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50 Cents

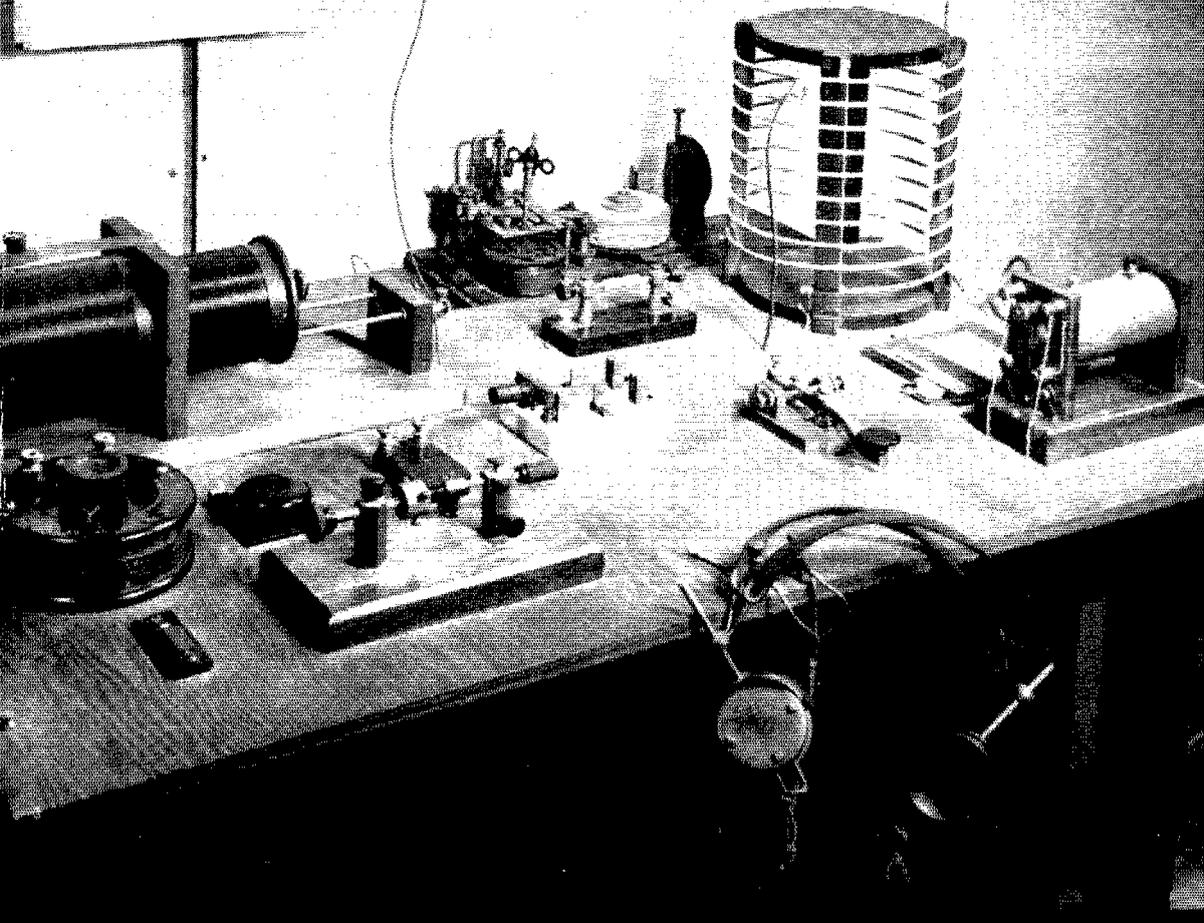
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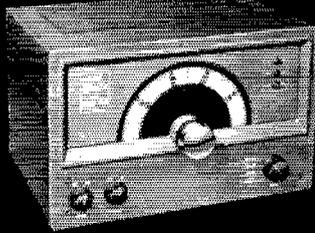
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VHF pioneers designed and built this versatile VHF Converter. It will extend the range of any communications receiver through the 6, 2 and 1 1/2 meter bands. All bands are tuned with equal ease since the 50mc tuner does the tuning for the higher bands in the same way it tunes the 50mc band. Sensitivity 1/2 microvolt with very low noise figure. Built-in power supply. Simple to install and requires no circuit modification to select either VHF or standard communication ranges. Designed and manufactured to the requirements of costly astronomy receivers.

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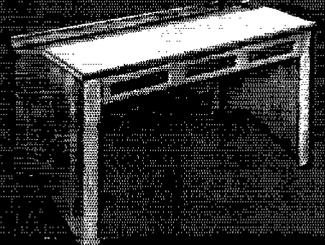
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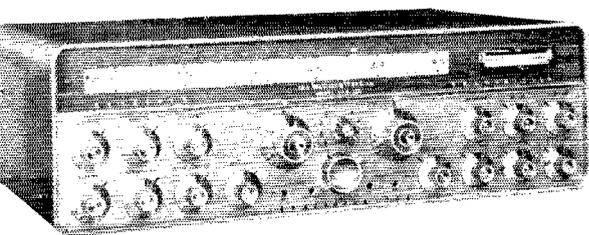
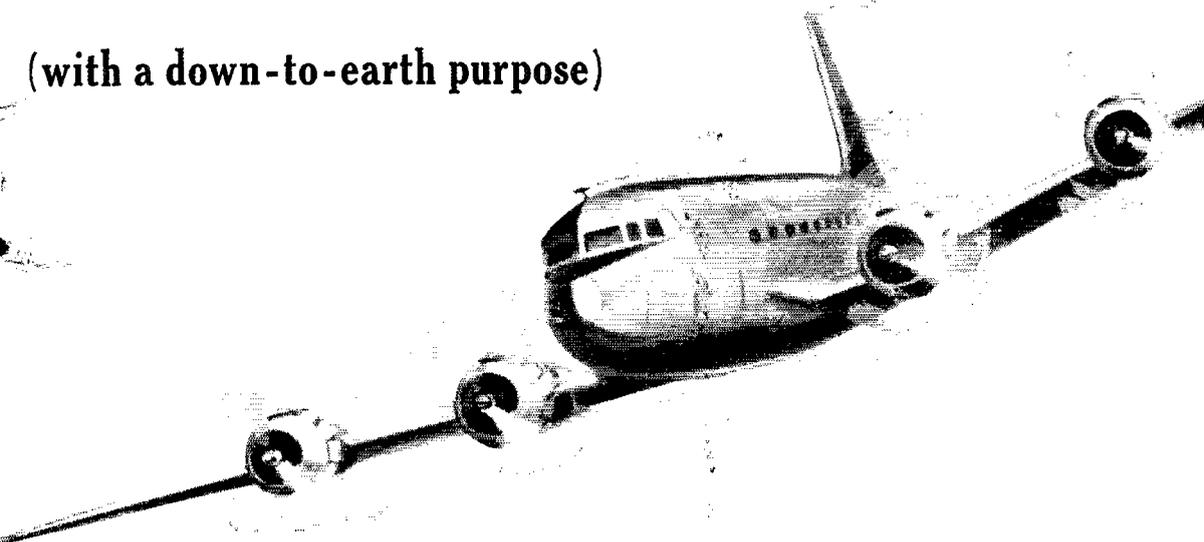
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Morocco	25th	Ceylon	14th
United Kingdom	26th	Bangkok	16th
France	28th	Philippines	18th
West Germany	30th	Formosa	20th
Berlin, Ger.	May 4th	Okinawa	21st
Italy	6th	Korea	22nd
Tripoli	7th	Japan	26th
Greece	8th	Guam I.	27th
Middle East	11th	Wake I.	28th
		Hawaii	June 1st

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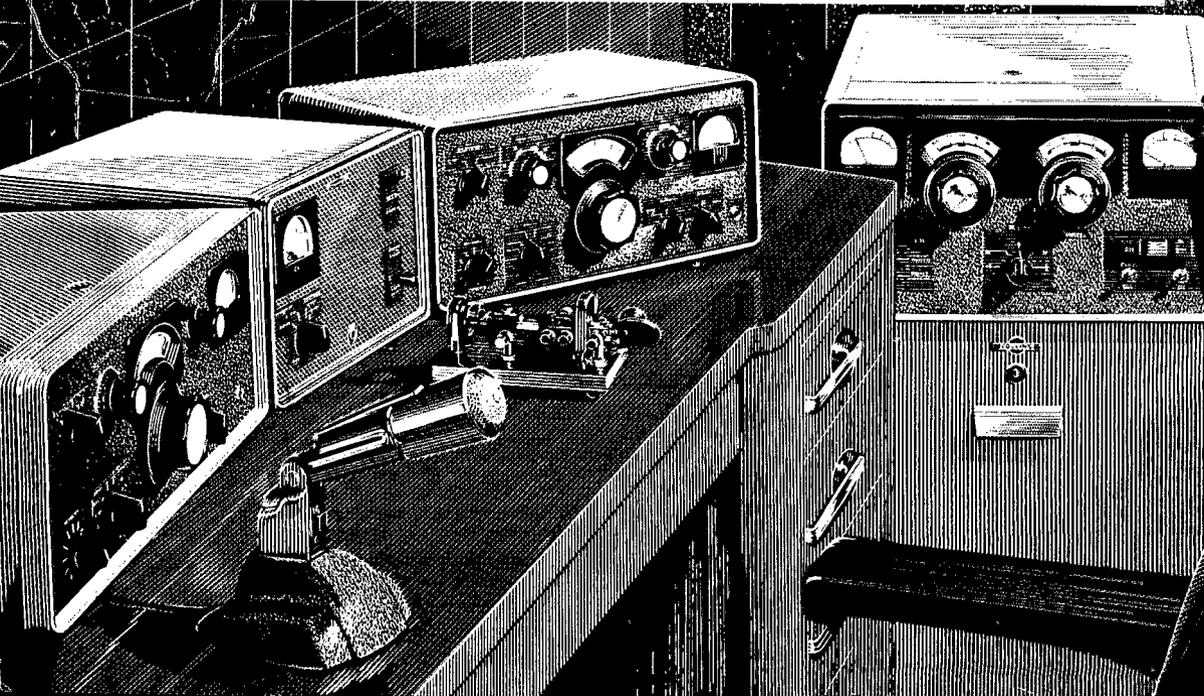
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### STAFF

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740 S. Western Ave.

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### OFFICES

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4CX1000A TETRODE  
POWERS NEW  
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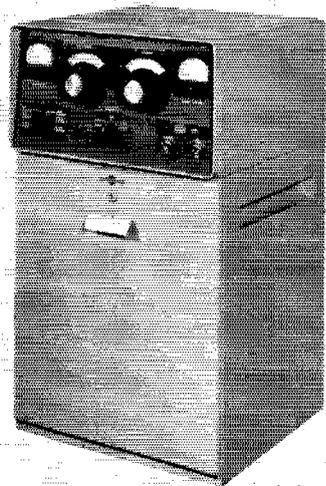
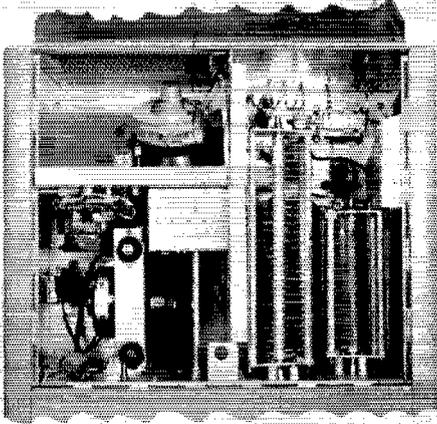
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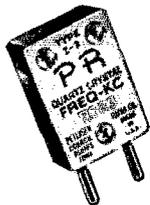
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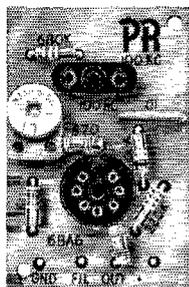
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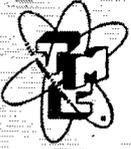
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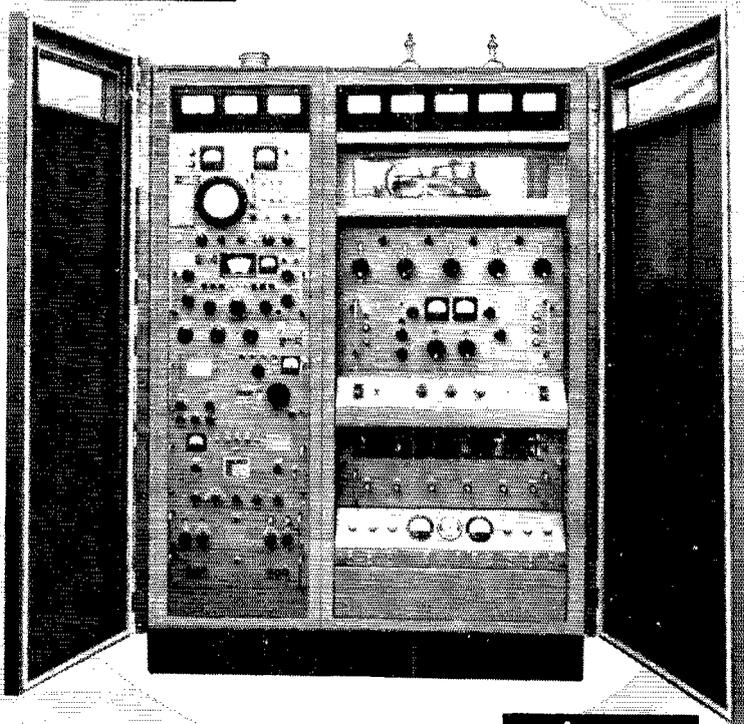
**Reports Invited.** All amateurs, especially League members, are invited to report station activities on the first of each month (or preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in QST. **ARRL Field Organization station appointments** are available in the areas shown to qualified League members holding Canadian or FCC amateur license, General or Conditional Class or above. These include ORS, OES, OPS, OO and OBS. SCMs also desire applications for SEC, EC, RM and PAM where vacancies exist. OES appointment is available to Novices and Technicians.

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			Indianapolis
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			Bismarek
			Hermosa
			St. Paul 4
			Osceola
			Metairie
			Cleveland
			Kingsport
			Owensboro
			Buchanan
			Canton 8
			Schenectady
			Huntington, L. I.
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			Pocatello
			Harlowton
			Portland 16
			Seattle 15
			Honolulu
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			Monterey
			Dixon
			San Rafael
			Sacramento
			Fresno
			Morganton
			Rock Hill
			Fredericksburg
			Forest Hills, Charleston 4
			Denver 20
			Salt Lake City
			Carlsbad
			Casper
			Montgomery
			Miami 55
			Fort Walton Beach
			Atlanta 17
			Urb. Truman
			Rio Piedras, P. R.
			Balboa Heights
			Rialto
			Phoenix
			San Diego 7
			Santa Barbara
			Fort Worth 7
			Lawton
			Corpus Christi
			St. Stephen, N. B.
			Willowdale, Toronto, Ont.
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**GPT-10K**



**AN/FRT-39**

## **GENERAL PURPOSE HI-POWER TRANSMITTER**

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**FREQUENCY RANGE:** 4 to 28 mc continuous. **OUTPUT POWER:** 10 kw, 2 tone PEP, 35db 3rd order product suppression, 5 kw, 40 db. **OPERATING MODES:** CW, MCW, SSB, ISB, DSB, FS. **FREQUENCY CONTROL:** High stability VFO, 10 oven controlled crystals, three oven controlled crystals in FSK, provision for frequency synthesizer.

**OUTPUT IMPEDANCE:** 70 ohms unbalanced, 600 ohms balanced. **AUDIO BANDWIDTH:** 3 kc or 7.5 kc. either sideband. **POWER REQUIREMENTS:** 208/230 volts, 50/60 cps, 3 phase, approx. 13 kw.

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BULLETIN 207C

**The TECHNICAL MATERIEL CORPORATION**

IN CANADA  
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Main Office: MAMARONECK  
NEW YORK

# THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

All general correspondence should be addressed to the administrative headquarters at West Hartford, Connecticut.



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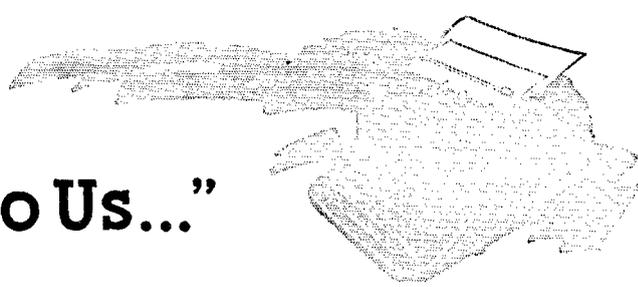
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# "It Seems to Us..."



## FORTY-FIVE YEARS

May, 1914, is the birth date of our American Radio Relay League. In briefly commemorating this forty-fifth anniversary, we think it appropriate to quote liberally from a much earlier *QST* editorial recounting our beginnings:

"In 1914, with amateur radio in its swaddling clothes, with the handful of amateurs a feeble voice crying in the wilderness of despair, ARRL existed only as a grand idea in the mind of our founder-president, Hiram Percy Maxim — its only asset his will to see the idea through. Today we can look back upon years of accomplishment during which we have built our own unique cooperative association, healthy, mutually-owned, self-supporting, enjoying recognition as our spokesman, prestige as our representative before the world.

"We like to tell the tale of how ARRL came into being. With the crude apparatus of those early days, amateurs could not talk from one town to the next. But an intermediate amateur could *relay* for them if only there were some mutual understanding that each amateur would willingly so aid his fellows. Organization to supply this mutual need would work wonders, and if this spirit of one for all and all for one could help in practical operating, how much greater its opportunities in the realms of fraternalism and protection! And the organization should be owned by the amateurs themselves, not run for profit but for their common good.

"This was the Maxim vision of 1914. How the idea took form is an enthralling story of cooperative accomplishment. Early birds remember the little brown call books, the map of relay stations with a dot for every member, the little blue-backed *QST*s mailed from the "office" in the attic of Clarence D. Tuska, our first secretary-editor, himself a college youth. Those were the beginnings. How richly the idea has succeeded is attested by the *QST*s of the years, and by our members and strength to-day . . .

"We hams of America owe something to the men who have built up ARRL. First and always is the Old Chief, Hiram Percy Maxim. And there is Tuska, founder of *QST*. Then there are the [many] amateurs who during the years have sat as members of our Board of Directors, giving from their hearts of their time and thought that ARRL might advance. We always think with particular pride of that Board back in 1923 which deliberately voted

itself out of office that ARRL might enjoy a truly representative form of government. And then there were those hundreds of amateurs who lent the League thousands of dollars as working capital for the first two years after the war, with no security except their firm faith in a non-commercial amateur-owned society. These are but typical examples of the amateur spirit that has built our League.

"Let us not forget to-day that we have achieved these things by mutual forbearance, by the control of selfishness, by team-work. We have created something that is without parallel in American life, representative of all that is fine in a good, clean game. We may all be proud of it. Let us not be misled by those who, actuated by greed and jealous of our success, seek to take the control of our hobby into their hands and by planned misrepresentation are endeavoring to weaken our faith in our own selves. We have come a long way in twenty years, shoulder to shoulder. Together we have worked these marvels. We know that amateur radio has a rich destiny. Arm in arm we go on towards it."

## BOARD MEETING

On May 15, the sixteen amateurs who have been named by Full Members of the League in the U. S. and Canada to represent them in matters of ARRL policy will meet in Hartford. There this Board of Directors will examine the progress of the League through the numerous reports required of committees on special matters; of the General Manager on membership matters, legislative and regulatory subjects (with special attention to the forthcoming world radio conference) and business operations; of the Communications Manager on all phases of the League's field operating organization, contests, awards, etc.; of the Treasurer on the status of the League's finances and investments; and of each individual director on the status of affairs in his division. With the situation as concerns amateur radio thus brought into focus on a nationwide scope by elected representatives of individual amateurs, the Board is enabled to come to decisions of policy and to instruct the League's officials accordingly for the coming year.

At press time we have notice, served in advance as required of proposed amendments to our Articles and By-Laws, of several matters to be presented for Board consideration.

(Continued on next page)

These include a proposal to raise membership dues to \$5 per year in the U. S. (\$5.25 in Canada); to revise the make-up of the Executive Committee; and to provide that a vice-director may represent his division at the Board meeting should the director be incapacitated through illness. But the agenda is wide open — no subject is barred, and at the meeting undoubtedly some dozens of new problems and proposals will be discussed. If you have views on amateur matters of the day or what you think is a good idea to improve the status of amateur radio, convey the information to your director. His address is on page 8.



(See page 91)

### COMING A.R.R.L. CONVENTIONS

- June 19-21 — ARRL National Convention, Galveston, Texas
- July 4-5 — Pacific Division, San Jose, Calif.
- July 24-26 — Southwestern Division, Pasadena, California
- August 15-16 — Pacific Div., Honolulu
- August 22-23 — Central-Midwest Divisions, St. Louis, Mo.
- September 5-6 — N. E. Division, Hartford
- October 3-4 — Roanoke Division, Richmond, Va.

### MASSACHUSETTS STATE CONVENTION

Swampscott — May 17, 1959

The famed New Ocean House Hotel at Swampscott will be the scene of the Massachusetts State Convention May 17, sponsored by the Federation of Eastern Massachusetts Amateur Radio Associations. The location is nine miles north of Boston, on Route 129, connecting with Routes 1 and 128, with plenty of free parking. Registration and an extensive exhibit hall open at 9 A.M. Program features will be technical talks, demonstrations, net meetings and special events for the YLs (hams or not). Talk-in stations will cover 2, 6 and 10 meters. Advance registration is \$7.50, including roast beef banquet dinner. At the door, registration alone will be \$3; if still available, banquet tickets will be \$5. Send your check to Horace Snow, W1YYJ, 15 MacArthur Blvd., Danvers, Mass., together with a #8 self-addressed stamped return envelope.



In late March the press services carried reports on the feat of MIT's Lincoln Laboratory in bouncing signals off the planet Venus. One of the engineers on this job was W1OUN, long-time v.h.f. enthusiast.

### OUR COVER

Just another equipment shot? Not at all. Our cover this month depicts an amateur station as it might have looked forty-five years ago, when the League was founded. This setup is a permanent exhibit at the museum of the Antique Wireless Association in Holcomb, New York.

Turn to page 92 and read all about the Antique Wireless Association, as related by W2ICE.

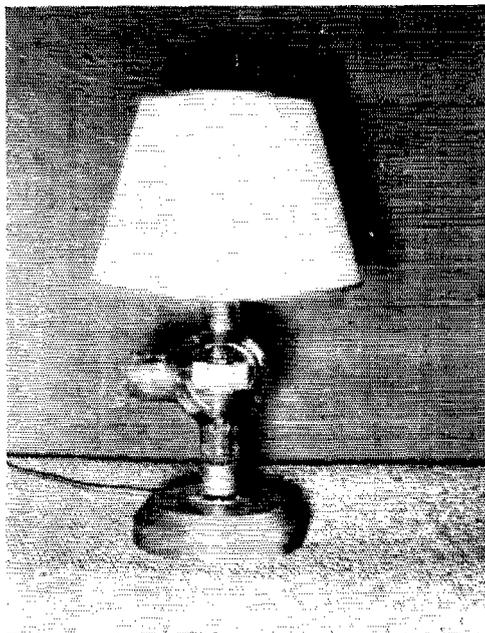


Word comes via UA1DZ that there will be another U.S.S.R. International C.W. DX Contest in May as in the past. Official rules have not been received at this writing, however, from the Soviet Central Radio Club, sponsors of the activity. But if the U's start calling CQ Test at 2100 GMT and passing out RST plus QSO serial numbers to all comers some Saturday in May, don't say we didn't warn you!

New definition of an old timer — one who has made the last payment on his rig.

One fellow's XYL said she was disappointed because he had never gotten his name or call in QST. She added, "You probably won't get your call in print until you appear in 'Silent Keys'."

— K9EUF



This is how W2HLY retires an old faithful 852. Rather than heaving it in the ashcan, he made it into a lamp, and it now occupies a place of honor in his shack.

# The World Above 20,000 Megacycles

## Amateur Communication Techniques for the Superhigh Frequencies

DATE	STATION	CALLED	TIME	MODE	TIME	MODE	TIME	MODE	TIME	MODE	OTHER DATA
12/29	W2UKL	W2RDL	12:00	21,000 Mc.	12:05	21,000 Mc.	12:10	21,000 Mc.	12:15	21,000 Mc.	Highest frequency for voice communication by amateur — Distance: 25 feet.
1/25	W2UKL	W2RDL	12:00	50,000 Mc.	12:05	50,000 Mc.	12:10	50,000 Mc.	12:15	50,000 Mc.	Extended 25 feet to 150 feet.
1/25	W2UKL	W2RDL	12:00	21,000 Mc.	12:05	21,000 Mc.	12:10	21,000 Mc.	12:15	21,000 Mc.	Extended 25 feet to 14 miles.

BY

DR. A. H. SHARBAUGH,\*

W2UKL,

AND R. L. WATTERS,\*\*

W2RDL

AS MAY be seen from the log excerpt above, we have two new DX records in the microwave region — 14 miles on 21,000 Mc. (14 mm. in wavelength) and 150 feet on 50,000 Mc. (6 mm. in wavelength) — for two-way communication by voice. A considerable amount of activity on microwaves took place in the Schenectady, N. Y., area, during the past several months, on the highest frequency band, 21,000 to 22,000 Mc., allotted to hams. In addition, experiments and successful communication were carried out in the unassigned and almost unexplored frequencies above 30,000 Mc.

The work on 50,000 Mc., believed to be the highest frequency ever used by radio amateurs, is more than double the frequency used by the authors in 1946 when they were first to communicate on the 21,000-Mc. band.<sup>1</sup> A check of informed sources indicates the two-way communication on 50,000 Mc. may constitute a record in commercial circles as well.

After several months of experimentation with the 50,000-Mc. equipment to be described later, successful two-way communication by voice was first established on July 29, 1958, between two sets of equipment with their antennas 25 feet apart. Signals were quite strong over this distance, but erratic behavior of some components in the gear prevented making check over a greater distance.

More work on the equipment during the next few weeks resulted in extending the distance over which two-way voice communication could be maintained to 150 feet on September 27, 1958. Each transmitter-receiver unit was mounted on a table with wheels so that after the initial tune-up, the equipments were simply rolled further and further apart until the signals became too weak to be intelligible. Transmissions over the 150-foot

\* 39 Pine St., Scotia 2, N. Y.

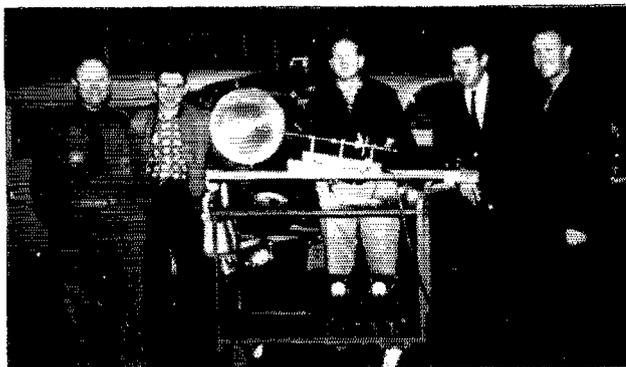
\*\* 1581 Clifton Park Road, Schenectady 9, N. Y.

<sup>1</sup> Sharbaugh and Watters, "Our Best DX — 800 Feet," *QST*, August, 1946.

distance were carried on for several hours using an estimated r.f. power of *one microwatt!* This minute power was the limiting factor in the transmission range; coverage of several miles should be possible at 50,000 Mc. with improved equipment: several milliwatts of r.f. power and greater receiver sensitivity.

After the experiments at 50,000 Mc. the authors decided to attempt an extension of their two-way record on 21,000 Mc., 800 feet, set in 1946. The same microwave oscillator tubes, waveguide and fittings from the 50,000-Mc. experiment were used and will subsequently be described in detail.

For years our two-way records for the amateur bands from 50 Mc. up carried a record of 800 feet for the 21,000-Mc. band. The calls were W1NVI/2 and W9SAD/2, but the names of the holders were those in the byline of this article. Feeling that it was of vital importance to a future generation of hams to stake out a claim for amateur radio in the as yet unassigned region above 30,000 Mc., W2UKL and W2RDL went at it again. After much experimentation they succeeded in generating enough signal on 50,000 Mc. to work two-way over a distance of 150 feet. This is believed to be the highest frequency ever used for communication, amateur or otherwise. The authors also made extensive improvements in their gear for 21,000 Mc., and were able to extend their record for that band to some 14 miles. Though it may be some time before you can run out to the corner store and buy parts for their kind of microwave station, we think you'll be interested in this account of amateur pioneering in an almost unknown field.



These five sleepy-eyed Schenectady amateurs gathered at 5 A.M. for the 14-mile record attempt on 21,000 Mc. Left to right: W2UKL (coauthor), K2UNN, W2JZK, W2RDL (coauthor) and W2KLM.

On Saturday, October 4, 1958, the two sets of gear were tuned up at one location. One transmitter-receiver unit was then loaded into W2RDL's station wagon and hauled to a vantage point about  $\frac{3}{4}$  of a mile away for a test transmission. Gonset Communicators on the 144-Mc. band provided liaison between the locations while the microwave gear was being readied. Horn antennas, aimed visually with field glasses, were used initially. Later, 15-inch diameter parabolic reflectors were tried at both ends of the circuit with considerable improvement in signal strength.

During this test, two klystrons designed for operation at 36,000 Mc. (8 mm. in wavelength) were tried in the gear, but this attempt at two-way communication was unsuccessful because one tube developed an internal short circuit.

The 21,000-Mc. signals were so strong over the  $\frac{3}{4}$ -mile path that we immediately scanned topographical maps and the horizon for a more distant vantage point. Mount Rafinesque, 14 miles away near Troy, N. Y., referred to as Bald Mountain by local inhabitants, was selected. This name owes its origin to a complete absence of trees and shrubs on the mountain peak, so it is ideal for line-of-sight communication.

A u.h.f. television station at this site provided the necessary 115-volt power, and its tower was a convenient sighting landmark for aiming the antenna on the equipment at the Schenectady end of the circuit. The parabolic antenna on the Bald Mountain gear was aimed at a large water storage tank located near the gear in Schenectady.

We had anticipated ruinous overloading of the television receiver used as the i.f. amplifier, from the powerful television transmitter on the mountain. So, to avoid this problem, the crew of helping hams was rounded up at daybreak on Saturday, October 18, 1958. One set of gear was again loaded into W2RDL's station wagon and hauled up Bald Mountain.

Both microwave equipments were in operation by 9 A.M. and contact was established at 9:10 A.M. over the 14-mile path. Again, Gonset Communicators on 144 Mc. permitted liaison between the locations, but the microwave gear worked so well that it was unnecessary to further utilize the auxiliary 144-Mc. link. Horn-type antennas were tried at both ends of the circuit, in place of the parabolic antennas shown in the photographs.

Communication was still possible, but with considerable reduction in signal strength.

Just to see if the television transmitter actually would interfere with our microwave gear, we kept the latter operating until the station came on the air at 12:30 P.M. No trace of interference with the microwave gear could be detected, so our 5 A.M. arising had been unnecessary after all! Since the television transmitter was on Channel 35 in the u.h.f.-TV band, it was far removed in frequency from our i.f. amplifier on Channel 2.

The 21,000-Mc. signals were sufficiently strong over the 14-mile path to assume that two-way communication on this band could be established over an airline distance of about 40 miles from Schenectady to Mount Greylock in Western Massachusetts. An attempt at a new record on this band will be made during the summer.

Meanwhile, back on the workbench, the two equipments are being improved. Larger parabolic antennas are being readied. Low-noise pre-amplifiers following the crystal mixers in the receivers will be provided, and any other means by which a few db. of improvement can be obtained will be included.

The authors would like to acknowledge the assistance of the following people in the 21,000-Mc. distance record: Ted Swartz, W2KLM; Ed Neal, W2JZK; Bill Havens, K2ZLX; Paul Perrone, K2UNN; and Herb Singer of TV Station WTRI. We are also indebted to the Receiving Tube Department of the General Electric Co. for encouragement and assistance in these experiments.

#### *The 50,000-Mc. Experiment*

The equipment used in the 50,000-Mc. (6 mm.) transmission was basically similar to that used in setting the original 21,000-Mc. record thirteen years ago.<sup>1</sup> A block diagram of the circuit is shown in Fig. 1, in which waveguide and coaxial transmission line connections are indicated by double and single lines, respectively.

Using this circuit, the r.f. carriers of the two communicating stations are transmitted simultaneously and duplex communication, like that employed on land telephone lines, is accomplished as follows:

At station 1, r.f. power at frequency  $f_1$  is fed through a crystal mixer and on to free space. A

part of this power is absorbed by the mixer. An identical arrangement at station 2 transmits power at a frequency  $f_2$ , so that  $(f_1 - f_2)$  equals the intermediate frequency. Thus a signal at this difference frequency may be amplified and detected at both stations. This scheme permits the same tube to operate as both local oscillator and transmitter and so reduces by one-half the necessary transmitting and receiving equipment. Furthermore, should it be desired, automatic frequency control circuitry is required at one station only, since it is only necessary that the two transmitted signals be held at a constant difference frequency.

### Description of Circuit Components

The component most critical in design and adjustment is the harmonic generator into which fundamental power is fed and power is extracted at the second harmonic. Fig. 2 shows it to consist of two pieces of rectangular waveguide with different internal dimensions. These are placed at right angles to each other and a crystal diode is mounted on the broad surface of the smaller waveguide.<sup>2</sup> A standard coaxial connector on the opposite face is used to make connection to a d.c. milliammeter to monitor the power input. Fundamental power fed down the larger waveguide causes currents to flow in the semiconducting crystal diode. Due to the nonlinear response of the crystal, currents flowing at harmonics of the fundamental frequency are generated and harmonic power is propagated down the smaller guide. The sliding short-circuit plungers which terminate the two waveguides are used to optimize the fundamental power flowing into and harmonic power out of the nonlinear element.

Waveguides behave like high-pass filters; i.e., all wavelengths longer than a critical value  $\lambda_c$  are highly attenuated. The critical or cutoff wavelength is determined by the large dimension of rectangular waveguide. In our case,  $\lambda_c = 1.2$  cm., and we have about 15 db./cm. attenuation of the fundamental 25,000-Mc. power. Thus a piece of small guide ten centimeters in length provides about 150 db. attenuation to the fundamental and insures that we are transmitting with harmonic and not fundamental power. (See component marked *filter* in Fig. 1.) Since the generated harmonic power drops about 10-15 db. per higher harmonic, very small amounts of power are generated at harmonic frequencies above 50,000 Mc.

It is difficult to estimate the amount of power which was generated at the second harmonic. If we assume approximately 15 db. loss in conversion to the second harmonic, an upper limit of 150 microwatts is set by the available fundamental power of about 5 milliwatts. On the other hand, we measured about  $10^{-6}$  amp. of rectified crystal current across an estimated impedance of about  $10^3$  ohms. Therefore, a minimum in the generated 6 mm. power is  $10I^2R = 10^{-8}$  watts,

<sup>2</sup> Gordy, Smith and Trambarulo, "Microwave Spectroscopy," published by John Wiley, New York, N. Y. (1953), page 50.

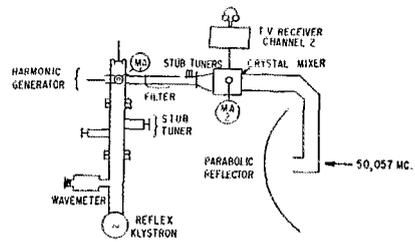


Fig. 1—Block diagram of the 50,000-Mc. transmitter-receivers used by W2UKL and W2RDL. The precise frequency given at the lower right should not be taken too literally. Only the 57-Mc. frequency difference between the two oscillators is important.

assuming 10 per cent conversion efficiency of r.f. to d.c. in the crystal detector. Thus the available power is very small, and is probably of the order of a microwatt. The possibility of burns by r.f. power was indeed remote!

The diodes used as nonlinear elements were selected 1N26 silicon crystals. The amount of output was very sensitive to rotation and amount of insertion of the crystal cartridge in its coaxial mount. From 1 to 5 ma. of rectified d.c., indicating approximately 1 to 5 microwatts of power, was used; the harmonic power was proportional

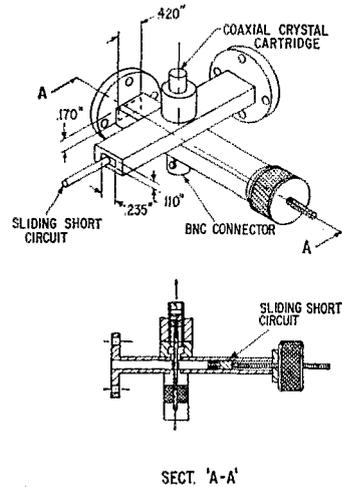


Fig. 2—Details of the harmonic generator used in the 50,000-Mc. experiment.

to the d.c. current throughout this range.

The double-ended mixer block in Fig. 1 is shown in detail in Fig. 3. It was designed for operation at 23,000 Mc. and so performed rather poorly at 50,000 Mc. To avoid excessive mismatch it was coupled to the small-sized waveguide through a tapered section about one inch in length. Again, the orientation and amount of insertion of the coaxial crystal cartridge were extremely important. Several 1N53 silicon diodes were tried as mixers and found to be somewhat better than the selected 1N26 units. This was expected since they are designed for operation in 8-mm. wave region, whereas the 1N26 is designed

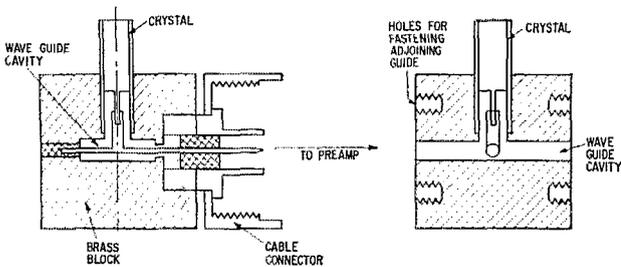


Fig. 3—Cutaway view of the double-ended mixer block.

for 12-mm. operation. If a sufficient number of 1N53 diodes were available to permit selection, there is no doubt that the transmitting range could be greatly increased. The outer diameter of the 1N53 crystals was increased to that of the larger 1N26 units by the use of a brass sleeve. This permitted their use in the mixer blocks designed to fit the larger unit.

One of the problems associated with the circuit of Fig. 1 is the lack of a suitable amount of local oscillator power, resulting in excessive conversion loss in the mixer. For example, the conversion loss might be 50 db. when mixing two 50,000-Mc. signals when the local oscillator power is of the order of  $10^{-6}$  watts, and only 10 db. when the local oscillator power is increased to  $10^{-3}$  watts.<sup>3</sup> To circumvent this trouble, in some experiments we removed the mixer block and accomplished mixing in the harmonic generator section. In this case the i.f. output was taken off at the connection normally used to measure the mixer crystal current. Since the klystron oscillator delivered milliwatts of power on the fundamental frequency—a mere 25,000 Mc.—we had adequate local oscillator signal level.

Both parabolic reflectors and tapered rectangular horns were used as antennas. The horns were more convenient to aim and consequently were used in preliminary experiments before making the final tests for maximum communication range. At such short wavelengths, large gains in effective power can be achieved with only a small antenna. The largest horn had a rectangular aperture of only 4 by 5 inches at its open end and was 10 inches long. The gain of even this horn was in excess of 20 db.

Much larger gains are provided by parabolic reflector antennas. For example, our reflectors were 15 inches in diameter and the calculated gain was about 48 db. (See Appendix A for a calculation of this gain figure.) A 1-degree beam width attained with a parabolic reflector is sufficiently narrow that it is expedient to initially align the transmitters with horns and then change over to the parabolic antennas.

The frequency of the transmitted power was measured at its fundamental by the use of the resonant cavity wavemeter shown in Fig. 1. Resonance was indicated by a dip in the rectified output current. Multiplication by a factor of two then gave the frequency to within about  $\pm 15$  Mc. out of 50,000 Mc. When not in use, the

<sup>3</sup> Johnson, *IRE Transactions*, MTT-2, No. 3, 27 (1954).

wavemeter was replaced by a sliding short circuit in the arm of the "T" section connecting the wavemeter to the main waveguide. The location of this short circuit was, of course, adjusted for maximum output. There was little worry about staying within the band since the spectrum above 30,000 Mc. is currently "free for all"!

Several methods were used to ascertain that the transmission was accomplished at the second harmonic frequency and not at the fundamental. First a metallic reflecting plane was inserted in the transmission path in front of the antenna. This stopped the transmitted signal and the reflected wave pattern repeated itself as the reflecting metal was moved a half wavelength (3 mm.) in space. Second, removal of the harmonic generating crystal completely eliminated the transmitted signal. Third, the frequency of the local oscillator was changed continuously, and the two fundamental frequencies were noted at which there was an output from the i.f. amplifier. These *fundamental* frequencies were separated by the i.f., 57 Mc., as they should be for transmission and mixing at the second harmonic.

Normally, waveguide connections are made with choke joints. This is accomplished by the use of flanges which have a built-in radial cavity resonant at 25,000 Mc. which provides a low-impedance path for r.f. currents at the junction. This reduces the losses over that for an ordinary butt joint. Such choke joints were used in the portion of our system which was operating at the fundamental frequency, but were not used in those parts of the system which transmitted harmonic power. At double frequency, the chokes would have caused increased losses. Thus, flat flanges, screwed together at four points around their periphery, served as connections in the 50,000-Mc. portion of the plumbing circuit.

Since all available power had to be conserved for useful communication, no isolating attenuation could be used in the various parts of the system. As a result, the system was extremely frequency sensitive, and a change of a few megacycles caused the amount of radiated power to change drastically. To maximize the output power at a single frequency, eighteen separate adjustments by actual count had to be made; and a large number of these were interdependent! This procedure had to be repeated at each new frequency and made the tuning of the klystron tubes rather painstaking to yield the correct i.f. It was during this part of the experiment that the authors were nearly driven to elbow-bending or

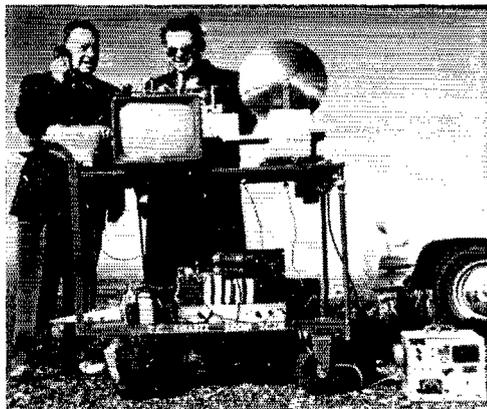
some other more relaxing form of indoor sport! Fortunately, once a pair of tubes had been finally tuned to the proper frequencies, they remained quite stable aside from an initial frequency drift during warmup.

Two types of klystron tubes were used for generating power in the 12-mm. wavelength region: the General Electric Z-668 and the 2K33A. The principle of operation and a cross-sectional view of the Z-668 was given in our prior article.<sup>1</sup> Unfortunately, these tubes have not been produced commercially to date; we are indebted to the designer, Dr. James M. Lafferty of G.E., for the loan of a number of them. Although the power output from the Z-668 is a little lower than the 2K33A, the tuning is so much smoother (constant output over a wide frequency range), that we preferred to use them whenever possible.

Since the frequency of klystron tubes is dependent upon the various applied voltages, it was necessary to use voltage-regulated power supplies. An annoying 60-cycle ripple on the signals was evident, if the supplies were not regulating properly. This residual ripple could probably be reduced still further if the heaters were operated with d.c. voltage. Forced air cooling of the klystrons was employed to insure long tube life and to minimize frequency changes due to breezes and drafts. The useful bandwidth of the i.f. amplifier was about 2 Mc., hence the two tubes had to be maintained at about  $57 \pm 1$  Mc. apart in frequency. (The mid-frequency of TV Channel 2 is 57 Mc.) No automatic frequency control was employed and slow drifts occurring over several minutes could be compensated for by adjustment of the focus or reflector voltages. This procedure provided a finer control of frequency than could be accomplished by mechanical tuning of the tube.

The output frequency of the klystron decreases about a megacycle for an increase of one volt applied to the reflector, and no current is drawn by this electrode, so these tubes are easily frequency modulated. The same modulation circuit was used as described previously.<sup>1</sup> During preliminary adjustments it was convenient to modulate with a few volts output from a 1000-cycle generator. Low-impedance carbon microphones were used to minimize the 60-cycle pickup problem encountered with high-impedance crystal microphones.

A G.E. 14-inch portable television receiver tuned to Channel 2 served conveniently as i.f. amplifier and discriminator (using the slope of the response curve). The audio was taken off between the video output connection to the picture tube and the chassis. Crystal earphones were used, although the raster pattern could also be used for visual indication of output. The contrast control served as the gain control. An increase in noise could be heard readily when the mixer crystal was plugged in; hence the television set probably was performing efficiently as an i.f. amplifier. Its noise figure is estimated to be roughly 10 db. on Channel 2. It would be difficult to construct a



W2KLM and W2RDL with the equipment at the Bald Mountain end of the 14-mile 21,000-Mc. circuit. The high-voltage power supply for the klystron oscillator is on the lower shelf of the wagon. The portable TV receiver serves as the receiver i.f. system.

suitable i.f. amplifier with a lower noise figure without going to a lot of special design and construction.

### Conclusion

It is impossible at present to estimate the expected maximum range of communication at 50,000 Mc. because of (1) the lack of performance data for the crystal and mixer at these frequencies; and (2) the uncertainty as to our available r.f. power. Certainly one important theoretical limitation for long-distance communication is the strong absorption by oxygen in the air,<sup>2</sup> about 14 db./mile. Our 150-foot working range, however, was largely determined by the low efficiency of power generation at the 6-millimeter wavelength. A more efficient harmonic generator could be constructed by actually mounting the crystal slab and cat's whisker in the small waveguide itself.<sup>2</sup> Furthermore, the use of crystals and a mixer block designed for use at 25,000 Mc. and insufficient r.f. choking at the i.f. output connection have also undoubtedly limited the available 50,000-Mc. power output. One could avoid most of the oxygen absorption by shifting about 2 mm. in wavelength on either side of the peak absorbing frequency of 60,000 Mc. (5 mm.). However, we could not do either because we did not have enough power to work at the third harmonic wavelength, nor a klystron which would operate at a fundamental frequency of 16,000 Mc. (18 mm.).

Transmissions were maintained for several hours at 50,000 Mc. The quality was good; the chief objection was some 60-cycle ripple. Each transmitter-receiver was mounted on a table with wheels and the two were simply rolled apart until the signal became too weak to be intelligible.

### Details of the 21,000-Mc. Experiment

Our 1946 transmission<sup>1</sup> marked the first use

<sup>1</sup>R. Beringer, *Phys. Rev.*, Vol. 70 (1946), p. 25



The Schnectady end of the 21,000-Mc. circuit, manned by W2UKL and K2UNN. Water tower at the left was used as a landmark for aiming the antenna system at the Bald Mountain end of the 14-mile circuit.

of the highest frequency band allotted to hams; 21,000 to 22,000 Mc. The maximum two-way distance which was covered was 800 feet. We had been able to establish one-way communication at a distance of one-half of a mile, but due to the lack of sensitivity of one of our receivers, two-way work was impossible over this distance in 1946. But in 1958 the advent of television had made available i.f. amplifiers with much improved noise figures, and calculations of possible range showed that we should be able to greatly extend this distance with the use of this improved receiving equipment.

