles 150 cycles, $100 pair Teletype 15, $125; Wheatstone perf, $250. Boehme auto trans, $100. GR 726A VT voltmeter $30; Regency ATC-1, $30; GE-2 speed recording milliameter 5 ma, $250. W2ATQ, Box 143, Huntington, N.Y.

SWAN 350, two months old including AC supply and new VOX accessory, $490: Heathkit Twoer $40; Twoer DC supply, $15; Webster Top Sider mobile antenna $11; 75 meter coil, $4; 40 meter coil, $4; 20 meter coil, $3, $550 takes all, or will trade for perfect Heathkit SB-300, and SB-400. All equipment barely used. Absolutely perfect, in original cartons, F.o.b. Bill Siefkin, WB6KEH, 603 Johnson Apt. #4, San Luis Obispo, Calif. 93401.

CALL CQ, roll calls, contests, meteor and moonbounce schedules, etc. automatically with your tape recorder. Transistorized unit keys your transmitter from pre-recorded tapes. Send for descriptive literature. Parrish Electronics, Box 1785, Melbourne, Fla.

75A4, Invader 2000, mint condx, W5OBX, 1919 Ramada, Houston 58, Texas. O. C. Lindsey.

POLYCOM 62B, in excint condx. Complete, $225. Richard Stannard, 13 Circle Dr., R.D. #1, Voorheesville, N.Y.

SELL: HQ-110A, in excint condx, $165, or will trade for comparable general coverage rcvr. K1FZL, 22 Birdsey Ave., Middletown, Conn. Tel: 203-346-4983.

CARTONED Tubes: 810, $10.00; 832s, $2.75; 872As, $2.00; HF60, $4.00; 100THs surplus, $6.00; 4-65A, $5.00; A. B. Dick, #430 mimeograph machine, mint condx, orig. price, $450, only $65 or trade for good general coverage receiver. Stamp for list. Samkofsky, 201 Eastern Pkwy, Brooklyn 38, N.Y.

CLEGG-Thor 6, one of the best on the air, $260; five element 6-meter Telrex with coax, $20; CDR AR22 rotor with control cable, $20; 35 ft. 2 in. rustproof pipe, $25; Clegg 6-meter lowpass filter, $10. Complete outfit, $340. Pick up deal only, srv. W2KSC, Tel: 388-6596.

DX-100B with FSK, $100 Wescott KW linear PL-172 and matching power supply, $250; Alltronics-Howard Model K RTTY converter with cabinet and polar relay, $125.00; custom RTTY converter with bandpass input filter and 'scope tuning indicator, $95 Model 26 typing reperforator with keyboard, $50; BC221 rack-mount with AC supply, book, $50; pair new 4CX250Bs with sockets, chimneys, $50; pair 4-400As, $35.00; ART-13 $25.00; NC-183 rack-mount, $75. W4EHU, 7110 Cane Hills Cr., Orlando, Fla.

COLLINS KWM-2, 516F2 AC supply; 312-B-5, VFO console 516E-1, 12VDC supply, 351-D2 mobile mount, $1600. Equipment perf. Not a scratch! One package. W1THM.

WRITE For free lists of reconditioned amateur equipment. Guaranteed. On approval. Time Payments. Henry Radio Co., Butler, Mo.

TAPETONE XC-144C4 417A 2-meter converter with p/s and spare 417A, $40; Globe HG-303, 75 watt 80-10, factory-wired with Heath VF-1 VFO, $45; two Eimac 4X150As, new: $7. for both. Mallory Vibrapack, 12V in., 325 v. 100 ma. out. New, $7.00. BC-453A with p/s, $12. Super Six, $12.00; 100 w. 80 and 40 ARC-5s with p/s, $16. Interested? Everything for $85, plus many parts. K2MHP, Pete Adely, 1576 John St., Fort Lee, N.J.

CIRCUITS from handbook, QST, CQ, etc., constructed. All work guaranteed. Reasonable. Free information. WA6IKV, Whitmore, 3240 Machado Ave., Santa Clara, California.

COAX Special. RG-11 cellular, 5¢ a foot. Will stand kilowatt. Weight 100 ft., #8, RG59U, 2¢. Weight #4. You pay postage. Ranger factory-wired, $130. Polycom 62B, $160; Viking Adventurer, $35.00. Will trade. Goodwin, WAØHLT, P.O. Box 43, Colony, Kansas 66015.

CASH For surplus manual to CW-45044 crystal osc. unit of model UE-1; catalogs on lab test items before 1950 GR, H-P, etc. Robert Ireland, Pleasant Valley, N.Y. 12569.

HEATH Mohican, excint condx, $85; new ARC-3 transmitter 4 to 5.3 Mc, $6; new UTC swinging choke, $4; Heath Signal Tracer, $16, J. D. McCauley, 6541 Odessa Ave., Van Nuys, Calif. 91406.

DRAKE 2B with Q multiplier, $220; Heath Cheyenne and Comanche with DC and AC P/s (2 extra power transistors), mobile mike, all cables, $195.00; DX-20 with 3 xtals, $30; D-104 mike, $25.00; 1938 RME-69 rcvr and spkr, $30. All equipment is in gud optg. condx, w/manuals, no scratches. You ship. Wanted: all-band transceiver with both AC-DC p/ss. D. W. Erickson, K9DUD, Ettrick, Wis.

OSTS 1930 to 1960, sell or trade. Want 12 ft. cartop fishing boat. Filters 75A-4. Make offer. W4BKN, 603 Bunkers Cove Rd., Panama City, Fla. 32401

FOR Sale: Complete all-band fixed and mobile Hallicratters station: SR-150, AC supply, DC supply, mobile mount, $600. W2GQN, Sheldon Weil, 114 Phylis Ct., Elmont, N.Y. Tel: 516-HU-8-3555.

WANTED: Heath IP-10 or IP-22 Isolation xfrmr; Heath 10-10 'scope; Heath GR-41 auto fm rcvr. R. Arrowsmith, 1204 North Evergreen St., Arlington, Va. 22205.

SSB Receiver, Heathkit SB-300 with SSB and AM xtal filters. In excint wkg. condx: $235.00. W9GYB, Dale Rethmeyer, 60 N. Bolton Ave., Indianapolis, Ind.

HT-37, used only 15 hours. Will ship prepaid (in U.S.) in original carton for $280. J. M. Kootsey, 66 Rounds Ave., Riverside, R.I.

TELETYPE Headquarters for hams. Send for free listing. Atlantic Surplus, 250 Columbia St., Brooklyn, N.Y.

SELL: HR-10 rcvr, factory-aligned, and xtal calibrator, DX-35 wid VF-1 VFO. Best offer takes. Henry Golczynski, US #1, Motel, Alma, Ga.

SB-300 Receiver, new, expert wiring, perf, condx: $240.00. R. Barncard, 7701 Mission Road, Prairie Village, Kans.

TOWER Wanted: Tri-Ex crank-up, Model HZN, HM or LM galvanized 54 or 71 ft. Advise condition, age and price. Have 60-ft. self-supporting galvanized Aermotor tower in excint condx, for sale or trade. Make offer. W3BBK, 825 Bromley Street, Silver Spring, Maryland 20902.

FOR Sale: RBU-2 Panadapter, excint condx, with service manual, new CRT, set of IFS-1-BC459A 1-BC453B, 1-BC946A BC band receiver. All inquiries answered. Al Bart, W9ITL, 5406 N. Neenah Ave., Chicago 31, Ill.

AM Going into the Peace Corps. Need c.w. portable. What have you? Howard B. Myers, K2SPZ, P.O. Box 35, East Syracuse, N.Y.

VIBROPLEX Buy (semi-automatic key) in real gud condx, only $11.75. W4SHL.

WANTED: Heathkit HR-10 receiver, $50 if in gud condx. Write first, stating condx. WN6OGG, 3171 Walker, Rossmoor, Calif. 90720.

CHRISTIAN Missionary effort needs SSB transceivers for summer use. WA6YOL.

HAMMARLUND HQ-145C, $175.00; Heath HX-10, $250.00. John A. Deithloff, W5FFS, 401 Lake St., Bryan, Texas.