In this amateur band we are confronted with absorption of the radio energy by water vapor in the air, but the magnitude of this absorption is known (1 db./mile at 100 per cent humidity) and may be taken into account. Unlike the fourteen-fold stronger oxygen absorption at 50,000 Mc., we could always minimize the amount of water vapor attenuation by waiting for a dry day to do the experiments!

The 21,000-Mc. equipment was identical to that used in the 50,000-Mc. experiment except that the harmonic generator and filter were removed. In the 50,000-Mc. circuit the power level was readily monitored by observing the rectified current flowing through the harmonic generator crystal. However, with the removal of the harmonic generator, it was now necessary to devise the circuit of Fig. 4 to measure the power output from the klystron tube. With this circuit the power level was indicated by the magnitude of the mixer current, while the crystal was simultaneously connected to the i.f. amplifier input. Capacitance  $C_1$  represents the total shunt capacitance; Twin-Lead, input to receiver, and mixer block. Inductance  $L$  resonates with  $C_1$  at

57 Mc. and  $C_2$  is a 0.005- $\mu$ f. bypass capacitor.

In contrast to operation at 50,000 Mc. the performance data of 1N26 crystals is available for 21,000 Mc. Hence, a relatively reliable calculation of the expected range can be made. This was highly desirable for our tests since transportation of the microwave gear to two elevated locations in the field involved considerable work and man power. We thus wished to minimize the number of field tries for maximum distance. The method of calculating the probable working range, about fifty miles for the equipment used in our experiments, should be of interest to those amateurs who may be thinking of an assault on our 14-mile record! Details are given in Appendix B.

#### Appendix A

The gain in db,  $G$ , of a uniformly illuminated parabola (our diameter,  $D$ , was 15 inches) is readily computed as:

$$G = 10 \log_{10} \frac{16D^2}{\lambda^2} = 48 \text{ db.}$$

From classical optics, the angle  $\theta$  between half power points, is given by

$$\theta = \frac{2\pi 70\lambda}{360 D} \approx \frac{\lambda}{D} = .017 \text{ ra. (1}^\circ\text{).}$$

#### Appendix B

The ability of a receiver to detect weak signals is expressed in terms of the overall effective noise figure  $F'_{rec}$ , which expresses as a power ratio how many times worse a given receiver is than an ideal receiver. The two most important sources of noise in a receiver are the mixer noise, and the i.f. amplifier noise. In addition to this, the efficiency of conversion of r.f. to i.f. power  $L$  must also be taken into account. When all these factors are

(Continued on page 196)

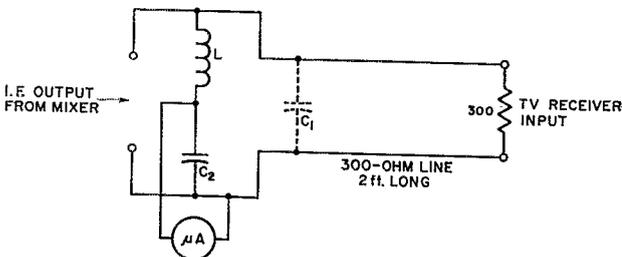


Fig. 4—Circuit used for monitoring power in the microwave experiments, where a television receiver is used as the i.f. amplifier system.



c.w. before we built "Monitrol." Since the relay contacts and the plate switch are in series, there is no plate voltage applied to the final until both are on, an arrangement essential to the operation of the v.f.o. transmit-tune switch  $S_3$  on the new control unit.

The station receiver is an SX-100, which has the muting circuit built in and the r.f. gain control ground connection brought out to a plug on the rear of the chassis.

The break-in relay  $K_2$  used in "Monitrol" is a compact d.p.d.t. unit (Advance GHP/2C/6VD) that plugs into a standard octal socket and has a neat, dust proof plastic enclosure. Its operating current is about 250 ma. at 6 volts d.c.

The break-in circuit functions as follows: When  $K_2$  is keyed, one normally open contact keys the transmitter and grounds the receiver antenna terminal. The r.f. choke and 0.02- $\mu$ f capacitor isolate the keyed circuit and the receiver antenna from each other. The normally-closed contact on the same side of the relay opens the ground lead of the receiver r.f. gain control.

The other normally-open contact keys the monitor oscillator. The normally closed contact of this set will be used to operate a t.r. switch of the type described by W5JXM<sup>1</sup> to permit using the same antenna for transmitting and receiving.

There are two auxiliary controls connected

with the break-in unit. Switch  $S_4$  transfers the receiver muting circuit from the break-in relay to the auxiliary contacts on the antenna relay, for push-to-talk phone operation.  $S_2$  in the TUNE position closes the oscillator circuit of the transmitter and at the same time opens the ground side of the transmitter plate voltage relay. See Fig. 2. With this arrangement, when zeroing on an incoming signal, it is not necessary to operate the transmitter plate switch to tune the v.f.o. with the receiver on and the transmitter off the air.

### Monitoring

The idea for the monitor used was also suggested by the W5JXM article mentioned earlier. It is a second b.f.o., keyed simultaneously with the transmitter, and set to produce an audible beat note with the receiver b.f.o.

W5JXM used a standard commercial b.f.o. coil in his rig. We tried, but the SX-100 has a 50-ke. second i.f., and our inquiries at local stores resulted only in "Sorry, we never heard of a 50-ke. b.f.o. coil. What do you want it for?" It was apparent that if we wanted one, we'd have to build it ourselves or buy it from the receiver manufacturer.

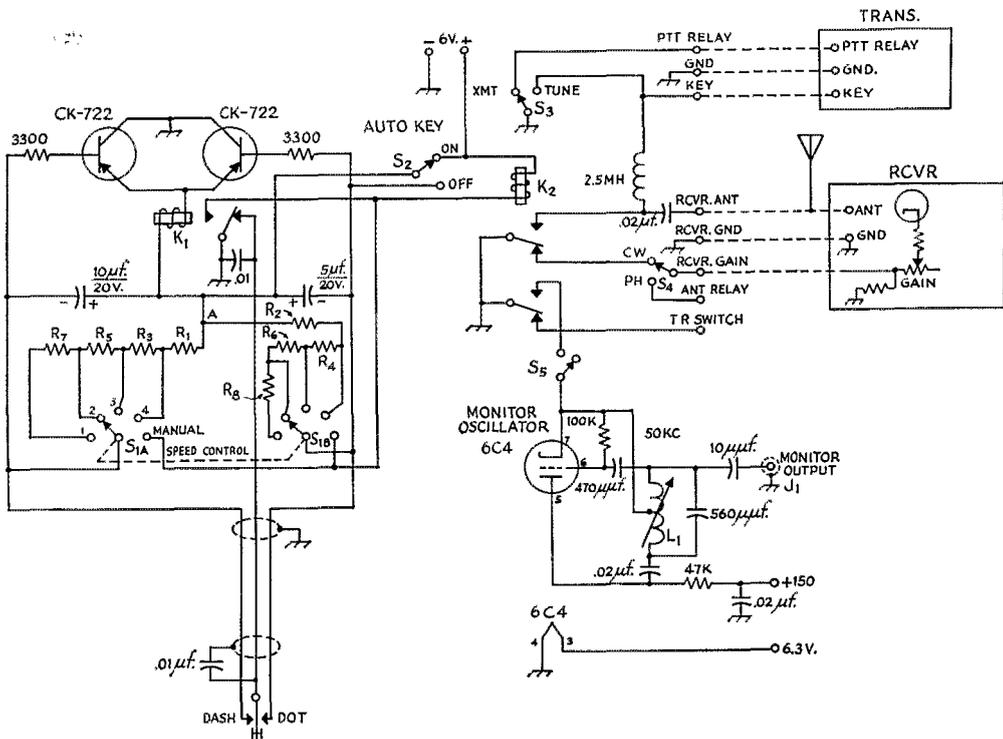
As installed at W8GRG, the monitor b.f.o.

<sup>1</sup> QST, February, 1955.

Fig. 1 — Circuit diagram of "Monitrol."

- $K_1$ —Sensitive s.p.d.t. relay, 400 ohms, less than 5 milliwatt (Advance SV 1C 400D)
- $K_2$ —6-volt d.c. 25-ohm d.p.d.t. relay (Advance GHP/2C/6VD)

- $L_1$ —Slug-tuned inductor.
- $S_1$ —2-pole 5-position rotary.
- $S_2$ - $S_5$  inc.—S.p.d.t. toggle
- $R_1$ - $R_8$  inc.—See text.



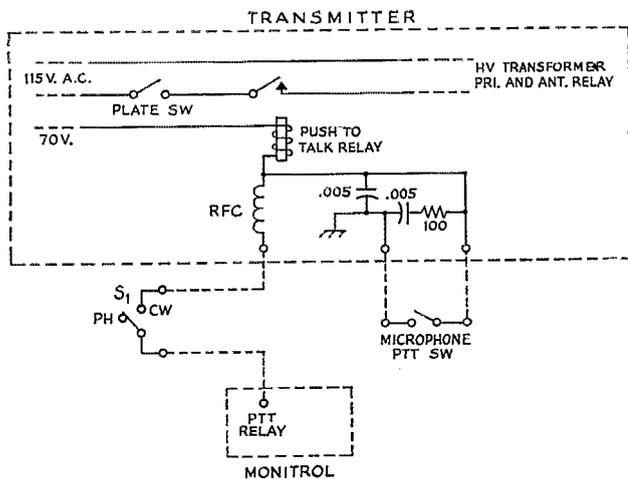


Fig. 2—A push-to-talk relay was added to the Viking II transmitter as shown.  $S_1$  is an external switch formerly used for "send-receive."

coil is wound on a slug-tuned core from a surplus unit we had in the junk box, using fine cotton covered wire. We mounted the core in a chuck on our lathe, wound on several hundred turns, and measured the inductance with a bridge. It read 7.5 mh.; we wanted 17.8 mh. with a center tap, so we brought out a loop for the tap, ran the lathe a while longer, and measured the inductance again. It was 19 mh. this time, so we backed off to 18, taped the winding to hold it together, sprayed it with Krylon, put it in the circuit, and it tuned both sides of zero-beat with the receiver b.f.o. on the first try! If you don't think you have that kind of luck, save yourself trouble and order a spare set of components for your receiver b.f.o. from the manufacturer.

Heater current for the 6C4 is taken from the receiver at the connection on the rear of the chassis provided for battery operation. To get plate voltage we tapped the 150-volt regulated supply for the receiver oscillators. Output of the monitor is delivered to the receiver using shielded microphone cord, plugged into the receiver "Phono" jack. Who wants to play records through a ham receiver anyway?

The receiver can be easily restored to its original condition. Nothing inside was disconnected except one of the two grounded pins on the power socket on the rear of the chassis. A wire was added to bring +150 volts to this pin, and the phono plug input was connected to the cathode of the second detector (where the receiver b.f.o. hooks in) through a 200- $\mu$ f. capacitor. There is no perceptible effect on receiver operation.

$S_5$  is provided to inactivate the monitor if there is any reason to want to operate without it.

### Electronic Keying

Addition of the electronic key to the unit was inspired by W5VHO's article<sup>2</sup> on a transistorized automatic keyer. Its simplicity of design, construction, and operation fitted perfectly with the specifications of our unit. An attempt was made

<sup>2</sup> Q87, April, 1958.

to use transistors to switch the break-in relay directly, and while possible it requires power transistors and introduces some problems of relay adjustment which the addition of a second relay avoids. The relay selected (Advance SVIC4001) is a very sensitive s.p.d.t. unit with adjustable contacts and variable spring tension. One with a 1600-ohm coil was tried and found to limit the current too much when used with a 6-volt supply, although it worked perfectly with 12 volts. The 400-ohm model, which works perfectly on 6 volts, is easily obtainable on special order.

Since the relay operating current runs about 5 ma., it is well within the current-handling capacity of inexpensive transistors such as the CK-722.

Modification of the W5VHO circuit to put the relay in the transistor emitter circuit instead of the collector circuit seems to make cut-off more positive. We don't know why, unless the original circuit had a tendency to be self-biasing.

Rearrangement of the speed control switch  $S_1$  permits use of the fifth position to bypass the electronic key and restore the bug to normal operation with its dot and dash contacts in parallel. Use of a s.p.d.t. switch for  $S_2$  is a safeguard against accidental reversal of transistor polarity. Without the connection it makes when in the OFF position, any accidental grounding of the relay or resistor network with  $S_1$  in position 5 could throw the emitters negative in relation to the bases, under key-up conditions. We think that is what ruined a pair of transistors during our experiments.

### Construction

Physical arrangements of the components is a matter of the operator's personal preference. At W8GRG the complete control unit is on a 2  $\times$  5  $\times$  7-inch chassis, mounted on end alongside the receiver, just above the key. The b.f.o. monitor tuning slug and output jack are available on the top end of the chassis. The

(Continued on page 170)

# A New Material for Ham Construction

## Using Printed-Circuit Stock To Replace Sheet Metal

BY CHARLES H. LEIPER,\* W1IPV

SOME years ago I spent many hours breadboarding a band-switching amplifier for the lower bands. Once it was completed and on the air I soon found out that it made hardly a dent in the QRM on 80, 40 or 20 — so I went v.h.f. As I enjoy building my own gear, the first project was a converter. I made two, neither of which worked as it should have, but from them I learned about such things as short r.f. leads, stray ground paths, the right and wrong in bypassing, the need for adequate shielding, and all the rest.

My next converter started out with a flashing copper base, but I gave up on this when my 100-watt soldering gun gave me nothing but cold solder joints, because of conduction of heat away from the tip. I was about to give up and buy a converter, when a change of jobs introduced me to industrial plastics. One look at some of the parts we fabricate for customers who use printed circuits and I felt that I had my material for v.h.f. converter bases.

My fourth converter effort worked out nicely, and is shown herewith. At first glance it will look very much like many other home-built v.h.f. converters, and it is, circuitwise. There are two grounded-grid r.f. stages, a push-push mixer, and a cathode follower. (The oscillator is on a separate chassis.) Circuit details are not important for the purposes of this discussion; it could be anybody's converter design, a small exciter, or any other piece of ham gear of moderate weight and size. It's the base and shielding ideas that are different.

The main chassis plate and the shield partitions are of  $\frac{1}{16}$ -inch Formica, copper clad. This is the same material used for making printed circuits, except that here it is used in its virgin state, without sensitizing or etching. The main base plate is

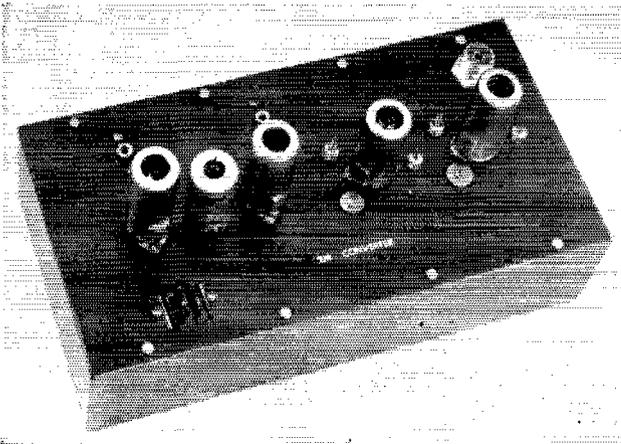
cut to fit a standard chassis, and is used with the copper face down. This leaves a smooth brown surface of attractive appearance for the top. This takes decals readily, and it maintains its neat look indefinitely. The shield assembly is made up by clamping the various pieces in place and soldering them to the base plate, and to each other, as shown. The work on this converter was done with a 25-watt Ungar soldering pencil!

This printed-circuit stock has many advantages in amateur home construction, and particularly for v.h.f. gear, in view of the importance of grounding and shielding in the latter. The copper bonded to the Formica is only .00135 inch thick, but this is adequate for the d.c. ground currents found in equipment of this type. At frequencies from 50 Mc. up, at least, it is several times the depth of "skin effect" penetration. It can be drilled, sawed and filed much more readily than suitable forms of sheet metal, and it has mechanical and electrical possibilities that are limited only by the ingenuity of the user. Here are a few hints.

For feed-through insulation: drill a hole the required size and then scrape away the copper around the edge. Another way to do this is to touch a larger size drill lightly to the copper surface to give a slight countersink effect. For a bypass capacitor, either feed-through or conventional type, all that is needed is a sheet of Teflon or other suitable insulating material, a disk or other shape of the copper-clad stock, and a screw, with nut, washer and soldering lug. See Fig. 1. Interstage shielding has already been described; all you need for this is a soldering iron and a vise or other clamping device. No brackets or drilling are involved.

The advantages are not obtained without some special consideration in working with the new material, but the problems are by no means in-

\*Chief Engineer, Fabrecon Corporation, 19 Mill St., Unionville, Conn.



A 2-meter converter of conventional design, built by W1IPV, using printed-circuit stock for the base plate. Top surface is brown Formica, which takes decals nicely and retains its neat appearance under hard use.

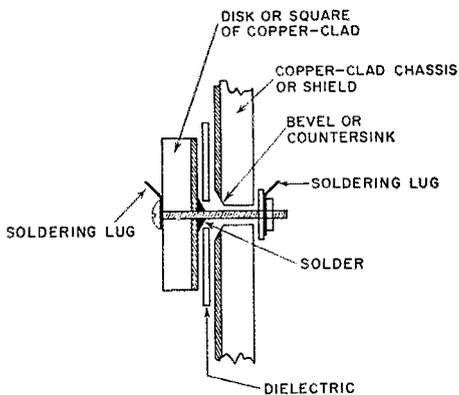


Fig. 1—Method of making a feed-through bypass capacitor using copper-clad printed-circuit stock.

surmountable. In drilling the stock, back it up with a flat board; otherwise there may be a tendency for the material to chip slightly when the drill breaks through. In cutting, use fine-toothed saws. A hacksaw or spiral coping saw works fine. In clamping the stock in a vise use wood blocks to prevent damaging the copper coating or marring the smooth Formica surface. Wire leads may be

soldered directly to the copper surface, but if they are large or stiff wire they should not be bent after soldering in place. If a stiff wire must be reformed, unsolder it from the copper first, otherwise the strength of the bond between the copper and phenolic plastic may be exceeded and the copper coating will tear away.

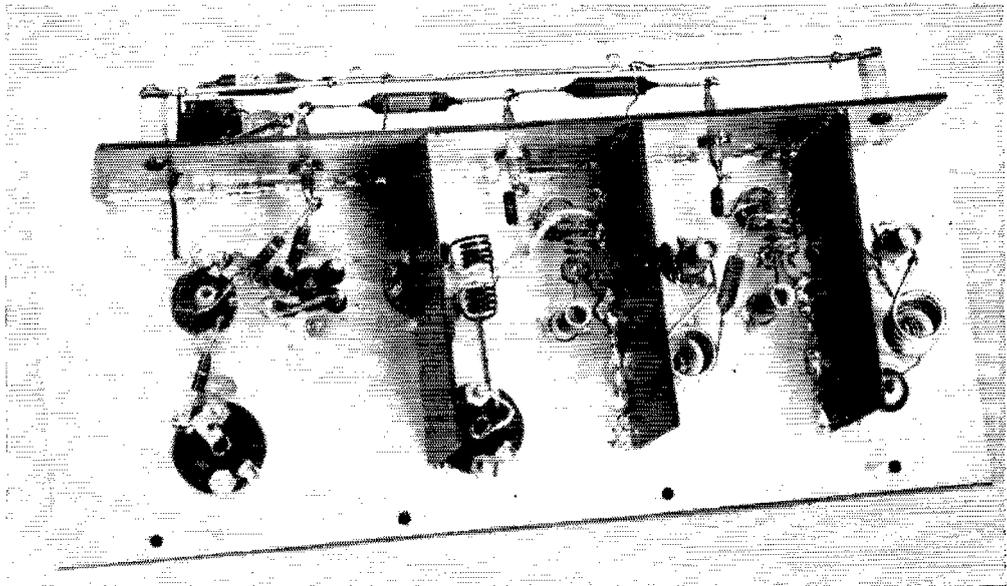
The material is normally available only in sheets 36 by 42 inches in size. This is probably larger than most amateurs will require at any one time, so arrangements have been made to supply sheets 14 by 18 inches in size through a local radio distributor. Sheets are available in  $\frac{1}{16}$ -,  $\frac{3}{32}$ - and  $\frac{1}{8}$ -inch thickness. Prices for the  $\frac{1}{16}$ -inch stock, the thickness that would normally be used for base plates and small construction work, are closely comparable with those for aluminum sheet.<sup>1</sup>

Sheets are supplied with a peel-off protective coating, to prevent oxidation. When this is removed the copper surface may be given a coating of Krylon spray, to prevent finger marks. This has no effect on the ease of soldering, and no scraping or cleaning of the Krylon-treated surface is required.

QST

<sup>1</sup> 14 × 18-inch sheets are \$2.56 in 1/16-inch stock, \$3.35 in 3/32-inch and \$4.10 in 1/8-inch, plus postage from Hartford, Conn. Inquiries to the author will be forwarded. Shipment is made on a cash-with-order basis only.

Bottom view of the converter, showing base plate and shield partitions made of printed-circuit stock. Soldering operations can be handled with the smallest type of soldering pencil or gun. No mounting brackets or soldering lugs are needed.



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# 75 Meters with a KWM-1

## Modifications for Low-Frequency Operation

BY JOHN ENGLESTED,\* W1VLN

*If you are the owner of a KWM-1 and would like to modify it for 75-meter operation (without changing its performance on 20, 15 and 10, of course), this article is your meat. But even if you don't have one of these compact sideband stations, you just may get some ideas from W1VLN's description of how he tackled the job.*

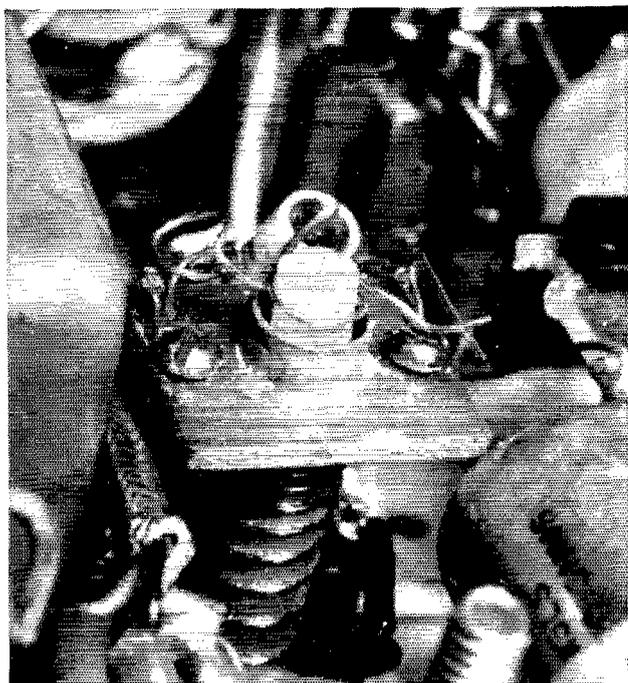
THE Collins KWM-1 has been in business on the amateur bands for over a year now and is obviously a tremendous success, as the vast majority of mobile single-sideband signals emanate from such installations, and hundreds more from home stations can be heard on 10, 15 and 20 meters. There is no doubt that this well-designed and compact piece of equipment has revolutionized the concept of what it takes to make a ham radio station. Probably the one thing that has kept more hams from being completely enthusiastic about this unit is the fact that no provision was made for 75- or 40-meter operation. Last summer, when 10 and 15 meters were out for long periods of time, this became particularly

\*West Road, Petersham, Mass.

annoying, because 20 meters was then so overcrowded that often it was not too useful either. This prompted the author to look into the possibility of including at least one of the lower-frequency bands.

Possibly the Collins engineers had some such thought in mind when they originally designed the circuit. The tunable i.f. of the receiver portion covers 3.9 to 4.0 Mc., and on transmit the lower sideband is passed through this same frequency range. After a little study it became apparent that if the antenna could be coupled to this portion during receive, and if this and the (retuned) output 6146s could be used on transmit, the problem would be solved. A further condition we set for the modification was that no new panel controls would be added. It took quite a bit of study and experimentation and back tracking, and about 10 hours of production time, to put the KWM-1 on the top 100 kc. of 75.

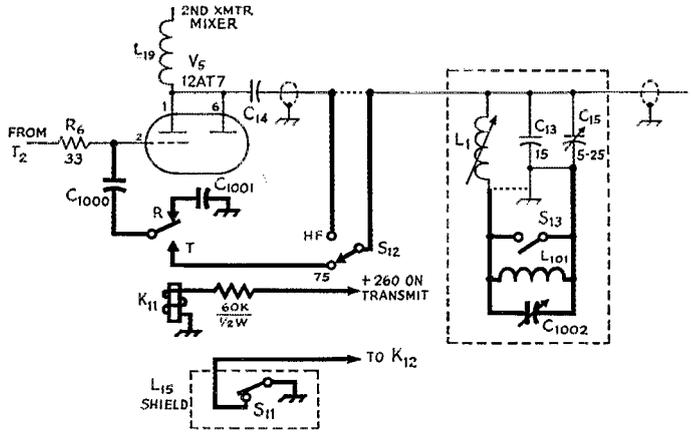
The operation of the converted KWM-1 on 75 meters is identical to that on the three higher-frequency bands, except that the 0 position on the dial corresponds to 4.0 Mc. and 100 corresponds to 3.9 Mc. In other words, the dial reads "down" rather than "up," but actually this is not the hardship it was anticipated it might be. The dial reading shows how far the set is from the high-frequency end, which is just as satisfac-



A view of the bottom of the "KWM-2" shows that switches that are actuated by the coil tuning slugs have been added to several of the coil assemblies. For this photograph, one shield can was removed.

Fig. 1—Circuit changes at the second transmitter mixer to extend KWM-1 range to 75 meters. The heavy lines indicate new circuitry and components; the dotted lines represent former wiring. Switches and relays are shown in receive and 75-meter position.

The "+260 on transmit" can be picked up at the junction of  $C_{187}$  and  $K_2$  (Collins designation).



$C_{1000}$ —470  $\mu\text{f}$ . mica.

$C_{1001}$ —25- $\mu\text{f}$ . silver mica.

$C_{1002}$ —8- to 50- $\mu\text{f}$ . ceramic trimmer (Erie 557 or Centralab 822).

$K_{11}$ —Shielded s.p.d.t. relay, 10,000-ohm 2.7-ma. coil (Potter & Brumfield SM5LS).

$L_{101}$ —1.5  $\mu\text{h}$ . (National Blue Chip MIL Inductance B15977).

$S_{11}$ ,  $S_{12}$ ,  $S_{13}$ —Homemade switches actuated by exciter tune control. See text and Fig. 4.

tory as the reverse would be. Actually, frequency can be calculated very quickly, after a few hours' practice. Lower sideband is automatically produced when switching to 75 meters, and both the tuning of the signals and the relative spread are just about the same as on any of the other bands.

To accomplish the band change without adding panel controls, several switches were added that cut out (or in) as the exciter tune control is set to the low-frequency end of its travel (14.0 Mc.). These switches allow inductance and capacitance to be added to the pertinent circuits, and through their control of relays they modify mixer circuitry and change the transmitter output circuit from an L network to a hybrid pi. The tuning of the output tank then becomes very similar to the tuning on the higher frequencies, except that all of the tuning is done with the right-hand roller coil, with the left-hand coil at maximum inductance. The pi network is designed to work into a fixed load of 52 ohms. To go to 75 meters, it is not necessary to select a particular crystal, and the crystal switch can be left in any position.

### Circuit Changes

Referring to Fig. 1, it is necessary to jump the second transmitter mixer,  $V_5$ , during 75-meter transmit operation. This is done through a switch  $S_{12}$  and a new relay  $K_{11}$  which closes during transmit. (Switches  $S_{11}$ ,  $S_{12}$  and  $S_{13}$  are actuated by the exciter tune control setting, as mentioned earlier.) Switch  $S_{12}$  opens the original circuit so that  $V_5$  will be bypassed during 75-meter operation, and  $S_{13}$  cuts in an additional inductor and trimmer to load the original tuned circuit to 3.95 Mc., the center of the signal-frequency band. The tuned circuits associated with coils  $L_5$  and  $L_8$  are switched and tuned similarly, except that the circuits are maintained above d.c. ground, as shown in Fig. 2.

To change over the 6146 output circuit, a d.p.d.t. relay is required. A triple-pole double-throw relay is shown in Fig. 3; it was done this way in our particular installation because the third pole was used to control an external antenna relay. The two essential poles switch in padding capacitors that convert the L network to a pi and, as mentioned earlier, the tuning is done with  $L_{12}$ , with  $L_{11}$  set at maximum inductance. Although the  $Q$  turns out to be a little high with the values shown, no trouble has been experienced with the roller coils or other components.

### Construction

The switches  $S_{11}$ ,  $S_{13}$ ,  $S_{14}$  and  $S_{15}$  (not shown)

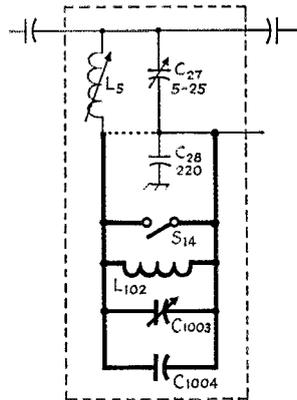


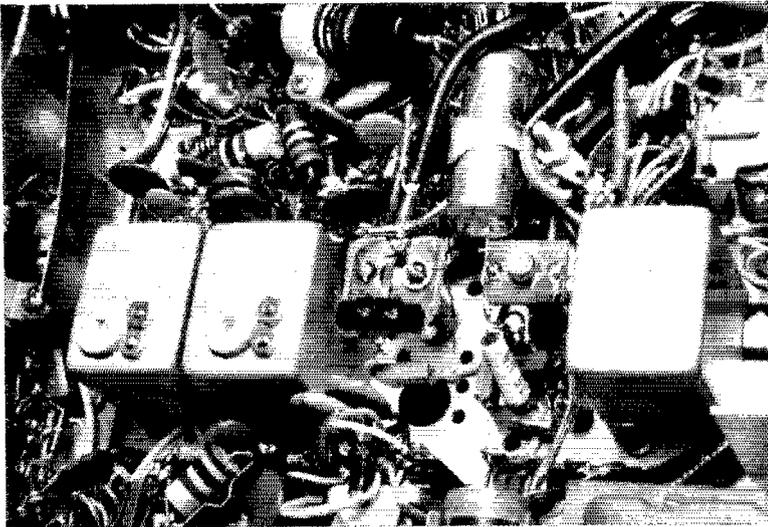
Fig. 2—Circuit modifications for  $L_5$  (and  $L_8$ ). Heavy lines indicate new circuitry and components; dotted line represents former wiring.

$C_{1003}$ —8- to 50- $\mu\text{f}$ . ceramic trimmer (Erie 557 or Centralab 822).

$C_{1004}$ —50- $\mu\text{f}$ . silver mica.

$L_{102}$ —1.5  $\mu\text{h}$ . (National Blue Chip MIL Inductance B15977).

$S_{14}$ —Homemade switch actuated by exciter tune control. See text and Fig. 4.



The shielded relay ( $K_{11}$  in Fig. 1) is mounted horizontally with its base near the socket for  $V_8$  (Collins designation). Held in place by a clamp, it can be seen near the top center of this picture.

are mounted in the cans for  $L_{15}$ ,  $L_1$ ,  $L_5$  and  $L_8$  (not shown), respectively. There is room on the chassis between the shields for  $L_1$  and  $L_5$  to mount the switch  $S_{12}$ , where it, too, can be actuated by the exciter tune control through a dummy coil form and slug.

Details of the switch construction are given in Fig. 4. A plastic shelf is cemented to the coil form, and the threaded plastic plug is adjusted with a screwdriver so that the switch just opens (or closes, in the case of  $S_{11}$ ), when the exciter tune control is set at the low-frequency end of its range.

The associated trimmer capacitors (as, e.g.,  $C_{1002}$  with  $S_{13}$ ) are mounted in the tops of the shield cans housing the switches and coils. In  $L_1$  the rotor of the capacitor is grounded to the can, and the stator is connected with a length of wire to the proper place in the circuit. The can is replaced, taking a little care to see that the wire to the trimmer is dressed properly inside the can. While this may seem like a haphazard method, no trouble has been experienced. In  $L_5$  and  $L_8$  it is necessary to run two leads from the capacitor,

since the rotor is not grounded; this is illustrated in Fig. 2.

In the plate circuit of the 6146 transmitter output stage, the Potter & Brumfield relay mounts on the side of the antenna-coil compartment without drilling a hole; the mounting stud of the relay will fit in a convenient ventilation hole after the hole has been reamed out slightly. There is also room in the antenna-coil compartment for  $C_{1008}$  and  $C_{1009}$  near the rear wall. The ceramic capacitors,  $C_{1005}$ ,  $C_{1006}$  and  $C_{1007}$ , were wired together and supported by the lead between  $C_{40}$ ,  $C_{42}$  and  $L_{10}$  (Collins designation—see Fig. 3).

### Operation

Currently there is only one antenna on the car, and there is the minor annoyance of getting out of the car to slide up the Slim Jim antenna to the 75-meter position when going from high-frequency operation. Our present thinking involves the use of two whips, one for 75 and one for the high-frequency range, with the third circuit on  $K_{12}$  (Fig. 3) controlling the antenna

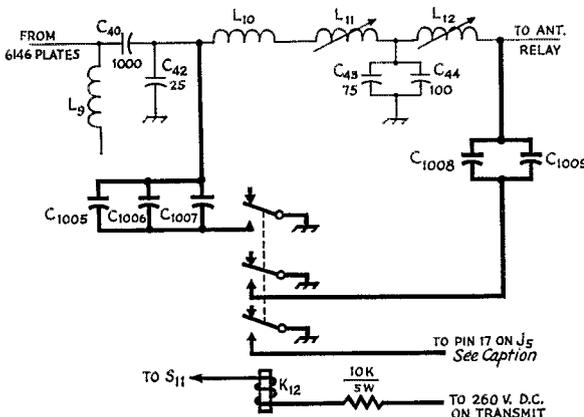


Fig. 3—Circuit changes in the 6146 plate circuit. Heavy lines represent new circuitry and components.

$C_{1005}$ ,  $C_{1006}$ ,  $C_{1007}$ —100- $\mu\text{f.}$  ceramic, 5000 volts (Centralab 850S-100N).

$C_{1008}$ —1500- $\mu\text{f.}$  silver mica.

$C_{1009}$ —300- $\mu\text{f.}$  silver mica.

$K_{12}$ —Triple-pole double-throw 110-v. d.c. relay (Potter & Brumfield KA14D 110 v. d.c.). Lead to Pin 17 on  $J_5$  required only if 75-meter antenna switchover circuit is desired. If lead is connected to Pin 17, lead from  $S_5$  to Terminal 17 should be disconnected.

The output circuit relay (K<sub>12</sub> in Fig. 3) is mounted in the antenna-coil compartment at the left. Output capacitors are also mounted in this compartment (visible just above the hinge); the trio of ceramic capacitors in the center are the input capacitors.

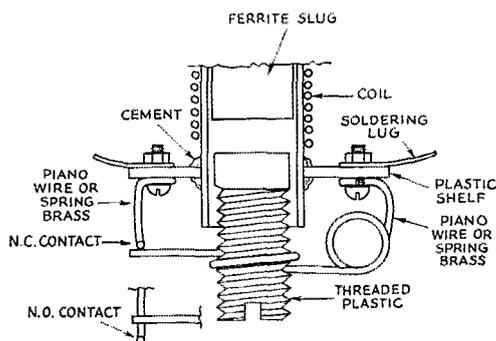
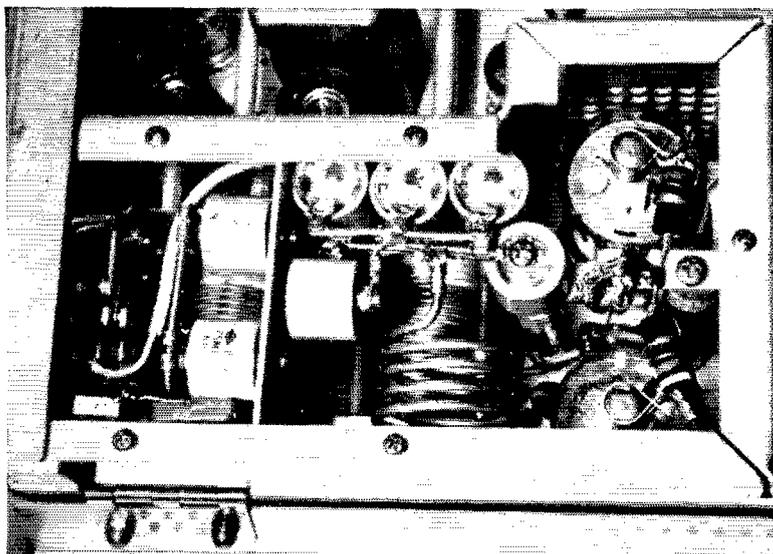


Fig. 4—Details of the switches. When the ferrite tuning slugs move all the way in, at the low-frequency end of the tuning range, they actuate the threaded-plastic slugs and open the switches. The normally-open switch, S<sub>11</sub>, requires a minor modification of the contact arrangement, as shown.

The switches are adjusted by the positioning of the plastic slugs and the "springiness" of the loops.

changeover relay. But for the time being the "KWM-2" does quite well with the present antenna system.

The "KWM-2" was first tested at home on a regular 75-meter antenna. Results were extremely satisfactory, as the receiver portion performed equally as well as a comparison 75A-4 within the same limitations as would apply to the three higher-frequency bands. Similarly, the transmitter portion of the new unit lived up to our fondest hopes. The "KWM-2" was then installed in the car and has been operating since early winter with very gratifying results. The limitations of using a base-loaded 8-foot whip for 75-meter radiation were not as severe as anticipated, and when there is any activity at all it is possible to make some satisfactory 75-meter contacts under even the worst band conditions.

Operation during the past months has demonstrated that 75-meter mobile sideband operation is very practical. Several years ago the author gave up 75-meter mobile a.m. operation, as the results were never worth it. However, the use of mobile s.s.b. more than justifies the effort. **QST**

## Strays

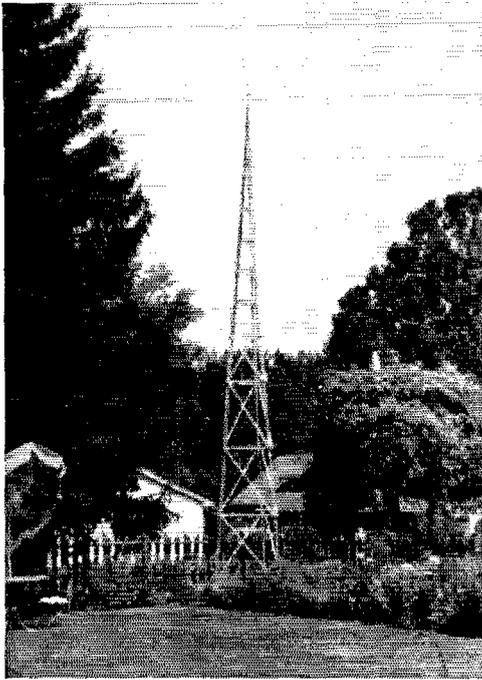
The Missile Amateur Radio Club of the Vandenberg Air Force Base, California, has a sub-assembly known as the Guided Hams of Outer Space Telegraphy Society (GHOSTS). The GHOSTS are amateurs who are primarily connected with the operation, maintenance or support of any military guided missile program.

K5EYZ, who has just received his General class ticket, says that as far as he is concerned life begins not at 10 but at 77. ('Cause that's how old he is.)

Another long-winded QSO — K2MUB and K2RHH for 35½ hours on 50 Mc. — K2ZSQ.

Coincidence? W6RFD is named Henry while K6RFD is named Coulombe.

W2EYG, who operates 80 and 40, phone and c.w., would like QSOs with other members of public school boards of education.



*Here's a small tower that can be built in a week end with not much more than a saw and hammer. It will carry a small beam without guying.*

**A**FTER deliberately ignoring for several years a crooked two-by-four pole holding up one end of our 40-and-80 skywire, we (the jr. op, W7JHS, and myself) decided to build something which would integrate itself with the landscape in a more pleasing manner. Incidentally, there was practically no QRM from the XYL on the matter.

Guy wires were out of the question because we would have to obtain permission from two neighbors to anchor them on adjacent property. So we settled for the 32-foot self-supporting wooden tower shown in the photographs and sketches. It is triangular and is fabricated from 2 × 2s and 1 × 2s (S4S pine). All truss members are formed from 1 × 2 pine. The bottom sixteen-foot section of the tower is built with the 2 × 2 stock for vertical members and the top half is reduced to the 1 × 2 stock. The tower is extremely light and rigid and can easily be lifted off the ground by one man as seen in one of the photos. Incidentally, the tower is being held at its center of gravity, slightly below the mid-point of the tower. This low center of gravity is one reason the whole business can easily be pushed up by one man.

The site of our tower is one corner of the lot, in the angle formed by a property-line fence. The

\*1124 Fifth St., Prosser, Wash.

## Self-Supporting Tower for Small Back Yards

*A 32-Footer for  
Less Than \$20.00*

BY CORMAC C. THOMPSON,\* W7ACA

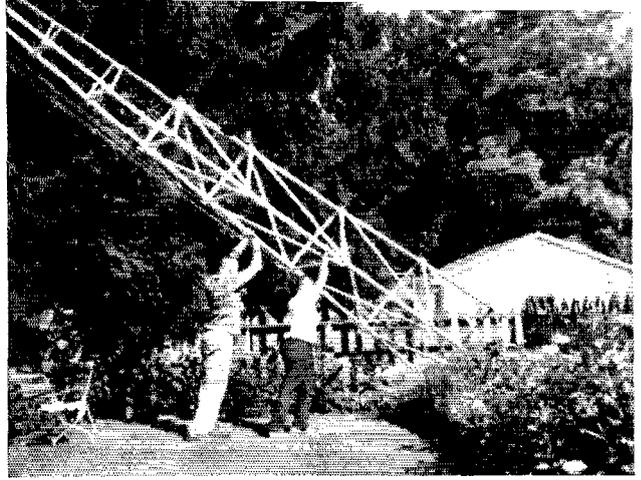
front legs are nailed or bolted to a 2 × 6 which diagonally crosses the fence corner and the rear leg is secured to the top rails of the fence. Thus the fence forms a stable and secure ground anchorage for the tower and serves to tie it in with the rest of the landscaping. As seen from the photo the shrub border at the rear of the lot satisfactorily hides the base of the tower in a pleasing manner.

The photographs and sketches of Fig. 1 show the details of construction. All joints and splices were made using galvanized nails with cement-coated, serrated nails being used in the proportion of one to three. We completely painted the tower with one quart of aluminum paint, brushed on, with liberal application at the joints.



"The tower . . . can easily be lifted off the ground by one man. . . ."

"The heavy lugging comes from the ground level up to the 45-degree angle."



The complete cost of material is itemized below:

Three	2 × 2 × 16	at 10¢ per l.f.	\$ 4.80
Three	1 × 2 × 18	at 5¢ " "	2.70
One	2 × 2 × 8	at 10¢ " "	.80
115 lin. feet of	1 × 2	at 5¢ " "	5.75
2	Awning pulleys	at 35¢	.70
1	Quart aluminum paint		1.80
			\$16.55

This amounts to just about 50 cents per foot.

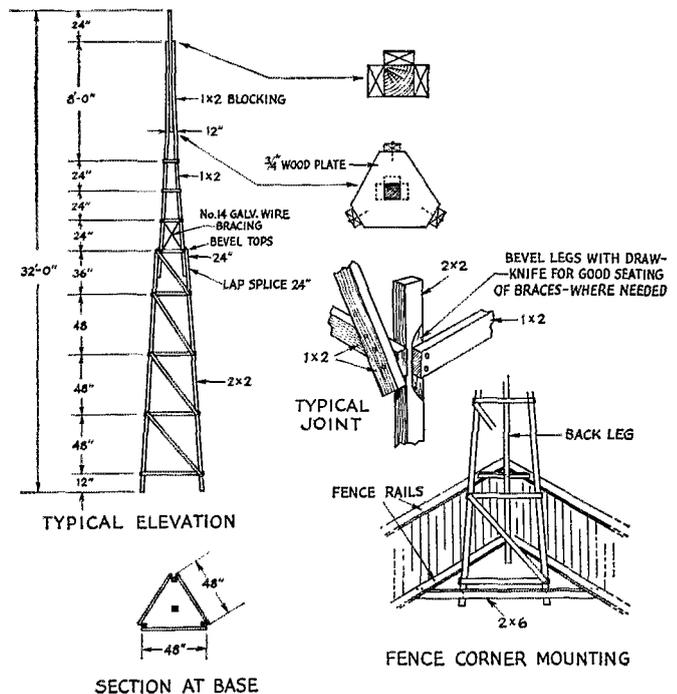
The construction and painting of the tower consumed less than eight hours. Erection took just a few minutes. We first nailed the diagonal 2 × 6 across the fence corner, placed the tower

on it and tied the legs to the 2 × 6 to keep the base in place while we pushed it up. The heavy lugging comes from the ground level up to the 45-degree angle. From then on, the center of gravity starts to swing in toward the base and it's duck soup.

We are thinking about building another one. There is something highly satisfying about backing off and contemplating a structure which stands there and holds itself up. Besides, there are no guy wires with loose or corroded contacts giving birth to spurious r.f., or lying in wait to tear an ear off when you chase the neighbor's cat out of the flower garden.

This thing will hold up a small beam if you want it to. QST

Fig. 1—Constructional details of the 32-foot mast designed and built by W7ACA and W7JHS.



# A Transistor Transmitter for 50 Mc.

## 50-Mc. Operation with Inexpensive 10-Mc. Transistors

BY L. U KIBLER,\* K2MSU

**T**HOUGH prices are slowly coming down, transistors designed to operate in the v.h.f. range are still fairly expensive. There are features of lower-frequency transistors which can be utilized to overcome the cost problem, at least at 50 Mc. It is the purpose of this article to point out these features, and to describe a transmitter operating at 50 Mc. using 30-Mc. transistors that sell for about \$3.00 each.

A transistor is characterized at high frequencies by its alpha ( $\alpha$ ) cutoff frequency. This is the frequency at which  $\alpha$  is down 3 db. from the low-frequency value. For frequencies greater than this,  $\alpha$ , and hence the gain, falls off at approximately 3 db. per octave.

To operate in the v.h.f. range with lower-frequency transistors, we seek an inexpensive transistor whose gain at the cutoff frequency is such that at the frequency at which we desire to operate there is still sufficient gain. The 2N247 transistor fills these requirements. The cutoff frequency is 30 Mc. and the common emitter power gain at 11 Mc. is 24 db. If we consider that this gain falls off at 3 db. per octave (a bit pessimistic) we have a power gain of about 17 db at 50 Mc. This is a gain of about 50. The 2N247 also fills the second requirement in that it costs about \$3.00 at present. This transistor also has the advantage that it will dissipate 35 milliwatts, and it has a maximum collector voltage of 35.