RARE Pre-War Command receiver, tunes 20-27 Mc. Built by ARC for Navy in 1940 this set is a prototype (Serial #6) and was never mass-produced. Complete with original local control box. Like-new condx inside and out, with not a scratch on it. Best offer gets it? J. Demler, 318 Garfield, Hastings, Nebr.

SELL: SB-10 SSB exciter, $60.00; Knight VFO, $15.00; NC-98 rcvr, in excint condx, $68.00, F.o.b. Sothern Pines, N.C. 28387. W4ANTS, H. L. Tate, P.O. Box 388.

HW-12-22-32 owners convert your rig to a Tribander for a total of $25.00 with these specifications: 200 watts SSB, 170 watts c.w. covering 14-14.35, 7-7.35, 3.7-4.0 Mc. Featuring selectable SSB/Selectable AVC. Completely self-contained for fixed and mobile with neat appearance. Other specifications are unchanged. Average construction time is 4 hours. For complete step-by-step instructions with 17 pictorials and complete parts list with catalog stock numbers and prices, send $5.00 ppd to Tribander, Robert Christie, WA2SJZ, 88-15 168th St. Jamaica, N.Y. 11432.

HEATH Pawnee 2-meter transceiver, Nuvistor preamp, professionally wired, $180.00; clean Clegg 99'er transceiver, $90. Want: Pierson KE-93 receiver, LW-51 deluxe transmitter, Roy Norby, K2COG, 2514 Crompond Rd., Yorktown Heights, N.Y.

FOR Sale: Viking Valiant, $225; SX-111, $150; Heath HW-32 (factory aligned and calibrated), with AC supply, $150; Lyscotransmitter (35 watt), $25.00. All are in A-1 condx. John Huyett, WB2PEC, 18 Tennis Terrace, Sparta, N.J.

EXTRA Transmitter tubes, 4-1000As, 4CX250Bs, 8008s. Cash. Trade for mobile equipment, obsolete world coins. Postpaid, guaranteed gud. Ed. Box 51, Maricopa, Arizona 85239.

SELL: Lafayette KT-320, $40; HT-40, $70. Both for $100. Perf, condx. Robert, 212 Sunset, Belleville, Illinois.

SACRIFICE: Apache. Not a scratch! Operates perfectly, $135.00. SB-10, $50. Needs adjusting. Both for $175.00. WA5-ERC, 154 Ronald Blvd., Lafayette, La.

6-METER Gonset Communicator III, in excint condx, $140.00. Will ship. J. Crowley, K2HEG, 528 William St., Scotch Plains, N.J. 07076.

KILOWATT! 2-8122s! 80-2 meters! SSB. AM. CW. FM. PM. FSK. ARSK! $475.00 F.o.b. SRS Electronics Co., Box 267, Newark, Delaware.

WANTED: Ranger II, trade (or sell) Hallicrafters S-36A commercial monitor receiver, VHF AM/FM/CW 27 to 143 mgc. 3 bands, with manual, in excint condx. K2CR, Dick Zucker, Water Mill, L.I., N.Y. 516-726-4585.

HT-9 100-watt AM xmtr, $75; HT-18 VFO, $29.00; NC-173 rcvr, $89; all with manuals: $179; HT32B, $364; SX-100, $144. Both for $489, HA-4 keyer, $35. New Browning Shotgun $149 (trade?); new 22 HP Scott outboard $249. W9AOL, Walt Rabe, 233 No. Taylor, Oak Park, Ill.

FOR Sale: Apache TX1, 1960, built by expert. Condx excint. Appearance like-new. Can ship in wooden crate. With manual, etc. First offer takes at $165.00. Call for or express collect 1/5 down, bal. cash. Tommy R. Allen, WAØEQW, 209 Sycamore St., Fulton, Mo.

SELL: HT-44 Transmitter, matching PS-120/150 supply and spkr. 200 watts c.w., SB. AM. Like new. Original cartons and manual. First offer nearest $375. Gray, W2EUQ, Painted Post, N.Y. Tel: 607-96-25924.

RIDERS Manual and half kilowatt home-brew fone xmtr. Any reasonable offer. May trade for Sideband gear. Mark Maston, 4526-13th Ave. Rock Island, Ill.

VALIANT F/W spotless. Pair plus-in silicon rectifiers replaces 866A tubes plus 5 new 6146B spares, $174. Cash and carry. W2NWX, Fair Lawn, N.J. Phone: 201-SW7-9652.

NC-105 receiver, in excint condx, 1 year old. WN2RRH, 55 Tulip Lane, Williston Park, N.Y. 516-PI-2-1264.

MARAUDER HX-10, in excint condx. Just reconditioned. Brand new final, completely aligned. $275. WA9ETJ, 75 Pearl, Clintonville, Wisc.

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WANTED: Hammarlund HQ-180A receiver; also want Johnson Invader 200. Sell excint Apache, only $155. Write or phone K2EGI, Jarvis, 5 Stratford Pl., N. Babylon, L.I., N.Y.

TR-3, $455; AC-3, $66; DC-3, $108; all factory sealed, never unboxed. Warranty, naturally. Sell separate. K4LGR, Box 10021, Greensboro, N.C.

COLLINS S/Line, 75S-3, 32S-1, 30L1. Trade for '64 model automobile. WA4LXX, 251 Collier Ave., Nashville 11, Tenn.

COMPLETE Plans for the W8EP radio operating table. Bill of materials and step-by-step procedures to accommodate Novice through the Old Timer. A beauty! $1.00. George, Box 46, Grafton, W.Va.

MOBILE Rig complete: Johnson Viking mobile transmitter and VFO, 5 bands, 60 watts. Elmac PMR-8 receiver. Transistor power supply powers receiver and transmitter. Mike, antenna relay, cables, manuals. In excint condx. All for $200. Marv Polan, W2MVS, telephone: IN 1-4919. 140-39 34th Ave., Flushing, L.I., N.Y.

SELL: Knight T-150, $75. Hammarlund HQ-110, $130: G-E 6M transmitter, receiver, $20: Sixer, $80: Vanguard 2-meter converter, $10: URC-4 walkie-talkie, $15. Stephen Smith, WA8-LMF, 621 M.A.C. East Lansing, Mich. 48823. Tel: 517-ED2-2496.

GRICE Electronics has Collins 516-E-1 P/S, $120; PM-2 AC P/S, $125; 75A-4 w/filter and spkr, $425.00; Drake 1-A, $125; 2-B, $200; 2-BQ, $25; Hammarlund HQ-110, $120. Write P.O. Box 1911, Pensacola, Fla. 32502.

CENTRAL Electronics 10-B SSB Exciter, VFO QT1, $80; HRO-5TA1 receiver, .5-30 Mc coils, $70. All manuals. Will dicker. No shipping. WA8EZZ.

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SELL: DX-35 with tune, switch, wiring checked by Heath, VF-1, $55, in excint condx. M. Jacobson, K9IJJ, 5507 N St. Louis, Chicago, Ill.

COLLINS 75S-3, $375; 75A-1, $150. Graham Kent, W7CZL, 112 John's Terrace, Ft. Worth, Texas.

NEW England: SX-101 receiver and speaker. Excint. $195.00. K1UQC, 40 Clarissa, Chelmsford, Mass. Tel: AL-6-5902.

SELL: Collins 75S-1 recvr, perf. condx, $300; D-104 mike with G-stand, $18.00; 10-D mic., $12.00; Heath "Q" Multiplier, $7.00. K1MMU, 30 Granaston La., Darien, Conn.

75A-1 recvr, matching speaker, manual, $140; 32V-2 transmitter, mike, coax relay, spare final, manual, $120; xtal lattic filter, $8; audio PSNs, $3.00; bargain list of components. WØLWZ, 1030 So. Dudley, Denver, Col. 80226.

FOR Sale: SX-101 Mark III Hallicrafters recvr, in perf. wkg. order: $150.00. Write William J. Roy, K9IFZ, 487 So. Harrison Ave., Kankakee, Ill.

HQ-170A receiver, Clock-timer, noise silencer and limiter and matching speaker. Like new. K3RIY, 312 Owen Ave., Lansdowne, Penna.