A transmitter using four 2N247 transistors in the r.f. section and two CK722 transistors in the modulator was designed using the above principle. The r.f. transistors are operated in the common-base connection. The type of d.c. bias used in all circuits provides maximum temperature stabilization. The circuit diagram is shown in Fig. 1.

The oscillator uses a 50-Mc. International Crystal Co. crystal in a series-tuned feedback circuit between the collector and the emitter of the first 2N247.  $R_{FC1}$  keeps the emitter above r.f. ground. Several combinations of capacitor and r.f. choke will work; however, one combination will be optimum for the particular transistor used. Individual experimentation may be necessary for the most efficient operation.

The second transistor serves as a buffer to the oscillator and a driver for the final amplifier. It is coupled to the oscillator tank coil by  $L_3$ .  $L_1$  and  $L_2$  are placed parallel to each other and about  $\frac{3}{8}$  inch apart. One to three turns of fine wire (about No. 27) wound about both coils will

provide sufficient coupling. The coupling to the final involves a bit of adjustment.  $L_5$  is placed about  $\frac{1}{8}$  of the way into and in the center of  $L_4$ . Small variations of this position are necessary to provide the best coupling to the final.

The final amplifier uses two 2N247s in push-pull. A small amount of forward emitter bias is provided for both transistors by the 7500- and 100-ohm resistors in series. Without drive about 100 microamperes or less collector current flows. With drive the collector current is 6 to 10 ma. depending on the drive and the activity of the final transistors. The output coupling coil,  $L_7$ , is coupled to the center of  $L_6$  and for a 50-ohm load about one half the way into it.

The tuning procedure is somewhat different from that for the usual transmitter. The r.f. voltage across the various tank circuits is observed with the aid of an r.f. probe and a vacuum-tube voltmeter. (A Heathkit r.f. probe is satisfactory.) The final transistors should be removed during the initial tuning of the oscillator and the buffer. When tuning the final it is necessary to terminate the output coil,  $L_7$ , with a 50-ohm or 75-ohm resistor. One-half watt carbon resistors are adequate. *Unloaded operation of the final can result in r.f. voltages across the collector that are in excess of the 35-volt collector-to-emitter breakdown voltage, and may produce a permanent short between these terminals of the transistor.*

Some 2N247s will be more efficient and give higher output than others. Twelve transistors were tried in this circuit. The minimum output power, as delivered to a 50-ohm precision resistor, was 32 milliwatts and the maximum power was 65 milliwatts. It is suggested that the transistors be switched about in the circuit until the most efficient pair is in the final. All 2N247s will operate well in the oscillator and the buffer.

The modulator is a simple two-stage transformer-coupled amplifier. Transistors are operated in the common-emitter connection. D.c. temperature stabilization is used in the bias arrangement. The potentiometer is included between the two stages to allow adjustment of the modulation level at the r.f. final. There is sufficient gain to allow the use of a crystal microphone. A cheap (\$1.75) crystal microphone was used, and while the audio quality was not the best, it is adequate for voice.

The physical layout is not critical, but good v.h.f. practices such as short leads and shielding between the input and the output of the final should be observed.

\*R.D. 1, Box 506-7, Red Bank, N. J.



# Exit Ignition Noise!

## Eliminating Automotive Noise by Shielding the Car Ignition System

BY E. LAIRD CAMPBELL,\* WICUT

LIKE "death and taxes," automobile ignition noise<sup>1</sup> has been with the mobile ham since he first took to wheels. He has been able to clip it, limit it, suppress it and has sometimes tried to overlook it, but rarely has he completely cured it. It seems that no matter how carefully leads are by-passed, body joints bonded, resistance inserted, or traps installed, there is always at least some noise remaining.

### What To Do?

The author tried all of these methods to suppress noise and many others, too on his 1956 Ford V8, but they just didn't satisfy because of that last remaining bit of noise that prevented hearing the weak ones. Since none of the usual methods completely cured the noise, a new way had to be found for making mobile operating what it could be at its very best.

Why not bottle up the entire ignition system? If the noise source were completely shielded there would be no need for the usual bonding and bypassing, because the noise wouldn't get out to contaminate the remaining electrical system. KICJX, a licensed aircraft engine mechanic, advised that it is common practice to shield the ignition systems of aircraft. If it could be done in an airplane it ought to be equally successful in a car, so shielding of the ignition system of my car was undertaken.

Before describing the project, here is a little background which may help in understanding the shielding approach to noise elimination.

### Ignition Noise

Most automotive noise is generated and radiated by the ignition system — that is, the distributor, high-voltage coil, spark plugs, and interconnecting leads. A diagram of an ignition system is shown in Fig. 1. You can think of the ignition system as a spark transmitter with plenty of radiation throughout the radio spectrum. When the coil primary circuit is interrupted by the breaker points, the high voltage induced in the secondary causes a spark to jump the gap in the spark plug, emitting high-frequency electrical energy. The sparks at the breaker points and

\* Technical Assistant, QST.

<sup>1</sup> That is, noise arising in the ignition system alone — not including noise originating in such auxiliary electrical-system equipment as the generator, regulator, gauges, and similar devices.

Sometimes a lesson learned in one field can be turned to good account in another. What we know about shielding for TVI can be applied usefully to getting rid of the last vestige of ignition noise in a mobile installation. If you want mobile reception really free of QRN from your own car, here's how to get it.

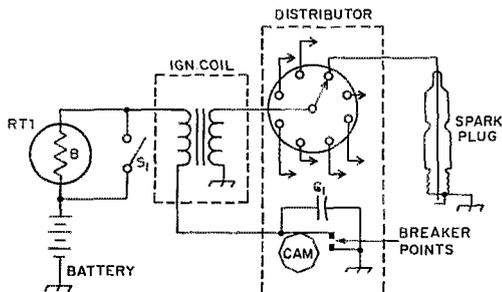


Fig. 1—Schematic diagram of the ignition system.  $RT_1$  is ballast resistance in series with the ignition coil primary. When the engine is started the ballast is temporarily bypassed by switch  $S_1$  and full primary voltage is applied to the coil.  $C_1$  is the ignition capacitor.

reductions of 10 to 80 per cent, depending upon the automobile, operating frequency, and type of equipment. (By the way, spark plug manufacturers claim resistor spark plugs are not harmful in any way to the operation and performance of the engine.)

### Other Noise Sources

Before describing methods of shielding ignition systems, it should be mentioned that there are several other sources of noise in the car — generator, voltage regulator, wheels, and gauges, to name a few. Conventional suppression methods will usually clean up this noise.<sup>2</sup> In the case of generator noise, a 0.5- $\mu$ f. coaxial feed-through capacitor with appropriate current rating, connected to the generator armature terminal, usually will suffice. In cases of extremely bad generator noise, a trap consisting of a tuned circuit at the operating frequency of the mobile station should be connected in series with the generator armature.

<sup>2</sup> Short, "Automotive Radio Noise Elimination," QST, April, 1952, p. 17.

Voltage-regulator noise can be suppressed by using coaxial feed-through capacitors connected as shown in Fig. 2. Two 0.1- $\mu\text{f}$ . capacitors are used. One is connected to the terminal marked "armature" and the other to the regulator "battery" terminal. A third capacitor, which can be a 0.002 $\mu\text{f}$ . mica, bypasses the "field" terminal to ground. The 4-ohm resistor in series with the capacitor is absolutely necessary when connecting a capacitance across the field, to protect the regulator contacts.

Tire and wheel static usually can be eliminated by using static-collector rings between the wheel hub cap and front axle. These rings are sold by most auto dealers. Antistatic powder can also be injected into the tire tubes. This powder is conductive and provides a bleed-off path for the static charge.

Gauge noise can be suppressed by bypassing the gauge terminals at the gauge itself. Most late-model cars come equipped with these devices already bypassed.

The coaxial feed-through capacitors mentioned above are made by most capacitor manufacturers, and are designed to have very low in-

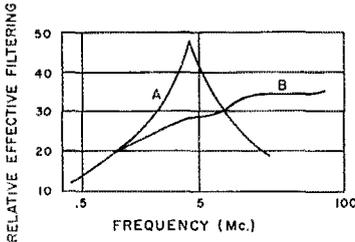


Fig. 3—Curve showing relative effective filtering from (A) conventional capacitor and (B) coaxial feed-through capacitor.

ductance; thus they are very effective over a wide frequency range. The graph in Fig. 3 illustrates the effective filtering action of a conventional capacitor A, compared with one of coaxial construction, B. The conventional capacitor has a limited range of filtering usefulness.

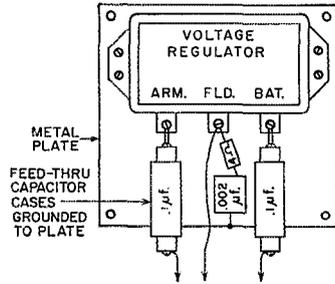


Fig. 2—Sketch showing connection of noise suppressors to the voltage regulator. The 0.1- $\mu\text{f}$ . capacitors are of the coaxial feed-through type.

### The First Experimental Model

Once the sources of noise mentioned above have been treated by the methods described, there is still the pulse-type ignition noise, and with it the reason for shielding. Bottling up the ignition system can be compared to TVI harmonic suppression in a transmitter. Every joint, hole, crack and crevice must be electrically tight. Even a small break in the noise armor will render the system useless. The high-voltage coil, the distributor, spark plugs, and interconnecting wiring must all be enclosed in the shield. All leads leaving the shield must be bypassed in order to complete the screen around the system.

Our first experimental shielded harness, dubbed the "milking machine," is shown in Fig. 4. Constructed in a few hours, it consisted of four main parts: the distributor shield, the high-voltage coil shield, spark-plug shields, and the shielded ignition wire. The distributor and coil covers were tin cans that fitted snugly over these components. A few suspicious looks came our way while we ambled up and down the aisles of a local supermarket with the coil and distributor in one hand, sampling tin-can sizes with the other! The coil cover was clamped over the end of the high-voltage coil, which was first scraped clean of all paint and grease. The two primary leads leaving the can were bypassed with coaxial capacitors. A peanut can made a tight fit over

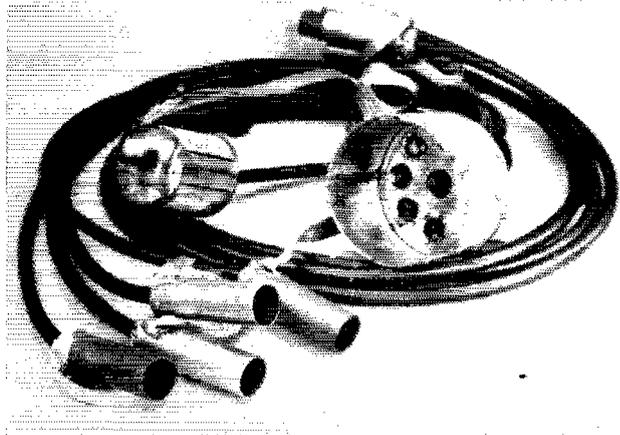


Fig. 4—The "milking machine" was the first experimental model of the shielded harness. Spark plugs were covered by the open-end tubes and the shielded braid was bolted to the car ground. A peanut can shielded the distributor, and a glue-can shield, at the left, was clamped to the end of the ignition coil.

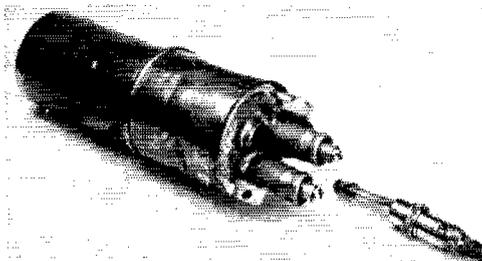


Fig. 5—Shielded ignition coil. Coaxial feed-through capacitors are soldered to the can, which is then soldered to the coil. The open hole is for the high-voltage lead at the right.

the distributor cap. Holes were drilled in the top of this can to allow the knobs on the distributor cap to pass through. Four small strips of shim stock were soldered to the lower lip of the can. When the shielded distributor cap was mounted, the shims were bent around the bottom of the cap so that electrical connection would be made between the shield and the engine. RG-8 U coaxial cable was used for the high-voltage leads and there was no trouble with voltage breakdown. Sections of brass plumbing pipe covered the spark plugs. The RG-8 U outer shield was soldered to one end of each pipe, and a length of shield braid was soldered to each pipe and grounded to the engine block. This completed the harness, which was then mounted in the car.

Results of the first test were encouraging. There was a definite improvement. Nevertheless, there was still a slight trace of noise. It had to be coming from the ignition system because all other sources had previously been treated. Further experimentation indicated that the weak link was the method of shielding the spark plugs. Even though the plugs were covered by brass pipe, the open ends of the pipes permitted noise to escape.

KICJX suggested using shielded aircraft spark plugs, which come in a variety of thread sizes. These plugs were obtained, and although the threads fitted perfectly they wouldn't screw in all the way, unfortunately, because of interference with the spark plug well on the engine block. To overcome this the plugs were turned down on a lathe to reduce their diameter, and the hex shoulder used for tightening the plugs was also removed. After this they could be screwed in all the way and tightened by hand.

The second test was then made. The result: absolutely no trace of ignition noise! Mobile reception could now compare with reception at a home station.

The installation was made semipermanent in order to road-test it and see how it would stand the rigors of moisture, heat and vibration. Then after a few thousand miles of use the shielded system was removed and inspected. (The original distributor cap and cables had been pushed aside for the test, and were easily reconnected when the shielded harness was removed.) But it took almost a whole day to remove the aircraft spark

plugs since there was no way to grasp them with a wrench. Finally, after using a special tool loaned by WIVON, the plugs were extracted. The harness was in excellent shape. The coax didn't show any signs of voltage breakdown, the breaker points in the distributor apparently weren't affected by the added shunt capacitance of the bypass, and the tin-can shield caps were in good condition.

The only thing remaining to make the system foolproof was to find a solution to the spark-plug question. A little research at local spark-plug agencies revealed that a shielded spark plug was available in both the standard and resistor type. Designed primarily for marine installation, these shielded plugs are interchangeable with the unshielded variety provided the additional height doesn't create a clearance problem. Models are available to fit all cars, and are generally carried in stock by marine supply houses. Ordinary automotive-supply sources may not stock them, but can get them for you within a reasonably short time.

### *The Finished Shielded Harness*

Once it had been determined that all the components for the shielded harness could be obtained, a final model was designed. Instead of using RG-8 U cable, which was rather bulky and difficult to dress around engine components, standard unshielded ignition wire (Belden 7766) was covered with copper braid (Belden 8661) Shielded ignition cable is available from aircraft parts distributors but is quite a bit more expensive than the homemade cable.

For those who wish to duplicate the shielded harness, here is a breakdown of the ignition components and a description of the shielding methods:

### *The High-Voltage Coil*

Fig. 5 shows the finished shielded coil. All the paint and grease are removed from the coil case with acetone. The tin-can cover (a Weldwood Glue can fitted our coil perfectly) is drilled so that the two 0.1- $\mu$ f. feed-through capacitors (Sprague 80P3) can be mounted and soldered as shown in the photograph. Don't let this extra capacitance across the breaker points worry you: the average value for distributor capacitors runs from 0.2 to 0.3  $\mu$ f., so the added 0.1  $\mu$ f. won't affect distributor performance.

One might ask if it is necessary to bypass both primary leads coming from the coil since one lead is at ground potential when the breaker points are closed. The answer is emphatically YES! An earlier experiment proved that if the ground side is not bypassed, the noise rises to the original objectionable level.

A third hole is drilled in the can so that the high-voltage lead can be passed through. The plastic center of a female microphone chassis connector (Amphenol 91-PC4F) is drilled out and the fitting is mounted in the hole. The mate to this fitting (Amphenol 91-MIC3M) is also drilled out and connected to the high-voltage lead as shown in the photograph. The shielded con-

ductor is soldered to the fitting and the insulated ignition cable passes through the center. This provides an r.f.-tight connection but allows for easy disassembly.

Before the shield can is soldered to the coil, leads should be connected between the capacitors and the primary voltage terminals on the coil. These leads should be tucked in when the can is placed over the end of the coil. Be sure to line up the high-voltage connector on the coil with the hole in the shield can. Solder the can to the coil. A 100-watt or larger soldering iron can handle the job.

### The Distributor

The distributor is already partially shielded since the lower part of the container is a metal cup connected to the engine block. The only electrical opening is the plastic cap which contains the sockets for the leads that come from the high-voltage coil and the various spark plugs. Fig. 6 illustrates the shielded distributor cap. It's a good idea to purchase a new plastic cap and leave the present cap, along with its cables, in the engine so it can be used again if the shielded harness is removed. A tin can (a Planter's Peanut can fitted our distributor cap) is drilled so that the knobs protruding from the cap can pass through. Holes are made in the sides so the clips that normally hold the cap in place can be used. Four small strips of shim stock are soldered to the can lip as shown in the photograph. These complete the electrical connection between the cap and the distributor housing. Insert the plastic distributor cap in the can with all the connector knobs protruding through the top of the can. The cables, which have fittings normally used for this connection attached, are inserted into the proper receptacle and pushed in until they are seated correctly. The outside shields from each cable then are worked down around the outsides of the plastic knobs until they make a complete electrical seal. When in place, solder the shields to the can. It's a good idea to strengthen the shield with solder up to about one inch above the junction. If the plastic cap is removed from the can the shield will then retain the proper shape to accept the cap when it is reinserted.

### Cables and Fittings

The shielded spark plugs mentioned earlier require special fittings in order to mate with the shielded ignition cable. Fig. 7 shows the fittings required to make up the spark-plug connectors. First come the ceramic sleeves and spring (these assemblies are sometimes called "cigarettes"), which can be purchased from most spark-plug distributors. Next comes the washer — really two washers soldered together — with the cable shield sandwiched between them. Finally there is the threaded cap, which can be purchased along with the other components. In assembly, the ignition cable passes down through the ceramic sleeve and is soldered to the small spring. The end of the shield passes through the hole of the first washer where it is clamped by the

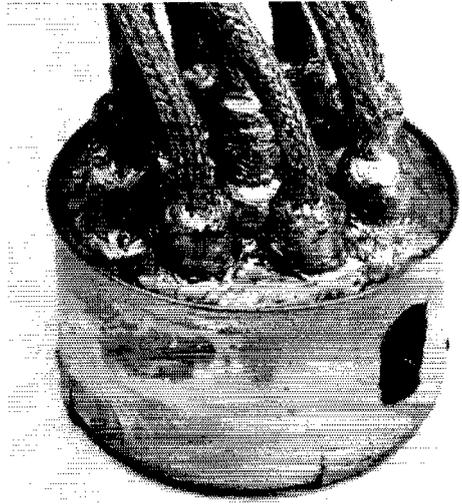


Fig. 6—Close-up of the shielded distributor cap assembly. Note the shims soldered to the underside lip of the distributor cap cover.

other washer and soldered. When the threaded cap is screwed onto the spark plug, it presses against the washers and completes the connection between the cable shield and spark plug.

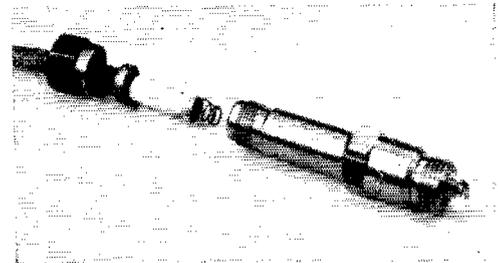
### Final Assembly and Installation

Final assembly of the harness includes cutting the cable to the proper lengths, connecting the spark-plug fittings to the shielded high-voltage cable, and soldering the cable shield to the distributor shield can. Electrical continuity throughout the entire system should be checked with an ohmmeter. The paths between the shielded cans, the high-voltage cable shields, the coil case, and engine ground should all be checked.

The easiest way to install the shielded system is to assemble the harness first on the workbench and then drop it on the engine in one piece. Actual installation should take only a few minutes. The existing unshielded system (distributor cap and high-voltage wires) can be pushed aside and tied down. If it is necessary to remove the shielded harness, the old system can be returned to use immediately.

(Continued on page 174)

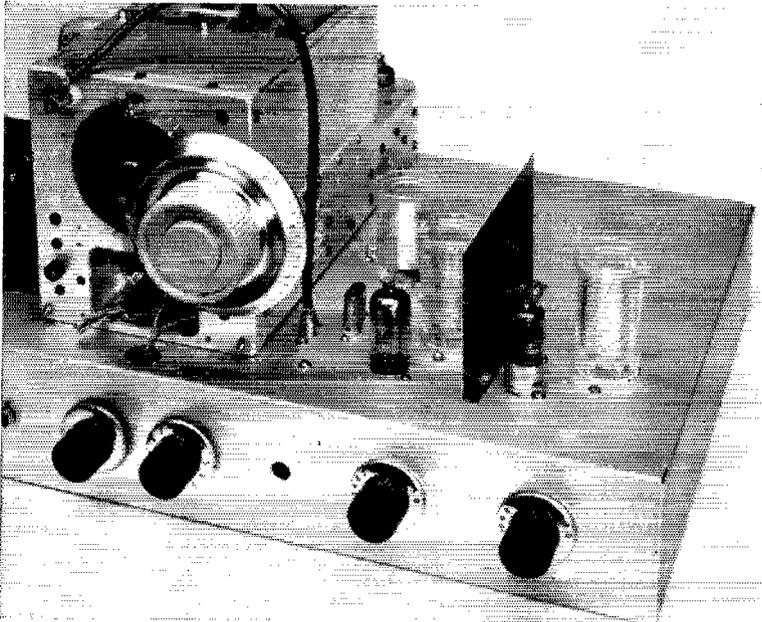
Fig. 7—Exploded view of the spark-plug assembly. From right to left are the shielded spark plug, ceramic sleeve, washer, cap and shielded cable.



# 80 Through 6 with the BC-454

*Extending the Frequency Range of a Popular Receiver*

BY LEWIS G. McCOY,\* WHICP



This view shows the layout of the converter parts on top the chassis. To the right of the aluminum shield are the 6AU6 and the  $L_1L_2$  coil assembly. The 6U8,  $L_3L_4$  coil assembly and the crystal are on the other side of the shield, with the oscillator coil to the rear. The RG-58/U coax lead from the antenna terminal of the BC-454 is plugged into  $J_3$ .

The two knobs at the right front of the chassis are for  $C_1$  and  $C_2$ . The hole at the center and the knob at its left are used in another modification to be described in a coming issue. The knob at the far left is the audio control described in January QST.

**I**N a recent article describing the conversion of a BC-454 surplus receiver,<sup>1</sup> which tunes from 3 to 6 Mc., it was pointed out that the BC-454 would make an excellent tunable i.f. for use with a crystal-controlled converter. This article describes such a converter, extending the frequency range of the setup so that all amateur bands from 3.5 through 50 Mc. can be covered.

The addition of the converter does not affect the 3.5-4-Mc. coverage, which is still the same, using the BC-454 by itself. When the converter is used, the BC-454 becomes a 3-to-6-Mc. tunable i.f. There is a decided advantage to using the BC-454 this way because its stability and tuning rate are maintained for the entire receiver when using a crystal-controlled converter for the higher-frequency bands.

The converter uses two tubes, one for an r.f. amplifier stage and the other for a combination mixer-oscillator. The r.f. and mixer stages are individually tuned, which eliminates tracking problems usually associated with building a gang-

tuned converter. This in turn simplifies construction and design. Also, by being able to tune the two stages separately you can always be sure your receiver front end is lined up. The output circuit of the converter is untuned, so no adjustment of this circuit is necessary.

### *Circuit Details*

As shown in Fig. 1, the converter circuit uses a 6AU6 r.f. amplifier and a 6U8 mixer-oscillator. In order to simplify the design and get away from the complexities of band switching, plug-in coils are used. As you will find when checking the coil information, the design is such that each r.f. coil,  $L_1L_2$ , and mixer coil,  $L_3L_4$ , will cover two bands. This means, of course, that only two sets of these coils are required to cover 7 through 28 Mc., a separate set being needed for 50 Mc.

The triode portion of the 6U8 operates as a crystal-controlled oscillator whose output is coupled to the mixer via the capacitance existing between the pentode and triode elements within the tube. It was found on testing the converter that no additional mixer injection was required.

A short length of RG-58/U is used to couple

\* Technical Assistant, QST.

<sup>1</sup> McCoy, "Getting Started with the BC-454," QST, January, 1959.

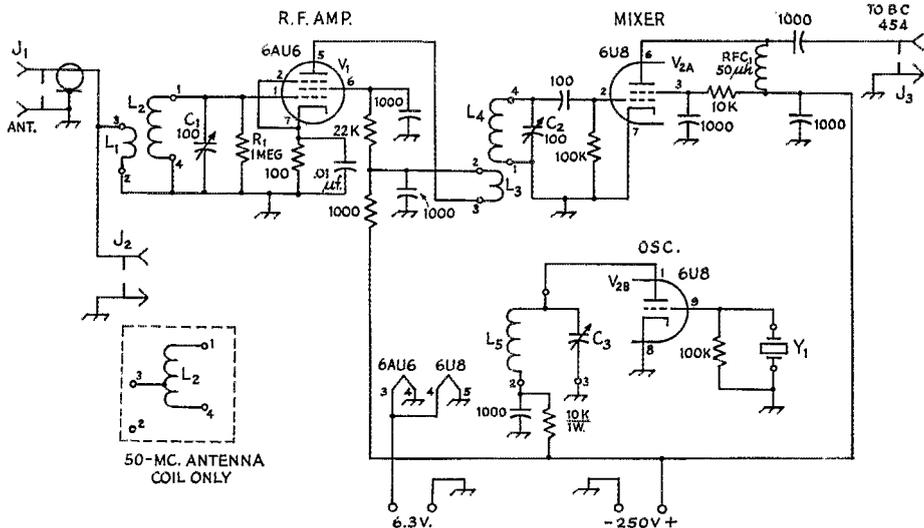


Fig. 1—Circuit diagram of the crystal-controlled converter. Unless otherwise indicated, capacitances are in  $\mu\text{mf.}$ , resistances are in ohms, resistors are  $\frac{1}{2}$  watt.

$C_1, C_2$ —100- $\mu\text{mf.}$  variable capacitor (Hammarlund MAPC-100-B, Hammarlund MC-100-M, or E. F. Johnson 149-5).

$C_3$ —Trimmer capacitor, one needed for each oscillator coil; 30  $\mu\text{mf.}$  (Centralab type 827C, El Menco type 461, Allied 60 H 335) for all bands except 7-Mc. circuit for 3400-kc. crystal.  $C_3$  for this 7-Mc. coil is a 100- $\mu\text{mf.}$  mica fixed capacitor.

$J_1$ —Coax chassis receptacle (Amphenol 83-1R).

$J_2, J_3$ —Phono jack.

RFC<sub>1</sub>—50- $\mu\text{h.}$  r.f. choke (National R-33, Millen 34300-50).

$Y_1$ —\* 7 Mc.—3400 kc.

14 Mc.—10,500 kc.

\*21 Mc.—17,500 kc.

28 Mc.—24,500 kc.

50 Mc.—46,500 kc. (International Crystal Co. type FA-9).

#### Coil Data

7 & 14 Mc.— $L_1, L_3$ —4 turns No. 20, 1-inch diam., 16 t.p.i. (B & W 3015).

$L_2, L_4$ —15 turns No. 20, 1-inch diam., 16 t.p.i. (B & W 3015).

\* $L_5, 7$  Mc.—32 turns No. 24, 1-inch diam., 32 t.p.i. (B & W 3016).

$L_5, 14$  Mc.—16 turns No. 24, 1-inch diam., 32 t.p.i. (B & W 3016).

21 & 28 Mc.— $L_1, L_3$ —3 turns No. 20, 1-inch diam., 16 t.p.i. (B & W 3015).

$L_2, L_4$ —7 turns No. 20,  $\frac{3}{4}$ -inch diam., 16 t.p.i. (B & W 3011).

\* $L_5, 21$  Mc.—10 turns No. 20, 1-inch diam., 16 t.p.i. (B & W 3015).

$L_5, 28$  Mc.—9 turns No. 20,  $\frac{3}{4}$ -inch diam., 16 t.p.i. (B & W 3011).

$L_1$  and  $L_2$  are made from a single length of B & W coil stock. The coils are separated by one turn, the 5th, which is cut and unwound from the support bars.  $L_3L_4$  is exactly the same as  $L_1L_2$ .

$L_1$  fits over  $L_2$  and is positioned near the bottom of  $L_2$ .  $L_3L_4$  is the same as  $L_1L_2$ .

50 Mc.— $L_2$ —5 turns No. 20,  $\frac{5}{8}$ -inch diam., 16 t.p.i., tapped 2 turns from ground end (B & W 3007).

$L_3$ —5 turns No. 20,  $\frac{1}{2}$ -inch diam., 16 t.p.i. (B & W 3003).

$L_4$ —5 turns No. 18,  $\frac{3}{4}$ -inch diam., 8 t.p.i. (B & W 3010).

$L_3$  is inserted inside  $L_4$ .

$L_5$ —4 turns No. 20,  $\frac{1}{2}$ -inch diam., 16 t.p.i. (B & W 3003).

\* Not actually required; see text.

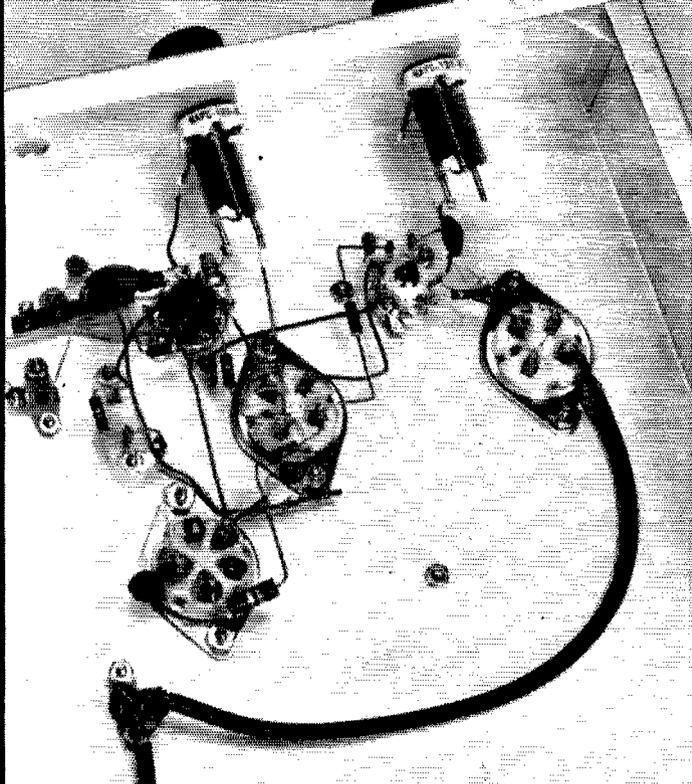
the output of the converter to the BC-454. For 7 Mc. and higher bands one end of the coax is connected to the antenna terminal of the BC-454 and the other end is plugged into  $J_3$ . When 3.5-Mc. coverage is desired (the BC-454 by itself) the converter end of the coax should be connected to  $J_2$  and the r.f. coil  $L_1L_2$  should be removed from its socket. The purpose of  $L_1$  is to provide a d.c. return for the grid of the 6AU6 when the coil is removed.

#### Construction

The original article included a description of a power supply which, along with the BC-454, was mounted on a chassis large enough to provide space for future additions, such as this converter.

If you compare the photographs in January *QST* with those in this article you will see how the space was used for the converter. However, the converter can be built on a separate chassis if you wish, but in that event you should follow the layout shown in this article. The chassis size is unimportant so long as it is large enough to accommodate the components. One as small as  $2 \times 5 \times 7$  inches would provide more than enough room for the parts. Also, if you build a separate power supply for the converter alone, it should furnish approximately 250 volts d.c. at 40 ma. and 6.3 volts a.c. at 1 amp.

Before starting construction study the top and bottom views to see how the tube and coil sockets are arranged. Note that a metal shield is used on



The input, mixer, and oscillator coil sockets run from right to left in this view. The 6AU6 socket is at the right and the 6U8 is at the left. The two variables,  $C_1$  and  $C_2$ , are mounted on the front panel in line with the associated coil sockets. The crystal mounting is near the oscillator coil socket.  $J_3$  is beside it and  $J_2$  is at the lower left. A piece of RG-58/U runs from  $J_2$  to the antenna connector,  $J_1$ , on the rear wall of the chassis.

top of the chassis to separate the r.f. and mixer circuits. The shield is made from a piece of aluminum measuring  $3 \times 5$  inches.

Four-prong forms and sockets are used for the r.f. and mixer coils. These coils are identical on each band, except 50 Mc., so there is no danger of plugging a coil into the wrong socket. A five-prong coil form and socket are used for the oscillator; this helps avoid confusion when changing bands, although only three terminals actually are needed.

When installing the 6AU6 socket mount it so that Pin 1, the grid terminal, faces the  $L_1L_2$  socket. The metal pillar (called the "shield") in the center of the coil should be grounded to a grounding lug mounted under one of the socket screws. When wiring, keep all lead lengths as short as possible.

The antenna terminal,  $J_1$ , is mounted on the rear chassis wall and connected to  $J_2$  by a short length of RG-58/U coaxial cable. Another short length of RG-58/U is used to connect from  $J_2$  to the socket terminal of  $L_1$ .

### The Coils

Making the coils is a very simple process as there is no winding of wire involved. Amphenol type 24-4P and 24-5P transparent polystyrene coil forms are used to hold the coils, which are made from various sizes of B & W Miniductor stock. The coils are mounted inside the polystyrene forms and held in place by their own leads, the ends of which are soldered to the coil-form prongs.

The oscillator coils must be tuned to the crystal

frequency. This is done by mounting a small capacitor along with the coil inside the form. With the exception of the one used in the 3.4-Mc. circuit all the capacitors are variable. The method of mounting the coil and capacitor is shown in the photograph of an assembly with a portion of the polystyrene form cut away to give a better view.

Before soldering the coil leads file off the nickel plating on the ends of the prongs. This makes the soldering job easier, because solder doesn't take too well on nickel. Also, hold the prong being soldered with a pair of pliers to conduct the heat away from the polystyrene coil base. Too much heat will loosen the pin. *Important:* after soldering the leads, clean off all traces of rosin that may have accumulated on the prongs.

### Getting It To Work

After you make your first set of coils you are ready to test the unit. Connect an antenna to  $J_1$ , connect the coax lead from the BC-454 to  $J_3$ , turn on the power supply, and let the unit warm up. If you have a voltmeter you can check the voltages on the tubes to make sure they are approximately correct. The voltages measured from chassis, using a 20,000-ohms-per-volt meter, were as follows: plate of the 6AU6, 200 volts; screen, 125; 6U8 pentode plate, 200, screen, 150; 6U8 triode plate, 125. These voltages are approximate so don't be too concerned if your setup is different. A variation of as much as 20 per cent either way should be O.K., but voltages measured through a high resistance, as at a screen grid,

may be somewhat lower than given above if a voltmeter of lower internal resistance, such as 1000 ohms per volt, is used.

Next, check to see if the crystal-controlled oscillator is working. There are a couple of methods that can be used to do this. The positive lead from your voltmeter can be connected to the chassis and the negative lead to the grid of the 6U8 triode. Use an r.f. choke (2.5 or 1 mh.) in series with the lead from the voltmeter to the grid. If the oscillator is working the meter will show a reading of a few volts. If there is no reading, adjust  $C_3$  so that the oscillator starts. The best adjustment of  $C_3$  is the one that gives the maximum voltage.

Another way to check is to measure the positive voltage at the junction of the 10,000-ohm, 1-watt resistor and  $C_3$ . When  $C_3$  is tuned through its range the voltage will go through a maximum value. The oscillator is working when the voltage is maximum.

Still another method of checking is with an absorption-type wavemeter, not the light-bulb type but one that uses a milliammeter as an indicator.<sup>2</sup> To check the oscillator, couple the wavemeter to the oscillator coil and tune the wavemeter to the crystal frequency. If the oscillator is working you will get an indication on the wavemeter. If not, try another setting of  $C_3$  and recheck with the wavemeter. The setting of  $C_3$  that produces oscillation is quite broad so you shouldn't have too much trouble getting the circuit to work.

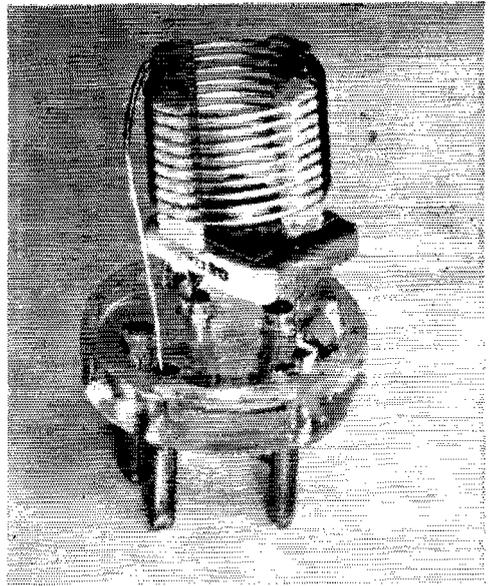
With the crystal oscillator frequencies specified in Fig. 1, the low-frequency edge of each amateur band will be at 3.5 Mc. on the BC-454, with one exception. The exception is the 7-Mc. band, the low-frequency edge of which starts at 3.6 Mc. on the dial. To make the band start at 3.5 Mc. the oscillator frequency also would have to be at 3.5 Mc., and all you would hear at the low end of the 7-Mc. band would be the crystal oscillator.

If you don't mind tuning the BC-454 "backwards," two crystals and two of the oscillator coils can be eliminated. The oscillator coil information for the 3400- and 17,500-ke. crystals is given for those who prefer to have their receivers tune in the same direction on all bands. If you choose to use the 10,500-ke. crystal and oscillator coil to cover both 7 and 14 Mc., both bands will start at 3.5 Mc. on the BC-454 dial but you'll tune toward 3.2 Mc. for the 7-Mc. band and toward 3.85 Mc. for 14 Mc. A similar method of tuning is required for 21 and 28 Mc. when using the 21,500-ke. crystal and oscillator coil. If you are interested in learning more about the "how" of converters the subject is covered in an article in October 1958 *QST*.<sup>3</sup>

When you have the oscillator working, tune the BC-454 to 3.5 Mc. and adjust  $C_1$  and  $C_2$  for maximum background noise. Also, you'll have to peak the antenna trimmer on the BC-454. Now tune around and find an amateur signal. You will

<sup>2</sup> McCoy, "A Novice Band Checker," *QST*, July, 1958.

<sup>3</sup> McCoy, "The 'Bonus' 21-Mc. Converter," *QST*, October, 1958.



An oscillator tuned-circuit assembly with part of the polystyrene coil form removed to give a better view of the coil and capacitor mounting.

probably find that you can peak the signal by readjusting  $C_1$ ,  $C_2$ , and the antenna trimmer on the BC-454. We found with the unit described here that a single setting of the controls would cover the c.w. portion of any band up to 28 Mc. and no readjusting within a band was needed. On 28 and 50 Mc. you'll find that the controls will have to be readjusted if more than 200 kc. is to be covered. You may also find that adjusting the oscillator trimmer,  $C_3$ , will peak up the performance a bit, but this need only be done once for each band.

A comparison between the BC-454-converter combination and a high-quality communications receiver showed that stability and sensitivity were all that one could ask for—any signal heard on the regular receiver came in just as well on the BC-454. Selectivity leaves something to be desired, but we are working on an addition to improve that part of the receiving setup and hope to have some information available soon. Aside from selectivity, it would take a lot of dollars to buy a receiver comparable with the BC-454-plus-converter. **QST**

## **Strays**

K6ODY was testing out a 100-watt transmitter using a 100-watt light bulb as a dummy load, and was heard and called by K6USL. K6USL was feeding a lower-powered antenna—he only had a 25-watt bulb tied to his rig!

.....

K4RJM put a spinner knob on his v.f.o. and now covers the band in 3.5 seconds instead of 10.

# Transistorized Electronic Key and Monitor

*A Semiconductor Version*

*of a Multivibrator*

*Character-Forming System*

BY MARLAND M. OLD,\* WSLAN

*The electronic key circuit devised by W9TO has earned a high reputation for itself among the connoisseurs of electronic keying. In WSLAN's version transistors are substituted for the vacuum tubes used in the original circuit. The result is a unit that, except for the battery, takes less space on the operating table than an ordinary key.*

**A**FTER building and operating several electronic keys described in *QST* and other publications during the past few years I was fortunate to obtain the schematic of a vacuum-tube keyer, originated by W9TO,<sup>1</sup> which had the good features of all the keys tried previously plus some of its own. The key featured self-completing dots and dashes, all-electronic timing, a single inexpensive keying relay, and an exact two-to-one dash-dot ratio<sup>2</sup> at all speeds. The keyer described in this article is a transistorized version of that design, complete with monitor and key lever, all enclosed in a box chassis 4 by 2½ by 1½ inches and operating from a single 22½-volt battery.

## *Circuit Operation*

Those not familiar with transistor operation might find it helpful to consider the transistor to be crudely analogous to the triode vacuum tube with the base corresponding to the grid, the collector to the plate, and the emitter to the cathode. Note, however, that the p-n-p type CK722 transistor used in the keyer requires voltages opposite in polarity to those on the corresponding elements of a tube.

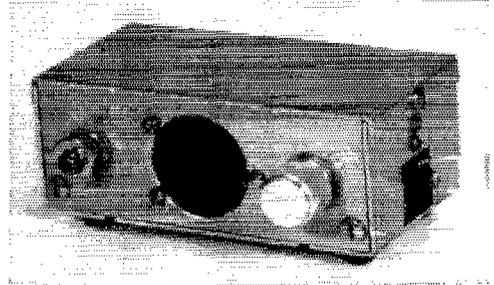
In the block diagram of Fig. 1, all transistors will be considered as switches, either open from collector to emitter ("off"), or closed ("on"), according to the currents being fed to the bases. If the base is at emitter potential (no base current flowing) the collector-to-emitter resistance will be high and only a small leakage current will flow. A transistor in this condition will be considered to be open or "off." If the base is fed a current from a voltage of the same polarity as the collector, the collector-to-emitter resistance becomes very low and the circuit can be considered to be closed or "on."

Transistors  $Q_1$  and  $Q_2$  are connected in a free-running multivibrator circuit that generates the basic pulses for producing dots and dashes. This stage will be referred to as the pulse generator.

\* 4739 Sandra Lynn, Mesquite, Texas.

<sup>1</sup> To the best of our knowledge this circuit has not been described in any periodical, but has been furnished privately by W9TO to a number of amateurs. — *Editor.*

<sup>2</sup> That is, ratio of the time occupied by a dash-plus-space to the time occupied by a dot-plus-space. — *Editor.*



This electronic keyer—including a monitor with loud-speaker—takes up less space than the average bug. The only component not contained in the 4 × 2½ × 1½-inch box is the 22½-volt battery that runs the transistors. The screw-driver-adjusted control is for the mark-space ratio; the one with the knob is the speed control.

Transistors  $Q_5$  and  $Q_6$  are connected in a pulse-counting bistable multivibrator circuit which when driven by the pulse generator will produce pulses at exactly one-half the rate of the basic pulse frequency. This stage will be referred to as the pulse counter.

Transistors  $Q_3$ ,  $Q_4$ , and  $Q_7$  operate as switches to control the operation of the pulse generator, the pulse counter, and the keying relay.

With the keyer at rest,  $Q_3$  and  $Q_4$  are "off," keeping  $Q_2$  and  $Q_5$  "off." Since  $Q_2$  and  $Q_5$  are "off,"  $Q_1$  and  $Q_6$  are "on," with their collectors at or near emitter potential. (In a multivibrator circuit when one transistor is "off" the other must be "on" and vice versa.)

To produce a single dot the key lever may be tapped to the dot side and released, thus momentarily placing negative battery on the base of  $Q_3$  and forcing it to the "on" condition. This negative voltage is prevented from reaching the base of  $Q_4$  by diode  $CR_1$ . With  $Q_3$  "on," the pulse generator starts to oscillate, with  $Q_2$  switching to the "on" condition while  $Q_1$  goes to the "off" condition. As  $Q_1$  goes to the "off" condition its collector rises almost to the negative battery potential since there is little voltage drop across the collector load resistance with little current flowing through it. Current from this negative potential is fed to the base of  $Q_3$ , keeping it in the "on" condition even with the key released.

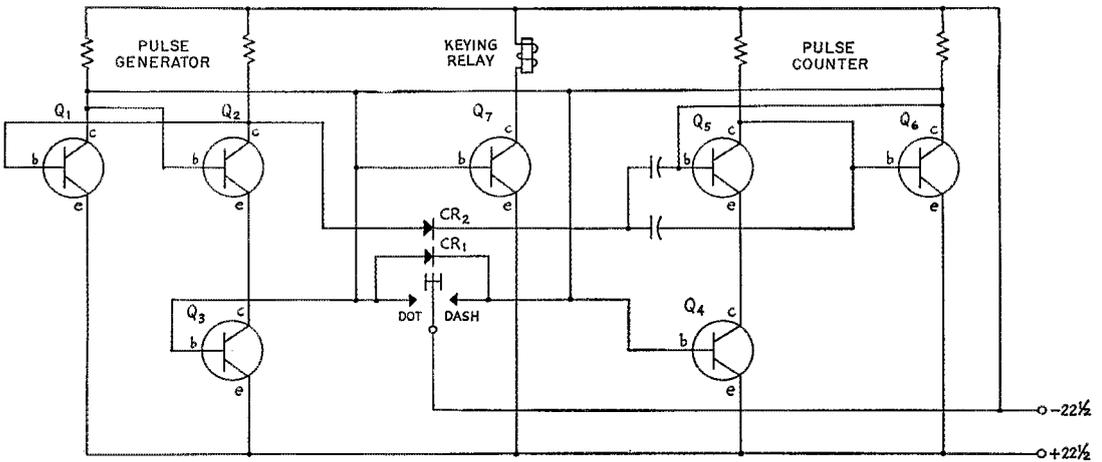


Fig. 1—Block diagram of transistorized keyer.

It is also fed to the base of  $Q_7$ , turning it "on" and thus operating the keying relay. As the half-cycle point is reached  $Q_2$  cuts off and  $Q_1$  returns to the "on" condition, returning  $Q_3$  and  $Q_7$  to the "off" condition and releasing the keying relay. The circuit is then returned to the resting condition.

#### Forming a Dash

To send a single dash, the key lever may be tapped to the dash side, momentarily placing negative battery on the base of  $Q_4$ , and on the base of  $Q_3$  through  $CR_1$ .  $Q_4$  turns "on," readying the pulse-counting circuit for operation once a positive-going pulse is received from the pulse generator. (The pulse-counter transistors  $Q_5$  and  $Q_6$  will reverse their "on" and "off" conditions only upon reception of a positive-going cut-off pulse impressed upon the bases.) Since negative battery was also placed on  $Q_3$  through  $CR_1$ , the pulse-generating circuit starts a dot cycle as described in the preceding paragraph. As  $Q_2$  turns "on" the collector drops almost to the positive emitter potential. Diode  $CR_2$  carries this positive-going pulse to the bases of  $Q_5$  and  $Q_6$ , causing  $Q_6$  to turn "off" and  $Q_5$  to go to the "on" condition. With  $Q_6$  "off," the collector is at a high negative potential and currents from this potential are fed to the bases of  $Q_3$  and  $Q_4$ , holding the two control transistors "on." Current is also fed to the base of  $Q_7$  which, along with the current from the collector of  $Q_1$ , causes  $Q_7$  to conduct and operate the keying relay.

The pulse generator completes one cycle and starts another, since  $Q_3$  is held "on" by current from the collector of  $Q_6$ . At the instant the second cycle starts, another positive-going pulse is emitted from the collector of  $Q_2$  and the condition of the pulse-counting circuit again reverses, with  $Q_5$  going to "off" and  $Q_6$  going to "on." With the collector of  $Q_6$  again near emitter potential no currents flow from it to the bases of  $Q_3$ ,  $Q_4$ , or  $Q_7$ . With no current to the base of  $Q_4$  the pulse-counting circuit is disabled.  $Q_3$  and  $Q_7$

are kept "on," however, by currents from the collector of  $Q_1$ , until the end of the first half of the second cycle. At that time  $Q_1$  returns to the "on" condition and releases  $Q_3$  and  $Q_7$  for the last half of the second cycle. The circuit again returns to the resting condition unless the key lever has been kept in the dash position or has been operated to the dot side. Fig. 2 illustrates the generation of a dash.

Note that the positive-going pulses from the collector of  $Q_2$  are carried to the bases of  $Q_5$  and  $Q_6$  through  $CR_2$ , a 1N34.  $CR_2$  is used to prevent the possible operation of the pulse-counting circuit by negative-going pulses. Its use is not always necessary since the circuit is relatively insensitive to negative-going pulses.

#### Components

It is suggested that the base-emitter junction of a transistor be used for  $CR_1$ , since the diode must have high back resistance to prevent the operation of the pulse-counting circuit with the key held to the dot side. The base-emitter junctions of common transistors generally have a back resistance of one to ten megohms, which is far superior to the back resistance of a 1N34. A 1N34 selected for a high back resistance may

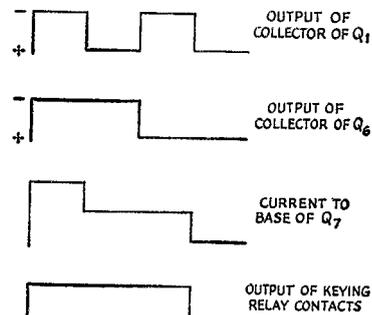
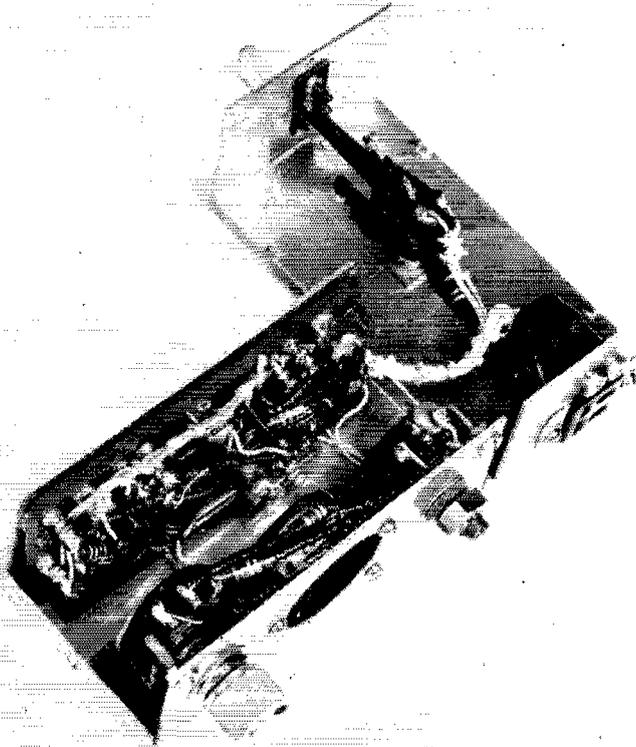


Fig. 2—Time sequence in forming a dash and following space.



Most of the parts are on phenolic terminal boards mounted on the sides of the box. The key mechanism mounted on the bottom (at top in this photograph) is made from relay parts. Layout of components is not critical, and any convenient type of construction may be used.



be advantageous to have the base of the key at chassis potential to prevent shorting the battery if the key should happen to touch the keyer or the transmitter. If satisfactory voice-coil keying is not obtained and a grounded key lever is still desired, an n-p-n type transistor may be used in the monitor by reversing the polarity of the voltage supplied to the oscillator. The negative battery terminal may then be grounded, since that polarity is required on the base of an n-p-n transistor to prevent oscillation.

The resistor and capacitor values shown in the monitor oscillator schematic result in an output frequency of about 500 cycles, which is near the resonant frequency of the speaker. The resistance may be decreased to increase the oscillation frequency, or vice versa, to suit the individual tastes of the builder. It is suggested that the monitor be completed and tested before attempting to test the keyer, since proper operation of the keyer can most easily be detected with the ear.

#### **Transistor Characteristics**

If a transistor tester is available when purchasing the CK722s it would be well to ask your distributor to allow you to select a group of transistors from his stock to avoid getting any exceptionally low-gain units. CK722s usually have current gains ranging from about 10 to 60, with most falling in a range of 20 to 40. Out of about forty or fifty CK722s tested in selecting

transistors for several models of this keyer only three or four have had to be rejected because of gains as low as 8 to 12. If a tester is not available it would be wise to use transistor sockets to allow easy substitution should trouble be experienced in getting the keyer to work properly. In the model shown CK722s with gains from 24 to 54 were used. Transistors with exceptionally high current gains (100 or more) should not be used except possibly in the pulse generator. Higher-gain transistors generally have higher leakage currents and are especially undesirable in the control transistor stages,  $Q_3$ ,  $Q_4$ , and  $Q_7$ , since their leakage currents are often high enough to allow operation of the pulse generator, pulse counter, and the keying relay while they are supposedly in the "off" condition.

#### **Constructional Details**

The keyer shown in the photographs was constructed in an LMB box chassis No. 00. A piece of  $\frac{1}{8}$ -inch phenolic board obtained from the surplus section of a local wholesale house was trimmed to a size that could be fastened to the  $1\frac{1}{2}$  x 4-inch side of the box by two  $\frac{1}{2}$ -inch 6-32 screws. A piece of flexible  $\frac{1}{16}$ -inch plastic was cut to size and sandwiched between the phenolic board and the side of the chassis to prevent the bradded ends of the terminals from touching the chassis. The terminals were also obtained from the surplus section of the local distributor and appear to be similar to USECO

1330D terminals. Since a swaging tool was not available the rivet braddding tool from the XYL's leather tooling set was used to brad the ends of the terminals to the phenolic board. Perforated  $\frac{1}{16}$ -inch bakelite boards with matching "flea" clips to fit the perforations are available from Lafayette Radio and have been used to construct one model of the keyer.

The transistors in this keyer were mounted by drilling the phenolic board with a  $\frac{1}{8}$ -inch drill and reaming the holes to a size that provided a snug fit for the transistors. Ordinary household cement was used to secure them.

The keying relay and speaker transformer are also mounted on the phenolic board, along with most of the resistors and capacitors. The speaker and the controls were mounted on the opposite side of the chassis, leaving a corridor through the middle of the box for the key lever and a Jones socket, type S304AB, to fit into when the box chassis is put together.

The key lever was constructed from some relay contact assemblies that are similar to those available in the Guardian universal "200" series of contact assemblies. An extra switch blade with the contact end snipped off was placed on either side of the key lever to provide extra stiffness. The dot and dash contacts are backed by a horseshoe-shaped piece of bakelite to give the key a more solid feel. The paddle for the key lever was fashioned from a  $\frac{1}{8}$ -inch piece of Plexiglas by marking the desired shape with a scribe and sawing around it with a hacksaw, being careful not to saw into the scribe marks. A sheet of fine sandpaper was placed on the flat surface of a table and the edges of the paddle were sanded down to the scribe marks by a series of circular motions with the paddle. The key lever end of the paddle was drilled, tapped, and fastened to the end of the key lever with a 4-36 screw.

Four holes were drilled in the bottom of the chassis and tapped for 4-36 screws for fastening rubber feet to the keyer.

Extreme care must be used when soldering the transistors and the diodes into the circuit to avoid damaging them with the soldering heat. The transistor and diode leads should be the last leads soldered to their respective terminals. They should be tinned and quickly spot soldered to the terminals while holding the leads with a pair of long-nose pliers between the transistors and the terminals. The leads should be held until all soldering heat has been dissipated from the terminals. If transistor sockets are used all connections to the socket terminals should be made with the transistors removed.

### Operation

After the keyer is completed and the wiring thoroughly checked for errors the speed and mark-to-space ratio controls should be set in the middle of their ranges and the battery connected. A string of dots or dashes should result when the key lever is held to one side or the other. The mark-to-space ratio control should

be adjusted to give 50 per cent of full-scale reading on an ohmmeter connected across the keying-relay contacts. With the mark-to-space ratio control adjusted on dots the ohmmeter will read 75 per cent of full scale on dashes, indicating that correctly proportioned dashes are being produced.

Successively smaller values of  $R_1$  and  $R_3$  may be tried until points are reached where the keyer fails to function properly at the extreme ends of the speed-control range.  $R_1$  and  $R_3$  can then be increased slightly so that proper operation can be obtained over the entire range of the speed control. A range of at least 10 to 45 w.p.m. should be attained, using coupling capacitances of 3  $\mu$ f. each as specified in the diagram. Increasing these capacitances will move the range toward lower speeds, and vice versa. For example, in two models of this keyer it was found that the speed range was 7 to 33 w.p.m. if the capacitors were 5  $\mu$ f. each, and 25 to 100 w.p.m. if both capacitors were 2  $\mu$ f.

Although most 22 $\frac{1}{2}$ -volt batteries available will supply the average current of about 12 ma., some of the smaller batteries will not supply the peak currents demanded by the keyer for proper operation. It is recommended, therefore, that batteries larger than the smallest available be used.

When using the keyer keep in mind that transistors are temperature-sensitive devices and should not be subjected to extremely wide variations of temperature. Therefore do not operate the keyer close to heat-producing gear—for instance, on top of the receiver or transmitter. No difficulty from internally produced heat will be experienced, naturally, since only 0.3 watt is required to power the keyer. (Over six times that amount is required for the filament of a 6J5.)

Those who are trying an electronic key for the first time will find that considerable practice is required to master one. Old sending habits that resulted in incorrectly timed dots or dashes must be broken before the keyer can be used successfully. The effortless keying and the perfectly-timed characters attainable with this keyer make it a worthwhile project for any radio amateur. QST

## Stays

Operation World-Wide gets underway on April 20 when a MATS Globemaster takes off from New Jersey bound on a round-the-world flight. The prime mission of the plane will be to make a documentary film on MATS, but on board will be W8OLJ, operating aeronautical mobile, along with W2SKE and W2BAK. Look for them on sideband.

Ham employees of the Santa Fe Railroad are forming a ham club, with membership dues of \$1.00 per year. Any interested Santa Fe employees should contact W. E. Courtney, WA6BG1, 1169 Crestview Ave., San Bernardino, Calif.

Correction! That EICO wall chart mentioned on page 15 of April is free only to teachers.

# Simplified Product Detector Design

BY JOEL L. EKSTROM,\* WIUGX/3

THE present-day popularity of single-sideband techniques has been responsible for the development of a number of product detector circuits, most of which, when adjusted properly, perform more or less as intended. A survey of the literature seems to indicate that the Crosby product detector and the pentagrid converter are the circuits most commonly used. It is possible to adjust the Crosby detector so as to minimize intermodulation distortion, but it uses at least two triodes (preferably three) and does not have a large signal-handling capability. The pentagrid converter, on the other hand, does not have these disadvantages, but does not usually have an intermodulation balance control.

satisfactory when the circuit is properly adjusted.

Fig. 1 shows the separately-excited detector, and Fig. 2 is its self-excited brother. Both work well at the common i.f. frequencies of 50 to 500 kc., although more plate circuit filtering would probably be advisable at the lower intermediate frequencies, to prevent local-oscillator saturation of the audio circuits following the detector.

Adjustment of these circuits is not difficult, but is best done with the aid of an oscilloscope. With the oscillator circuit working correctly at the proper frequency, two half-volt low-frequency (approximately 5 kc.) audio signals separated in frequency by about 500 c.p.s. should be applied to the signal input, and  $R_1$  adjusted to minimize the difference-frequency component in the output. The null should be fairly sharp.

A half-volt signal is about the maximum signal that should be used for testing. If the intermodulation adjustment is made for a half-volt signal it should hold for signals smaller than that quite well. If the balance is made with a larger test signal, the balance will not be correct for signals larger or smaller than that level.

QST

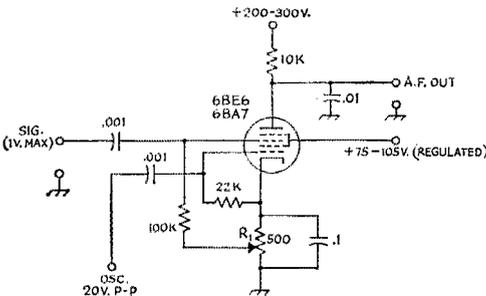


Fig. 1—Pentagrid converter in product detector with control for minimizing intermodulation. Capacitances are in  $\mu\text{f.}$ ; resistors are  $\frac{1}{2}$ -watt composition with the exception of  $R_1$ , which is a carbon potentiometer. This circuit is for use with a separate beat-frequency oscillator. A.f. output should be fed to the following audio amplifier grid through the usual blocking capacitor.

It is the purpose of this note to describe a simple pentagrid converter which may be either self- or separately-excited, and which has an intermodulation balance adjustment to reduce rectification effects. While no exact quantitative measurements are available to compare it with the Crosby circuit, an oscilloscope examination of the output shows the performance to be quite

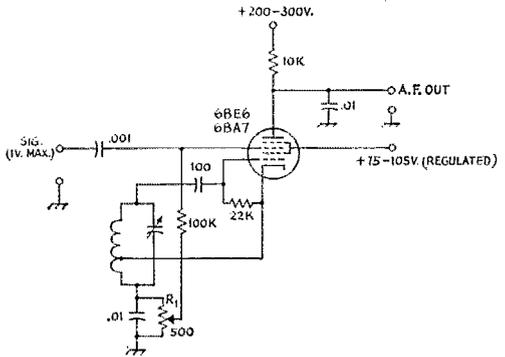


Fig. 2—Product detector circuit with self-excitation. Values are similar to those in Fig. 1. The b.f.o. tuned circuit can use any b.f.o. transformer designed for the particular intermediate frequency used.

\* 2006 Swansea Road, Baltimore 14, Md.

## Strays

W8RNB called CQ Albuquerque with traffic and raised K5IFB. Both are named Raymond Oliver.

W0JBT, a golf course superintendent, would like to QSO other hams in the same business. (He doesn't say what bands he works, so if you run across him it'll be like making a hole-in-one.)

K2IOW has cleaned up most of his TVI and

BCI, but one case continues to baffle him. A neighbor reports that late at night he hears K2IOW coming up out of the bathtub drain. When the drain plug is put in, K2IOW is cut off. Obviously, this tub does not have the customary trap.

Young Andy Marx, after listening to some of the signals on sideband, asked his mother (W6DFJ) if those people were born that way.

# • Recent Equipment —

## The RME VHF-126 Converter



The RME VHF-126 Converter for 50, 144 and 220 Mc. is similar in size and appearance to the 4350-series receivers of the same make.

ONE of the first pieces of commercial gear ever to be made available to the v.h.f. fraternity was the RME DM-36 "Expander." This two-band converter, produced more than 20 years ago, gave many a 10-meter man his first look at the world above 50 Mc., with its bandswitching coverage of 56 and 28 Mc. You can still find a DM-36 here and there, converted to the 50-Mc. band, and still doing quite well. Its postwar successor, the VHF-152, brought hundreds of recruits to the 6- and 2-meter bands. Hams who bought it for use on 10 took a look at the higher bands now and then, and a look was often enough to start the v.h.f. bug biting. If the subject of this discussion, RME's new VHF-126,\* does as much for the 220-Mc. band, it will be a boon, indeed.

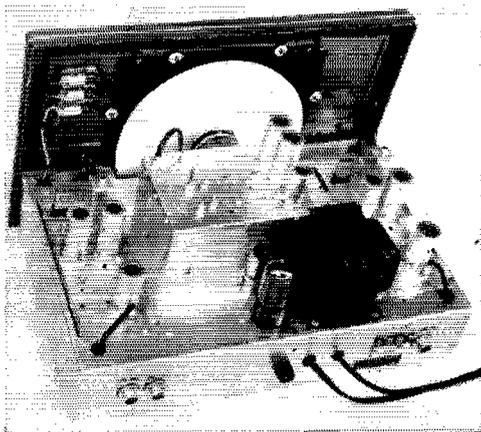
The DM-36 and the VHF-152 were simple tunable converters, with oscillator, mixer and r.f. amplifier circuits switched in changing bands. This meant that circuit design could not be completely optimized for all the bands covered, and it entailed other compromises with the ideal. Oscillator circuit switching added mechanical instability to the already considerable problem of designing a tunable oscillator that would be useably stable at 144 Mc. from a drift point of view. These limitations are bypassed in the latest product.

In the VHF-126 we have a new approach to three-band converter design, providing coverage of all three amateur v.h.f. bands with optimum performance on each. The converter approaches a communications receiver in size and cost, but it does the job on 50, 144 and 220 Mc. in a way that would be impossible with simple bandswitch-

ing. The basic tuning unit is a 50-Mc. converter of conventional design, having a tunable oscillator designed for high stability and accurate dial calibration. The oscillator tunes down to about 41.5 Mc., so that coverage of the converter extends to about 48.5 Mc., a handy feature in checking the possibility of 50-Mc. DX openings by examination of the commercial and experimental frequencies below the band edge. It also gives a tunable i.f. range of slightly more than 5 Mc., so that the complete 220-Mc. band and the 144-Mc. band can be covered, with some leeway on each end, with the built-in crystal-controlled converters for these bands.

The 126 is shown in block diagram form in Fig. 1. The converters for 220 and 144 Mc. are of similar design, using a 6AM4 grounded-grid r.f. amplifier ahead of a 6BQ7A mixer and cathode follower. Crystal-controlled injection is supplied by a 6BQ7A oscillator-doubler. The 50-Mc. converter has a 6BQ7A cascode, a 6U8 mixer and cathode follower, and a 6AF4A tunable oscillator. Separate coaxial antenna inputs are provided for the three v.h.f. bands. A two-terminal strip allows an antenna for lower bands to be connected through the converter, so that no making and breaking of connections to the communications receiver need be done when the receiver is operated on frequencies below 50 Mc.

The size, finish and dial design of the VHF-126 are similar to the RME 4350 and 4350A receivers. The two-speed friction drive dial is very handy in v.h.f. work, providing a quick way to run up to the opposite end of the long tuning range when



Interior view of the VHF-126, showing the converters for 220 and 144 Mc. at either side, and the tunable 50-Mc. converter at the center. Dial is large friction-drive illuminated type with two-speed tuning. Power supply and voltage regulator for the oscillator are included.

\* RME Division, Electro-Voice, Inc., Buchanan, Mich.

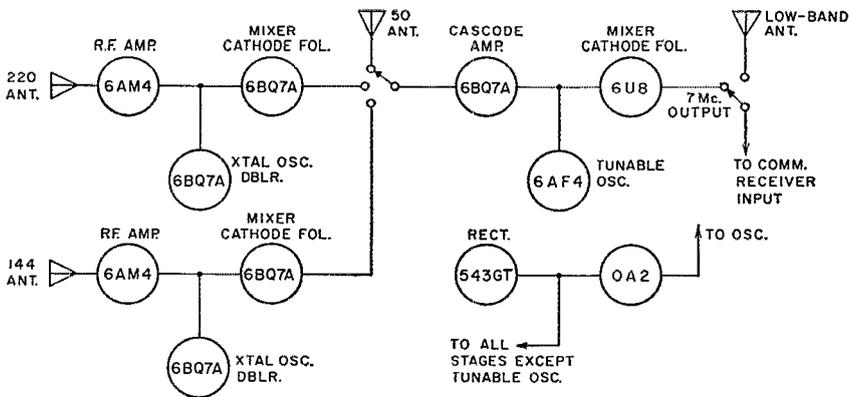


Fig. 1—Block diagram of the RME VHF-126 Converter. Crystal-controlled converters for 220 and 144 Mc. work into a tunable 50-Mc. converter having 7-Mc. output.

it is needed, but at the same time giving a smooth "feel" on the slow-tuning knob. The band in use is indicated by panel jewels in three colors in the upper right corner of the front panel. Three switches provide flexible operation. They are for a.c. on-off, converter out-in, and range switching. The converter switch, second in from left in the front view, switches either the low-frequency antenna or the 7-Mc. i.f. output to the communications receiver. The range switch serves as its name implies, but also has a standby position that leaves the converter hot and ready to go, but with plate power off.

The rear view of the 126 shows the crystal-

controlled converters at either edge of the chassis with the 50-Mc. tunable converter mounted turret style at the center. It is worth pointing out that the r.f. and mixer tuned circuits of this converter are gang-tuned with the oscillator. This allows the use of moderately selective circuitry in the 50-Mc. front end, a factor that should be helpful in keeping down spurious responses from signals outside the intended tuning range. Uniform response across a 5-Mc. passband is thus achieved without the broadbanding that so commonly results in susceptibility to overloading from commercial signals in 50-Mc. converters using fixed-tuned circuits. — E. P. T.

## More Mobile Power Supplies

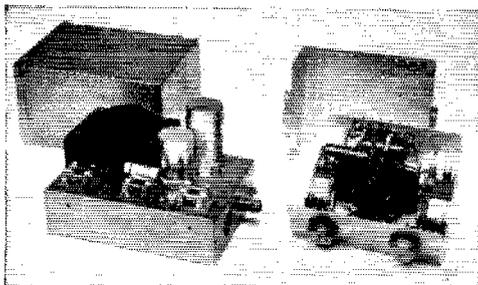
WITH the summer months approaching, mobile operating will take on a more attractive aspect. To help it along, a number of new transistor-type commercially-built mobile power supplies have appeared on the scene since last summer and have been reported in *QST*. To bring the mobile power supply picture up-to-date, here are some facts about a few more supplies now available for mobile use.

First, one important word of caution concerning transistor supplies: Some of these supplies are designed for a maximum input of 14 volts. However, many of the newer cars have their regulators set at the factory for generator outputs up to 14.6 volts. Although the difference is less than 5 per cent, a few moments of overload operation may destroy the transistors. If you are using a transistor supply that is rated at 14 volts maximum input, it would be a good idea to measure the voltage at the input terminals of the supply while the battery is charging. If under any conditions the voltage rises above 14, a dropping resistor should be placed in series with the "hot" lead. For instance, if the supply demands 10 amps., a one-quarter ohm (at least 25-watt rating) resistor will give a 2.5-volt drop. A suitable resistor could be made by connecting four one-ohm ten-watt resistors in parallel.

### Transcon Mobile Power Supplies

THE Transcon power supply group includes types having output ratings ranging from 125 volts at 65 ma. to 600 volts at 200 ma. The photograph shows a Model H-600 transistor supply (on the right), which will deliver 600 volts at 200 ma. Output ratings on all the supplies are for continuous-duty operation. All models are designed for use with either 6- or 12-volt input. When operated on 6 volts the output voltages are approximately halved, although the current values remain unchanged. Also, it is necessary to change several resistors when operating the supplies on 6 volts since the units are normally wired for 12-volt input. The necessary replacement resistors are furnished with each power supply. The circuitry is insulated from the chassis so the units may be used with either positive- or negative-ground systems.

All of the transistor supplies use matched-pair transistors and silicon diode rectifiers. The rectifiers can be plugged in and are therefore easily replaced. Input and output connections are made through a terminal board mounted on the side of the chassis. The model H-600 measures 5 by 6 by 2 1/4 inches.

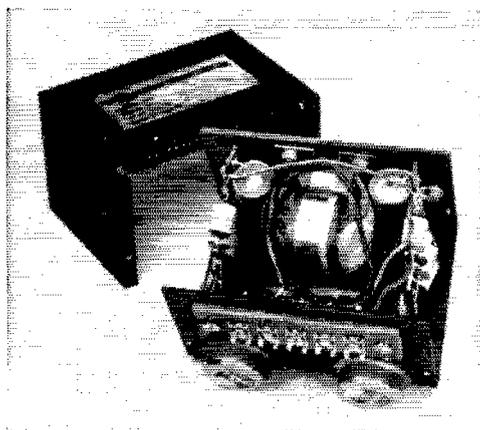


Transcon Mobilcon vibrator power supply (left) and 120-watt transistor supply (right).

The Mobilcon Vibrator Power Supply Model H-302 shown at the left is not much larger than some transistor supplies. It measures 5 by 7 by 5½ inches. This vibrator supply also uses plug-in silicon rectifiers. The supply furnishes 350 volts at 125 ma. under full load, and 200 volts when switched to stand-by. A built-in relay controls these output voltages. Output connections of the unit terminate at an octal socket. Low-voltage input leads connect to binding posts. Either 6 or 12 volts may be used to power the vibrator supply and it may have either a positive or a negative ground. Transcon power supplies are manufactured by Creative Electronics Corp., 94 Lincoln Ave., Stamford, Connecticut.

### Kupfrian Transistor Power Supplies

THE Kupfrian series of transistor power supplies covers the power range of 50 to 225 watts. The 50-watt (250 volts at 200 ma.) is designed for 6-volt systems and the 100-watt models (250 volts at 400 ma., and 500 volts at 200 ma.) for 12-volt systems. The 225-watt model, unfortunately for hams, requires 28 volts input. The chassis is not connected to any of the circuit components, and the negative output is isolated from ground for convenience in making biasing

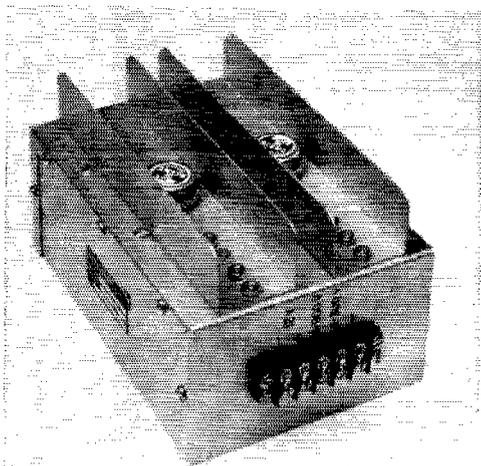


Kupfrian 100-watt transistor power supply.

arrangements. Input and output connections are made through a terminal strip mounted on the side of the chassis. The 12-volt 100-watt supply shown in the photograph measures 3 by 4 by 2½ inches. Kupfrian Mfg. Corp., 395 State St., Binghamton, New York, is the maker.

### The Globe Model A12/600/200 Transistor Power Supply

THIS supply is designed to deliver 600 volts at 200 ma. or 300 volts at 400 ma. with a nominal input of 13 volts at 13 amp. It will operate at full output at temperatures up to 105 degrees F. Electrical connection to the power supply is made at the marked terminal board mounted on one end of the chassis. The case is insulated from the electrical circuits, and the input and output circuits are isolated from each other. This allows choice of positive or negative grounding of the unit. Plug-in silicon diodes are used for rectifiers.

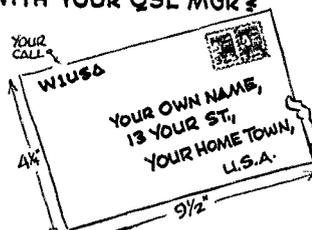


The Globe Model A12/600/200 transistor power supply. Aluminum channel fins provide additional area for cooling.

A 10-page instruction manual furnished with the supply covers principles of operation, maintenance, specifications, installation and schematic diagram. The Model A12/600/200 measures about 5 by 7 by 4¼ inches and is manufactured by Globe Industries, Inc., Belleville, New Jersey.

— E.L.C.

IS YOURS ON FILE  
WITH YOUR QSL MGR?



QST for

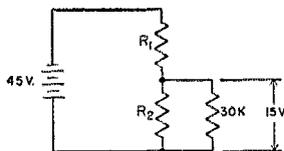
## Silent Keys

It is with deep regret that we record the passing of these amateurs:

KIBKE, Robert L. Willard, Hennifer, N. H.  
 KICDH, Matthew Chess, Washington, Conn.  
 W2BGM, John E. McConnell, Brooklyn, N. Y.  
 K2EK, Col. John H. Hineman, jr., Little Silver, N. J.  
 W2FL, Dallas C. Akers, East Orange, N. J.  
 W2PPR, George W. Fremow, Rochester, N. Y.  
 W3AKT, Anthony K. Thornley, sr., Morrisville, Pa.  
 K3GGM, Alfred A. Markson, Pittsburg, Pa.  
 W3OQQ, Gilbert H. Wogan, Hollidaysburg, Pa.  
 W4IGO, John M. Chamberlain, Sarasota, Fla.  
 W4NTT, Beverly D. Vaughan, Portsmouth, Va.  
 W5AIT, Virgil M. Santy, Hamilton, Texas  
 W5ALW, James W. Lewis, Mesquite, Texas  
 W6CNA, Rollins O. Plummer, Temple City, Calif.  
 W6QCK, Herman L. T. Bradley, Los Angeles, Calif.  
 W7ANZ, Donald C. Buckingham, Seattle 55, Wash.  
 W7CCB, Archie L. Bolstad, Seattle, Wash.  
 W7HX, Dr. Leslie Guy Van Slyke, Basin, Wyo.  
 W7KNP, Lewis K. Weiss, Phoenix, Ariz.  
 W7VKA, George F. Picaud, Jacksonville, Oreg.  
 W8CCE, Rex K. Struble, Flint, Mich.  
 W8DAC, James R. Baker, jr., Tiffin, Ohio  
 W8LKU, Dr. Darrell B. Green, Athens, Ohio  
 W8SAN, Morris Krastof, Detroit, Mich.  
 W9FVV, James V. Lato, Chicago, Ill.  
 W9FWO, Thomas F. Vinson, Sioux City, Iowa  
 W9GXW, Paul Moffett, Concordia, Kans.  
 W9MAO, Jerome B. Cox, Lincoln, Nebr.  
 G3GJW, Wilfred Steele, Nottingham, England  
 G12CIZ, Jim Gallaughier, Belfast, Ireland  
 LA1D, Gunnar Hammerik, Oslo, Norway

## Quist Quiz

Martin Sonn, K1CKZ in Hartford, Conn., contributes the following: In the sketch below, it is known that  $R_1 + R_2 = 15,000$  ohms. What are their values?



In last month's Quiz, closing  $S_1$  allowed  $C_1$  to charge to 100 volts. The charge is  $Q = CE = 10 \times 10^{-6} \times 100 = 10^{-3}$  coulomb = 1 millicoulomb. When  $C_2$  is connected across  $C_1$ , by closing  $S_2$ , the voltage becomes  $E = Q \div C = 10^{-3} \div 15 \times 10^{-6} = 66.7$  volts.

To which W. B. Wrigley, W4UCW of Atlanta, Ga., adds this intriguing sequel:

1. When  $C_1$  is charged to 100 volts, the stored energy is 50 millijoules ( $W = \frac{1}{2}CE^2 = \frac{1}{2} \times 10 \times 10^{-6} \times 100^2 = 0.05 = 50$  millijoules)
2. "When things settle down" after  $S_2$  is closed the stored energy in  $C_1$  is 22.2 millijoules ( $W = \frac{1}{2} \times 10 \times 10^{-6} \times 66.7^2 = 0.022$ ) and that in  $C_2$  is 11.1 millijoules, making a total of 33.3 millijoules.
3. What happened to the 16.7 millijoules ( $50 - 33.3 = 16.7$ ) of missing energy?



May 1934

... Twenty-five years ago *QST* celebrated the 20th anniversary of the League. One quotation from the editorial is interesting, "Let us not be misled by those who . . . by planned misrepresentation are endeavoring to weaken our faith in our own selves."

... Then followed a sketch of two decades of technical progress in amateur radio, with five pages of fascinating pictures of representative amateur stations through the years.

... Then, by gosh, a 160-meter phone transmitter, described by WITS himself, who has the same interest in phone today that he did twenty-five years ago.

... Next, a deluxe crystal-type single signal receiver, built and described by LeRoy Moffett, W9LL.

... W1DF added an 830 amplifier to the three-stage transmitter, and housed the whole works in a wooden rack.

... W6CGR and W6FMG discussed the advantages of regeneration in the tuned r.f. stage as a means for increasing selectivity and sensitivity.

... There was a report on "the greatest DX contest ever staged," in which over 80 foreign countries participated.

... Al Jackson, W1NI, described a 500-watt transmitter "in the modern manner." It was an elaborate and advanced piece of construction. (1959 note — W1NI is still much in evidence locally, and his wife works in our circulation department!)

... W1EAO (now W1VW) brought the regenerative single signal receiver up to date with six tubes and preselection.

... Dr. Frederiek Kolster discussed high- $Q$  tank circuits for u.h.f.

... W1AL gave the technical specifications on Raytheon's new pentode screen-grid transmitting tube — the RK-20.

## Strays

A floundering physics student defined a decibel as the number of marbles that would have to be dropped from the top of the Taj Mahal in order to equal the sound of a stampeding hippo.

K6GEEF, operating on 15 meters, called CQ and signed with phonetics as K6 George Easy Fox. An irate neighbor, experiencing TVI, looked up George E. Fox in the telephone book and raised Cain with *him!*

The Radio Club of Scott High School, Toledo, Ohio, would appreciate any gear which anyone might care to donate to the club. — K8HWB.

While W7ROM was living in North Carolina (he's now KP4AMU) he obtained his W7 call letters on a North Carolina auto license tag.

PA0VO, writing on behalf of the Netherlands IARU society, reports that they are contemplating republishing their booklet on awards, and would like everyone who issues awards and certificates to send him particulars. Address PA0VO, Aalsterweg 277, Eindhoven, The Netherlands.



# Hints and Kinks

For the Experimenter



## LIGHTNING PROTECTION FOR VERTICALS

THE sketch in Fig. 1 shows a vertical antenna mounted above and in line with a ground pipe, thus giving spark-gap protection during electrical storms. The top vertical portion of the antenna is supported by stand-off brackets and held to these brackets by U-bolts. A piece of rubber hose or other insulating material is placed around the antenna where the brackets and U-bolts connect.

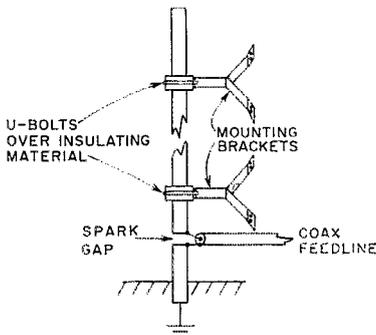


Fig. 1—Sketch showing the vertical antenna with lightning protection.

The spark gap should be set as close as possible, but not so close that it will break down with voltages encountered from the transmitter.

— Luke McCloud, K2DDM

## R.F. ISOLATOR FOR D.C. METERS

OCCASIONALLY, fellow amateurs have come to me with d.c. meters that were in need of repair. It appeared that many of these meters were damaged by large overdoses of r.f. The owners reported that the readings weren't always consistent even when the meters were working. The reason for this inconsistency was probably the same — r.f. getting into the instrument.

The device shown in Fig. 2 will enable the user to measure safely d.c. voltages in circuits where r.f. voltages are present. It will also minimize the loading effect on the circuit by the meter.

The isolator consists of a series isolating resistance built into a probe and bypassed for r.f. When the probe is used with a sensitive d.c. current meter the series resistance can be calculated by using the following formula:

$$\text{Resistance (megohms)} = \frac{\text{full scale voltage desired}}{\text{full scale current value of the meter (in } \mu\text{a.)}}$$

Use two or three resistors in series to make up the total resistance; this will provide a longer r.f.

leakage path. For good r.f. isolation, ranges which require a series resistance of less than one megohm should be avoided. If a v.o.m. is used, it is easier to choose a scale that is already cali-

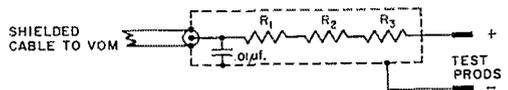


Fig. 2—Diagram of the r.f. isolator. Resistors  $R_1$ ,  $R_2$  and  $R_3$  should total the value found by the formula in the text

brated so that the voltage may be read directly from the old scale. I use the 0- to 60- $\mu$ a. range on my v.o.m. so that a 2-megohm resistor gives a 0- to 120-volt d.c. range.

— Stuart E. Bonney, W8JUV

## INCREASING VIBRATOR LIFE IN THE ELMAC POWER SUPPLY

USERS of the Elmac M-1470 power supply may have noticed excessive sparking in the vibrator. This may be eliminated with a resulting increase in vibrator life by simply changing the buffer capacitors  $C_{16}$  and  $C_{18}$  from their original value of 0.1  $\mu$ f. to 0.5  $\mu$ f. These capacitors should have a 600-volt rating.

— Harry Stewart, W8PSV

## NOVEL REGULATOR

REGULATOR tubes can't be paralleled directly to obtain greater current capacity because one tube will always ionize at a slightly lower voltage, thus preventing the other tube from firing.

The diagram in Fig. 3 shows how parallel operation of VR75s may be used without the usual equalizing resistors in series with each tube.

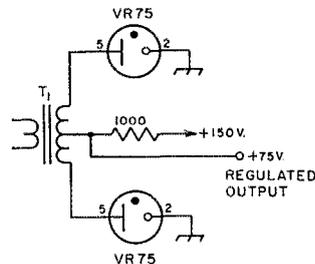


Fig. 3—W0DYW's voltage regulator.

The transformer  $T_1$  can be any universal output transformer having a center-tapped primary. The secondary winding is not used. The d.c. resistance of the transformer winding is sufficient to accommodate the slight difference in operating potential of the two VR tubes.

— W. E. Witte, W0DYW

### HEADPHONE ADAPTOR FOR CONTEST OPERATING

HERE'S a gimmick that is useful during contest operating, especially on Field Day. The circuit is shown in Fig. 4. It allows two sets of headphones to be operated from one receiver; each channel has its own volume control.

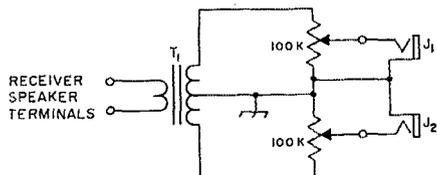


Fig. 4—Diagram of the adaptor. The transformer,  $T_1$ , is a universal output transformer.  $J_1$ ,  $J_2$  are phone jacks.

The transformer can be a universal output transformer. The voice coil winding is connected to the low-impedance output terminals of the receiver and the phones are on the push-pull winding side. The potentiometers allow for level adjustment to suit the operator/logger. Value of the pots is not critical; the ones shown just happened to be in our junk box!

The unit can be wired into a small minibox for easy transportation to the Field-Day site.

— Jack Cox, W0KMY

### CARRIER INJECTOR FOR PHASING TYPE S.S.B. EXCITER

WHEN using an s.s.b. phasing exciter it is sometimes desirable to inject some carrier without upsetting the carrier balance potentiometers in the balanced modulator. The diagram in Fig. 5 shows how this can be accomplished with a minimum of parts.

When the slider of potentiometer  $R_1$  is at the ground end, there will be no carrier injection. However, when the arm is advanced toward the B-plus end, the circuit will become unbalanced

### BALANCED MODULATOR

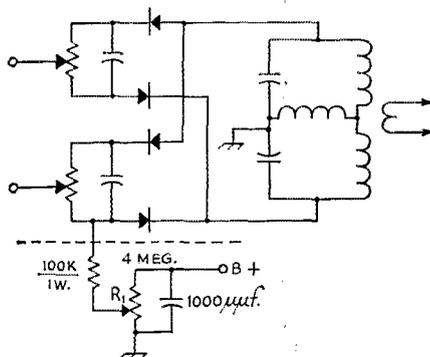


Fig. 5—Diagram of the carrier injector.

due to positive voltage applied.

Since the 100,000-ohm resistor is in the circuit at all times, a slight carrier unbalance will occur, but this can be overcome by a slight readjustment of the carrier balance potentiometers.

— W. Lane Trifts, K6JIV

### REMOTE F.M. MODULATOR FOR V.F.O.'s

THE circuit in Fig. 6 shows a six-meter remote tuned f.m. modulator and v.f.o. that makes use of the junction capacitance of a silicon semiconductor diode.

The v.f.o. consists of a standard 8 Mc. Clapp oscillator with the diode ( $CR_1$ ) connected in the tuned circuit. The 12AX7 modulator is connected to the v.f.o. through a length of shielded wire.

When audio is applied across the diode, the junction capacitance varies and changes the frequency of the oscillator at an audio rate, producing frequency modulation. Deviation of the system is controlled by the gain of the modulator.

— Leonard Kudravy, K3ASU

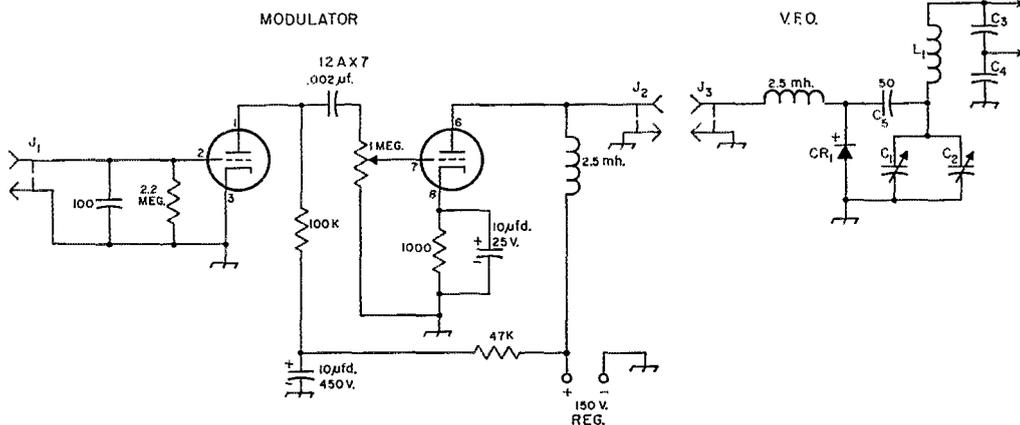


Fig. 6—Circuit of the f.m. modulator. Unless otherwise indicated, capacitances are in  $\mu\text{mf}$ , resistances are in ohms, resistors are  $\frac{1}{2}$  watt.  $L_1$ ,  $C_1$ ,  $C_2$ ,  $C_3$  and  $C_4$  determine the frequency of oscillation of the Clapp oscillator.

- $C_1$ —15  $\mu\text{mf}$ . variable.
- $C_2$ —75  $\mu\text{mf}$ . variable.
- $C_5$ —50- $\mu\text{mf}$ . silver mica.

- $CR_1$ —Westinghouse 1N1169 diode.
- $J_1$ —Microphone jack.
- $J_2$ ,  $J_3$ —Phono connectors.

## FIELD-DAY ANTENNA MAST

SINCE not all Field-Day sites come equipped with trees of adequate height and spacing for antenna supports, here is a design for a light-weight, portable and easy-to-erect 40-foot antenna mast. The drawing in Fig. 7 gives most of the details. The carefully selected lumber should be free from knots and as straight as possible. The mast sections should be painted and then marked at the joints for identification when assembling. Guy wires are looped around the mast so that they can be removed easily and coiled for reuse. A four- or five-foot length of rope at the end of each guy wire facilitates fastening and adjustment.

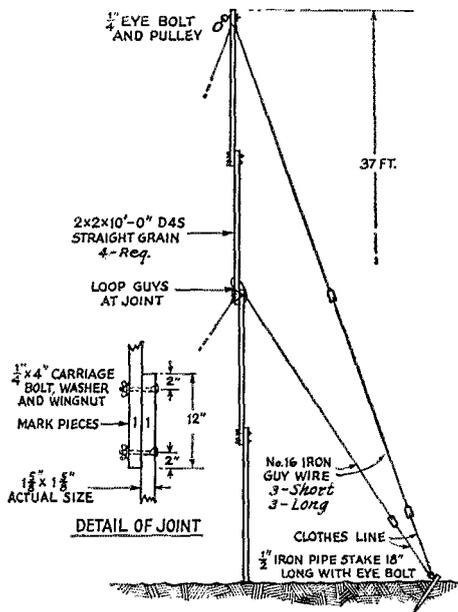


Fig. 7—Details of the Field-Day mast.

The mast sections should be bolted together and guys attached before erection is started. When raising the mast, two helpers on the side guys should steady the pole while another holds the back guy. When the mast is in position, the stakes should be placed at equal angles about twelve feet away from the base.

Two masts, when disassembled, can easily be carried on top of a car since they weigh less than thirty pounds apiece.

— L. A. Cundall, W2QY

## CAR BATTERY REMINDERS

ALWAYS keep battery terminals clean and tight since corrosion reduces the charging current supplied to the battery by the charging system.

Periodically check system voltage with a voltmeter to make sure the generator is developing sufficient voltage. Look for excessive voltage drops caused by loose or high-resistance cables.

Check specific gravity with a hydrometer once

a month and recharge the battery if necessary. Add distilled water to the battery as required.

Check regulator setting after regulator has come up to operating temperature. Too high a setting of the voltage regulator is damaging to the radio, light bulbs, and ignition contacts. Too low a setting will allow the battery to become discharged.

## SIMPLIFYING CARRIER NULL ADJUSTMENTS

I WAS not completely satisfied with the carrier null control on my Central Electronics 20A s.s.b. exciter, since it was rather difficult to adjust.

To obtain greater over-all resolution, I replaced the 1000-ohm carrier null potentiometers with 250-ohm linear potentiometers. I compensated the loss in resistance by adding sufficient resistance to the potentiometers. The resistance values added were obtained by measuring the resistance of the original potentiometers from the slider to each outside terminal (with carrier nulled) and then subtracting 125 ohms (half the resistance of the new potentiometer). I then used the nearest standard value resistor. In my case, this was two 390-ohm resistors on one potentiometer and a 470-ohm and 270-ohm resistor on the other.

This modification resulted in four times the resolution as compared with the original circuit. By using 100-ohm potentiometers, still greater "spread" should be possible.

— Joe Humphreus, K6DXW

## SQUELCH FOR HALLICRAFTERS SX-99

THE Hint & Kink in *QST*, December 1958, titled "Squelch Circuit for Hallcrafters S-85," will also apply to the SX-99 receiver. These receivers are quite similar in their circuitry, so I built the squelch exactly as described in *QST* and it worked perfectly with my SX-99.

For those interested, the price of all the parts for the squelch came to \$4.21.

— Donald N. Shrader, K3CCC

## ADAPTOR FOR FT-243 CRYSTALS

THE popular FT-243-type crystal can be made to fit the 1/8-inch large-pin crystal sockets (such as those used in the ARC-5, SCR-522, or TDZ) by using the pins from an old tube base. Take any old tube that has the large-type pins, break off its base and remove two pins. Open the seam on these pins with a sharp screw driver or knife and slide them over the pins of the FT-243 crystal. Now the crystal with its new pins will fit the large wide-spaced socket.