SBE-33 transceiver, DC inverter, mobile mounting tray and Turner PTT dynamic mike; ideal mobile, portable or fixed SSB station. $275.00. A. M. Magagna, W3RWW, 224 MacAlpine Rd., Ellicott City, Maryland 21043.

SELL: Collins 75A-4, $400. HQ-140X Q mult, $115. W1OOC.

DX-100B modified for SB-10 $100. Don Ellis, K3LQQ, 43 Poplar Lane, Levittown, Penna.

SWAP: 167 QSTs, 47 old CQs. Want: Transmitter—receiver or 6-2 meter gear. T. E. Burmeister, 1052 Woodview, Cleveland, Ohio 44121.

SELLING My SX-117 and HT-30 to make room for S/Line. Best offer on these clean units. K9LDD, Lyman Smith, 1409 Wincanton, Deerfield, Ill. Tel: WI-5-2486.

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FOR Sale: 2 Collins transmitters 30S-1, Ser. Nos. 203 and 482. All modifications to date by Collins. $900 for either transmitter or both for $1700. W8JRG, R. Littler, 640 Snowhill Blvd., Springfield, Ohio 45504.

FOR Sale: Stobotac General Radio 631, electronic stroboscope 600-14, 400 rpm, good-working order. $100.00. Sidney Berg, W2IID, 83 Middleneck Rd., Great Neck, N.Y.

FOR Sale: SR-34 Hallicrafters transceiver 6 and 2 meters, many extras: $150. Prefer pick-up deal. Tel: 201-796-2648.

SELL: HT-37, $300; SX-111, $150; Johnson Low-Pass filter KW, $4; Dow-Key relay, $6.00: Vibroplex Vibro-keyer, $10; Astatic JT-30 mike, $6.00; plus extras. All in excint condx. Will deal if buy all. Tel: 62207224, WB2BEV, George Roberts, 63 8th Ave., Brooklyn, N.Y. 11217.

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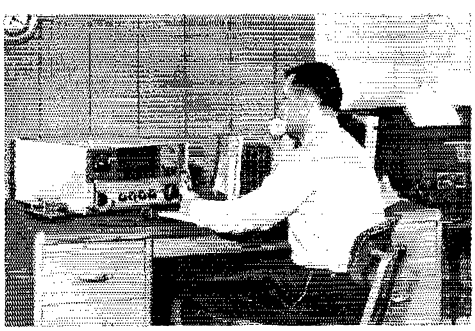

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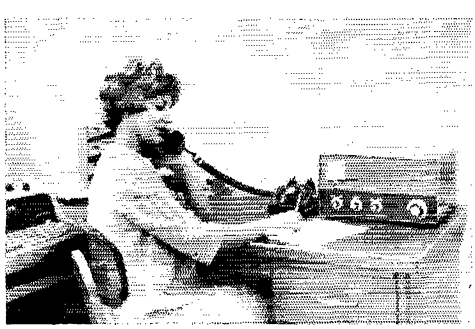

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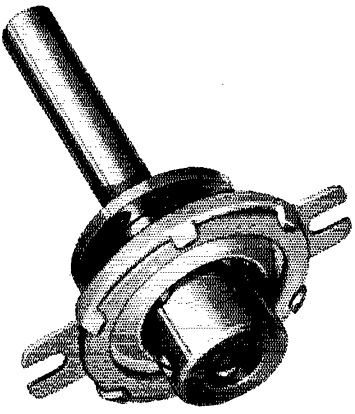

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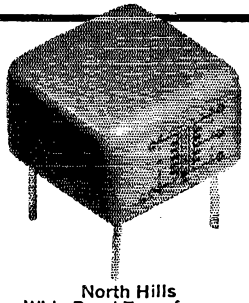

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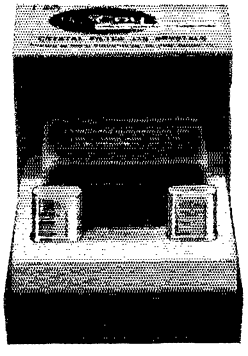

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