— Francis LeBaron, W1TQZ

## REMOVING PAINT FROM PANELS

ACETONE is useful in removing paint from a panel and chassis when a tight metal-to-metal r.f. seal is needed. Use only enough acetone to remove the paint in the desired area. Several applications of small "doses" on the selected

area seem to work better than a single soaking on the entire panel.

Acetone is flammable so safety precautions should be observed during the entire cleaning process. Also, avoid breathing the fumes from the acetone and do the cleaning in a well-ventilated area.

— Nelson Bigelow, jr., W5HQL

### STABLE OSCILLATOR

HERE is a circuit which will be of interest to those who are experimenting with stable oscillators. The diagram in Fig. 8 shows the oscillator. The tuned circuit  $L_1C_1$  determines the frequency of oscillation. Capacitor  $C_2$  is a 50- $\mu\text{f}$ . variable and is fairly critical in adjustment when the oscillator is first tuned. However, once set, it doesn't require readjustment throughout the tuning range of the oscillator — in my oscillator this was 3.8 to 6 Mc.

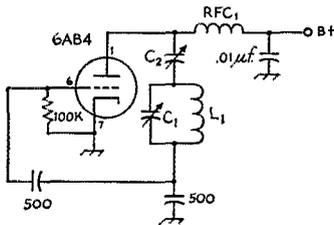


Fig. 8—Circuit of the oscillator. Unless otherwise indicated, capacitances are in  $\mu\text{f}$ . The tuned circuit  $L_1C_1$  is tuned to the operating frequency.

$C_2$ —50- $\mu\text{f}$ . variable capacitor.  
RFC<sub>1</sub>—2.5-mh. choke.

I plan to add another triode as a cathode follower and to use the oscillator as a v.f.o. There are several points in the circuit from which the output can be taken but the best will have to be found experimentally.

— Clarke Redfield, K2DIG

### RELAY POWER SAVER

MOST relays require only about  $\frac{1}{2}$  to  $\frac{1}{3}$  the initial closing current to hold them in the closed position. This fact can be used to reduce the size of the relay power supply.

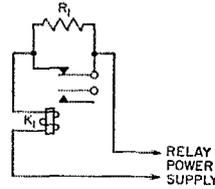


Fig. 9—Circuit of the relay power saver.

The circuit in Fig. 9 shows a current limiting resistor  $R_1$  across a set of normally-closed contacts on relay  $K_1$ . These contacts are adjusted to open when the armature is near the end of its travel. When these contacts open,  $R_1$  is placed in series with the relay coil winding thus reducing the coil current to a lower value.

The resistance of  $R_1$  can be calculated by using Ohm's Law.

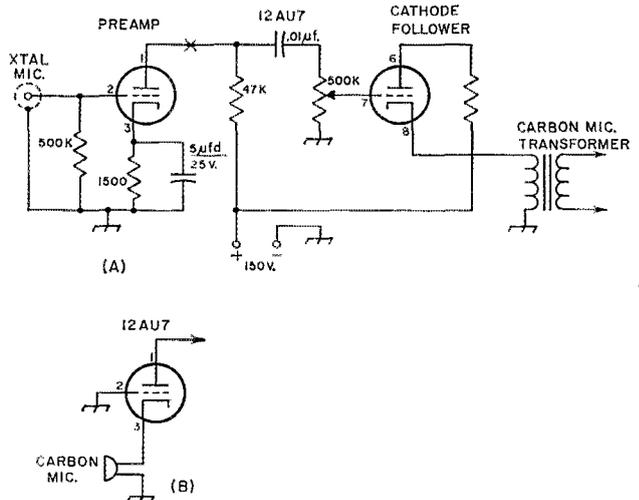
— D. C. Mead, K2ZZF

### MICROPHONE CIRCUITS

THE speech quality of a transmitter that uses a carbon microphone can be improved by substituting a crystal microphone. The diagram shown in Fig. 10A shows a 12AU7 crystal microphone preamplifier and cathode follower which feeds into the low-impedance winding of a carbon microphone transformer. Fig. 10B shows an alternate preamplifier circuit which will provide more gain for a carbon mike. Here, the tube is connected as a grounded-grid amplifier. The carbon microphone receives its operating voltages from the 12AU7's cathode current. If this circuit is used, it should be substituted for the part to the left of point "X" in Fig. 10A.

— H. J. Hoechstetter, W6UVM

Fig. 10—Microphone circuits. All resistors are  $\frac{1}{2}$  watt. The cathode follower plate load resistor is 47,000 ohms.





For posting 235,790 points and 1296 contacts, W4KFC (left) receives 21½-inch trophy from President W3EIS at recent Potomac Valley Radio Club meeting. W3EIS made the presentation on behalf of W3GJY, who donated this Raymond R. Rosenberg (W3NCJ) Memorial Award to the top scorer in the 25th Sweepstakes.

Three guesses who the top Four was! Cutting loose with 1296 QSOs and a blazing 235,790 pointer, W4KFC landed (1) the Virginia award, (2) the PVRCclub award, (3) plaudits for top tally among the 1677 code entrants, (4) the W3NCJ Memorial Award donated by W3GJY. Vic was two QSOs and 500 points shy of W2IOP's 1298-236,246 killing in 1957, both of Larry's records thus continuing in force. Elsewhere in Four-land, Tennessee's K4LPW claims he's not getting any younger (who is?) but with 214,529 points worth fifth nationally, Mel scarcely seems doddering. K4HXP and W4BWZ rode roughshod over the Carolinas and W4WKQ, albeit slowed by queries from people who don't realize most of West Florida is on CST, won anyway. See East Florida and Georgia for nip and tuck skirmishes where, as always, the fellow who kept the most accurate dupe check, who waited to copy receipts for information sent, and who submitted the least illegible log, emerged with sheepskin to grace his walls.

K5DGI nosed out W5YDC in Louisiana last time but the tables were turned in 1958, YDC whomping up 191,625 on 14 Mc. alone, the highest one-bander of all time. Other Five-land highlights: W5FPI's powerful little 30-watter grabbed Mississippi and New Mexico's W5CK became one of two Stateside two-letter men earning a certificate. That K5LZO who triumphed in South Texas was none other than ex-KN5LZO, whose 1957 score of 37K still stands as best Novice work.

California has the Top o' the Mark, sunshine, more hams and ARRL Sections than any state, and movie stars. It also has a healthy share of contest stars, one being Sac Valley's young K6SXA. As a KN, Jim started off with the country's top score in the 1957 Novice Roundup, moved up to lead the Sixes in this SS. W6TT, a fan since the Thirties, took East Bay again though K6QHC pushed hard, while W6MVQ lost a toughie to W6UTV in S.C.V. Down south K6VTQ's 162,768 paced 62 L.A. entries and W6ZVQ fared famously in San Diego. Penned K6VTQ: "Please try to impress on the gang that QSZ is seldom necessary and only slows things down. Repeat *only* if requested."

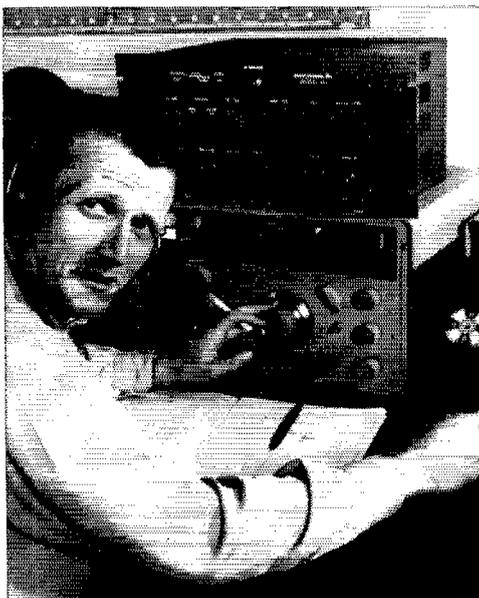
Hearing a Seven, any Sweepstaker with ears

K6VTQ took Los Angeles entrants over the hurdles with 162,768 points and 921 contacts. President of Hughes Amateur Radio Club and ex-W2UZS, Ed favors DX, contests, experimentation and ss.b.



wide open for multipliers does a fast double take and cranks up the r.f. gain for a closer listen. The top W7 with 188,683, Las Vegas' W7KEV rolled his fifth straight "natural" in Nevada (maybe Baby needs a new pair of shoes) while neophytes W7YGN and W7YKT dominated Washington and Oregon. Wrote W7RGL: "A 410-watt rig, I've found, is about as handy during an SS as telescopic sights on a muzzle-loader! I'm also convinced that a traveler wandering through East Mass. couldn't go more than 17 feet in any direction before becoming snubbed up tight by assorted ham antennas. I'd have given my left arm (I'm left-handed) for a Maine come Sunday evening."

Like a highballing freight train, Ohio's W8LQA steamed over Eight-land with 198K. Meanwhile W8DUS's KW-1 was outdoing 50 Wolverines by



kicking the gong to 111,399. And you could cry yourself a river over the grumblings at missing W. Va., except that W8s DIE FNI TDG and nine more were dishing out the section all over the place.

In W9. K9, W9RQM sprinted to a thirteenth consecutive Wisconsin victory by outmaneuvering K9CAN 198 to 187 kilopoints. Indiana belonged to W9YSX hands down and, believe it or not, somebody besides W9YFV and W9ERU finally captured Illinois.

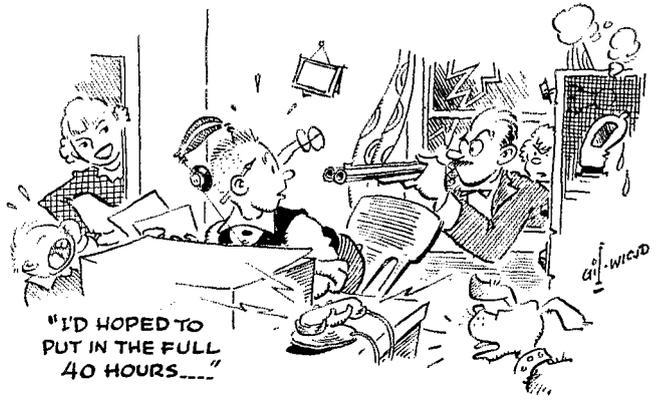
W9YCR, as sharp an op as there is in the busi-

ness, clobbered Minnesota and the other Zeros with 209,328 points and 1153 QSOs, and ARRL Dakota Director W0PHR, coursing through 37 time-on-air hours at his habitual lightning pace, conquered South Dakota again. Out in Colorado W0CDP, testing a combination log-duplicate card-index system developed by W4KVV, found it a highly successful dupe-reducer. After defeating 35 Iowans, W0VXO weeped, "I've heard some hard luck stories but think mine takes the cake. During the contest I replaced the receiver rectifier tube and three 6146s in the transmitter.

### C. W. WINNERS, 25TH A.R.R.L. SWEEPSTAKES

Section	Call	Score	Transmitting Equipment	Receiving Equipment	Bands Used
E. Penna.	W3JNQ	221,555	Ranger-813	75A4	80, 40, 20, 15
Md.-Del.-D. C.	W3EIS	217,266	Ranger-813	51J	80, 40, 20, 15, 10
S. N. J.	W2HDW	157,413	DX100	HQ140X, Heath Q mult.	80, 40, 20, 15
W. N. Y.	W2SSC	185,603	Viking II	75A3	80, 40, 20, 15, 10
W. Penna.	W3ZTQ	142,355	DX100	SX100	80, 40, 20, 15, 10
Illinois	W0TRH	177,210	Viking II	SX101	80, 40, 20, 15
Indiana	W9YX	146,183	32V3	75A4	80, 40, 20, 15, 10
Wisconsin	W9RQM	198,450	VFO-807-813	HRO50T	80, 40, 20, 15, 10
No. Dakota	K0CNC	106,760	Heath VFO-6AG7-6146-837s	HQ100, QF1	80, 40, 20, 15, 10
So. Dakota	W0PHR	193,550	Pacemaker-814	NC183D	80, 40, 20, 15, 10
Minnesota	W0YCR	209,328	VFO-dblrs-807s (5 separate finals)	Super 170	80, 40, 20, 15, 10
Arkansas	K5LNN	82,500	Ranger	RAME 4350	20, 15
Louisiana	W5YDC	191,625	VFO-811As	NC183	20
Mississippi	W5FPI	134,959	TB550	S76	80, 40, 20, 15
Tennessee	K4LPW	214,529	HT32	SX101	80, 40, 20, 15
Kentucky	K4GEZ	174,653	Ranger; Valiant	75A4	80, 40, 20, 15
Michigan	W8DUS	111,399	KW1	75A4	80, 40, 20, 15, 10
Ohio	W8LQA	198,378	VFO-807-813	HQ129X, Q mult.	80, 40, 20, 15, 10
E. N. Y.	W2VCB	111,873	Ranger-4-125A	NC183	80, 40, 20, 15, 10
N. Y. C.-L. I.	W2AYJ	166,140	DX100	NC300	80, 40, 20, 15, 10
N. N. J.	W2DMJ	184,500	Subracer-75T; Collins VFO	HRO50	80, 40, 20, 15, 10
Iowa	W0VXO	191,430	DX100	HQ129X	80, 40, 20, 15, 10
Kansas	K0BJR	143,464	Ranger	HQ170	40, 20, 15, 10
Missouri	W0TDR	142,898	DX100	75A2	40, 20, 15
Nebraska	W0NYU	131,488	Valiant	75A4, SX25	80, 40, 20, 15, 10
Connecticut	W1FEA	180,000	VFO-exciter-6146-7094	SX101	80, 40, 20, 15, 10
Maine	W1DEO	71,175	Millen VFO-exciter-813	75A3	20
E. Mass.	K1CQO	149,455	Viking VFO-Viking II	75A1 (mech. filter)	80, 40, 20, 15, 10
W. Mass.	W1JYH	181,813	VFO-4-250A	Homebuilt	80, 40, 20, 15
N. H.	W1HKA	80,500	VFI-AT1	RME99	80, 40, 20, 10
R. I.	W1CJH	126,913	VFO-807s	75A1, Q5er	80, 40, 20, 15, 10
Vermont	W1QMM	91,170	VFO-6AG7-6DQ6-813	Homebuilt (triple conv.)	40, 20, 15
Alaska	KL7CRE	55,725	Ranger	Super Pro	40, 20, 15, 10
Idaho	W7WMO	51,699	DX35	NC45	40, 20, 15
Montana	W7HAH	116,424	Valiant	HQ140X	80, 40, 20, 15, 10
Oregon	W7YKT	142,375	Navigator-1625s	HQ129X	80, 40, 20, 15, 10
Washington	W7YGN	167,353	DX100	NC300	80, 40, 20, 15, 10
Hawaii	KH6LJ	104,609	HT32-4-250As	75A4	10, 20, 15, 10
Nevada	W7KEV	188,683	VFO-807-4-65A	HQ129X	10, 20, 15, 10
Santa Clara V.	W6UTV	156,768	VFO-4X150B	75A4	80, 40, 20, 15
East Bay	W6TPT	167,760	32V3	75A4	40, 20, 15, 10
San Francisco	K60PI	126,000	HT32	SX100	80, 40, 20, 15, 10
Sacramento V.	K6SXA	193,633	Ranger	NC300	80, 40, 20, 15, 10
San Joaquin V.	W6VPV	69,513	10B-4X150As	75A3	40, 20
No. Carolina	K4HXF	138,361	HT32	75A4	80, 40, 20, 15
So. Carolina	W4BWC	75,863	VFO-6AG7-6BQ6	SX71	80, 40, 20, 15, 10
Virginia	W4KFC	235,790	VFO-807-4E27	75A2	80, 40, 20, 15, 10
West Virginia	W8DIE	129,500	VFO-Viking II	HRO	80, 40, 20, 15, 10
Colorado	W0CDP	133,020	Valiant	NC300	80, 40, 20, 15, 10
Utah	W7BAJ	100,909	DX100 (modified)	75A4	10, 20, 15, 10
New Mexico	W5CK	135,720	DX100	RAME 4350	80, 40, 20, 15, 10
Wyoming	W7ABO	72,562	Viking II	HQ150	80, 40, 20, 15
Alabama	K4HPR	87,763	DX35	NC98	80, 40, 20, 15, 10
E. Florida	W4LJV	138,700	310B-4-250A	HRO50T1	40, 20, 15, 10
W. Florida	W4WEQ	104,190	Lysox 600-813	HQ140X	80, 40, 20, 15
Georgia	K4BAI	116,830	VFO-10GTHs	SP400X	80, 40, 20, 15
West Indies	KP4AOO	43,792	Ranger; BC610 (14 Mc.)	SX71	80, 20, 15, 10
Canal Zone	KZ5CN	98,340	Phasemaster 2A-P400 (g.g. amp.)	Collins R-390A	80, 40, 20
Los Angeles	K6VTQ	162,768	20A-4E27s	NC300	80, 40, 20, 15, 10
Arizona	K7AIH	97,020	Sig. Shifter (modified)-829	BC342 (conv. 15) HC10	40, 20, 15
San Diego	W6ZVQ	158,330	5100	75A3	40, 20, 15, 10
Santa Barbara	W6ULS	114,245	HT32-PL172	75A1	40, 20, 15, 10
No. Texas	W5MCT	153,810	VFO-Viking I	NC303	40, 20, 15, 10
Oklahoma	W5YJS	114,835	32V2	75A3	80, 40, 20, 15, 10
So. Texas	K5LZO	156,690	HT32	75A4	80, 40, 20, 15, 10
Maritime	W22RX/VO1	44,672	Pacemaker-4X250Bs	75A4	20, 15, 10
Quebec	VE2AD	49,445	VFO-6AG7-6N7-6146-813	NC125	80, 10
Ontario	VE3UOT	130,889	Pacemaker-Thunderbolt	75A1, Q5er	80, 40, 20, 15, 10
Manitoba	W3MCG/VE4	72,720	KWS1	51J4	40, 20, 15, 10
Saskatchewan	VE5VP	48,454	6AG7-6L6-807s	S76	10, 20, 15
Alberta	W7PSO/VE8	42,210	HT32	75A3	80, 40, 20, 15, 10
B. C.	VE7JO	87,675	6AC7s-6L6-813	Homebuilt (double conv.)	40, 20
Yukon	VE8JW	108,188	DX100	HRO60	20, 15, 10

Murphy's Law, which loosely defined means "If anything can possibly go wrong, it will," received initial QST mention in connection with the generator-weather-equipment troubles that normally keynote Field Day participation. It must now be conceded, however, that M.L. may strike even the comparative safety of the home shack, especially during contests. How many applications can you spot in Gil's cartoon? The law also explains why your first-born, your mother-in-law, or those friends unseen in 20 years arrive while the SS is on. Other grounings appear in Soapbox.



My E-bug was sticking and I burned up two 6AH6s and an assortment of resistors in the t.r. switch. To top it off, a neighbor chopped down my 40-foot wooden tower the eve of the second week end." Another Murphy's Law tale comes from W0ATA: "Had to race to the hospital at midnight the first Saturday to beat the stork with our first-born, and my mother-in-law came the second week end to live in our small apartment. Tell the boys who had equipment failures they were fortunate." You boys who had equipment failures were fortunate.

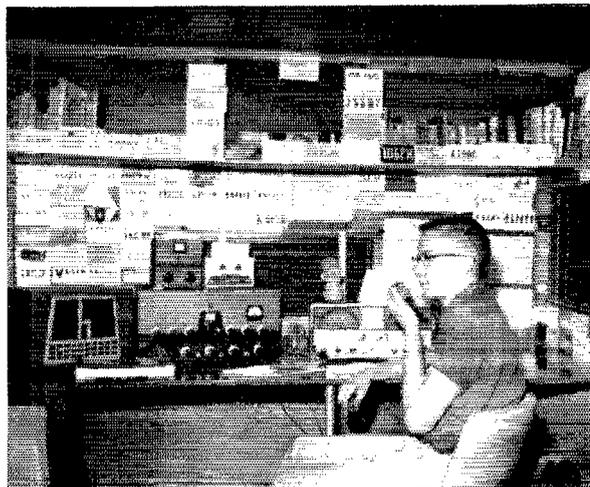
Pumping the key at University of Toronto's VE3UOT, VE2NI relied on a 750-watt Johnson rig to amass 899 QSOs and 130,889 points and lead the VE/VO bunch on both counts. VE3DSU's 115,575 and VE8JW's 108,186, latter registered in chilly Whitehorse, rounded out Canada's six-digiters. Just VE3UOT and VE7CQ qualified for the perfect multiplier of 73. Clunker calls notwithstanding, Yanks W2ZR.X, VO1, W3MCG/VE4, W7PSO, VE6 mopped up in three of the eight Dominion Sections.

In the Possessions, renowned contester KH6IJ seized Hawaii with 104,609 points, KZ5CN got 98,340, KL7CRE 55,795, KP4AOO 43,792.

Sorted by descending order of score, the code leaders line up as follows: W4KFC 235,790, W3JNQ 221,555, W3BES 220,643, W3EIS 217,266, K4LPW 214,529, W0YCR 209,328, W3GAU 204,583, W3GHM 201,028, W9RQM 198,450, W8LQA 198,378, W3ALB 196,370, W3FYS (multiop) 194,185, K6SXA 193,633, W0PHR 193,550, W5YDC 191,625, W0VXO 191,430, K5DGI 188,888, W7KEV 188,683, K9CAN 187,793, W2SSC 185,603, W2DMJ 184,500, W3KLA 184,051, W9LVR 9 183,230, W3TMZ/3 (he got married and moved) 183,060, W3AFL 182,880, W1JYH 181,843. For statistical kicks, howdja like to have *those* 26 in your club?

A record 104 sharpshooters landed the 73-section perfect multiplier: W7s BIH BOD DEO FOB JSM JYH UBC VG, W2s AYJ EMW FZY GND GSJ NOY PRE SSC VCB, K2s CPR IAD LGN OMT, W7s ALB BES BQA CPS DBX EIS

These two yearlings give early promise of becoming SS VIPs. At left is KN5PFL of Southern Texas, the contest's top Novice scorer with 31,608 points and 270 QSOs. On the right we have Indiana's KN9PDH whose 19,635-pointer ranked second among the WN/KN/WV clan.





In the Northwest, W7YGN (left) walked off with Washington while W7YKT (below) was performing identically in Oregon. The youngster's score-contact totals were respectively 167,353-933 and 142,375-861.



EQA EVW FYS GAU GHM GQF GRF GRS  
 HHK IYE JNQ KLA KT LEZ MFJ QMZ VAN  
 WG WJD WSE WV, K3s CBQ CIO CYA GUR.  
 W4s CVI GF JAT KFC LVV PRO RPZ RQR  
 ZM, K4s GEZ LPW, W5s DRW FPI YDC, K5s  
 DGI JZY, W6s HOC JVA ULS UTV, K6s GS  
 SXA, W7s PQE YGN, W8s DQG LQA RSW  
 SDJ TJQ ZJM, W9s DYQ FDX GFF GRF  
 KLD KXK KZZ LNQ LVR/9 PZT YSX ZAB  
 ZRG, K9s CAN ELT, W0s CXN FZO TDR  
 YCR, VE8s 3UOT 7CQ, KH6LJ.

Here are the 24 Novice winners: KN3DJN  
 KN2JXF KN9OUU KN9PDH KN9LWV  
 KN0OLM KN0QMU KN5RFL KN5OPM  
 KN4UUH KN8KNT KN2QBD KN2POB  
 WV2BDV KN0PVJ KN1HTV KN1GTW  
 KN7CEO KN6ROU KN4SSM KN5OWH  
 KN4ZRU KN6TUN KN5PFL.

### Soapbox

"It was interesting to see what could be done when the rig held together for a change. Put on the wrong antenna sometimes but this made no difference to KH6LJ and others as conditions were sizzling hot. Didn't beat the bushes for KP4AIO on 14 Mc. and paid for it. One Idaho in 8 SS's.

Next year I'm going to have an antenna that will singe the trees here!" — W1RAN.

"Hope I did better than in '57 when I was 1346th nationally, hi. Happy to hook W0BLZ and W3GAU for my 47th and 48th states." — K9HCP.

"My log represents ten hours and two minutes of the most fun I've had since becoming a ham in January, 1958. It also represents one tired list (a straight key is no match for a bug no matter how fast you can send), one tired finger (the log had to be typed), two ringing ears and one splitting head (I've just gotta get a looser-fitting pair of earphones).

Thanks for sponsoring this worthwhile activity which builds such high-ranking proficiency." — K2KUA. . . "500 QSOs and no Maine! My head hangs in shame. Sob." — W1MTX. . . "Why must those long lost friends call on a guy just on those two week ends?" — K0PML. . . "Been punching at the SS since '32 when I won in E. Pa. One of these days I'll crack the 1000 mark and retire." — W3ARK. . . "My mother showed unprecedented interest in ham radio by asking, 'When's this thing over?'" —

W6UQC. . . "This rat race gets better and better but even with Operating Aid Six I goofed on a few. WOE is me!" — W2W0E.

"I jumped to 82,500 points over my '57 Novice score of 426, but filling out the log was a most unpleasant task. I made 22,500 above my goal and in '59 I'll try for more. Thanks for making this wonderful contest possible." — K5LNV. . . "Last time I had 91,433 points, recopied the station log into smooth form in many evenings of longhand, then forgot to mail it! That explains the carbon copies." — W3TJQ. . . "What a contest! After several phone tries this is my first c.w. entry and by far the best of them all. How else can you land WAS and 69 sections in four days of one-band operation? Twenty meters was really fantastic. Hats off to the ARRL Staff for making this marvelous event possible!" — K2BWR. . . "Last one for a while due to college. I squeezed about everything out of the 162s but not enough to equal the all-band boys. Conclusion: It can't be done on 80 and 40 alone." — W8FNI. . . "Really had a ball working every state except Vermont. With 30 watts, ten and 20 came through with the western sections to improve my '57 score by 233 per cent." — K2UZZ. . . "To keep an accurate account, I used a spare electric clock plugged in only when actually operating. I've never before heard of this method. Is it old stuff?" — W9FDX. . . "I had hoped to work all 73 and score 100,000 and, this accomplished, I am retiring (until next year). The Frankford Radio Club issues a certificate for working 25 of its members. Checking my log for the few needed to qualify, much to my surprise I found a total of 27 of them contacted on c.w. I think Frankford should be commended for being such an active organization of top-notchers." — W3BQ4.

"Thought I'd dabble around and perhaps pick up the few remaining states but soon I was completely engrossed in the spirit of the thing. The operating tactics on 14 Mc. were swell. "Though a ham since '38 and a commercial air-line of five years, I learned many new tricks. A wonderful experience." — W5HHE. . . "QRP disappointing on 20 but 40 was fabulous. Never again without perfect one-switch control." — K6BEP. . . "Where was New Hampshire? More than doubled the '57 score due to more time and sections and better operating position but noted little QSOs-per-hour improvement. The Tattoo (a break-in system, August 1956 QNT) functioned FB. Now if I can just double my score in '59 and again the year following!" — K9DHW. . . "I found out right quick that the SS is no place for an SW-3." — K0DCF. . . "Starting a 700-calorie diet two days before does not make one sharper. H.v. arc in nearby TV set killed my communications receiver good." — W0VNR. . . "Really enjoyable although quite a change from my Alaska operations. Surprised at the performance of the 25-watt portable rig in picking up 37 states toward WAS at the new location." — W4AMP

(*ex-KL7BPK*). . . "Didn't break any records or come close to the leaders but got some real operating pleasure. Expect to enjoy many more of these annual band-scramblers." — *W2OWX*. . . "Spent as much time filling out the sheets as operating. Would like a robot logger for the next one." — *K4MUP*. . . "Not much homework got done but it was the best SS in my three years of experience. Sigs clean and operators excellent." — *K2QIX*.

"Since '54 as *WNØTDR* I have participated in each SS. Working all 73 this time has given me a thrill I'll never forget. *QST* back issues reveal this has never before been done from Missouri so don't blame me if I throw out my chest a little. The first week end was devoted to trying for the harder sections on 15 and 20; the second, with six states and West Indies lacking, mainly to 40 where more QSOs could be made. When *W3IHK* told me about *KV4AA* I immediately shifted to 14 Mc. to land the 73rd. Eureka! A suggestion: With scores increasing tremendously each year, one week end should be ample. Surely more ops would participate except that they cannot arrange for both periods. I really believe it would improve competition among the top c.w. men." — *K2LZW*. [In '48 *ARRL* announced an SS so patterned but did a fast reversal after cries that: (1) score-contact-club totals would no longer be comparable; (2) year-to-year improvement wouldn't be measurable; (3) an ionospheric disturbance might wreck the SS for everyone; (4) chances of grabbing all sections, a popular side project, would be decreased, as would the newcomer's WAS opportunities; (5) no one need kill himself with a maximum 40 of

with v.f.o. and a 21-Mc. wire with s.w.r. better than 27:1. Now back to the relatively quiet life of chasing DX on 40 c.w." — *K2UBW*. . . "There should be few complaints about North Dakota activity with *W0EOZ* making over 500 QSOs, *K9CVC* 200, *W9NL/Ø* 'DXpeditioning' here, and my greatest effort so far. Happily, Murphy's Law was not in effect. My beautiful 50-foot pole did not collapse until the day after the SS in an ice windstorm. Operating seemed better but there is still much time-consuming, unnecessary repetition." — *K0CNC*. . . "Would have broken 100,000 but had to QRT the final night to study for calculus exam. These contests are rough on engineering students." — *W4HBK* (*W4JLW* op).

"When November *QST* arrived I immediately ordered a v.f.o. sent special delivery (bless the Heath Company for fast service!) and finished adjusting it minutes before. Still haven't put all the screws in the thing. Took an hour off for church where they had trouble with a clanging pipe organ. Could have sworn it went 'dahdidahdit dahdahdidah dididit dididit' during the sermon." — *W2SYV/2*. . . "Even with many difficulties, including equipment malfunctions and hooking *K7AXO* on his CQ DX for my 73rd, I still find the SS one of the most stimulating and challenging of the many *ARRL* activities." — *W3WJD*. . . "Heard several stations giving numbers around 1000 early Sunday p.m. so there should be some whopping, record-breaking scores. Was especially pleased to work *W7BAJ* and *W7IRM* to finish WAS and *KX6CW* for a new country. Now if they only QSL!" — *K2DXV*. . . "While everyone else was smoking and drinking coke and coffee, I went through one lb. of cookies, one lb. of mixed nuts, and ½ lb. of candy. Thanks to all those who repeated preambles while I munched noisily." — *K6RFT*. . . "Have been in nearly every one of the 25 holdings and this one seemed to be a peak for activity with operation around the clock on 14 Mc. and even 21 Mc. adding to the totals. Often before I have missed only one section but for the first time I got them all. Not the distinction it used to be, perhaps, but still very gratifying to me." — *W3LEZ*. . . "The goal was 100,000 with 50 watts and was going great until I took a short rest, forgot to set the alarm, and slept through the last five hours of the contest." — *W1K6J*.

"Since I use a kw. all year and if they don't come back the antenna has fallen down, I thought it might be more sporting to enter with my HT-18 v.f.o. which puts out 1.3 watts on 28, 14 and 7 Mc. and 1.8 watts on 21 Mc. Antennas are dipoles and 28- and 14-Mc. beams. Working with a peanut whistle calls for perseverance and an entirely different technique.

1. Look for stations just finishing an exchange and sending a fast *QRZ*. It's a waste of time calling CQ or answering a long CQer.
2. Answer the stronger stations.
3. Best results are obtained during the waning hours when the big guns are searching around for contacts.

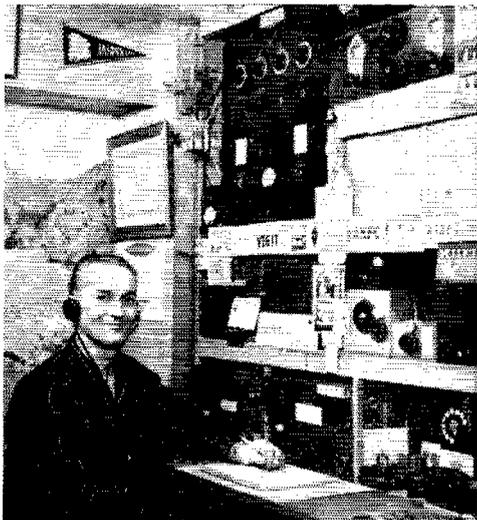


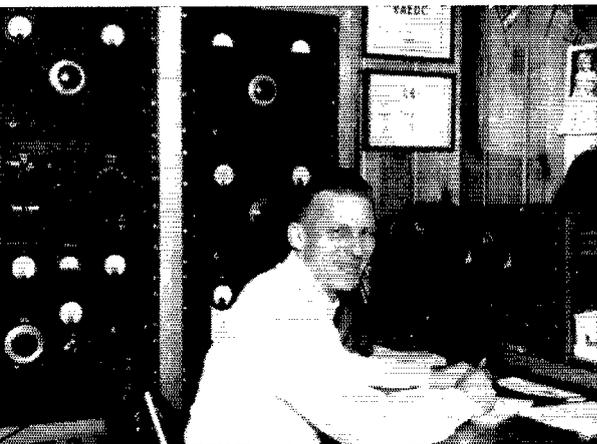
A score of 184,500 netted Northern New Jersey plaudits for *W2DMJ*. Frank has signed that call since '31, is active in *RACES* and other civil defense work, and may be heard on the bands 160 through 2, c.w., a.m., p.m. and s.s.b.

the 66 stretch usable, 26 hours remaining for sleep, chow, church, family, etc.; (6) no one has to operate 40 hours anyhow; (7) the tabulations carry a time-on-air figure enabling those unable to work full time to make their own comparisons; (8) the 'wheels,' many of whom average over 40 QSOs per hour at the start, would probably win by a larger margin in a shorter contest." — *W1ZDP*

"I seem to have survived my first SS. A poor receiver, a sick v.f.o., an ailing transmitter, stirred up with a great deal of school work doesn't mix into a cocktail befitting a decent score. Even managed to goof up my serial numbers. The summary is correct and true (though I hope). Will be improving the station and looking forward to many more SS's." — *K6SAX*. . . "Started out searching for all sections but simply couldn't resist answering all those CQs." — *K5IDZ*. . . "Everything FB except for a tube socket falling apart and a receiver bandspread failure forcing use of the 1:1 direct drive. Crystal control doesn't help a person win either. Hope to give the boys a go in the future

British Columbia went to *VE7JO* and his vertically-oriented station. Art doffs his hat to the many fine operators contacted, noting "speed with courtesy seemed much in evidence this year." How many OTs recognize that piece of gear in the upper right corner?





(During the opening two hours I almost lost faith. Beaucoup calls, no answers.)

Biggest thrill was raising KX6CW on ten meters. Had the time of my life." — *W3KDD*.

"Pushed for 100,000 but fell short because of various operating inconveniences. Need right and left foot pedal switches, a gross of right-handed pencils and a left-handed bug." — *W6PZH*. . . "The rig did a respectable job but it became obvious a t.r.-switch and more comfortable operating position were required. The old back and seat got awfully tired and the call KØKWR/Ø was a real killer. Worked 45 states and 81 sections but just couldn't find Miss., W. Va. or Vermont. Hope to double the score and take Missouri in '59." — *KØKWR/Ø*. . . "Good practice at copying through QRM but why do some Generals park in the middle of the Novice band and block the whole works? Great fun anyhow." — *KNØOLM*. . . "A delightful SS, because I finally hit 73 sections after four years of trying. For me with a measly (by Potomac Valley Radio Club standards) 666 contacts it was a maximum effort. Some day I'm going in one of these things just for the fun of it and not because a gavel is hanging on each contact." — *W4ZM*. . . "It was my first SS and I was amazed at the amount of interest. I will be back with a v.f.o., more power and a bug. Never again with a straight key!" — *K8LUS*. . . "My second try in the king of all contests. Score of 43,313 was a sharp improvement over '57's 630 points." — *K1PI*. . . "How about an extra multiplier for us high school kids who have to explain sleeping in class to the teachers?" — *K4DAS*. . . "W4KFC told me once that anyone who goes over 900 contacts in the SS is somewhat nuts. He was right." — *W1JYH*.

"My age is 11. Am I the youngest ham to get over 4000 points?" — *K2MIG*. [No. Ten-year-old KN2POB took the N. Y. C.-L. I. Novice certificate with a score of 10,050. — *W1ZDP*]. . . "Be back with General and v.f.o. to quadruple my score." — *KN3DJN*. . . "Sincerest thanks for every fun-packed minute and will return in '59 to break all existing records!" — *K2IMK*. . . "After a certain Novice had sent most of the dope I asked him for the date. He came back, 'Don't you have a calendar?'" — *W4BUU*. . . "One crystal, five watts output, a loose antenna connection and lots of QRM = 135 points. Do I qualify for the booby prize?" — *KN8MKG*. . . "I used the two-tube regen and the one-tube 25-watt 80-meter rig which I built from instructions in *How to Become a Radio Amateur* and one 3645-ke. crystal. I don't claim any outstanding record but it does show that something can be done with a very simple outfit. Novices, take note." — *K9IPS*. . . "Where was W9IOD?" — *K1CCA*. . . "Just stick around long enough and Vic (W4KFC-W1EOB-W1TYQ) tory will be yours." — *W3UE*. . . "Recommend that smokers keep a candle burning at the operating position to permit light-up and avoid nicotine fits during QSO." — *W1FGF*. . . "No big score but had fun trying and won't miss another. Some day hope to beat W8LQA." — *K8GWK*. . . "Absolutely no assistance, no spotting, no logging, no telephone help, no intercom. This vehement insistence on 'no help' stems from one poor loser's increasing suspicions

WØYCR administered a 209,328-point shellacking to Minnesota contenders, became the first Zero to transcend 200K. Bill owns five completely handswitched 150-watt finals, two 807's in each, and a very pretty fist.

that some of the brethren are not playing the game fairly. It is supposed to be a hobby." — *W3CPS*.

"This is a U. S. A.-Possessions-Canada contest. Every one of these locations can be contacted on 3.5 or 7 Mc. Why clutter up the DX bands of 14, 21, and 28 Mc. with Sweepstakes garbage? I can also well imagine what some DX stations think. No wonder you can hear them call CQ NO W. After hearing the rat race we call a contest, they think we are nuts. I'm not too sure they haven't got something there." — *W9ABI*. . . "Once a year it doesn't hurt anybody to go wacky, so please ignore the bluenoses and set up another madhouse in '59! Suggest a multiplier of 0.5 for anyone who uses a CQ SS longer than 3 × 3. These 20 × 10 calls drive us all batty. On second thought no 0.5 multiplier is needed. Long calls are an automatic score reducer." — *W8NNL*. . . "Fabulous! Had a ball. Let's have more contests. How about having the SS twice per year?" — *K2PGB*. . . "I wore right through the paint on the panel where the transmit-switch is. Never again without full break and a foot-operated v.f.o. spotter-switch." — *W3VDV*. . . "KL7, Ark., S.J.V., Wyo., Idaho, Sask. seemed scarest. Pulled VE5YJ off ten phone for number 73, then after all that effort worked VE5DZ an hour later on 14 Mc." — *W9KLD (ex-KL7CDF)*. . . "What a pile-up on VE6NXI!" — *W3UGY*. . . "I don't know why but this one just didn't appeal to me. Murphy and his law didn't even show. Think I'll stick to Field Day and CD Parties." — *K9JIN*. . . "Copying the log is a large job but necessary after the flop of the carbon-copy method last year. Too messy." — *W3GYP*.

"Never had so much fun. I made more QSOs in this SS than in my whole Novice year!" — *W2RZK*. . . "I got all shook up when I got 589 from F8MG on 40 with only ten minutes SS time lost. Too bad France isn't a section. When I have my General and v.f.o. you will see some sparks fly, hi hi, 73 and long live the SS!" — *K1HHTV*. . . "A good example of the power-vs.-multiplier argument is the result between WØWWA and myself. We both operated the limit, and with a kw. I had 155 more QSOs than he but was edged out with the multiplier afforded his DX-100. I'm not griping. In fact, it was so close I think the 1.25 multiplier is just about right." — *KØJFF*. . . "Two terrific week ends. Conditions, especially on the higher frequencies, were about as good as one could ever hope for." — *W9KZZ*. . . "This year I kicked the OMI (WISAD) off the air and had the rig to myself. The score proves he is the better op so next year he gets the rig." — *Marie, W1COL*. . . "Please place more emphasis on keeping a running check list to eliminate time lost in replying to stations already worked. Can't a penalty system be set up for such actions? Some called me four and five times. Despite my efforts, one duplicate still crawled into my list." — *WØCXN*. . . "Spent too long digging for sections to run up a big score but got all 73 for the second time in a row, this time on 14 Mc. only. Conditions were excellent and QRM terrific, especially with my ancient receiver." — *W2EMW*.

"Boy, what QRM. 'Twas wonderful. On 40 the band was solid six deep for hours on end and don't know how some guys were able to pull 'em out of the mud. As usual the most consistent sigs were W4KFC, W3TAMZ/3, W1JYH, W1EOB, W3BES, W3GHM." — *W2GP*. . . "Worked 72 sections the first period and without prearrangement got S.C. in the first eight minutes of the second leg, although I had a 9 p.m. sked just in case. No one runs up a score by looking for sections." — *W2FZY*. . . "Wonderful conditions prevailed throughout. Until late the second Sunday thought Arkansas had seceded from the Union, hi." — *W1HKA*. . . "How could I ever miss Idaho when it's so close!" — *W7LEV*. . . "It seems that any time I try this contest we have hurricanes, plumbing or power failures, dry wells, lost antennas, poor connections in the setup, etc. This one was no exception. Had a terrific blow and lost a 45-foot 1 × 4 mast and was feeding 100 watts of

W3JNQ relaxes happily after grueling battle for Eastern Pennsylvania and Frankford Radio Club certificates and second high national tally. Licensed since '41, Dick likes contests and DX, is presently E. Pa. Section Communications Manager.



## C. W. SCORES

### Twenty-Fifth Sweepstakes Contest

r.f. into the Atlantic Ocean for an hour. Was wondering why I wasn't making any contacts. Those pi-nets will load anything, even the ocean." — VE1AR. . . "Guess I will never get too old to enjoy the SS. Bought a new 11Q-170 the day before and learned to use it during the contest. Now a decent antenna and maybe the fellows will hear me better." — W9WEN. . . "Swell contest but missed the clean sweep again. Where was S.C.? How about SCMs in some of these hard ones stirring up some activity?" — W6CIS. . . "1956, 'way down in Connecticut; 1957, 12th; 1958, 4th or 5th? Worked 81 W4/K4 stations but no S.C." — WTECH.

"The way everyone kept away from us, we must have B.O. Were there any other father-son teams?" — KN8DUX and KN8DUY. . . "An orchid to W3MCG/VE4 for the Manitoba multiplier and my nomination for the worst call." — W7QLH. . . "The best yet, with good conditions and competition sharp. We should have these SS tests twice a year." — KH6HA. . . "Will return with new receiver and antenna farm for top score or bust!" — K8HLE. . . "When I snagged Idaho for my 73rd it made all the time spent on 20 and 15 worth while. Pleased with the general high level of operating but some stations had bad clicks." — W2GSJ. . . "The newcomers certainly should be commended for their fine operating. A great turnout of Novices." — W8ZAU. . . "Got Wyoming for my 48th." — K2QYL. . . "Since I couldn't be on the first week end, thought it might be interesting to try for 73 sections in 73 QSOs. It was!" — W8HOC. . . "My first contest of any kind and even though I made a poor showing, judging from some transmissions heard others did worse. I was 'forced' into it because joining was the only way to get a contact. Once in there was nothing left but to continue. Believe techniques were learned which will help with the next one. While working as a General will be fine, the competition will surely be tougher. I'm game to try anyhow." — KN8DJ. . . "Poor planning. The XYL delivered a baby boy the second week end!" — K3CBQ. . . "The 25-watt QRP made the going slow but got my 25 w.p.m. code proficiency sticker as a result." — W3HRE.

"It's over, thank goodness! My legs are frozen from the basement floor and there were too many interruptions. Three sick kids and I spent three days in bed with flu between week ends. 'Twas as rough a one as I ever went through. Never again, till the next SS!" — W9RCJ. . . "One day I will finally take W.N.Y. I am 16 and have scored 100K twice already. With secrets stolen from JNQ, IOP and others, I expect to break 7 or 8 million soon." — K2MFK. . . "Wow, what a contest! Insofar as I can tell I'm about 6th in the section and here I went and got me over 1000 QSOs. The harder you chase the Md.-Del. D.C. gang, the faster they run. Guess my only hope of winning an award is to move back to W8-land." — W3KLA (ex-W3QOL). . . "FB conditions throughout. Now let's try to pick a comparable week end for ARRL Field Day some time." — W8OFT. . . "Celebrated my 25th anniversary in ham radio during the 25th SS. My only suggestion is that some special dispensation be given us 'poor preachers' who find the contest coming at the busiest time in our week. Perhaps a special multiplier of ten or an extension including some midweek holiday or a letter to our congregations advocating off-time in November would help. Seriously, I enjoyed every hectic moment. I learned how rusty I was at message procedures and how unskilled at rapid sending, but rediscovered the fact that amateurs are among the most completely cooperative human beings alive. Congratulations to ARRL on this one of many outstanding contributions to the hobby. I hereby promise not to wait another 25 years before loosening up the fist and burning the midnight oil." — W8JUP.

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.), 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: W3JNQ 221,555-1215-73-A-39, or final score 221,555, number of stations 1215, number of sections 73, power factor of 1.25, total operating time 39 hours. . . An asterisk denotes Novice certificate winners in sections where at least 3 Novice logs were submitted. . . Multioperator stations are grouped in order of score following single-operator station listings in each section tabulation.

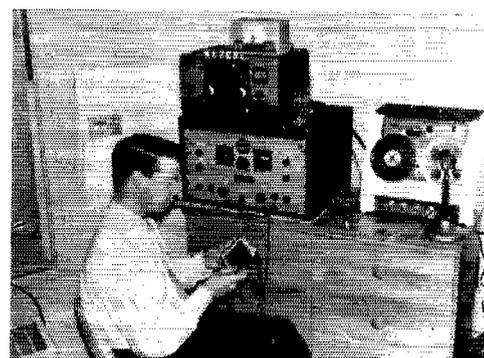
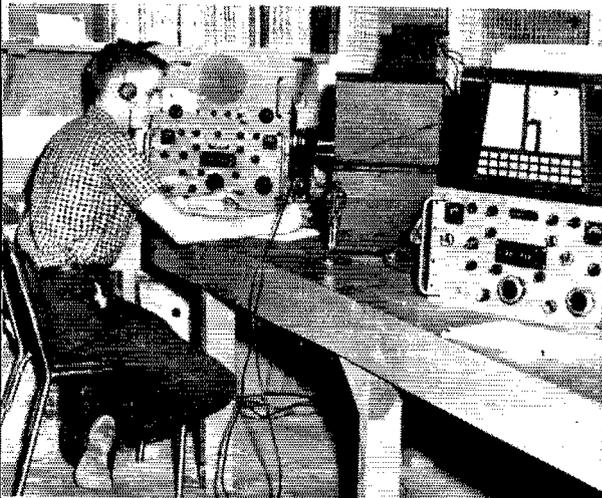
### ATLANTIC DIVISION

Eastern Pennsylvania		W3MFW	144,540-	803-72-A-34
W3JNQ	221,555-1215-73-A-39	W3LEZ	143,080-	735-73-A-31
W3BES	220,643-1215-73-A-40	W3WJD	131,856-	725-73-A-37
W3GHM	202,028-1107-73-A-38	W3KPK	131,400-	730-72-A-35
W3ALB	196,370-1078-73-A-40	W3EQA	129,210-	716-73-A-30
W3CPS	189,543-961-73-A-38	W3KT	128,115-	702-73-A-31
W3HHS	188,501-889-73-A-39	W3ARK	126,822-	920-69-14-38
W3MWC	146,970-834-71-A-40	W3WCK	124,100-	730-68-A-39
		W3YD	121,958-	707-69-A-40
		W3BQA	110,230-	604-73-A-53

Using only 14 Mc, Louisiana's W5YDC ticked off 1063 exchanges in 73 sections for 191,625 points and all-time high W5 and one-band score. Novel QSL display features SS cards sorted by ARRL Divisions and Sections.



The final tabulations of phone and club winners are now being prepared. We'll spill the beans in June QST.



Rare multipliers were dispersed by two former W's now hanging out in the Possessions. Left is KZ5CN, who was able to borrow those two snazzy Collins R-390 receivers for the contest. KL7CRE, the gentleman above, a Philco TechRep in Alaska, was snapped studying his SS QSLS. KZ5CN is ex-W0MVBH and KL7CRE ex-W8FGB.

W3GRS	110,048	608-73-A-31
W3LAN	109,624	640-89-A-31
W3AFP	108,240	641-08-A-39
W3LQO	108,275	610-71-A-34
W3BB	107,920	608-71-A-32
W3OHH	107,210	601-71-A-40
W3DQC	105,080	592-71-A-40
W3RFW	95,813	625-73-A-34
W3LXN	91,770	633-69-A-35
W3DVF	92,565	563-66-A-4
W3VDV	91,350	653-70-B-39
W3EPR	91,120	536-68-A-9
W3AID	90,800	512-71-A-24
W3HHA	89,278	533-67-A-40
W3DVC	77,089	507-61-A-28
W3KDP	75,815	514-59-A-23
W3HFF	74,800	440-68-A-34
W3GSD	74,200	530-56-A-35
W3NLI	73,048	482-61-A-30
W3GSS	71,100	452-63-A-19
K3ALD	66,000	400-66-A-32
W3RCV	65,993	419-63-A-31
W3YLL	63,550	411-62-A-36
W3DDN	63,510	348-73-A-37
W3DAO	63,350	362-70-A-32
W3DQO	60,546	351-69-A-36
K3DKC	56,695	398-58-A-35
W3CCH	55,025	310-71-A-22
W3FHR	54,960	344-64-A-40
W3WHK	53,763	391-55-A-36
W3HYX	50,320	296-68-A-31
W3NHL	46,000	412-59-A-32
W3KQV	42,840	272-63-A-21
W3ADZ	40,020	276-58-A-18
K3AFT	40,000	400-40-A-20
W3AIR	36,000	300-60-A-21
W3PAP	34,930	255-48-A-31
W3NOH	33,600	280-62-A-8
K3ALL	32,400	300-54-A-17
W3ABZ	30,600	255-48-A-24
W3BRN	28,373	291-39-A-21
W3XPX	27,545	170-65-A-25
K3CTB	26,125	209-50-A-29
W3BHP	23,870	175-56-A-24
W3ZC	23,513	172-55-A-19
W3JPW	23,288	207-45-A-20
W3RFX	20,396	167-49-A-16
W3QKX	18,730	143-44-A-16
W3MDE	14,500	145-40-A-16
W3KPK	14,385	137-42-A-20
W3HNI	14,256	200-36-B-18
K3ACD	14,065	198-29-A-11
W3JSA	14,000	200-28-A-24
W3NCW	13,395	114-47-A-20
K3BFW	11,500	112-59-A-12
W3G8Y	11,300	113-40-A-12
K3DZB	11,010	154-26-A-25
K3ATL	11,000	139-32-A-14
K3ANT	10,750	100-43-A-4
K3PHX	10,695	186-23-A-20
W3TJW	8,585	100-34-A-12
W3HFK	7,852	121-26-A-9
W3PNI	7,500	100-30-A-13
W3ZON	6,510	4-31-A-6
W3HUS/3	3,840	60-32-B-5
W3HIO	3,690	68-17-A-6
K3BKL	3,575	65-22-A-13
W3GHD	3,562	57-23-A-1
K3BPL	3,375	50-27-A-9
K3NDJ*	3,188	53-25-A-19
W3NFC	3,000	75-16-A-6
W3PCL	2,890	68-17-A-6
W3DFJ	2,550	61-20-A-8
K3AYY	2,115	46-21-A-4
K3DDPQ	2,300	40-23-A-14
W3CBK	2,126	50-17-A-10
W3FNB	2,118	47-18-A-12
W3JLL	1,890	42-18-A-6
W3QKU	1,820	55-14-A-9
K3FTX	1,140	29-16-A-6
W3DVB	1,015	37-14-A-20
KN3CNN	940	27-16-A-29
W3NCT	368	21-7-A-7
W3LWC	150	10-6-A-2
W3RNF	45	5-4-A-5
W3QMZ (K2JLXN W3QNZ)	91,798	503-73-A-31
W3IEF (W3S IIF IOK)	67,063	537-50-A-31
W3RBP (K2S LNO OSY)	36,228	230-69-A-4
KN3DUX (KN3S DUX)	2205	49-21-A-37
W3AEQ (K2S KDW KFFSCT)	2100	41-21-A-5

*Mid.-West.*

W3EIS	217,266	1192-73-A-40
W3GAU	204,583	1129-73-A-40
W3KLA	184,051	1010-73-A-39
W3TMZ/3	78	1-1-A-1
W3AEL	188,060	1017-72-A-37
K3BGL	182,880	1016-72-A-40
W3VAN	168,265	1153-73-B-39
W3MSR	166,824	1160-72-B-40
W3GRF	154,213	845-73-A-36
W3YTF	153,483	841-73-A-40
K3CGL	148,829	816-73-A-40
K3CJO	141,300	777-73-A-40
W3DRD	140,760	782-72-A-40
W3MFL	138,244	758-73-A-39
K3GUR	132,313	725-73-A-37
W3HQV	99,648	692-72-B-40
W3TIV	85,388	609-69-A-40
K3CYA	76,650	429-73-A-20
W3BKE	76,250	500-61-A-32
W3KA	75,075	455-66-A-28
W3FRZ	58,500	362-65-A-34
W3KZQ	57,600	320-72-A-31
W3HYM	56,250	375-60-A-25
W3UUE	56,000	350-64-A-33
K3CWF	50,850	339-60-A-40
W3VQ	46,538	255-73-A-21

*W8YKM/3*

W3ZAE	44,820	332-54-A-25
W3ZQ	41,088	323-64-B-40
K3B6J/3	38,360	276-70-B-21
W3MOU	31,695	258-54-A-26
W3PYZ	26,962	223-61-B-20
K3ANA	19,805	233-54-A-25
W3DCN	14,150	202-73-A-27
W3HRE	12,420	184-27-A-14
W3KDD	11,750	100-47-A-21
W8YV/3	8680	113-31-A-22
W3YAG	7000	70-10-A-8
W3HUR	5250	75-35-B-12
W3FJD	3088	65-19-A-6
KN3EST	2820	50-24-A-31
W3RNY	2750	45-25-A-6
W4WSP/3	2043	43-19-A-4
KN3DDY	520	16-13-A-4
W3NHA	18	3-3-B-6
W3MTH	3	1-1-A-1

*W3FYS (W3FYS W6H0H)*

W3WV (W3WV KP6BJ)	194,185	1065-73-A-37
W3WV	157,289	795-73-A-37
W3WSF (W3S CPB WSF)	99,280	545-73-A-36
W3GQF (9 oprs.)	99,006	548-73-A-40

W3EAX (W3S JWN YVQ YVC)	58,515	503-47-A-40
W3FOR/3 (W3S FOR GFN HXN)	20,504	175-47-A-15

*Southern New Jersey*

W2HDW	157,413	903-70-A-40
W2SHM	151,230	852-71-A-39
K2CPR	125,289	680-73-A-34
K2OMT	120,450	660-73-A-32
W2QDX	102,800	695-38-A-37
W2EXH	99,400	560-71-A-35
W2ILN	95,794	591-65-A-23
K2UFF	79,670	511-62-A-31
K2OAK	61,278	522-67-A-29
W2DAJ	59,264	463-64-B-39
W2RDB	54,450	330-66-A-27
W2BUT	49,500	300-66-A-22
K2BWR	40,279	234-69-A-37
K2ORA	37,375	300-50-A-24
K2MIO	33,550	221-60-A-16
W2FXN	27,560	210-53-A-6
W2RRE	24,668	215-48-A-23
W2APD	24,150	210-46-A-25
K2KML	23,108	187-50-A-24
K2HGG	18,185	142-51-A-12
W2BIV	16,760	170-30-A-21
K2MPV	12,505	122-41-A-6
K2KJF	12,480	104-48-A-9
K2HGF	12,355	183-28-A-30
W2MPO	10,936	142-31-A-27
W2BIV	10,200	114-36-A-16
K2PGB	9,025	80-30-A-12
K2BZK/2	7800	50-30-A-12
W2UAP	4995	111-18-A-22
K2AMA	2875	50-23-A-13
K2VQH	1620	36-18-A-11
W2PAB	1390	28-16-A-5
W2PAZ	1080	27-16-A-3
K2SJA	1018	7-11-A-6
K2UTA	1008	31-13-A-1
W2ISZ	220	12-8-A-2
W2PAU (W2S USN PAT)	135,588	783-70-A-39

*Western New York*

W2NSC	188,603	1017-73-A-34
K2MVK	131,920	782-68-A-30
W2FXA	127,620	712-62-A-29
W2FEB	124,373	721-69-A-29
K2MWM	112,880	710-64-A-39
W2G8J	112,146	617-73-A-40
K2EVP	108,985	615-71-A-9
W2WOF	103,106	636-65-A-35
K2VCF	75,378	511-60-A-32
K2UNR	73,125	866-52-A-8
W2FMW	70,810	388-73-A-81
W2MTA	64,945	419-62-A-23
K2OZJ	62,993	365-69-A-33
K2VCF	62,370	449-56-A-31
K2JVF	51,545	362-58-A-20
K2PKL	48,500	304-62-A-61
W2NTJ	46,480	332-56-A-20
K2IAM	39,600	362-14-A-35
K2DNV	35,845	214-67-A-4
W2VJO/2	34,935	274-51-A-23
K2VLD	29,356	337-35-A-30
W2RHQ	26,300	182-48-A-18
W2NZA	25,650	285-45-A-15
W2PKK	24,049	293-33-A-14
W2PTA	22,301	157-57-A-40
W2KTT	20,876	168-50-A-16
W2ZFL	17,432	147-51-A-15
W2PKT	18,630	162-46-A-18
K2VPR	15,258	182-3-A-33
K2BFP	15,139	188-13-A-35

W2CJQ	12,857	139-37-A-15
K2DWR	12,730	135-36-A-10
W2KEC	9620	148-26-A-7
K2KCE	9400	100-47-B-3
W2GTH	8776	125-33-A-23
W2QVH	7125	76-38-A-16
W2OVP	5100	85-24-A-8
K2KKI	3939	71-23-A-19
W2EEB	2750	56-20-A-9
K2NJA*	2256	52-19-A-20
W2WBN	1953	38-22-A-38
K2RTZ	1788	48-16-A-8
K2SSB	1573	37-17-A-3
K2RNL	1445	37-17-A-18
K2MMP	1040	26-16-A-4
K2NVC	363	20-10-A-20
K2MTW	358	13-11-A-2
K2MGN	105	7-6-A-2
W2MSN (W2MSN, K2OVO)	32,489	279-47-A-40

*Western Pennsylvania*

W3ZHQ	142,555	803-71-A-40
W3NRP	109,518	617-71-A-35
W3YDK	95,134	555-69-A-34
W3RBI	66,500	800-70-A-33
W3NCR	51,408	376-68-B-32
W3UGV	50,240	314-84-A-22
W3GKY	41,038	245-67-A-20
W3NTQ	32,680	301-43-A-26
W3MEE	30,198	260-47-A-22
K3AIV	24,799	197-51-A-26
K3BZP	21,685	166-24-A-20
W3JHT	13,100	132-40-A-13
K3GPP	5250	60-35-A-11
K3BID	3768	70-22-A-9
K3BIV	3500	56-25-A-6
K3BZP	2168	55-17-A-8
K3NIC	2024	46-22-A-4
W3KQD	1275	30-17-A-2
KN3DJ	1160	29-16-A-16
KN3WB	860	22-16-A-8

**CENTRAL DIVISION**

W9IRH	177,210	988-72-A-39
W9ZAB	159,870	876-73-A-36
W9NPP	158,153	891-71-A-39
W9KLD	157,224	863-73-A-40
W9NII	151,940	858-71-A-40
W9PZT	146,365	802-73-A-40
W9PZT	142,810	792-73-A-38
W9RCJ	142,790	809-71-A-38
W9JNL	141,400	811-70-A-35
W9LNQ	139,065	762-73-A-35
W9AMU	138,600	770-72-A-37
W9YGO	137,160	764-72-A-40
W9HZW	105,826	614-67-A-37
W9MAK	105,210	585-72-A-27
K9IND	92,700	515-72-A-40
W9VPZ	86,709	500-71-A-27
W9ZVD	85,470	519-66-A-31
W9ZGQ	78,848	435-72-A-25
W9FCN	72,075	417-70-A-40
W9ARV	70,975	520-69-B-30
W9PCQ	67,320	408-66-A-30
W9NIF	64,100	300-66-A-40
W9PVT	60,000	400-60-A-27
W9YGO	55,826	386-69-B-17
K9DWC	54,079	315-69-A-30
K9HMI	50,706	332-61-A-23
W9AGM	50,250	300-67-A-18
K9AWW	49,000	356-56-A-26
K9BYR	47,175	318-60-A-36
W9NCR	43,848	280-62-A-22
K9ISF	40,500	300-54-A-32
K9IYW	34,272	252-68-B-40

W91DO. 34,100 248-55-A-16  
W91ET. 33,790 218-62-A-26  
W91RC. 32,500 190-66-A-26  
W91SU. 32,376 220-59-A-35  
W91TY. 31,813 257-50-A-40  
W91WQ. 31,775 312-16-A-16  
K91AK. 29,680 215-56-A-33  
W91PF. 25,980 176-59-A-24  
K91CP. 25,086 220-47-A-24  
K91HL. 24,625 204-50-A-19  
K91EA. 24,030 180-54-A-18  
W91DY. 23,760 190-51-A-14  
W91ZN. 23,230 202-46-A-18  
K91EG. 21,660 183-48-A-17  
K91JO. 21,533 190-54-A-19  
K91WB. 21,120 192-44-A-27  
K91BS. 20,475 205-42-A-19  
W91JR. 19,380 190-51-A-21  
K91BK. 18,288 194-38-A-24  
K91SV. 17,938 206-35-A-35  
W91AL. 17,800 183-40-A-31  
W91ET. 17,600 160-44-A-10  
K91TU. 17,430 251-28-A-26  
W91KY. 17,160 220-33-A-22  
K91UA. 16,663 215-31-A-11  
K91DK. 16,476 156-49-A-11  
W91PE. 15,375 150-41-A-23  
K91WD. 15,330 162-42-A-24  
K91DT. 14,336 123-47-A-11  
K91QM. 14,170 146-45-B-13  
K91JL. 13,140 146-45-B-13  
K91KM. 12,200 125-41-A-14  
K91RP. 11,813 103-45-A-13  
K91LN. 11,750 100-47-A-9  
W91XM. 11,563 125-37-A-18  
K91RS. 11,360 145-28-A-19  
W91PD. 11,320 120-38-A-11  
W91PS. 11,221 115-49-B-5  
W91AU. 10,658 102-42-A-12  
K91OI\* 10,200 113-40-A-29  
K91RF. 89275 102-35-A-18  
K91AL. 86045 100-34-A-13  
K91GC. 85000 100-34-A-13  
K91MS. 77188 150-31-A-17  
K91MDF. 71386 110-53-A-30  
W91CV. 69755 93-30-A-7  
K91VT. 64900 121-22-A-17  
K91WV. 51933 76-31-A-28  
K91MBW/9. 51735 72-30-A-39  
W91XC. 47855 666-29-A-7  
W91AC. 46020 104-18-A-19  
K91MNT. 42860 82-24-A-31  
W91WV. 41945 59-48-A-6  
W91JN. 39449 55-33-A-11  
K91JN. 38066 55-29-A-14  
K91JL. 35655 62-23-A-15  
K91ZW. 34699 95-15-A-11  
W91BZ. 31922 145-28-A-19  
W91WV. 29760 61-19-A-13  
W91CY. 28988 45-25-A-12  
W91YF. 28138 45-25-A-12  
K91KQ/9. 26988 43-26-A-22  
K91ORC. 24988 51-27-A-23  
W91KY. 23588 41-23-A-4  
W91DY. 21970 31-18-A-4  
K91LIA. 21149 19-19-A-20  
K91LK. 20660 52-20-B-5  
W91NG. 19434 56-14-A-7  
K91LOK. 18053 43-19-A-12  
K91KC. 16089 38-17-A-12  
W91ED. 13495 28-17-A-14  
K91UR. 12938 28-17-A-14  
K91MMR. 11116 29-19-A-16  
K91LRV. 9233 23-18-A-20  
W91MY. 9203 23-16-A-4  
K91PR. 770 22-14-A-8  
W91AV. 590 22-14-A-5  
K91YS. 500 15-10-A-6  
W91BZ. 488 15-13-A-16  
K91KTK. 481 81-11-A-9  
K91KUN. 350 12-9-A-22  
W91AL. 375 15-10-A-2  
W91WV. 360 15-10-A-2  
W91FE. 236 11-9-A-2  
W91TL. 218 11-9-A-2  
W91OK. 120 6-8-A-3  
W91NL. 60 6-4-A-3  
K91EC. 2 2-1-A-9  
W91XN. 2 1-1-A-1  
K91YD. 2 1-1-A-1  
K91MDM/9. 3 1-1-A-1

Indiana

W91X8. 146,183 801-73-A-36  
K91DWK. 126,888 757-69-A-37  
K91JUD. 83,548 544-62-A-40  
W91AY. 18,048 195-69-A-30  
W91PD. 8,350 332-50-A-12  
K91AT. 53,838 365-59-A-24  
W91TD. 43,494 333-66-B-18  
K91JO. 27,650 203-56-A-16  
W91CS. 24,644 202-61-P-21  
K91NPD\* 19,635 156-51-A-37  
K91AT. 18,048 195-69-A-30  
K91CY. 7169 78-37-A-6  
K91MAF. 6758 80-34-A-33  
W91DP. 4766 61-31-A-11  
K91NLB. 3656 68-25-A-20  
K91LIO. 3616 53-28-A-30  
K91WV. 3000 62-25-A-12  
K91HC. 585 21-12-A-13  
K91LX. 495 17-12-A-5  
W91B (W91CP, K91JK, K91NOGAM, W91CG) 126,360 704-72-A-40

K91HQ (K91S GEN THG, K91QAQ) 48,840 407-60-B-39  
K91LX (K91EJL, K91LX) 4163 61-30-A-16

Illinois

W91QM. 198,450 1104-72-A-40  
K91CAN. 187,793 1029-73-A-40  
W91YR. 183,230 1004-73-A-38  
W91DY. 161,980 891-72-A-40  
W91KZ. 157,224 866-73-A-36  
W91WEN. 140,175 802-70-A-40  
K91LT. 132,213 725-73-A-34  
W91CB. 132,213 725-73-A-34  
W91QV. 126,735 71-47-1-A-39  
W91UY. 106,500 690-71-A-31  
K91QF. 105,710 595-71-A-39  
W91RK. 100,625 575-70-A-33  
W91QQ. 90,588 586-62-A-36  
W91CD. 85,750 497-70-A-25  
W91KX. 79,023 435-73-A-37  
W91VC. 74,993 457-64-A-38  
W91CS. 73,500 525-70-B-36  
W91NY. 73,381 499-59-A-35  
W91WZ. 69,143 440-63-A-38  
W91PT. 60,000 400-60-A-26  
K91CF. 51,393 337-61-A-14  
K91NB. 47,740 371-13-A-33  
W91KQ. 37,606 280-55-A-4  
K91FR. 35,411 249-57-A-36  
W91PH. 30,728 211-51-A-32  
K91CB. 29,295 219-54-A-10  
W91DP. 28,650 191-40-A-1  
W91DG. 25,700 204-65-B-13  
K91BE. 24,140 172-56-A-34  
W91GO. 21,739 173-51-A-26  
K91BSH. 14,950 130-46-A-10  
W91GR. 13,870 76-73-A-11  
K91CX. 13,513 115-47-A-11  
W91TU. 13,073 205-42-A-20  
K91UA. 11,560 147-32-A-26  
K91AS. 10,750 103-43-A-23  
W91LR. 10,628 111-39-A-18  
W91BO. 9570 119-33-A-23  
W91DH. 9045 135-27-A-11  
K91WV. 8977 137-47-A-11  
W91SE. 7711 100-31-A-19  
V91DQB/W9 8873 84-29-A-2  
W91WQ. 5531 89-25-A-4  
W91OZ. 5239 64-33-A-9  
K91K. 4946 64-33-A-9  
W91LA/B. 4414 55-33-A-11  
K91LC. 4208 87-22-A-30  
W91TD. 3751 72-21-A-10  
K91HY. 2573 49-21-A-10  
K91MAS. 1620 45-16-A-7  
W91DK. 944 24-17-A-10  
K91PS. 910 24-12-A-10  
K91CD. 641 31-9-A-15  
K91JE. 360 16-9-A-2  
K91AIWQ. 294 24-5-A-10  
K91PD. 203 17-6-A-1  
K91P. 186 17-6-A-1  
K91MWR. 126 9-8-A-3  
K91OS. 10 2-2-A-1  
W91FDX (2 oprs.) 101,105 559-73-A-33

North Dakota

W91YH (W91SC, W91LH 878) 41,860 367-56-A-4  
W91TM (W91M, W91S) 46,965 303-62-A-23  
W91YT (W91UDK VOO ZQA) 32,450 275-19-B-13  
K91MK (K91NS MAW MKV) 37,330  
W91HX (W91HXT, W91C) 780 20-16-A-4  
K91CMP. 780 20-16-A-4

Dakota Division

K91NC. 106,760 628-68-A-24  
K91IV. 56,806 378-61-A-40  
K91JEP. 54,290 363-61-A-39  
W91SO. 50,065 330-62-A-38  
K91CY. 43,888 287-61-A-34  
W91NL. 26,000 202-52-A-16  
K91OLM\*. 7565 90-35-A-20  
W91CAQ. 6563 88-30-A-12  
K91AD. 4295 64-28-A-13  
K91NAP. 788 26-14-A-24  
K91RHE. 385 14-11-A-7

South Dakota

W91PH. 193,550 1106-70-A-37  
W91MV. 92,136 700-66-B-35  
W91WV. 5610 66-34-A-6  
K91MJK. 4260 72-24-A-20

Minnesota

W91CR. 209,328 1153-73-A-40  
W91TC. 179,630 1012-71-A-40  
K91LV. 105,484 615-69-A-28  
K91LL. 67,440 306-61-A-28  
K91AO. 40,950 256-65-A-39  
W91AD. 18,200 142-52-A-16  
K91LX. 6078 76-34-A-7  
K91OUM\*. 3173 50-27-A-25  
K91ML. 2188 36-25-A-11  
K91RHO. 5000 46-20-A-20  
K91VI. 1325 27-20-A-14  
K91RKF. 569 21-13-A-6  
K91DF. 313 13-10-A-2  
K91LX (K91PCL LIX) 43,523 310-71-B-30

K91MV (K91JM, K91QMU) 8373 102-34-A-15

Delta Division

K51LN. 82,500 500-66-A-36  
W51BY. 73,440 465-64-A-36  
W51PR. 56,484 312-73-A-33  
K51GR. 45,600 309-60-A-28  
K51OL. 11,244 106-43-A-13  
K51SGH. 3480 46-32-A-13  
K51FQ. 3558 13-11-A-1  
K51JP. 105 7-6-A-1  
W51YM. 32 4-4-B-1

Louisiana

W51YD. 191,622 1063-73-A-40  
K51DL. 188,888 1035-73-A-40  
W51BUK. 111,435 648-69-A-39  
W51AO. 91,050 617-60-A-31  
W51WU. 76,326 527-61-A-30  
W51FT. 69,120 395-72-A-31  
W51FR. 52,680 348-61-A-39  
K20WE. 45,338 268-65-A-4  
K51JZ. 42,996 294-59-A-30  
K51EJ. 20,655 205-54-A-27  
K51NR\*. 8603 94-37-A-22  
K51ZG. 3430 51-28-A-8  
W51TD. 3430 51-28-A-8  
K51NOG. 1138 35-13-A-27  
K51SGU. 481 22-11-A-5

Mississippi

W51PI. 134,959 749-73-A-38  
K51MZ. 104,040 612-68-A-40  
W51AM. 33,596 267-51-A-20  
K51OP\*. 16,875 163-45-A-30  
K51NQ. 6560 83-32-A-10  
W51ZV. 3625 50-29-A-11  
K51OT. 224 40-23-A-8  
K51NP. 1943 19-15-A-14  
K51RBG. 675 19-15-A-14  
K51OTI. 188 15-13-A-4

Tennessee

K41BV. 214,529 1176-73-A-40  
W41BV. 155,252 1076-72-A-40  
W40DR. 95,200 700-68-B-37  
W4EQ. 58,860 441-54-A-38  
K41ZR. 52,768 302-70-A-35  
W4SQ. 48,913 301-60-A-32  
K41PH. 33,150 256-52-A-24  
W41PH. 31,285 256-52-A-24  
K41VZ. 39,963 148-46-A-18  
W41FN. 11,438 108-53-B-8  
K41UW. 4130 59-28-A-15  
K41RS. 3283 51-26-A-8  
W41TO. 3080 56-22-A-4  
K41XK. 1283 30-18-A-19  
K41VAM. 210 12-8-A-19

Great Lakes Division

K41EZ. 174,653 965-73-A-40  
W41CV. 129,940 715-73-A-37  
W41RP. 126,728 868-73-B-40  
W41JB. 115,538 711-65-A-30  
K41KB. 73,600 440-66-A-33  
K41HG. 56,779 346-63-A-34  
W41MW. 39,150 292-60-A-16  
W41RH. 31,620 248-51-A-26  
K41QP. 21,611 170-51-A-28  
K41JP. 20,250 205-40-A-12  
K41YF. 5180 78-28-A-29  
K41FEW. 5130 62-36-A-18

Michigan

W81DU. 111,399 798-71-B-38  
W81PW. 103,845 602-69-A-40  
W81ZS. 89,026 532-67-A-39  
K81CP. 86,275 508-68-A-36  
K81VV. 82,538 536-62-A-36  
W81JQ. 83,311 457-78-A-37  
W81VC. 72,105 436-69-A-34  
W81PV. 72,865 437-66-A-36  
K81DU. 68,930 453-61-A-38  
K81GK. 63,545 358-71-A-40  
W81AP. 62,390 347-65-A-32  
K81YF. 59,849 439-52-A-32  
K81UZ. 52,909 409-53-A-32  
W81DM. 52,250 380-55-A-26  
W81FA. 47,663 309-62-A-23  
K81EP. 46,305 348-54-A-23  
K81UM. 41,804 316-55-A-17  
W81WV. 39,360 292-60-A-16  
W81AS. 37,440 208-72-A-21  
K81HZ. 36,960 353-42-A-36  
K81PF. 33,150 221-60-A-23  
W81CW. 32,400 225-72-1-13  
W81GE. 28,950 193-60-A-23  
W81WV. 26,460 196-54-A-34  
K81AH. 22,880 191-48-A-24  
W81QB. 22,500 150-60-A-26  
W81KNP. 22,360 174-52-A-11  
K81SH. 21,769 197-45-A-16  
W81KTR. 20,865 214-39-A-25  
W81MP. 19,793 208-39-A-24  
K81BG. 18,315 198-37-A-36  
W81RG. 18,269 203-37-A-32  
W81FX. 18,000 200-36-A-17  
W81GL. 16,100 140-46-A-8

K51YN. 14,478 149-38-A-19  
W51YK. 14,200 172-32-A-17  
K81KH. 9625 138-28-A-14  
W81KX. 7178 99-29-A-7  
K81SU. 6560 92-32-A-21  
K81DJ. 6145 90-29-A-18  
W81QAF. 4314 60-29-A-8  
K81BJ. 3824 81-19-A-11  
K81XL. 3478 55-26-A-8  
W81MG. 3080 70-22-1-4  
K81HE. 2625 71-15-A-5  
W81WV. 2100 35-24-A-13  
K81EQ. 263 18-6-A-1  
W81LE. 150 10-6-A-5  
K81G (K8S CHG) 18,602 900-66-B-40  
W81Z (W8S CHG) 3000 48-25-A-4

Ohio

W81QA. 198,378 1088-73-A-39  
W81YL. 172,708 973-71-A-36  
W81EV. 147,143 853-69-A-36  
W81ZU. 137,518 821-47-A-35  
W81YPT. 135,360 759-72-A-36  
W81JTW. 131,220 730-72-A-40  
W81WV. 129,630 730-72-A-40  
W81RSW. 114,063 625-73-A-36  
W81EU. 112,000 640-70-A-36  
W81ZM. 104,481 574-73-A-26  
W81OJ. 100,465 566-71-A-21  
W81APC. 75,757 534-71-B-37  
W81VQ. 73,345 430-29-A-39  
W81LW. 72,800 416-70-A-4  
W81NWR. 71,040 445-64-A-39  
K81AJ. 68,723 430-66-A-37  
W81LV. 68,085 402-68-A-39  
W81DVP. 65,450 375-70-A-32  
W81BZ. 62,360 352-71-A-36  
K81GL. 62,300 415-56-A-36  
W81UHP. 61,703 433-57-A-30  
W81U. 60,456 458-66-B-34  
K81LE. 59,535 386-63-A-39  
K81SO. 58,800 399-60-A-40  
K81HE. 57,120 357-64-A-36  
K81X. 52,841 348-61-A-39  
W81DM. 52,320 329-64-A-32  
W81MR. 51,765 305-68-A-4  
K81NE. 51,645 313-66-A-37  
K81SU. 51,280 325-64-A-40  
K41GSU. 48,360 352-65-A-15  
W81ZU. 48,400 352-65-A-15  
K81GT. 48,300 276-70-A-34  
K81EJ. 47,250 350-54-A-39  
K81HZ. 45,220 328-56-A-33  
W81L. 44,950 390-62-A-26  
K81A. 44,360 352-67-A-36  
W81AL. 40,280 304-53-A-32  
W81V. 39,825 266-60-A-18  
W81ZE. 38,775 259-60-A-25  
K81WT. 36,563 230-65-A-31  
W81KCP. 34,720 219-64-A-25  
K81K. 32,413 225-71-A-36  
W81DO. 32,775 223-60-A-17  
K81EG. 30,938 225-55-A-23  
K81SM. 30,090 204-59-A-16  
K81DT. 29,389 233-51-A-18  
W81GAC. 28,820 268-44-A-21  
W81WV. 28,820 268-44-A-21  
K81K. 27,981 304-37-A-21  
W81GK. 27,300 260-42-A-6  
W81N. 26,740 192-56-A-13  
W81MO. 26,660 215-62-P-25  
W81AE. 25,080 152-66-P-17  
K81Y. 23,775 192-56-A-22  
K81PS. 23,800 194-49-A-30  
W81JU. 23,120 202-42-A-31  
K81HJ. 21,100 211-40-A-20  
W81WV. 21,025 145-58-A-23  
W81ST. 20,320 217-38-A-18  
W81RO. 20,200 303-40-A-18  
K81KNT\* 19,544 156-53-A-39  
W81MOH. 19,540 156-53-A-39  
W81BN. 19,227 189-51-P-7  
W81TT. 17,700 148-48-A-4  
K81Q. 16,211 203-33-A-25  
K81L. 15,910 172-37-A-13  
W81DAE. 15,713 210-30-A-11  
W81BY. 13,125 125-42-A-16  
K81PH. 10,595 163-26-A-13  
K81TF. 9595 101-38-A-12  
K81WV. 9286 41-29-A-6  
K81DH. 7781 128-25-A-21  
W81GR. 7410 78-38-A-15  
W81OY. 7013 95-30-A-13  
K81N. 5500 100-22-A-13  
K81CP. 5390 100-22-A-13  
K81EL. 5158 70-17-A-23  
K81J. 4198 47-27-A-8  
K81ED. 3548 43-43-A-12  
K81PG. 3548 43-43-A-12  
W81FD. 3200 40-32-A-4  
K81AE. 2989 54-25-A-10  
K81TY. 2900 41-29-A-6  
W81KJ. 2280 38-29-A-12  
K81K. 2075 43-20-A-14  
W81EJ. 2074 40-14-A-5  
K81PV. 1978 60-14-A-5  
K81CV. 1890 36-21-A-3  
W81M. 1826 34-27-B-3  
K81Z. 1700 41-17-A-12  
K81AG. 1500 40-15-A-5  
W81NC. 1378 29-19-A-6  
W81QJ. 1200 40-15-B-2  
K81LW. 1103 34-14-A-14



Says Michigan winner W8DUS, who has a KW-1 rock-crusher and 200 confirmed: "My ham career dates back to spark and although my business has been concerned with microphones and audio products, I am a card-carrying c.w. man." Incidentally, AI is W9IOP's boss.

KN8LWV.....	893	26-14-A	12
KN8LVR.....	413	19-10-A	10
W8VUV.....	289	11-11-A	6
KN8LGB.....	160	8-8-A	6
KN8MKG.....	135	10-6-A	2
W8IUN.....	95	10-4-A	6
K8LXI.....	75	6-5-A	1
W8FIT.....	70	7-4-A	1
W8PLQ.....	45	5-4-A	1
W8SDJ (W88 LEX 8D)	37,700	261-58-A	36
W8MAX (W88 OHN QWL K38 DXW HKB IQQ)	86,460	524-66-A	40
K8DVJ (K88 C1Q DVJ)	53,750	500-43-A	40
K8JXJ (K88 LHE JIX)	51,621	340-61-A	34
K8WBL (4 oprs.)	44,220	264-66-A	25
K8CZJ/8 (W8ITN, K8CZJ)	37,700	261-58-A	36
W8ODJ/8 (W8GKB, K88 H8V DFW).....	19,580	178-44-A	11

**HUDSON DIVISION**

*Eastern New York*

W2VCB.....	111,875	614-73-A	34
K2VHU.....	80,300	508-64-A	39
K2EUI.....	63,830	492-52-A	24
K2QIX.....	59,378	411-58-A	32
K2MBU.....	50,513	461-45-A	40
K2TYI.....	46,800	312-60-A	29
W2HAC.....	45,000	300-60-A	20
K2HJX.....	39,780	307-82-A	17
W2TER.....	35,640	298-48-A	36
W2AZO.....	34,298	269-51-A	33
W2CJM.....	27,848	237-59-B	29
W2PKY.....	26,031	213-49-A	27
K2YAZ.....	25,691	203-51-A	20
K2YAB.....	23,445	202-35-A	17
K2MKC.....	15,180	255-2-A	-
W2NCO.....	14,600	100-73-B	17
W2HRZ.....	9373	162-23-A	19
K2BIG.....	9010	107-31-A	15
K2RUA.....	8706	100-35-A	10
K2ZAU.....	8040	102-40-B	7
KN2QBD*.....	8003	100-33-A	40
K2GFW/Z.....	7468	103-29-A	8
K2YFI.....	6570	73-37-A	5
W2AYM.....	3938	66-38-A	28
W2GRI.....	4725	70-28-A	11
K2YTK.....	4263	55-31-A	9

W2VAKK.....	2779	63-19-A	25
K2LZW.....	2704	54-21-A	19
K2IOV.....	2675	65-20-A	7
K2PRB.....	2530	44-23-A	4
K2OEG.....	2256	49-19-A	14
K2YTD.....	1950	52-15-A	6
W2KX8.....	1878	29-19-A	5
W2ATC.....	1340	41-16-A	10
KN2EJL.....	1243	32-14-A	25
W2GTC.....	748	23-13-A	2
W2WOH.....	3	1-1-A	1
W2BMC.....	3	1-1-A	1

*N. Y. C.-L. I.*

W2AYT.....	166,440	912-73-A	37
W2PZE.....	143,640	798-72-A	40
K2DCT.....	142,625	815-70-A	37
W2MAD.....	132,300	735-72-A	35
K2LAD <sup>2</sup> .....	131,400	720-73-A	38
W2OWO.....	123,596	722-69-A	40
W2CWD.....	123,090	754-66-A	40
K2PIR.....	111,860	656-68-A	39
W2DUS.....	100,595	649-62-A	38
K2IYC.....	94,180	557-68-A	40
K2BTT.....	83,160	605-66-A	37
W2MDM.....	73,932	606-61-B	33
K2UOX.....	73,080	505-58-A	36
K2JQJ.....	70,150	460-61-A	31
K2RAR.....	69,684	445-63-A	31
W2AEE <sup>3</sup> .....	68,407	513-67-B	32
K2YGM.....	63,075	440-58-A	34
K2LTI.....	56,875	350-65-A	4
K2QBV.....	56,719	314-85-A	25
K2QFJ.....	49,665	301-66-A	12
W2WUM.....	40,000	250-64-A	-
K2FC.....	39,139	250-63-A	-
W2WUQ.....	37,969	339-45-A	26
W2ZYX.....	37,875	253-60-A	21
K2UQT.....	37,605	327-46-A	36
W2NCG.....	37,034	282-43-A	26
K2KQH.....	33,565	277-49-A	27
K2UMV.....	31,750	254-50-A	18
K2YMO.....	30,400	304-50-B	19
W2HJW.....	29,186	272-43-A	11
K2TYV.....	28,600	209-55-A	14
W2GIP.....	28,438	325-35-A	19
K2LFC.....	27,869	231-49-A	-
K2LXU.....	24,994	233-43-A	9
W2DUU.....	24,885	238-42-A	38
W2OBU.....	24,238	272-35-A	14
W2ATJ.....	23,000	230-40-A	25
K2TOL.....	21,675	174-51-A	19
W2IHL.....	21,420	180-48-A	30

W2ICO.....	18,850	130-58-A	15
K2HTX.....	18,522	189-49-B	26
W2YKQ.....	15,620	157-40-A	20
W2IBV.....	15,050	150-43-A	8
K2TBU.....	14,520	121-48-A	-
W2KGN.....	14,210	98-58-A	8
K2UTY.....	13,650	200-35-B	15
W2FHZ.....	13,125	210-25-A	15
W2DGN.....	12,094	110-45-A	11
W2UAL.....	12,000	20-40-A	10
W2DJD.....	11,970	171-28-A	16
W2KVL.....	11,288	105-43-A	15
W2NTI.....	10,625	125-34-A	11
K2BHL.....	10,300	103-40-A	-
K2ZPB*.....	10,050	102-40-A	16
K2FXN.....	9610	98-37-A	21
K2HGR.....	8446	120-29-A	15
W2JGU.....	7280	91-32-A	19
K2CJS.....	6383	70-37-A	17
K2VNS.....	6156	100-25-A	16
W2ESO.....	5754	69-42-B	4
K2JLD.....	5334	117-19-A	10
K2PHF.....	5202	131-21-B	3
K2DZG.....	5460	84-26-A	24
K2UMO.....	5031	81-25-A	10
K2ZPEQ.....	4615	74-26-A	28
W2TUK.....	4080	68-24-A	3
K2HIG.....	4000	30-23-A	9
KN2UVV.....	3249	64-23-A	19
W2UNS.....	3240	81-16-A	10
W2CUE.....	2480	62-16-A	9
KN2ZTG.....	2126	50-21-A	25
K2OEG.....	2025	45-4-A	6
W2ICG.....	1900	30-23-A	9
W2YBK.....	1200	31-16-A	23
W2BHH.....	1088	29-16-A	6
K2UYG.....	1023	27-15-A	2
K2OPT.....	938	38-10-A	7
W2VQK.....	915	32-12-A	19
W2QRX.....	860	30-23-A	9
W2JGU.....	630	21-12-A	-
KN2KJX.....	618	21-18-A	17
KN2TFB.....	298	17-7-A	7
KN2JOK.....	193	12-7-A	11
W2MGV.....	175	10-7-A	4
W2PYX.....	120	10-7-A	4
KN2LW.....	113	8-6-A	6
W2QFF.....	100	9-5-A	4
K2MQJ.....	98	7-6-A	1
W2HBO.....	90	8-6-A	2
K2OED.....	75	8-4-A	7
K2SGJ.....	5	5-5-A	1
W2YAP.....	5	5-5-A	-
K2ZYR.....	13	3-3-B	-
KN2TEP.....	4	2-1-A	1
W2RLM (W2RLM, K2KUC)	197,888	694-62-A	40
WA2ABC (W2A 28-A HM)	63,128	446-57-A	34
K2AAW (K28 AAW ZYR)	18,450	164-45-A	16
KN2VWZ (K2KQH, KN2VWZ)	10	2-2-A	1

*Northern New Jersey*

W2DMJ.....	184,500	1025-72-A	40
W2ZSM.....	176,750	1010-70-A	39
W2CQB.....	155,164	900-69-A	38
K2LGN.....	144,620	776-73-A	38
W2OIB.....	140,625	855-70-A	40
K2GAL.....	113,640	800-67-A	40
W2PZY.....	113,150	620-73-A	39
W2TPJ.....	107,745	653-66-A	31
K2YJH.....	100,040	659-61-A	35
W2EBG.....	98,000	604-66-A	36
K2GHT.....	660	70-4-B	10
K2MFF.....	56,423	503-69-A	30
W2GND.....	54,498	466-73-A	28
W2DRV.....	53,396	530-63-A	36
K2BHQ.....	79,380	504-63-A	25
W2WOS.....	75,315	454-69-A	31
W2HBT.....	72,428	422-A	30
K2AYC.....	68,340	408-67-A	33
W2LSX.....	67,938	507-67-B	25
W2CVW.....	62,685	400-63-A	22
K2PLF.....	57,264	376-61-A	29
W2BRC.....	52,515	389-54-A	28
K2EAM.....	47,235	311-47-A	35
W2OWX.....	46,750	374-50-A	25
W2HTX.....	46,338	305-61-A	17
W2TWC.....	46,423	300-72-A	14
W2PHN.....	45,725	313-59-A	26
W2RWZ.....	44,200	273-65-A	30
K2YUJ.....	44,010	329-54-A	30
W2HUG.....	39,456	269-59-A	20
W2SJB.....	36,578	277-54-A	24
K2UTU.....	30,210	212-57-A	24
K2QWZ.....	28,000	200-36-A	24
W2QVY.....	27,000	292-A	24
W2ZEP.....	26,565	231-46-A	15
W2DEN.....	26,403	180-59-A	17

W2BWW.....	25,350	169-60-A	34
K2UFW.....	24,559	260-38-A	29
W2GBV.....	21,700	217-40-A	13
W2BZ.....	21,350	152-2-A	8
W2OPE.....	18,666	176-43-A	30
K2BJA.....	18,600	186-40-A	13
W2ABL.....	16,720	152-14-A	9
K2HRS.....	15,360	192-32-A	19
W2SNY/2.....	12,900	135-40-A	18
W2IBZ.....	12,420	165-31-A	11
W2TJD.....	12,240	138-45-B	-
K2PIM.....	12,160	128-38-A	9
K2PGH.....	11,715	143-33-A	11
W2LTI.....	11,550	200-24-A	24
W2PWF.....	11,408	117-39-A	9
W2PBR.....	10,658	79-73-B	22
W2ZVW.....	9975	105-58-A	7
W2VNG.....	9400	100-47-B	5
W2RWM.....	9240	112-33-A	9
K2VVL.....	5619	111-39-B	12
K2DSW.....	5578	74-47-A	5
K2TEO.....	5505	81-42-A	19
K2ZFK.....	5443	154-22-A	14
W2VBLV*.....	7219	86-35-A	33
W2UCA.....	7088	105-27-A	19
W2GFW.....	6698	100-34-B	5
W2BOL.....	6030	102-24-A	15
W2BPL.....	5630	71-42-A	11
W2BUJ.....	5320	76-28-A	5
W2PSL.....	3892	70-28-B	6
W2PYI.....	3740	68-22-A	10
W2JIB.....	3563	75-19-A	7
K2TIN.....	3500	70-20-A	8
K2ZS.....	2850	56-30-A	21
W2VRLK.....	2678	53-21-A	30
KN2MBX.....	2231	44-21-A	16
W2DED.....	1640	41-16-A	5
W2COG.....	1480	37-16-A	23
W2LFL.....	1225	35-14-A	9
K2EJ.....	1210	35-10-A	2
K2DWL.....	720	22-18-A	2
K2YAB.....	682	31-11-B	2
KN2SBW.....	440	17-11-A	6
KN2XK.....	288	12-10-A	-
KN2OYI.....	280	14-8-A	4
W2AP.....	254	16-7-A	22
W2LRO (W28 LRO NJT)	53,375	500-61-A	24
K2COY (K28 COV COY)	22,070	257-37-A	31
KN2OUX (2 oprs.)	480	22-12-A	22

**MIDWEST DIVISION**

*Iowa*

W0YXO.....	191,420	1088-72-A	40
W0WZ.....	149,325	818-73	39
W0CXN.....	141,985	778-73-A	37
K0KCR.....	116,756	683-68-B	40
W0EQN.....	96,061	594-67-A	31
K0AZJ.....	92,480	547-68-A	34
K0HCX.....	87,630	518-69-A	39
W0CXG.....	79,530	482-66-A	25
W0BSY.....	69,940	333-72-A	31
K0LL.....	39,730	277-58-A	34
K0CZQ.....	38,793	278-59-A	30
K0AUT.....	34,200	300-57-B	26
K0PL.....	28,669	212-55-A	40
W0LSP.....	27,860	199-56-A	22
W0TLX.....	27,170	218-62-A	28
K0BLJ.....	22,164	210-54-B	16
W0ATA.....	21,420	154-56-A	10
W0SNL.....	20,825	119-70-A	25
K0JTV.....	20,460	175-48-A	24
K0JRT.....	18,900	181-45-A	29
K0OVR.....	15,803	158-43-A	36
W9WJD/0.....	15,700	120-49-A	19
W0DSP.....	7600	80-38-A	5
K0AVZ.....	5495	79-28-A	12
K0PCG.....	4945	87-26-A	6
K0DFJ.....	1995	51-19-A	7
KN0PV*.....	1305	28-19-A	21
KN0QA.....	718	22-14-A	16
K01FA (K08 DPT LFA)	67,650	550-72-A	35
K0CLS (W0PKL, K05 AP8 CLS DLO)	76,032	576-66-B	

W9IRH got a Novice ticket in '54, rose to earn his SS spurs by clobbering 124 Illinois brasspounders in '58. Johnny eyes 200K hungrily, is serving a short Army hitch now but returns to mufli in July, "just in time to ready the station for the '59 SS." A CQ-SS wheel is in the offing.



KQCTF (KQs BSK GTF, KN9MTL)  
2903- 43-27-A-14  
KN9QAI (2 oprs.)  
2145- 40-22-A-24

WIASO.....2550- 68-15-A-9  
KNIGTF.....2520- 52-21-A-18  
WIOPB.....880- 22-16-A-7  
KILLJ.....810- 27-12-A-6  
WIAW.....750- 30-10-A-1  
KNIHOP.....263- 16-7-A-8

*Kansas*  
K0BJR.....143,464- 865-67-A-40  
W0QJW.....122,850- 709-70-A-34  
W0VWA.....117,150- 660-71-A-40  
K0ITF.....116,784- 815-72-B-40  
W0BYV.....56,608- 464-61-B-32  
K0HLC.....32,700- 218-60-A-19  
K0LWK.....700- 100-52-A-39  
K0KMZ.....19,373- 185-42-A-26  
K0CZP.....15,125- 122-50-A-14  
W0JFG.....9506- 99-39-A-20  
W0CFF.....8200- 83-40-A-12  
W0TTO.....1557- 59-37-A-8  
W0GCH.....4016- 60-27-A-5  
W0SPP.....2010- 34-24-A-8  
KN9PFV.....1069- 32-15-A-18  
W0QQQ (W0TPV, K0s H0J  
JHC JRO)  
33,626- 280-49-A-36

*Maine*  
WIDEO.....1715- 380-73-A-30  
WIIYS.....69,593- 452-62-A-7  
KIGOG.....26,048- 229-46-A-39  
WILCX.....14,985- 166-37-A-18  
KIBAZ.....13,213- 153-35-A-30  
KIAHS.....1880- 47-20-B-10

*Eastern Massachusetts*  
KICQO.....149,455- 842-71-A-40  
WIBOD.....140,890- 772-73-A-40  
WIAQE.....115,500- 660-70-A-40  
WIIHC.....110,139- 605-72-A-33  
WIMQV.....109,260- 607-72-30  
WIJSM.....100,101- 555-73-A-30  
WIMIX.....78,750- 500-63-A-36  
WIEIQ.....75,310- 443-68-A-32  
WICOL.....74,728- 421-71-A-38  
WIAWY.....62,883- 325-68-A-36  
KICUD.....46,894- 309-61-A-33  
WILJO.....42,333- 287-59-A-28  
WIMLZ.....41,738- 316-53-A-25  
WIMKW.....39,300- 393-50-B-30  
KICLO.....37,730- 311-49-A-23  
WIPSS.....36,693- 215-68-A-40  
WISMO.....34,830- 258-54-A-13  
WIPJL.....31,493- 221-57-A-26  
WIONP.....30,148- 195-62-A-22  
KIBYL.....27,405- 379-29-A-24  
KIAKL.....24,419- 300-41-B-33  
WIIHY.....19,440- 162-48-A-17  
WICWU.....17,380- 149-47-A-21  
WINJL.....17,270- 157-44-A-13  
WINGT.....12,208- 130-38-A-22  
KIDBK.....12,115- 105-38-A-26  
KIAKI.....11,244- 112-24-A-18  
WIMJL.....11,495- 98-31-A-16  
WICMW.....39,115- 87-18-A-21  
WILGO.....28,650- 57-20-A-7  
WIKIN.....16,900- 40-16-A-4  
WIMEG.....12,037- 37-13-A-3  
WIIET.....11,800- 35-8-A-3  
WIELE.....6,115- 21-12-A-5  
WIMMW.....5,338- 22-10-A-5  
WIOJP.....4,551- 14-13-A-7  
KIDPY.....1,666- 10-7-A-1  
KIAJC.....1,174- 8-7-A-2  
KINRD.....640- 5-12-A-3  
KICEH.....451- 5-4-A-3  
WIMX (6 oprs.)  
106,760- 785-68-B-35

*Massouri*  
W0TDR.....142,898- 783-73-A-40  
K0GJD.....06,030- 582-66-A-40  
K0JPL.....79,200- 489-66-A-37  
W0QWS.....75,225- 447-68-A-40  
K0HIM.....68,000- 427-64-A-34  
W0ACN.....54,445- 361-46-A-32  
K0KWR.....40,648- 925-61-A-33  
W0RTV.....43,039- 260-69-A-18  
W0FIN.....43,120- 308-56-A-28  
W0ARO.....38,880- 288-54-A-16  
K0KQK.....28,275- 222-52-A-33  
K0LJZ.....27,448- 216-46-A-38  
KN9PFV.....7354- 80-37-A-16  
K0NBE.....6800- 87-34-A-27  
K0HOK.....1,226- 81-18-A-7  
W0KIK.....1900- 41-19-A-16  
W0JTC.....1,425- 29-20-A-7  
K0AUV.....9,325- 25-14-A-7  
K9AUN (7 oprs.)  
57,184- 332-69-A-39  
W0EEF (6 oprs.)  
43,064- 387-56-B-20  
K0CQA (K0s CPN  
QRT)  
27,650- 200-56-A-16

*Nebraska*  
W0NYU.....131,488- 785-67-A-40  
W0WLO.....114,576- 651-71-A-40  
W0URB.....108,268- 700-62-A-38  
K0MRS.....63,975- 439-60-A-32  
W0LDW.....33,989- 231-59-A-23  
K0LOK.....5,880- 76-32-A-13  
KN9QVA.....4,133- 16-11-A-5  
K9OBF (W0A0s, K9OBF)  
62,434- 509-62-B-36

**NEW ENGLAND DIVISION**

*Connecticut*  
W1PEA.....180,000-1007-72-A-39  
W1BHL.....179,945- 999-73-A-40  
W1TYQ.....172,441- 978-71-A-40  
W1AW\*.....171,110-1205-71-B-40  
W1RAN.....142,568-1007-71-B-40  
W1MIF.....126,000- 700-72-A-24  
W1VYQ.....122,500- 703-70-A-36  
W1RCH.....112,410- 667-68-A-38  
W1RFE.....111,720- 798-70-B-38  
K1DHU.....108,875- 670-65-A-38  
W1ZDP.....107,920- 608-71-A-29  
W1TTP\*.....104,198- 638-66-A-38  
W1FTS\*.....90,000- 500-72-B-30  
K1CXA.....81,280- 411-28-A-38  
W1VGT.....71,613- 491-73-B-27  
W1MBA.....65,395- 451-58-A-36  
W1PFG\*.....56,115- 387-54-A-28  
K1AJJ.....55,080- 460-48-A-38  
K1ACC.....50,480- 343-58-A-19  
W1TYS.....49,410- 371-71-B-17  
W1BDD.....37,570- 251-68-A-17  
W1MWB.....35,550- 316-45-A-25  
W1CHR.....32,630- 252-52-A-15  
W1NJM.....25,300- 230-44-A-11  
W1ADW.....23,300- 203-43-A-14  
W1EWF.....22,600- 177-52-A-13  
W1LJZ.....16,370- 126-52-A-20  
W1JTD.....15,844- 65-65-A-7  
K1CSH.....14,026- 116-49-A-21  
KN1HFV\*.....13,018- 132-41-A-38  
KN1GCS.....11,495- 105-44-A-20  
W1YYM.....8,100- 74-26-A-3  
KN1GRJ.....4689- 68-31-A-21  
K1REF.....1675- 10-17-A-7  
K1GUD.....3623- 63-23-A-29  
W1UYV.....3480- 48-29-A-11  
W1NLM.....2341- 41-38-A-8  
KN1EBY.....2915- 53-22-A-11

*Western Massachusetts*  
W1YAH.....181,833-1248-73-B-38  
W1E0B.....178,588-1237-73-B-40  
W1DZV.....100,643- 567-71-A-31  
W1KGI.....91,350- 522-70-A-33  
W1PZD.....63,619- 398-65-A-39  
W1WFF.....37,395- 280-54-A-26  
K1AZW.....35,340- 228-62-A-21  
W1DGT.....29,510- 227-65-B-18  
K1BZM.....21,448- 101-46-A-25  
W1RWR.....11,500- 100-16-A-8  
W1PNS\*.....8458- 100-34-A-8  
W1BCK\*.....4760- 70-34-B-9  
KN1TWP\*.....640- 56-23-28  
W1DGL.....1998- 47-17-A-2  
W1DYO.....1960- 28-28-A-11  
K1GSW.....1720- 43-16-A-6  
KN1GHO.....1375- 35-19-A-14  
KN1HRL.....1080- 35-12-A-17  
K1TYS.....540- 27-8-A-7  
K1DAJ.....359- 25-7-A-6  
W1PPO (W1s CRK WEF,  
K1GIZ)  
126,300- 900-71-B-37

*New Hampshire*  
W1HKA.....30,500- 460-70-A-38  
W1CPL.....48,300- 328-60-A-36  
W1WPF.....35,625- 250-57-A-19  
W1TVP.....28,610- 210-66-A-21  
K1GGJ.....27,844- 253-45-A-31  
K1ATL.....10,050- 101-40-A-17  
K1CSJ.....8145- 92-36-A-17  
KN1HK.....2150- 48-20-A-32  
W1HKA.....1475- 35-8-A-7  
K1RCS.....893- 21-17-A-2

*Rhode Island*  
W1CJH.....126,913- 718-71-A-39  
W1SMB.....117,250- 700-67-A-40  
K1CIB.....61,045- 421-58-A-40  
W1RFO.....56,883- 376-61-A-38  
W1LWA.....47,453- 333-57-A-19  
W1WIQ.....44,888- 288-63-A-19  
K1RPI.....43,313- 275-63-A-37  
W1RFL.....39,345- 325-61-B-30  
K1BRJ.....11,224- 110-41-A-27  
W1LQJ.....9690- 163-24-A-19  
K1DFT.....5890- 76-31-A-6  
W1GMI.....5585- 71-33-A-2  
W1PNI (K20 YJ, K4AKP,  
K9A0N)  
75,640- 610-62-B-7  
W1SKT (W1W1Q, K1E1J,  
W0QQQ)  
69,818- 487-58-A-40

K7AST.....50,763- 333-62-A-36  
W7QLH.....44,606- 295-61-A-34  
W7IPW.....33,804- 248-55-A-21  
W7DZX.....31,320- 153-56-A-36  
W7BZR.....18,900- 135-56-A-14  
W7JTO.....14,040- 117-48-A-13  
W7FZB.....11,500- 100-46-A-9  
K7BRQ.....7770- 111-28-A-9  
W7MEJ.....7000- 70-40-A-9  
KN7CE\*.....6316- 90-31-A-30  
K7CUB.....5715- 64-36-A-5  
W7PN.....5500- 100-22-A-14  
KN7GHV.....3673- 59-26-A-37  
KN7CNT.....3360- 65-21-A-24  
W7IEU.....2970- 44-27-A-24  
K7AZD.....2138- 50-18-A-8  
KN7GDO.....1348- 49-11-A-25  
W7CWN.....454- 17-14-A-6  
W7EJD.....259- 12-9-A-3  
K7BSR.....30-4-3-A-1

**NORTHWESTERN DIVISION**

*Alaska*  
K17CRE.....55,725- 381-60-A-39  
K17CR.....15,405- 142-51-A-4  
K17FRT.....15,321- 139-37-A-6  
K17CTB (K17s CND CTB)  
7254- 93-39-B-7

*Idaho*  
W7WMO.....91,170- 354-59-A-31  
K7CPC.....10,660- 115-41-A-23

*Montana*  
W7HAA.....116,424- 825-72-B-40  
W7VGG.....64,756- 401-65-A-31  
K7ABV.....62,278- 440-59-A-38  
W7TPE.....59,710- 430-56-A-29  
K2OUK\*.....6526- 89-30-A-7

*Oregon*  
W7YKT.....42,375- 861-68-A-40  
W7TML.....12,732- 890-69-B-39  
W7OFC.....93,080- 756-66-A-39  
W7JHA.....79,730- 469-68-A-40  
W7RMU.....64,080- 405-64-A-34  
K7AWH.....51,170- 303-68-A-32  
W7LTP.....30,800- 224-55-A-27  
W7KFE.....15,921- 139-47-A-20  
K7BDK.....12,758- 122-41-A-16  
K7BBD.....11,020- 116-38-A-10  
KN7CBN.....590- 37-8-A-17  
W7DMC (9 oprs.)  
26,500- 213-53-A-33

*Washington*  
W7YGN.....167,353- 933-73-A-40  
W7HMQ.....160,020- 889-72-A-40  
W7LEW.....150,938- 864-70-A-40  
W7QFE.....129,392- 714-73-A-40  
W7AJR.....119,510- 705-68-A-30  
W7RGL.....82,524- 600-69-B-34  
W7JCC.....73,308- 413-71-A-7  
K7CHH.....73,185- 437-68-A-39  
W7VRO.....70,703- 431-66-A-19  
W7AVY.....58,240- 366-64-A-36

**PACIFIC DIVISION**

*Hawaii*  
KH6IJ.....104,609- 717-73-B-39  
KH6HAA.....73,618- 459-65-A-39  
KH6JG.....24,510- 244-58-A-30  
KN6CW.....20,882- 197-53-B-23

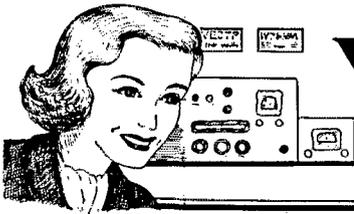
*Nevada*  
W7KEY.....188,683-1071-71-A-40  
W7ZVN.....36,018- 817-58-B-32  
W7VTD.....16,416- 152-54-B-12

*Santa Clara Valley*  
W6UTV.....156,768- 859-73-A-35  
W6MVF.....153,183- 863-71-A-36  
K6ITCP.....122,741- 698-71-A-40  
W6NLL.....85,425- 510-67-A-23  
K6AYB.....38,055- 258-59-A-22  
W6C1Z.....34,840- 268-52-A-29  
K6COD.....34,375- 250-55-A-27  
W6ACD.....27,500- 200-55-A-39  
W6HOC.....10,258- 73-73-B-13  
K6NLU.....7933- 90-38-A-32  
W6EJU.....5313- 125-17-A-15  
K6LQY.....2870- 83-14-A-7  
W6MMG.....2750- 55-10-A-7  
K6KPB.....1395- 30-21-A-11  
KN6GWQ.....280- 19-8-A-11

*Last Bay*  
W6TT.....167,760- 932-72-A-40  
K6QHC.....160,840- 847-72-A-39  
K6R5B.....112,146- 665-73-A-35  
K6IGV.....85,200- 481-71-A-35  
W6GEF.....76,763- 445-69-A-28  
W61PH.....66,528- 404-66-B-29  
W6NBL.....62,685- 400-63-A-39  
K6PJV.....55,875- 375-60-A-35  
K6QCF.....30,715- 323-63-A-40  
K6PWT.....44,250- 300-59-A-36  
W6YLL.....13,395- 141-38-A-29  
WV6BFR.....350- 24-7-A-11

*San Francisco*  
K6PFI.....126,000- 702-72-A-40  
W6S1J.....118,825- 379-70-A-38  
W6EYV.....115,908- 662-71-A-37  
W6YCC.....72,504- 607-72-B-25  
K6PJV.....17,200- 172-40-A-31  
W6WLV.....8978- 87-42-A-19  
K6B5A.....2494- 43-29-B-4

(Continued on page 176)



# YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,\* W1QON

## DXCC YLs

The following list contains the call letters of YLs who hold the Postwar DX Century Club award as of March 15, 1959. The number and date following the call letters is the number of the certificate and the date it was issued.

		Phone		
W1MCW	18	4-21-48	W6CXC	897 4- 3-57
W2PBI	115	8- 4-49	ZP5JP	930 5-29-57
W8BFQ	222	4- 6-50	W5JCY	960 7-12-57
LU4MIG	290	9- 1-50	W3BIW	985 8- 2-57
FA2CQ	363	4-25-51	IIZFF	994 8-12-57
LU4DMG	504	6-24-53	ZELJE	1011 9-18-57
CO2BK	547	1-16-54	IISGZ	1018 10- 1-57
IT1AFS	560	3-25-54	W5HWK	1059 11-18-57
W2FZO	604	1-31-55	KL7ALZ	1080 12-19-57
KZ5DG	637	5-16-55	W4VCB/3	1113 1-25-58
W9QLH	662	7-19-55	K8ACC	1119 2- 5-58
DL6VM	724	3- 2-56	W5HWX	1171 3-27-58
W6QOG	737	5- 1-56	K4CYP	1188 4-10-58
EA7EV	770	7-12-56	W3GEN	1224 5-19-58
W1YFK	772	7-16-56	W7TGG	1283 8- 4-58
PY7BVG	797	9-18-56	KL7BLE	1306 9-15-58
ZP5ET	810	9-26-56	PY5QZ	1329 10- 1-58
K5BEU	849	12-26-56	W3ICQ	1338 10-13-58
W1RYJ	861	1-25-57	K2MGE	1361 11- 5-58

## PHONE and C. W.

W6YZU	311	11-19-48	K5AHZ	2805	2- 1-57
W2NFR	393	2-23-49	W9MPX	2819	3-11-57
W6UHA	399	3- 1-49	W1YYR	2850	3-28-57
W4ITR	472	4-29-49	K5ADQ	2874	4- 9-57
G3ACC	750	10-28-49	ZSIRM	2988	6-17-57
W1FTJ	829	6-27-50	W3GEN	3031	7-28-57
ZS6KK	870	3-18-50	W9OMZ	3048	8- 5-57
W9TAM	998	7-28-50	W4VCB/3	3058	8-12-57
Z82EC	1269	6- 8-51	K6OWQ	3061	8-13-57
YK3YL	1407	12-26-51	D8QKB	3111	9- 9-57
W5UCQ	1880	1-26-54	DJ2YL	3119	9-18-57
W9QLH	2004	8-30-54	VE3DKY	3253	12- 2-57
W1RYJ	2024	10-14-54	W5DRI	3476	4- 7-58
F3YP	2041	11- 1-54	W1RLQ	3504	4-24-58
KZ5DG	2138	5-16-55	W5EGD	3515	5- 1-58
W3WUH	2171	7-15-55	KL7BHE	3516	5- 2-58
Z86WJ	2204	8-24-55	W3SKQ	3733	8-18-58
KZ5KA	2347	3-12-56	KH6AUJ	3756	8-25-58
W7QGF	2388	4-16-56	K0BES	3812	9-20-58
K6ENL	2451	6-20-56	PY4OD	4022	1- 9-59
W1YFK	2630	10-15-56	W9MLE	4029	1-14-59
W1YYM	2651	11- 1-56	K5BEU	4113	2-24-59
W6CXC	2700	4-29-56			

## Coming YL Get-Togethers

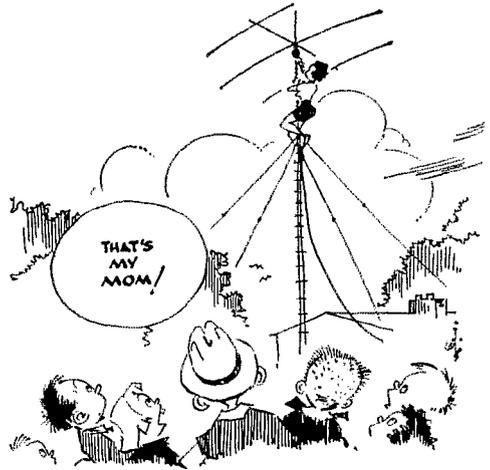
### Oregon ARA State Convention — YL Program

May 2 and 3, Roseburg, Oregon. Activities for YLs, include a special breakfast and luncheon, fashion show, greenhouse tour, and earring contest. Contact Charlene McLain, K7DIV, for further details.

### Women Radio Operators of New England

May 2, Pillar House, Newton, Mass. on Route 128 near Route 9. All W1 YLs cordially invited to attend annual Spring luncheon of WRONE. Contact Onie Woodward, W1ZEN.

\* YL Editor, QST: Please send all news notes to W1QON's home address: 318 Fisher St., Walpole, Mass.



### Santa Barbara YL Get-Together

May 23, Hotel Carillo, Santa Barbara, California, for W6 YLs. Contact Gladys Eastman, W6DXI.

### Eleventh ARRL National Convention — YL Program

June 19-21, Galveston, Texas. Program for licensed YLs will be hosted by members of GAYLARK, with Pres. Lillian Beebe, W5EGD, serving as chairman. High lights include a special breakfast with YLRL forum, a YL display booth, and hospitality room. The booth will display various YL certificates, QSLs, and YL handcraft. A ham station will be manned by W5 YLs for handling convention traffic. K5s ALF, BJU, and BWM, are chairmen of the aforementioned activities.

### ARRL New England Division Convention — YL Program

Sept. 5 and 6, Hartford, Connecticut at the Statler Hotel. YLs from the six New England states won't want to miss this one. Convention attendance will be limited so reserve Labor Day week end right now and watch for further details.

## Homework Anyone?

1. Name three basic parts or sections usually included in an antenna system.
2. What determines the polarization of a straight wire antenna?
3. True or False — In general, antenna construction and location become more critical and important on the higher frequencies.
4. What is meant by the bandwidth of an antenna?
5. Describe a simple dipole antenna.
6. Define front-to-back ratio.

Have to check on some of the answers? Chapter 14 on Antennas in any edition of the ARRL *Handbook* for the past few years is the reference we used. Let's compare notes next month.

If you like the idea of a smattering of technical talk here, let us know. Sure, and the rest of the magazine is ours for the learning too, but perhaps a bit of exposure to things technical on our own page (with deep deference to that small but inspiring group of YL operators who can and do hold their own in technical matters) will spur us on to a more extensive enjoyment of radio.

## CLUBS:

*Georgia Peaches*—Twenty-six members are happy to QSO with anyone interested in the Georgia Peach Certificate, which is offered upon contact with 10 Peaches. Send QSLs to Peggy Butterfield, K4KKR, 2203 Terry Mill Rd., Atlanta, Ga.

*Camellia Capital Chirps*—Doing their parts to publicize the California Camellia Festival March 6-15, members issued special camellia certificates to the first 3500 hams contacted during the annual festival.

*SPARCYLs* are flying a new YLRL affiliation certificate (at least 50% of the membership belongs to YLRL). The club's foreign "adoptee" ZS2NW, Estelle, sent over a big box of gifts, African style, as a token of friendship.

*Los Angeles YLRC*—Some 100 YLs brought their OMs to the annual club YL-OM banquet. Mr. Bernard Linden, FCC Engineer-in-charge of the Los Angeles office and OM W6ALZ were guest speakers. Travelers W9RUJ, Marv, and W9YWH, Evelyn, were present. W6MFP, Agnes, made ceramic hearts for each YL, with name and call inscribed.

*WAYLARC's* had a Valentine YL-OM dinner too, with twenty-two in attendance. W3RXJ, Irene, and W6QYL, Martha, planned the pleasant party, with the guests providing the spontaneous entertainment when each was asked to deliver a one minute speech (with mike) on her most interesting QSO or her pet peeve of ham radio.

## Miscellany

YLs involved with handling traffic in an attempt to locate a missing boy from Atlanta were K4s CYY, DNL, 1FF, KKR, KZT, LVE, MEH, and RNS. . . . W0ERR reports that she is active along with K0ERR, GZI, LSL, SDK, and W0QIW in the Denver area on 50 Mc. Ann is a member of the Mile High Hi Bander six meter net. . . . W1YPH, Leona, happily announces that her son and wife are new novices. Her daughter-in-law Jean is KN1JY in Springfield, Mass. . . . Look for Vermont YL W1ZWN, Arline, on 15 meters. . . . The Acra YL Net of Wichita, Kansas has changed net frequencies from 7.280 Mc to 145.35 Mc., according to KN0SML, Irene. . . . Another YL to take up flying is W1SVN, Millie, mother of four young boys, anticipates operating airborne occasionally. . . . OQ5IE can be found on 20 s.s.b. nearly every afternoon, and ZF1JE tunes up on 7066 kc. in the early evening. Both Jane and Molly look especially for YLs. . . . W1EY is off the air due to a fire at her QTH which put her in the hospital with first, second, and third degree burns. Happily, Skip is progressing satisfactorily. . . . W1BBS, Kate, of Freeport, Maine, is manager of the Northeast area Barnyard Net.

Lucia Toms, CR7LU, sends word of an International DX Contest sponsored by the DX Hunter's Club of Beira, Mozambique, Portuguese East Africa. The contest will run between August 15 and 25 and "any fixed station in the world, amateur bands, c.w. or phone, can compete under terms of their licenses in their respective countries." W amateur participation is cordially invited. Lucia writes that her official DXCC score has increased to 151, with 12 more QSLs expected. She and her OM CR7DQ attempted operations on 50 Mcs. but regretfully found that they could work only local CR7IT. They have returned to daily operation on 7, 14, 21, and 28 Mc.

## Addendum to CQ YL

Bringing her book *CQ YL* up-to-date, author Louisa Sando, W5RZJ, announces that a page of addenda is now available to all who have already purchased copies of the book. Easily inserted in the spiral-bound, flexible book is a page of information listing 1959 YLRL officers, new awards available from the YLRL, additional holders of DX and v.h.f. awards, in addition to other award information. The page is available upon request to W5RZJ, 212 Sombrio Drive, Santa Fe, New Mexico (include return postage) and is the first of similar addenda to be printed annually in order to keep the book as current as possible.

Celebrating the first anniversary of publication, the price of *CQ YL* has been lowered to \$3.00 per copy. The book is the first complete history of the YLs of amateur radio. Containing 18 chapters and some 500 photographs, the author has covered every phase of YL activity in our hobby.

Wondering if they may have initiated something unique, a group of Oregon YLs gave an on-the-air baby shower for Sandra Shepherd, W7DAT, XYL of W7GPC of The Dalles, Oregon. Organized by Marianna Kearney, W7WFO, with the aid of Lone Jorgensen, W7ZLS, the pink and blue baby shower net met on January 31st at 2:00 p.m. on 3890 kc. NCS Bea Austin, W7HHH, checked in W7s CSQ, GLK, CWG, HGS, ZLS, ZLT, and K7s AJB and DMH for vicarious attendance at the party.



Guest of honor W7DAT sends her thank-you-notes immediately on 75.

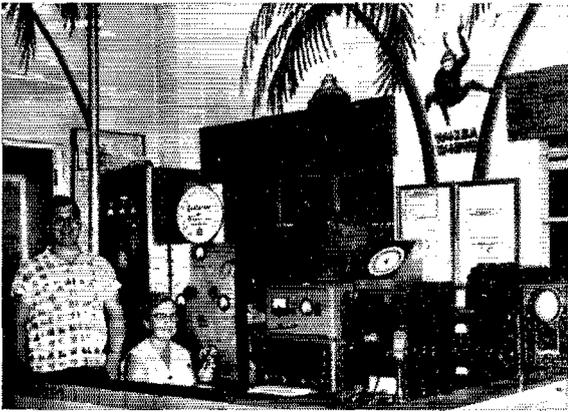
The expectant mother was lured to the hamshack of Hazel, W7JDU, after considerable intrigue. Pink and blue bows adorning the transmitter and receiver gave the clue to a novel approach to an old custom. Deluged by gifts that had been mailed in from YLs throughout the state, Sandra regained her composure enough to enjoy the roundtable that followed.

Naturally enough, when baby Scott arrived on Feb. 20, his parents confirmed his arrival to ham friends via QSL card announcements.

The party for W7DAT is the second "air-waves shower" that has been arranged by the Oregon YLs. The first was organized by W7DIC in honor of W7ENU a year ago.



Isn't the little fella cute? His mom and pop are Mr. and Mrs. Kazutake Hisajima of Yahata, Japan—by call, JA6MO and JA6PR. Mrs. Hisajima (Nariko) now has the company of several new JA YL operators as a result of a course conducted in Tokyo by several well-known JA OMs. The new YL calls are JA1s CLG, CLH, CLI, CLJ, CLK, CLL, CLM. (Photo via W7DJU and W9BRD and info via JA1JH and K6DY)



To add to the "Wow" you just uttered and merely by way of identifying the operators on the left, and not the equipment, Ruth, W4BWR, and Bernie, W4ZBA, Nissen are a well-known mother and son team in Melbourne, Florida. Bernie does most of the rig building while Mom does the operating and painting. Ruth has served faithfully for several years as EC for South Bervard County. (Photo courtesy W4IYT and Florida Skip)



The newest in telephone facilities was demonstrated to members of the Los Angeles YLRC during a tour of the Pacific Telephone Company's largest Los Angeles office. A group of fifty enjoyed the tour, which was arranged by Lee Eastman, W6AWI, OM of club member W6DXI, and a Pacific Telephone Co. engineer. W6AWI advises that telephone companies throughout the country are usually happy to conduct demonstration tours for civic and technical groups. The photo shows W6AWI pointing out new equipment to YLs W6JZA (seated) and (left to right) K6OQD, K6BUS, W6DXI, W6MWU, W6CEE, K6PFY, and WV6BNS.



Celebrating, as the sign reads, their first anniversary, the Florida girls posed for this milestone photo at the Orlando Hamfest. Identifying all from left to right, back row first: KN4SMW, KN4UIZ, W4UF, K4RGR, K4QOS, W4PIK, W4KOH, K4LEG, and W4BIL. Middle row: W4BWR, guest, prospective YL, K4RED, K4BQI, W4ZVW, and W3CUL, Mae, guest speaker. Front row: W4HRC, W4KZT, K4IDQ, K4PPX, K4RNS, K4OJD, and a little friend. (Photo courtesy W4IYT and Florida Skip)

### Strays

Phonetic confusion. A 3-way QSO on 40-meter phone between W8MM, W9MM and W9NN.

A typographical misprint, we think. A recent club bulletin described plans for Fiend Day.

The FCC is in need of Radio Engineers at

various points throughout the United States and possessions. Beginning salaries are \$4190 or \$5430, depending upon experience and student marks. For complete particulars, write to the Board of U. S. Civil Service Examiners, Federal Communications Commission, Washington 25, D. C., and request announcement No. 187B.

# Armed Forces Day

16 May 1959

**A**MATEUR radio operators are invited by the Army, Navy, and Air Force to participate in Armed Forces Day communication exercises on Saturday, 16 May, 1959. The co-sponsors of the activities are the Director, Naval Communications, and Military Affiliate Radio System (MARS) representing the Army Signal Corps and the Air Force Director of Communications and Electronics.

Complete details are as follows: A c.w. receiving competition will feature a message from the Secretary of Defense. Any individual is eligible to participate. A certificate of merit will be issued to each participant who makes a perfect copy. Transmissions will be at twenty-five w.p.m. on the following schedules:

Time 16 May 1959	Call Sign	Frequencies (kc.)
170300Z (2200 EST)	WAR/AIR Army & Air Force radio, Wash., D. C.	3347, 14,405, 20,994
170300Z (2200 EST)	NSS (Navy radio, Washington, D. C.)	3319, 4010, 6970, 14,480
170300Z (1900 PST)	AGUSA (Army radio, San Francisco, Cal.)	6997.5
	NPG (Navy radio, San Francisco, Cal.)	3319, 7595, 14,927.5
	NPD (Navy radio, Seattle, Wash.)	7455
	AG6AIR (Hamilton AFB California)	7832.5
1100 GCT (2000 India)	NDF (Navy radio, Kami Seya)	2287.5, 4545, 9427.5, 13,471.5, 16,445, 23,010

Each transmission will commence with a five-minute CQ. It is not necessary to copy more than one station, and no extra credit will be given for so doing.

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 shall be indicated as well as the name, call sign (if any) and address of the individual submitting the copy.

A radioteletypewriter (RTTY) receiving competition will feature a special message from the Secretary of Defense. A certificate of merit will be issued to each participant who makes a perfect copy. Transmission will be at sixty w.p.m. on the following schedule:

Time 16 May 1959	Call Sign	Frequencies (kc.)
170330Z (2230 EST)	WAR (Washington, D. C.) NSS (Washington, D. C.)	3347, 14,405, 20,994, 3319, 7375, 14,480, 7915
170330Z (2130 CST)	AIR (Washington, D. C.) A5USA (Ft. Sam Houston Texas)	5302.5
170330Z (1930 PST)	NDS (Great Lakes, Ill.) AG6AIR (Hamilton AFB, Cal.) AG168A (Army radio, San Francisco, Cal.)	7455 7832.5 6997.5
170345Z (2145 CST)	NDF (New Orleans, La.) NDW (San Francisco, Cal.) NPD (Seattle, Wash.)	6970 3319, 7375 7455

Each transmission will commence with a period of ten minutes of test and station identification to permit amateurs to adjust their equipment. At the end of the test period, the message will be transmitted. It is not necessary to copy more than one station, and no extra credit will be given for so doing. The message should be submitted as received. No attempt should be made to correct possible transmission errors. Time, frequency, and call sign of the station copied should be indicated as well as the name, call sign and address of the amateur concerned.

Messages copied in the contest should be submitted to: Armed Forces Day Contest, Room BE1000, The Pentagon, Washington 25, D. C.

The high light of the Armed Forces Day amateur radio activities will consist of military-to-amateur transmitting and receiving contacts, for all holders of valid U. S. amateur radio licenses. Headquarters stations of the Army, Navy, and Air Force in Washington, D. C., will establish radio contact with amateur stations and will acknowledge these contacts with a new type varicolored QSL card. Contact may be made with the Headquarters station of each of the three services providing an opportunity to qualify for the three different QSL cards.

Military stations, WAR, NSS, and AIR, will be on the air from 161800Z (1300 EST) to 170500Z (2400 EST) on 16 May, 1959, to contact and test with amateur radio stations. Amateur contacts will be discontinued from 170245Z to 170400Z to

(Continued on page 172)

This photo shows some of the activity at the Navy's NSS during last year's Armed Forces Day activities. From these four operating positions NSS worked amateurs on the various frequencies.



# Previews of...

# GALVE



Station K5BHF of the Electronic Technicians and Amateur Club will operate on 3850 & 3950 kc. and 29.2, 50.2, & 146.85 Mc. to "talk in" visitors to Galveston who will be operating mobile/5. Members of the committee of this operation include K5EHF, HPH, EIV and EHZ.



Shown in his Texas City Refining Company office is Doc Agee, W5AUN, Registration Chairman. Answers to many information requests from hams all over the country are dictated by Doc from this operating position. As Texas City RACES radio officer Doc monitors the 2-meter net at all times.



Registration ticket Number 1 is being presented to W5EYE by Bert Hepler, W5DMM, GCARC president. Although many registration blanks have been mailed to all states, additional blanks and a convention leaflet are available upon request. Address GCARC Convention Committee, Box 73, Route 1, Galveston, Texas.



Norm Bach, W5DJD, Chairman of the Galveston County Amateur Radio Club Convention Committee, meets with Major Wilson, Ellington AFB Communications Officer, to discuss Air Forces displays at the convention. At the mill of the Ellington MARS station is Corp. Maxwell.



Getting ready for the Saturday night dance are W5BRM, K5SPD, Martha Atkins, W5DMM, and Betty Atkins. The dance, which will follow a buffet supper, will be open to all registrants at no cost. Most convention activities will be held in the convention center.

# STON



Bill Fulton, W5JSU, exhibits manager, drives his car onto the floor of the exhibit hall to point out to W5ERH the location of the Houston GAYLARK exhibit. Supplementing displays in the exhibit area will be several mobile communications and demonstration vehicles located in the outside exhibit area.



Harry Cherrod, W5ZG, general manager of the convention, followed by Norm Bach, W5DJD, chairman, descend to the lobby of the convention center on one of the many escalators.



A breakfast for licensed YLs is being planned by members of the Gulf Area Young Ladies Amateur Radio Klub. Seated in one of the many convention meeting rooms are K5PFF, K5ALF, W5EGD, W5ERH and K5BJU.



Dorothy Fulton, W5JSV, ladies' program chairman, checks program details while W5ZG comments on the AF MARS session plans with MARS coordinator W5RIH, while seated in one of the Convention Center lounges.



A behind the scenes photograph shows Gail Atkins, K5AFN, arrangements chairman, and his XYL inspecting kitchen facilities at the brand new Moody Convention Center. The center boasts of one of the best kitchens in Texas and can serve 2500 people at one time.

# The 11th National ARRL Convention

Galveston, Texas — June 19-21

**T**HE 11th ARRL National Convention will be held in Galveston, Texas, on June 19-21, under the sponsorship of the Galveston County Amateur Radio Club. Cooperating clubs are the Bayshore Radio Club, Brazoria County Amateur Radio Club, Electronic Technicians and Amateur Club, Houston Amateur Radio Club, and the GAYLARKS. Amateurs in the West Gulf Division are old and expert hands at playing host to ham gatherings, as witness the fact that the event will also include the 29th annual division convention.

All convention activities except for the pre-convention party and some ladies' activities will be in the new, fully air-conditioned Moody Convention Center, which occupies a full block between the Galvez and Buccaneer hotels. Its main floor houses a large exhibition hall where manufacturers and dealers will be showing the latest in amateur gear; on the second floor are multiple meeting rooms for various activities in the program. Although not yet final, the schedule tentatively shapes up as follows:

*Friday afternoon:* Army and AF MARS sessions; AREC-RACES session.

*Friday evening:* Pre-convention beach party; also special rooms open, for the duration of the convention, for Army and AF MARS, and v.h.f. groups.

*Saturday morning:* Transmitter hunt; licensed YL breakfast; general assembly for formal convention opening; s.s.b. and v.h.f. forums.

*Saturday afternoon:* Informal luncheon; DX, RTTY, Novice and Receiver sessions; Mobile, TVI, Antenna, and Transistor sessions.

*Saturday evening:* Refreshments & Buffet;

Dance; Wouff-Hong initiation at midnight.

*Sunday Morning:* Transmitter hunt; v.h.f. breakfast; FCC exams; West Gulf Division and general ARRL sessions.

*Sunday noon:* Convention banquet; awards. (Convention closes about 1.30 p.m.)

Special activities for the ladies include a tour of a Navy vessel Friday afternoon; on a Saturday a luncheon, SWOOP initiation, harbor excursion tours, swimming; on Sunday morning a tour of Galveston Island.

A hospitality desk will include professional hostesses for advice on tours, religious services, etc.; talk-in stations will be on 3850, 3950 kc., and 29.2, 50.2 and 146.85 Mc. Bring your QSL card or card collection for entry in the QSL contest, and brush up on your code for the speed copying contest (or a left-foot sending contest for phone men).

Advance registration for amateurs, guys or gals, is \$7.50; for non-ham ladies, \$5. The pre-convention beach party is \$3; Saturday informal luncheon, \$3.75 (ladies' luncheon, \$3), refreshments and buffet, \$6.50; Sunday grand banquet, \$5; Wouff-Hong initiation, \$1. Send your reservation with remittance, or request for more information, to the GCARC Convention Committee, Box 73, Route 1, Galveston, Texas.

Room rates at the Galvez, Villa and Buccaneer Hotels, all adjacent to the convention center, are generally similar and are in the range \$5-\$8.50 single; \$9-\$15 double. Send your requests to the ARRL Housing Bureau, Box 59, Galveston. After June 1, fees will be slightly higher.

Combine your 1959 vacation with attendance at the eleventh ARRL National Convention; there won't be another until 1962!

**QST**

Left to right; the Buccaneer Hotel, Moody Center, the Hotel Galvez, and Galvez Villas.





# How's DX?



CONDUCTED BY ROD NEWKIRK,\* W9BRD

## Hah!

A supercilious guest of honor gazed haughtily down from the dais at the countenances of our motley DX Hoggery & Poetry Depreciation Society. He nonchalantly gulped another hors d'oeuvre followed by a flagon of Old Haywire, and listened in rapt indifference as echoes of our beloved Wouff Hong Song (cha-cha) wafted through the hall. We resumed our seats. Wonderful May! Spring's climax was confirmed with a *thwack-thwack-thwack!* as Hy Bauer, meeting chairman, gavelled for order preceding the star's introduction.

Our visitor was not overrated. After a meteoric rise to 299 countries and his triumphant acquisition of the first and only AACK! (Accumulated All Certificates Known!) award he had been toasted and lionized at polite DX assemblies far and wide. Our DXHPDS entertainment committee gloated understandably as their victim acknowledged the hubbub of the multitude below. He retrieved the few VQ7 and ZC9 QSLs that had popped from his vest pocket and resumed his manicure while we proceeded with the business portion of the meeting. O.M.Mose arose and led off with news of a broken record:

He called as a zealot inspired,  
With larynx that never grew tired,  
His CQ-DX —  
And wha' hopenen next?  
The poor nitwit's license expired.

"The toast!" someone shouted from the rear of the crowd. But Melton Fuis next took the floor to . . .

Consider the crust of McSquatz  
Who knocks off the rarest of spots.  
Skillful? No, cunning —  
The reptile is running  
Entirely too many watts.

More cries of "Toast, toast!" rent the air. And somebody screamed, "Where's Leo?" This disconcerted our gaudy guest but not Juan A. Workemal, who delivered:

One pea-brained lugubrious boar —  
Berserk at the chance of a score —  
Can't raise that Tibetan,  
So pounds out upsettin'  
CQs-AC4-AC4. . . .

Our impressive visitor paled as a curare-tipped Rettysnitch snatched off his toupee. The mob's mood moved from fun through frenzy to ferocity as ominous cracklings and rumblings reached our ears. Ivan Offalnote had to howl his verse above mounting bedlam:

I bring up for scorn Clown O'Sneez  
Who ought to dry up, yet springs leaks.  
While others stand by  
He clutters the sky  
With wisecracks and insults and squeaks.

This was it. The time had come to toast our stuffy guest and he sensed his danger too late. Suddenly he was alone on stage as a huge halo of unearthly lavender corona descended from hidden high-voltage electrodes above. *Cr-r-rack!* The lid shrieked in transfixed terror as another fiery ring enveloped him, another and yet another — *crack-crack-crack!* The tenth shattering explosion stunned him completely.

This was the signal for the release of Leo, our spirited DXHPDS mascot, from a cage behind sliding panels to the right of the rostrum. Simultaneously great steel bars clanged down between that gruesome scene and our hooting jeering throng. The gathering disintegrated into complete chaos as good old Leo thoroughly lionized our pompous visitor, a lout previously elected by secret DXHPDS ballot as undisputed DX Hog of the Year.

## What:

Speaking of lions, the first day of spring really roared into the Caribbean like Old Leo. *Wow!* After an earlier agonizing unsuccessful pass at low-lying Serrana Bank, W9EVI and shipmates, including such cricketjacks as Ws 3PZW 1KXX and YN1CB, finally zeroed in with K84BB in time to catch the closing c.w. session of the 1959 ARRL International DX Competition. Though hampered by the sheer weight of fantastically frantic pile-ups (will 14,050 kc. ever be the same again?) the adventurers turned in an ear-popping performance, a de luxe DXpeditionary production reminiscent of the granddaddy of them all, FOBAJ of Clipperton (1954). . . . So what else is new? Let's rattle the grapevine. . . .

**80 c.w.** gives interesting indication of a changing propagational climate if you compare this paragraph with our 3.5-Mc. rubric of twelve months ago. The range is moving *'way* out, as W1s TS Y1S, K2DDK (fast 22 countries worked on 80), K5LLJ, W6KG, W8YGR, W9MAK, K9JLT and K0JPL confirm in reporting CT2AI, EI9J, FA9VN, FM7WU, FO8AC 11, JA1BF 13 hours GMT,



\*4822 West Berteau Avenue, Chicago 41, Ill.

KM6BL, KV4AA, PJ2AE (17 kc. above the lower band limit) 6, SPs 3KBQ 8CK 0-1, TIZLA, UA0LS 11-12, VK5NO 12, VPs 5FP 7BT 10-11, VR2DA 11, XE2OK, ZK1BS 12, ZL3s PZ JT 8, QX and ZP9AY. Indeed, W8-DLU had a rousing three-way with DJ2HC and ZL3QX one quiet morn. And 75-meter phone fan G2DRT pleads for W/K/VE fellows to tune below 3800 kc. for his 35-watter, according to K2UYG ..... Eighty-meter Novice DX news is beginning to seep in. Here's KNTDAs (now a General) with JA1UL, WH6CWI and WL7CUW on a mere 10-foot-high dipole. And G3HZL writes: "Tell your 3.5-Mc. Novices to listen for DX. I hear plenty of them after 0300 GMT (2200 EST) mostly from the eastern call areas up to strength Six" ..... As for 75-phone fans, a batch of W6/K6s, W7/K7s and W8KF7/5 chin with KM6L between 10 and 14 hours GMT. And European contacts grow more plentiful off the low edge down East.



OD5LX has scored nearly nine thousand contacts, a third of these with W/K colleagues, since firing up in 1953. Ted favors 20 c.w. with a 65J7-65J7-6V6-807s arrangement, an ancient HRO receiver and a simple long-wire. OD5LX signed SP1CS before WW-II and now works as chief engineer for the Lebanon army signal corps. (Photo via W8KX)

40 c.w. becomes a strange melting pot of rag chewers, traffic nets and DX pile-ups as the weeks tick off. The long-haulers doubtless are moving in strong, judging from dispatches filed by W1TS, K2s UBW UPD, K3BVV, K4s CIA PHY, K5s ABV JVF, W6KG, K6OIZ, W7s DJU VCB, K7CZ, W8s IBX YGR, W9JIN, K9ELT, K9HGB and 11ER who specify the 7-Mc. presence of CE3AG, CN8ME, DM2AD, 5, DUs 6TY 7SY (13) 11-12, EA8BF 7, F9QV/FC, FA9VN 23, FO8AC, FV7YI (50) 12, HA5-KFR (12), HG4HE, HH2HB, HI2DN, HL2EO, JA1s AEA BF BKV BRL BWP BZS CBZ CGN GJF DY VX, JA2s AAQ BJ BP RL, JA3s AFB AIS AJB AT IS QY, JA4s HM LL/mn PL, JA6s ABC AK YB YG, JASOB, JA8s BR GG, K6TSQ/KG6 (17) 10, KA2s CB (25) 12, LG, KR6z AK 10-14, BF, LZ/KK 5-6, PHINTB, PJ2MF, PY7AF, K not Fernando but Recife, SP8CP (8), SV0WP 4, TG4AA (25) 7-8, UAs 1 DZ 4, 3C 1, 3KAN 5, 0FS 0KCK 0KFG (25) 10, 0KIA 0KIU 0KUV 0LS 8-11, 0BSs KBB (35) 22, TV 4, WF 4-5, UL7GQ (5) 12, UO5s AA (3), JA (35) 22, VK9s RR AK 10-11, VP7BT, VR2DA (20) 8-10, XEs 20K 5A just Mexico, YUs in gobs, ZK1BS 11 and a few random ZS chaps.

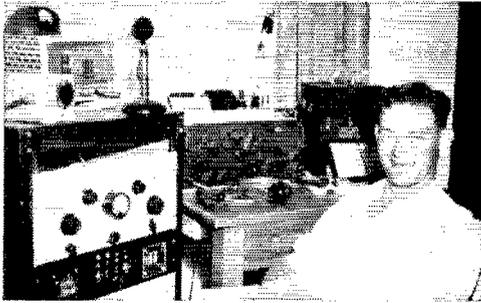
20 c.w. whistles a merry spring tune accompanied by W1s RB (227/220), TS, K1s CCA CDN, W2s GZV HMJ (281/275), JBL, K2s QXG UPD UYD, WA2CCC (125/53), W3LOS, K3BVV, W4s CYY JRU, K4s CIA (108/75) IGD (103/86), PHY (121/97), QJ (152/132), K5s ABV JNY MHG JZP, W6s JQB KG PIF, K6s ALH (107/65), CQF LAE (153/123), THZ, W7s DJU QNI VCB, W8s CSK IBX (173/142), W9s IHN JFJ (94/73), MAK, K9s ELT (85/58), JQA (70/41), W6SLB, K9s HGB JPL (72/50), VEs 1PQ (236/220), 3EIL (76/41), FO8AW and 11ER. This anvil chorus is swelled by outlying AC4AX in troubled Tibet (100), CNs 2BK (38), 22, 8BK 8JE 8ME

8MK, CP3CD 0-1, CRs 4AX (95) 12, 5AR (20) 21, 6BX (45) 7, 7AD (30) 13, 7BS 23-0, 7CI (30), 7CR 9AH (35) 12, CTs 1ID ITT (40) 23, 2AI 2BO 3As, DUs 1DR IRTI (40) 14, 6IV (25) 12, 7SV (95) 12, EA8s 8BF (83) 22, 9AP (40) 15, 9AQ, ET2s KY 1-23, VB, FAs 3AF 3DU 8RJ 9VJ, FB8s CL 23, XX (45) 13-14, FF8CI 6, FG7XE 22, FK8As 5-6 and 12, FM7WP (55) 0, FO8As AC (90) 12, AU, FO8Us AP AY, FS7RT, FY7s YF YI (50) 12, GC2FZC, GD3UB, HAs 1KSA 5KFR 6, 6IN, HGs IAGI 4E (30) 4, 5CN 2, H18BE, HKs 3TH 5SG (30) 2, 0AL, HL2AC (25) 12, HR-2FG, HSiC, HZIAB (325) 4, ITIs AGA 3, CDS TA, JA1s AB ACA AG BF BLM VE VE/8 VX, JA2s DO GX LK, JA3s AF MR, JA4s AA HM OP PL, JA5 5AF 6AP/3 6CI 6CS 7AD 7LA 8AA 9AA, JZBHA (60) 12, K6QPQ/KW6, KAs 2AC 2CB (25) 12, 2LN (65) 13, 2MF (50) 12, 2QT 2RS 8KW (55) 12, 9MF (25) 6, 0CG 0IJ (40) 12, KC6JC (15) 13-14, KGs 1DO (77) 2, 1EM (90) 22, 4AI, 6AAV (50), 6ALF (95) 13, KM6s BK (9), BL, KR6s AC (40) 13, AK 14, RY (40) 14, KV4AA (81) 21-23, KX6s AF 12, CO (65) 4, 12, CW 11-12, LAs 1VC/g 7 of Antarctica, 2CG/p and 2JE/p (35) 7 of Svalbard, LUs 1ZA 3ZX of Argentina's icebox, LZs 1KBA 1KPC 1KPK 1UR 2KBB 7, 2KSB, MP4s DAA TAC, OA4s FA FM, OD5s CI (90) 5, LX, OQ5EW (60) 19, OR4VN (6) 23 of the Belgian antarctic, OX3s AY (3) 13, UD, OY7ALL 22, PJ2AX, Fernando da Noronha PY7s AFN and SC (50) 21-22, PZ1AP, RAEM of Moskva, SM5WN/LA/p (20) 4-10, SL8AY/mm aboard a Swedish training ship, SU1s IM 22, MS (63) 0, SV0s WP (75) 9, WX, TFs 2WDY 3PI 4WDH 5AD (25) 13, TG9s MR TS, TI2DN, UA1KAE/6 14 of the Russian antarctic, UA9s AA (55) 1, AR BN CL DN DV DW JR (40) 23, KCA (5-95) 5-12, KCS (20) 14, KJA 4, KJF (40) 23, KOH KSB 6-7, 9RK (25) 12, 9VB (35) 1, UA0s AG AH (30) 23, CC CI CK (65) 13, GF 13, GK 12, JD (40) 12, JJ KAB 3, KAR 14, KCK (25) 12, KCO (80) 12, KDA KTG (5) 11, KIA (25) 12, KJA KKD KOA 3, KOC KQB 11, KSA 12-13, KSB (60) 12, KUA (40) 3, KUV (75) 12, OM (75) 15, RQ (20-60) 12, RW (55) 13, SK (40) 13, UB5s hand over fist, UC2s AA AD CB KAC 2, OM, UD6s AI AM 5, KAF (19) 20, UF6s DD (20), KAF KPA (40) 6, UG6AG 21, UH8s AG (20) 13, BG KAA 13, UI8s AD (55) 13, AP KAA, UJ8s AG 2, KAA 2, UL7s GQ (5) 12, KAD (35) 11-12, UM8KAA (65) 12, UN1s AE (40) 4, AH 4, UO5s AA (50) 21, BM 11-12, PK 19, UO2s AN 7, AR AS AT BU KAA KCA 4-7, UR2s KAA KAC 6, VE0NI, VK9s AD (25) 12, JG (25) 21, RO RR (35) 12, WP, VK0CC, VPs 2AR 2KR 2, 2SH (41) 2, 2SW 4TR 0, 5FP 6AP (40), 6PV (2) 0, 6RG 7BT 8BK 8EP (5) 1, 9BY 9EN 9EP 9L, VQs 2AB 22-23, 2W 6LQ 16, VR2s DA (15) 6, DK, VS1s EB GZ HU HX (30) 12, JP 23, JW 16, VS5JA (90), VS6s AE (20) 12, DX (50) 14, VS9s AQ MB (60) 18, NI, VU2s AJ 13, DN GJ (60) 13, RM, W4JRD/KS4 1, XE0NHD, XW8AI (45,72) 4, XZ2TH 21, YN1CAA, YO3s AQ WL, YJ1DL (80) 6-9, YV5s EB HL (65), ZB2I 21, ZC4s CB IP 16, ZDs IGM 2GUP (15), ZJM 2VPP 7SA 7SE, ZEs 2KL 7JF 20, 8JJ 5, ZKs 1AK (15) 12, 1BS (22) 6, 2AD 10, ZPs 6AG (90) 14, 9AY 1, ZSs 3FX (24), 7M, 3A2AF, 3V8AC, 5As 3TQ (60) 22, 5TO (43) 21, 9G1s BQ (45) 19-23, CF, 9K2AN 16, 9M2s DW (32) 3 and MA.

20 phone presented BV1US (160) 15, CNs 8JE\* 9CJ, CX5AF\* (305) 1, ET2BP\* (F8PAP (160) 13, HKs 1DK 3DB 6AF of San Andres delimit, HR2DK, HS1E (165) 15, HZIAB\*, KAs 2YA\* 91F (180) 14, K6CCG, KCs 1DZ\* 4AL, KL7FAZ (210) 14, KX6BT, OH0NC, of the Alande group, OV7AL\*, PJ2AV\* SP3, PI\* SQ\* (266) 21-22, VE3EGD/SU, VPs 2DX 9EP, XEs IH\* (310) 3, 90GO, ZC4AM\* (305) 21, 5A5TO and 9M2FR (140) 14 to redoubtable K1s CCA CDN, W2VZY\*, K4s CIA QJ\*, K6RAII, W7VCB, W8IBX, K9s HGB TAO and VE1PQ\*, the asterisks denoting single-sideband samplings.

15 phone is more fruitful although K6CQF goes on record to say, "Conditions are not as good as last year." Anyway, reporters K1s CCA CDN, W2ETU, K4s PHY QJ RSD (85), TTF, UTI, K5s JCC (130/100), JTP JZP, K6s CQF LAE OQT, W7VCB, K9GSG, K6JPL and OA4DE collected CE0ZG, CN8s FA FV JC 1, JE, CP1CJ, CR6AG, CT3AI, DUs 1GF 7SV (212) 14, EA8s 8CF 8CM (229) 22, EL2G, FG7XE (193) 2-3, FO8AJ, HGs 1FV 1RY 5MT, H18GA (195) 4, K1s 1GF 0AI (240) 3, HL0KT 2, HPILB, HR2s DK MT, Iwo's KA0JJ (235) 4, KC4s USB\* USQ\* USV\*, K64AG, KM6BK, KX6CM, MP4-BCC, OA4s DE V, OQ5s IG IH, PJ2AN, SP1CK, SV0WT, TG9s PS TS, TI2s WD WO, UR2BU (180) 16, VK9s AD (190) 4-5, NT (200) 4, RO (196) 4, SB 5 of Papua, VPs 1OLY (190) 19, 2AB 2AD (242) 2, 2DX (240) 4, 2GAB 0-1, 2GS (240) 1, 2LS 2SL (202) 2, 3HAG 3MC 4, 4TS 5AB (248) 3, 6GC 6MR 6WR 8CC (190) 12, 8CI (215) 2-3, 8CV (195) 3, 8CX (232) 2-3, 9BY 9DM 9PC, VQs 2SB 2VG 3HL, VR2BC (170) 4, VU2NR, XZSZY, XW8AL, YNs 1CAA 1M1 4CB 4HC 3, YS1s IM 1M1, ZDs LEO (175) 2, 1FG (206) 3, 2KT 9AH, ZE4JH, ZH2AB (220) 5, ZP5-MQ, ZSs 3E 9G, 5As 2TO 5TF 5TO, 9G1s AA (203) 1 and CW.

15 c.w.'s catchword, vouchsafed by K1CCA, is "unpredictable!" W1TS, K1CDN, W2s ETU GVZ (124 worked on 21 Mc.), K2s UBW UPD, W4JKU, K4s CIA IGD PHY QJ RSD UTI, W5KNE, K5s ABV JTP MHG,



VK2FR was just another Aussie until ARRL's DXCC Countries List annexed Lord Howe Island last year. Now Trevor basks in a spotlight of concentrated r.f., this glare alleviated only periodically when DX hounds from the mainland arrive for DXpeditionary work. (Photo via W6YY)

W6s JQB KG, K6s LAE OQT, W7s DJU QNI VCB, W8s CSK IBX YGR, W9s JLN MAK, K9s GSG JQA, K9s HGB JPL, VE3EIL and 11RR specify the raisability of BV1USB (52) 4-5, CE3AG, CNs 2AE 8DJ 8JE 3, 8JX 8AK, CRs 5AR (95) 0-1, 7BS, CTs 1JL 3AB (16) 17, CXs 2BT 7CO 1, DUTSV (103) 3, EA9s AD AP (5) 2, ELIs K 3, P 12, ET2s KY (24) 19, VB (30) 16, F9QV/FG, FAs 8ZZ 9VN/sh, FB8ZZ (46) 16, FF8BF/sg, GC3HFE, HA5DH 18, HC1ET 2, HK0AI (100) 21, HRs 3MW 9AA 0, HZ1AB (52) 1, ITIAGA, JAs 1BF 1KF 3AF, KG1AQ, KG6BI, KR6s AK BF (70) 3, KV4AA, KX6CW (92) 4, LJ2F, LZKNEI, OD5CI, OH0NC (90) 17, OQ5s CP (30) 18, LL, OX3RII, PJ2ME of Sint Maarten, SL3AG of the Swedish forces, SM5WN/LA/p (57) 2-15, SV8s (88) 13-19, WT, TF3PI 0-1, T2RO, UAs 1CC (26) 16, 1HR (45) 13, 1KAQ 4KE 9GB (50) 13, 9KYB 2, 9VB 0GF (80) 4, 0KAR of Dickson isle, 0KFG 0KLA (50) 4-5, 0KSA, UB5s KBV (92) 17, KLA (35) 17, WF (100) 13, UN1AF, UQ2AS 15, UR2s 1DX (103) 16, KAA KAE 14, VK9s AD (67), XK (95) 4 of the P.T., VPs 4LA 5FP 8CV (55) 23, 8EP (85) 1, VQs 2AB 19, 3CF (20) 18, 5EK (34) 20, 6LQ, VSs 1GZ (85) 15, 6DLS 4, 9MB (60) 18-19 of Gan, XZ2TH (23) 19, YV5GY, ZC4s 1P 21, RP, ZD1FG, ZE5s 1JV (50) 20, 4JH 5YE (10) 20, ZK1BS, ZPs 5AQ (55) 21-22, 9AY, 5As 2CV and 3TQ.

**15** Novice notes are noteworthy, filed by KNs HFFJ (30 worked), IIMP (now Generalized at 2K countries), 4YGS 4ZIW 5PYX 5RQJ (40 snagged), 6TUN 0REV, WV6s CGB and CPI (12 and 5 continents) and dealing with the likes of CN8JX, CO2BL, CX3BH, DM3s KSH KYN 22, DUTSV, EAs 5EH 7IA 8AL, FA9UO, HL2AG HPI1AI, HZ1AB, JAs 1TD 3AQ 3BP 5FT 6FB, KA2RB, KR6CA, KW6CE, KZ5LSN, LAs 3WG 4LE, OA4s RP 1T N, OD5LX, OX3s FP RH, PIHNTB, SP5AR, TI2LA, UAs 1TQ 0KLA, UB5WF, VKs 2LX 3VJ, VPs 2AB 2GS 3MC 5AK 6GC 6XZ, VQ2DQ, VR2AR, WK7LD/KL7, WH6DBF, WL7s CRL CRW, WP4s in force, YN1FF, YUs 2QZ 3CP, YV5HL, ZB1DC, ZE5JU, ZIs in quantity, ZSs the same, and 4X4DI.

**10** phone will thin out now for its summer siesta but a spring surge satisfied the DX urge of KIs ADH CCA\* CDN DIW, KC2UYG, W3QIR (109/98), K3AAH/4 (116) 90, K4QJL, W7VCB, W8s GKB IBX YGR, K8KIEI, W9PFT, K9SGG, K9LEQ, GC3RS and OA4DE with elegant sufficiency. How? With CRs 2AN 2CC 22, 3GI 3HL, CN8s AB EV 13, JE ME, COs 2CL 5CN, GRs 4AV 6CA 7AQ, CTIQE, a flock of CAs, EAs 8AH 8CF 12-13, 8CN, 8LD 19, FA2BV, FB8AP/m, FS2RT, GC2RS, GD3UB, HGs 1AG1 1ET 1FO 1WP 7WK, HI2s LD Z 30, HIRGA HK7AB 13, HPIAC, HR1AB, JA1OP, K6QPG/KW6,

"How about a certificate for working and confirming 6000 Stateside stations?" inquires VK9AD, easily eligible for such a sheepskin. "WAS already is in the bag here for c.w. and a.m. but I await a few more States for a sideband sweep." When not busy gratifying W/K/VE DX appetites Stan manages an occasional addition to his own 167/127 total. VK9AD's neat Norfolk installation feeds a triband quad, 14-Mc. s.s.b. preferred at present. "I'm scheduled to leave the island in October, destination possibly VK2, but my tour of duty may be extended a further two years."

KAs 2UJ 8LF 0LJ (415), KB6BK\*, KC6CG, KG4-AR, KJ6BV, KM6s BI BK BP, KX6s AF BP\*, LX1s HIM JW 14, OA4s DE HK V 13-14, OD5AC, OQs 5AC 5DQ 5FV 13, 0DM 0PD 21, PJs 2AF 2AQ 2AX 3AD 12, 3AG, TG9TS, TI2s GO OE WD, UAs 1GF 14, 9KWA 0LA, UR2BU, VE3EGD/SU, VPs 1EK 1SD 2AB 2DA 2DX 16, 2GV 2LS 20, 3HAG 17, 4LA 4LG 4TF 5AA 5AB 17, 5CB 6EB 7BO 9DC 9DU, VQs 2V 4AC 4GQ 20, VR2BC, VS6BJ, XE1s galore, XE3AF, XW8AL, YNs 1FF 1JZ 22, 4CB 21, YS1MI, YUIUS, YV3s AA CR, ZB1NR, ZDs 1FG 7SA, ZEs 2KR 6JL, ZP5MQ, ZLs 1ADA 1AQ 3JO 1, ZS3AG (200) 19, 4X4FR, 5As 5A5 TT 10, 9K2AZ and 9M2GA, the stars indicating s.s.b. action as usual.

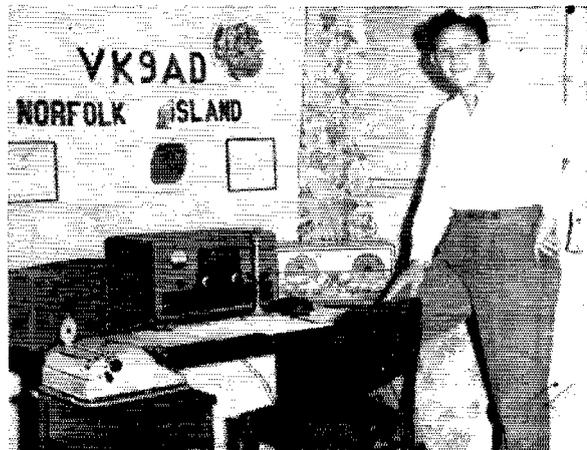
**10** c.w. simmers down after a pleasant equinoctial period. W1s KHV TS, KIs CCA C1N DIW (45), K2s UPD UYG, K3AAH/4, K4s CIA PHK, W5KNE, K5ABV, W6s JQB KG, W7VCB, W8s CSK KX (153/138), YGR, K8KIEI, W9MAK, K9s ELT GSG JQA and 11RR showing up with CE3AG, CNs 2BK 8PJ 8JE 8ME, CO2US, CR7BS, CTs 1TT 3AB 16-17, DM2s KBE KEK, DUTSV, EA8BF, F9QV/FG 16-17, FO8s AC 0, AK, GB2SM just England, GD3UB, HAs 5AK 18, 8WS 8WZ, HZ1AB, IT1PA 17, JAs 1BT 1BVK 1VX 3AA 5AF 7AD, KOTSQ/KG6, KA2s BE KS, KM6BK, KR6s AK 1, BF 6O (82), KX6s AF CW, QO5CI, QO5IG 17, P11NTP, PJ2ME, SMs 1BVQ 5WN/LA, p 2, SFs en masse, SV0WP (80) 14, TF3s AB 15, KG PL, UAs 1JZ (88) 15, 1TQ 3DB 0PR 0KIA 0-1, UB5s KA KAB TK WF, UQ2AN 15, UR2s KAA KAE 14, KCA 14, V6BN1, VP7BT, VS6JDS 23-0, VV5HL, ZC4IP 18, ZD2-11AI, ZK1BS, ZP9AY, 5As 2CV and 3TQ.

**160** c.w., though quiescent on the North Atlantic paths, displayed interesting February and March developments in other directions. Outstanding QSOs reported by WIBB in his invaluable low-band bulletins: W6KIP and HGHE at 0600 GMT on the 1st of March, a contact heard by ZL3RB; K6HXT and the same HC4; W8ANO and ZL3RB around 0900; and W9PNE made it to KH6LJ in late February. VP3AD logged lots of W/K/VE brethren but they didn't hear him around 1801 kc. VPs 7BT 9DAI and 9EP also were in there slugging, the former heard by ZL3RB. A VP2VA-VE2AZI QSO was overheard by K2UBW. All in all, the 1.8-Mc. gang made the best of a stubborn season. Just wait till next year — or before!

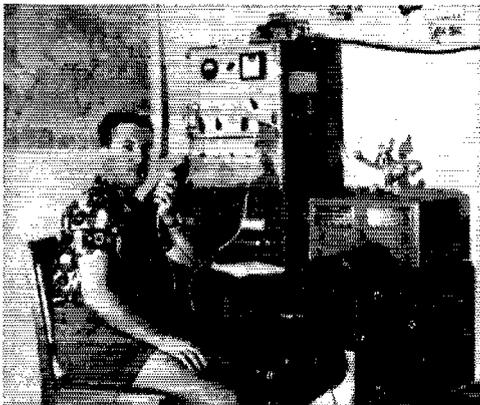
**Where:**

Africa — OQ5EH of the Union Congolaise des Amateurs de Radio advises via UIUED of ARRL Hq. that your OQ cards now can go via UCAR QSL Bureau, P. O. Box 3748, Elizabethville, Belgian Congo, a new address. "I have agreed to act as QSL manager for ZS5RO and XYL ZS58AI who planned two weeks of Swaziland operation in March, S.a.s.e. are a must." That from W1FFO. "CR6CA returned my IRCs," writes K1ADH. "He now uses sea mail direct rather than air mail." From FB8BC via W8KX: "In 1955, '56 and '57 a pirate used the call FB8AX. All efforts failed to locate him, however, and I received more than one hundred QSLs for FB8AX QSOs." That call had been defunct since the original FB8AX on Terre Adelle became FB8YI in 1953. "Beginning February 6, 1959, I will handle ZESJ's QSLs for the U.S.A. and possessions," writes W6DNP. "He plans to forward his log, or copy thereof, to me each week with full QSO data. ZESJJ began operation at Causeway last December." "VQ1QJ tells me he has a batch of new cards," says WIICP. "Charles mentions that it takes three IRCs for second-class air mail to the States, eight for first-class air mail." K4QJL, others learn that ZD7SA transmitted no single sideband prior to March of this year, spurious evidence notwithstanding. W9LJV continues to assist Bob with QSL matters, aided by K9PJN, and expects ZD7SA to win the s.s.b. fun for real one of these days. W8KX quotes 5A3TQ on the outskirts of Tripoli: "Being a civilian here, and our QSL bureau being at the air base to which I hold no pass, I must rely on the generosity of others to collect my inbound QSLs."

Asia — Via UIUED we learn that the Gan Amateur Radio Club, VS9AMB, will do honors for outstanding VS9MA



QSLs . . . . . Regarding his operation in this year's ARRL Test, HZIAB operator Bud McClure suggests the QSL route: HZIAB, Opr. Bud, APO 616, New York, N. Y. "In this manner I will be assured of receiving all of these cards and will see that they are answered." . . . . "Effective May 1 I will handle all American QSLs for VS6AZ," declares K6GMA. Self-addressed stamped envelopes, naturally . . . . "My compliments to XW8AL on his fast QSL, dispatched the day after contact," applauds KIADH . . . . OD5LX outlines his Yank QSL policy to W8KX: "Incoming cards can arrive direct or via bureau, outgoing cards go first class to ARRL QSL bureaus by surface mail." Ted emphasizes, "No dollar bills, either. To QSL is a duty and a pleasure at the same time." . . . . XZ2TH assures, "There is no QSL manager for my station anywhere. I receive cards direct only, and I guarantee a return QSL for every valid card received." . . . . As of this month W9QVY may be able to help you out concerning BV1A confirmations. Apparently he was in fact on Formosa . . . . From W4ML: "ZB2A/VS9 QSLs are being mailed to those who were considerate enough to enclose self-addressed stamped envelopes, and only to those who appear in Bob's log. Many cards were received for QSOs not corresponding to proper dates of ZB2A/VS9 operation." . . . . K6LAE, observing that W9CAE left the KA9IJ Two staff around the 1st of March, states that Ted has his chunk of KA9IJ log with him in Aurora, Ill., and will welcome QSL inquiries.



Geopolitical developments on the once Dark Continent now make press headlines, adding to the luster of such rare activations as that of FE8AP. Pierre expects to conclude his French Cameroons assignment for return to France next month. (Photo via W9WHM)

Oceania — "Please mention that I am still QSL manager for VS1JT," requests K6GMA, which we hereby do. . . . K5JVF learns from K6LKV that he handles no QSLs for KH6s operating fixed-portable in Samoa. Also, the call KH6SS has not been legitimately used for quite a spell . . . . "I still handle all cards for VR6TC," affirms W4-TAJ, "and no one who has actually worked Tom has to wait more than twenty-four hours for a card after I receive the logs here. Incidentally, I find an average of about five hams a month who try to squeeze VR6TC QSLs out of me on the grounds that they 'think he came back' to them." . . . . Don't neglect the s.a.s.e. angle when consulting W2CTN about JZ6DA and other pasteboards. . . . VK9AD discusses his QSL procedure in some detail. "I return a card by air mail upon receipt, provided postage is defrayed. I do not favor use of the bureaus because I don't like the amount of amassed work associated with receiving upward of 100 cards per batch. The time spent in processing such a number I could spend on the air. Six thousand VK9AD QSLs now are floating around Stateside, so I have enough of a chore handling cards with covering postage included let alone those without!" . . . . W8CSK is assured by ex-KB6BJ (W3PZW) that Dick's Canton QSL backlog will be reduced in good order, some eight kilo-QSOs' worth. . . . "I handle QSLs for VS5BY," advises W6ZEN. "S.a.s.e. are required or cards go via bureaus." Floyd also has it that disastrous weather may cause a break in ZK2AB's QSL continuity — see "Whence".

Europe — "In August of last year I managed to combine the family holiday with a slice of operating as 3A2CF, which I thoroughly enjoyed," reminisces G3ZY. "But on my return home I found that my activities had been preceded by a pirate using the same call. A lot of W/K cards have come to me for contacts made with this fellow. I have replied, explaining the position, to those who enclosed

IRC's. To all others let me say, 'better luck next time.' Only 3A2CF contacts made between the 4th and 17th of August are genuine." . . . . W7QNI informs, "UA4KAB operator Albert Perhutto appreciates QSLs sent to his home QTH [which follows] because he collects stamps. He promises return cards direct." Paul also finds that Swiss postal authorities don't seem to savvy those reply-paid international postals. . . . It pays to attend to minuscule details in addressing QSLs. G3HZL, for instance, may get no delivery if "Flat 3" is omitted from his otherwise apparently complete address. . . . "All QSOs of DL7AH/LX — 1710 of 'em — have been verified. Those who have not answered our QSLs are admonished to do so. Card stock is still available to replace those which may have gone astray." Harry hopes to revisit Luxembourg operationally again this year . . . . From friend OY7ML: "K6AXS has QSL'd every station who worked me on s.s.b. and I hope to receive a reply from each, direct or via bureau." . . . . ZB2A station manager Steve McClelland tells WLLF of ARRL that this Gibraltar mainstay issues from three thousand to five thousand QSLs yearly. The ZB2A gang stresses these pasteboard points: (1) contacts desiring fastest reply should be careful to include sufficient IRCs to cover return air mail (three coupons each for W/Ks), (2) QSLs received by bureau are answered likewise, and (3) all QSLs for bona-fide ZB2A QSOs are answered 100 per cent. . . . G3MNO, who uses 100 meters only, apprises K1GRJ that skulduggery may be afoot in connection with the use of his call on higher frequencies. Or else a G with similar label is careless in identifying himself. . . . C3CQE, as GB3GD on Man Isle, was hoping to encounter a few non-QSL types who need that country. K9ELT hears less a frustrating 40 countries shy in the confirmed department.

South America — G8KS regrettably advises that the DX logs of the late Stan Ward, VP8s BT and BU, cannot be located. "I have also been the accommodation address for Colin Johnson, VP8CC, who is now most likely on his way home to England. I forwarded a last batch of cards to him in October — he has but one ship per year. QSLs I have received since then are being held until Colin arrives." . . . . K2AYC finds that the street address of FY7Y1 (see following) is a requirement when addressing QSLs to Paul. Earlier versions of his QTH failed to specify same. . . . "Tell Jeeves to tell the gang that my PY8NA cards for October and November Trinidad Island DXpeditionary work began mailing in late February." PY1CK also indicates that further PY8 activity is in prospect . . . . PJ5AA, home at G5RV now, informs W7QNI that all his Netherlands Antilles work has been QSL'd but that quite a few cards evidently went astray in mailing. All requests are being attended to. . . . C83GI assures KIADH that Radio Club of Chile's 6500-or-so Juan Fernandez QSOs with 130-odd countries in February by CE9s ZA ZB ZC and ZD are being steadily confirmed upon QSL receipt.

Hereabouts — Latest available scorecard on QSL services provided by W2CTN: CR1AH, FK8AT, JZ6s DA HA, KW6CU, OX3RH, VKs 2AYY /h 2FR 9BW, QNT, VP6PJ, VQs 2EW 3CF 3HH, VR2s DA DK, ZB2L, ZD2DC, P Z8TM and 9LIBQ. Whew! Jack also does non-W/K duties for FM17WU. This commendation from DXpert W2HJM: "Ran out and saw W2CTN's QSL bureau. The guy deserves a lot of credit for doing such a fine efficient job. But too many hot-shot DXers send him cards without self-addressed stamped envelopes and that's not cricket, this being my own personal comment." Aug also noted that W2CTN went to the trouble of having a large batch of QSLs made up for CR5AR but the latter failed to close the arrangement (W2CN assists CR5AR). . . . TI2HP wants it clearly understood that his Cocos Island work (TI9s CW and SB) "is strictly an amateur expedition and we do not solicit nor want any 'contributions'. QSLs will be sent to all stations worked. Those who wish their cards by air mail should supply self-addressed envelopes and four International Reply Coupons each. Those who desire cards returned direct by surface mail need enclose only self-addressed envelopes. All other QSLs will go via bureaus." . . . . K9ELT hears that a few unscrupulous individuals are attempting an old congame in trying to fatten their countries-confirmed tallies. The theory is: Spray enough QSLs, with or without dollar bills, around the world, bearing the appropriate TNX-FOR-QSO legend, and you're bound to save yourself some pile-up fatigue. The catch is: It takes only a few tip-offs from incensed DX operators to inspire full-scale investigations and world-wide log checks of the QSOs claimed by such deranged dunces. The result is: obvious. . . . "Got a fast reply on my FM17WU card to W9YSX," beams W9MAK, "s.a.s.e., of course." K6ALII, W9s JFJ and MAK offer their services as QSL agencies for rare DX ops in true need. . . . W4CXA tells W8CSK that QSLing for his HR1-2-3EXP junket went forward upon delivery of appropriate QSL stock. . . . Newcomers, changes of QTH, etc., for your pleasure:

BV1A (via W9QVY)  
 BV1US, APO 63, San Francisco, Calif.  
 BY1PK (via LZ1AF)  
 ex-CN8MM (via LABRE)

This QSL's-eye view of ZL3RB, contributed by W1BB, introduces us to New Zealand's outstanding 160-meter DX-perimeter (visitor VK2AXH-ZL1AUL appears at right). Climaxing a year of propogational perseverance, ZL3RB and W6KIP clicked on mid-February 1.8-Mc. schedule for a joyful 20-minute two-way. This transpacific triumph somewhat compensated for a generally poor 1958-'59 160-meter season along U.S.A.-Europe paths. ZL3RB employs a hopped-up BC-342, a v.f.o.-6146-813 combo modulated by four 1625s, and a 560-ft.-per-leg Vee.



GO2DD (to CM2DD)  
 GR4AH (via W2CTN)  
 GR5AR (W/Ks via W2CN)  
 DU6TV, P. O. Box 9, Roxas City, Iloilo, P. I.  
 EA9DG, P. O. Box 345, Aaitu, Spanish Sahara, Rio de Oro  
 EL2G, W. Upshur, c/o U. S. Embassy, Monrovia, Liberia  
 FA2VB, M. Avella, Ecole de Garcons, Cite Petit, Oran, Algeria  
 FBBBS, A. Ladner, Box 1691, Tananarive, Madagascar  
 FB8CI, Box 8123, Dakar, F.W.A.  
 FC7XF (via REF)  
 FY7YL, P. Canavy, Rue des Ramparts, Cayenne, Fr. Guiana  
 GB3GD (via K9ELT)  
 HC1FO, c/o U. S. Embassy, Quito, Ecuador  
 HC1RY, R. Lopez, P. O. Box 581, Quito, Ecuador  
 HC5CN, Tesar Nieto, Box 219, Cuenca, Ecuador  
 HK0AI, V. Abraham, San Andres Island, Colombia, S. Am.  
 HL2AG, College of Engineering, National U., Seoul, Korea  
 HPIAC, Box 354, Panama City, R.P.  
 HRI-2-3EXP (via W4CXA)  
 IIEZZ/M1 (via 11DFC)  
 JZ0DA (via W2CTN)  
 K4SCW/mm, M/Sgt. R. L. Hoyt, USAF Vessel C-38-1862, Pier 8, Waalhaven WZ, c/o Van Brink Ltd., Rotterdam, Holland  
 KA0IJ, APO 815, San Francisco, Calif. (see preceding text)  
 KC4USX, AirDevRonSix (VX6), Navy 20, Box 911, FPO, San Francisco, Calif.  
 KM6BK, H. Pickerill, Navy 3080, San Francisco, Calif.  
 KP4GB, J. Browning, USCG, Box 2029, San Juan, P. R. ex-KR6LP (to K6EDV)  
 KV4BQ, E. M. Turner, ex-KP4WN, St. Paul's Rectory, Frederiksted, St. Croix, V. I.  
 KW6CL, R. Drake, P. O. Box 26, Wake Island  
 KX6CO, 1960th AACSSqdn., Box 11, Navy 824, FPO, San Francisco, Calif.  
 LU5OJ, T. Sotelo, Campaneto, Y.B.F., Vespucio, Argentina  
 OQ0D, R. Dethier, OQ5DM, P. O. Box 42, Usumburu, Ruanda-Urundi, Belgian Congo  
 OY1J, J. Gerald, Kiaksvig, Faeroes Islands  
 PJ3AD, E. Carroll, Box 52, Seroe Colorado, Aruba, N. A.  
 PY7AFN (via PY7AA)  
 PY0NE (via PY1HQ)

ST2KO, Dr. M. Dransfield, Cotton Breeding Section, P. O. Box 30, Khartoum, N. Sudan  
 TI9s CW SB (to TJ2HP)  
 UA4KAB, A. Perhutko, Postbox 19, Stalingrad, U.S.S.R.  
 VK9AD, S. Davies, Norfolk Island via Australia  
 VK9JG, Box 55, Rabaul, T.N.G.  
 ex-VK9LE (via VK6MK)  
 VK9ML, P. O. Box 55, Rabaul, T.N.G.  
 VK0AT (via VK6RU)  
 VP2GDW (via KV4AA)  
 ex-VP9DP (to K9JVR)  
 VQ2EW (via W3CTN)  
 VS4JT (via K6GMA)  
 VS5BO (via W6ZEN)  
 VS6AZ (W/Ks via K6GMA; see preceding text)  
 VS9MB, RAF Amateur Radio Club of Gen, RAF, BFPO 180, Maldiv Islands via Ceylon  
 W4JRD/KS4, J. Galbraith, 202F Stadium Apts., Key West, Fla.  
 XE2OZ, E. Richer, Box 34, Laredo, Mexico  
 XE4B (via LAIRE)  
 XE5A (via XE1DY)  
 XY1OM, M. McCutcheon, c/o J. Regan, VR2AZ, P. O. Box 236, Nadi Airport, Fiji Islands  
 YN1CK (via W1EQ)  
 YN4CB, H. G. Patrick, P. O. Box 4, Bluefields, Nicaragua  
 YN4DLS/mm (via W4KVV)  
 YN4TS, H. Stokes, P. O. Box 1089, Managua, Nicaragua  
 YS1IM, J. Giammattei, P. O. Box 190, San Salvador, El Salvador  
 YU1SF, L. Rudic, 27 Parceticeva, Subotica, Yugoslavia  
 YV5AEX, G. Ivec, P. O. Box 1827, Caracas, Venezuela  
 ZB2A/VS9 (via W4ML)  
 ZB2I (via W2CTN)  
 ex-ZC6UNJ, P. Altdorf, UN MoGip, 216 Sale Rd., Rawalpindi, Pakistan  
 ex-ZD1SW, S. Walti, 4895 Walkley, N.D.G., Montreal, P.Q., Canada  
 ZD2CKH, K. Harrison, P. O. Box 38, Jos, Nigeria  
 ZE8JJ (W/Ks via W6UNP)  
 ZP5AO (via RCP)  
 ZS5s RO/7 SM/7 (via W1FFO)  
 3A2CZ (to ON4QX)  
 3V8AC, Essid Abd Ali, rue Rekeb Impasse Jouapa, Msaken, Tunisia  
 5A2CV, RAF Stn., El Adem, BFPO Box 56, via London, England (or to G3BBF)  
 9G1CF, Dr. H. de Glanville, P. O. Box 4, Winneba, Ghana  
 Bless W1s AW ICP KRV TS UED VG WPO, K1s ADH CCA, CDN, W2s HMJ JBL, K2s AYC UYG, WA2CCC, W3QIR, K4s CIA DKX PNY, W5KNE, E5JCC, W6s JOB, KG PHE, K6s CQF LAE LKV OQT, W7QNI, W8KX, W9JUN, K9GSG, VE3EIL, PY1CK, A. Rugg, DX Club of St. Louis, DeRidder DX Club, International Short Wave League, Japan DX Radio Club, Northern California DX Club, Ohio Valley Amateur Radio Association, Southern California DX Club, VERON's DXpress, West Gulf DX Club, Willamette Valley DX Club and the Wireless Institute of Australia for the foregoing fingerwork.

**Whence:**  
 Asia — Wandering K4SCW relays word from H.R.H. the Prince of Sikkim, AC3PT: "There is but one operator on the air here at present, AC3NC, and it is likely that another station will go on in the near future. Bhutan has AC5PN active and another likely operator is AC5SQ. Recently there have been many pirate ACs and, so far as I am aware, there are no other AC3 or AC5 stations. Under the present political situation no foreigners apart from specially screened Indians are allowed to operate." ACs 3NC and 5SQ are better known as erstwhile ACs 4NC and 3SQ  
 ----- Gan's RAF gang, VS9MB, informs: "Simultane-



Pat O'Brien of VS6AE fame consistently bridges the Hong Kong-U.S.A. gap via several bands and modes. (Photo via W2EQS)

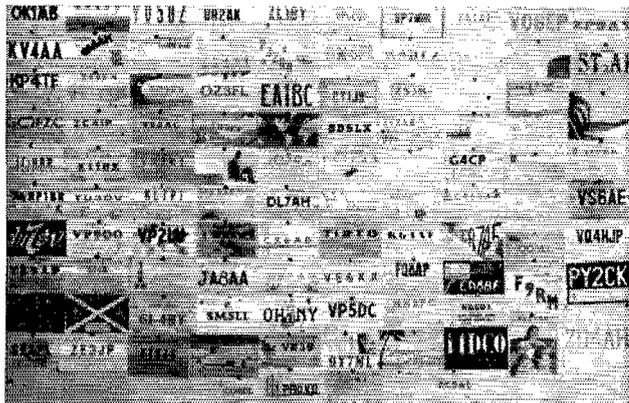
ously with the reforming of the club after the departure of Don Tranmer, VS9MIA, we also managed to find a better shack. After a hectic afternoon of moving we strung up a long-wire to a palm tree for a temporary aerial and were operating by evening. Stateside and European signals start rolling in at about 1700 GMT and we are kept quite busy. Our best band is 20 c.w., the only difficulty being that VS9MIA is on 14 Mc. at the same time. There may be another VS9 working from Gan in the near future." K4QJ reports the VS9MB signal consistently good near 14,095 kc. . . . K4PNY has it that ZC4RP returns to G3MRP early in July. . . . K6ALH is told that UA9OM's Tannu Tuva lark, somewhat delayed, may proceed this month. UA9KQA's Maru is recommended by W6KG for your world-wide YL collection. . . . VS6DS, secretary of H KARTS, formerly signed ZC6JG, MD-40C and VS1BF. W8XK found him enjoying fine spring conditions on 28-Mc. c.w. . . . Commentary from OQ5LX via W8XK: "The W/K boys come through fine on 20 at times in the mornings around 0100-0300 GMT. My operating schedule is 0200-0430 on 20 meters, 1800-2000 on 21 or 28 Mc., c.w. exclusively." W4AL writes: "ZB2A/VS9 alternated days of operation with VS9OM, both using the same 8-watt rig and doublet with an RAF receiver. Bob did a splendid job in QRM caused by those calling CQ-DX, rag chewing and testing on 14,050 kc. His receiving technique was excellent, and this cannot be said of some Stateside stations as he points out: 'You will find that some of the fellows in the States were under the impression that they worked me when in fact I was in QSO with someone else at the time.' Then again I heard ZB2A/VS9 many times come back to a calling station with RST, etc., only to get no return acknowledgment." . . . KI4DH finds XW8AL most workable between 28,310 and 28,410 kc., phone of course, around 1600 GMT. . . . "IUBKAE sometimes calls CQ W/K near 14,080 kc. without replies," observes K4QLI. [If he were calling CQ-W9, Boss, the whole country would come back. — *Jeeses!*]. . . . W9PJT finds KA2BE readying for U.S.A. return after a 13-month 140/107-country Japan DX career. . . . K0HGB feels that the country-and-state status of Alaska turns the spotlight on the prospect of enterprising East Pakistan DX activity. East and West Pakistan are separated by the breadth of India, you know. . . . Asian tidbits via DXCSL, H KARTS and WGDXC: Pegasus plays Cupid! VS6EC successfully courted DL1OV on 20 c.w. and the pair are marrying in Australia. . . . JT1AB sticks close to the well-worn JT1AA spot, 14,060 kc., and JT1KAB is said to inhabit 40 and 80 meters. . . . MP4BBW intended a KWM-1 test in Trucial Oman in mid-April. MP4DAA began his holiday in March, leaving MP4TAC on the crucial Trucial spot. . . . AC4AX, using his usual 14,100 around 1300 GMT, asked W5ASG for BC-610 conversion data.

**Africa** — New scenery on our DX vista: such calls as AL5RR and AL7GZ, both frequenting 14-Mc. c.w. and designating Algeria's Touggourt territory as QTH. That's an oasis community of 60,000 or so some 100 miles south of Biskra. . . . SU1IM confirms that he, SU1A AS IC KH and MS still are the only Egyptians licensed. . . . FB8BC assures W8KX, "There should be no difficulty working stations in Madagascar, I, myself, am QRV for W/K stations on 14-Mc. phone daily, 0345-0400 GMT by the short path, and once weekly on Sundays for the long path, 1330-1430 hours." . . . KGLAE notes that VQ2AB's six-month leave will take him through much of Europe and Africa, including stops at St. Helena and Ascension, operating intentions negligible. . . . From 5A3TQ (G3FJU, ex-9K2AQ) via W8KX: "DX conditions are poor for me, mainly because I'm using only dipoles and am unable to cut out European QRM. But 5A5TO, a great phone fan, has his own special quad version and does very well. I

manage to do exceptionally well with the States, however, and always have a queue. I run a DX-35 and have an Eddy-stone receiver. I don't use company equipment because our transmitters are always busy during the day and they require too much modification for c.w. work, my main interest. I'm very keen on contests and award-chasing but also like a rag chew." . . . UCAR officers for 1959 are OQ5EH, chairman; OQ5AO, secretary-treasurer; OQ5IC, QSL manager; OQ5s AT BT EU IK RT VD and OQ0DM, committeemen. . . . The March 28-Mc.-only Swaziland plans of Z55s RO and SM, OM and XYL respectively, featured Olga in full charge of all c.w. matters, by golly. . . . W9FJY, in close touch with South Atlantic doings through friend ZD7SA, affirms that fresh Ascension action is in the wind. . . . African oddments courtesy DXCSL, ISWL, WGDXC and WVDXC: FR7ZC shows up on 14,160 kc. now and then, and soon should have local competition. . . . FB8CD is said to put the Comoros on 14,320 kc. around 1700 GMT and keeps close touch with VQ8AD. Incidentally, FB8 "C" types are not necessarily Comoros-based. . . . ST2KO's favorite crystal is ground to 14,050 kc. or so. . . . CR5AC may be back in Portugal by now. . . . Z56AMV was to raid Swaziland last month if all went well. . . . Tromelin's FB8BK plays peck-a-hoo near 14,195 kc. around 0400 GMT.

**Oceania** — VS5BY should be on s.s.b. shortly," cheers W6ZEN. "Bruce returned to Brunei from vacation in Hong Kong and is very eager to return to the air. However, corrosion in his transmitter required the rewinding of several transformers as well as condenser replacements." . . . Grief at ZK2AB, reported by post to W6ZEN: "On the 20th of February we were visited with the worst hurricane within living memory ever to hit Nine. As a result I had a roofless house, a roofless store, and all my storage sheds are completely destroyed. Friends rallied 'round two days later and put a roof back on the house so we now have somewhere to live. But things are pretty grim. The side of the house where the rig was installed was blown in and the transmitter overturned. It soaked in sea and rain water for two days and I'm afraid it's off the air for good. The receiver also was dunked. All my radio papers and QSLs were a musty heap on the floor." W6ZEN, VK5AB, ZLs 1PA 3AB and 3DX are out to see what can be done for Charles to help stave off bankruptcy and return ZK2AB to the air. If you have an idea or two, contact W6ZEN. . . . "I noted a quote in your columns that I was going QRT last August," chuckles VK9AD. "Consequently I have been awaiting my airplane tickets from some kind Statesider but to no avail." . . . VK2AXH-ZL1AUU, the visitor shown in the accompanying photo of ZLARB, is one of Down Under's most prominent radio personalities. W1BB understands that Wal is the first to employ radio in antarctic exploration (1912) and is a founder of Australia's WIA. Since the passing of Wal's XYL in 1957 he has been invited to visit at ZL homes throughout the islands for two to four weeks per stop. "VK2AXH-ZL1AUL thus far has stayed at the homes of 27 hams, covered 6000 miles by car and 1000 by train, and is feted at clubs and gatherings wherever he goes," says W1BB. Talk about ham spirit! . . . W3PZW (ex-KB6BJ) tells W8CSK he left a c.w. void on Cauton after racking up thousands of QSOs with some 200 countries. . . . Boomer W2APF dropped into the Coconos-Keelings just in time to find VK9LE shut down and dismantled for departure to Australia. They had a pleasant line-of-sight contact nevertheless. . . . Old VK2ANN is back in the DX swim once again as VK5NO, notes W2HMJ. . . . W6PHF signs KFCN as third radio officer aboard SS Monterey. "The call FO8AW was granted to me by the Tahitian government while I was visiting the islands." . . . DXCSL, NCDXC, OVARA, VERON, WGDXC and WIA contribute Oceaniagrams: FO8AX (WA6DFH)

(Continued on page 186)



First "DXCC<sup>2</sup>" qualifier in our ninth call area is W9KXK (see page 59, April 1957 QST) who follows DL4ZC, Ws 4LVV 6GPB, CE3DZ, HB9J, Ws 5KC and 7ENW for the eighth such accomplishment recorded. Here you'll note colorful QSLs from scores of prominent ARRL DX Century Club members around the world. Who will be next to ship us a valid photo of aggregated confirmations from fellow DXCCers in 100 or more DXCC List countries?



CONDUCTED BY EDWARD P. TILTON,\* WHDQ

THIS is for the v.h.f. newcomer. Old hands at the game don't need to be reminded of it — they've been waiting patiently for several months now for May to roll around again.

If things have been a little quiet on your favorite v.h.f. band lately, keep heart. Better times are coming, if they are not already here. Come high or low sunspot numbers, spring brings joy to the v.h.f. enthusiast. You're about through working worldwide DX on 6 for at least 6 months — or maybe 10 years or so — but if this is your first spring in ham radio you've got some new thrills in store. Whether you're on 50, 144, 220 or 420 Mc., this is the season!

While it is certainly true that the v.h.f. man does not live by DX alone, it is nice to hear signals from outside the local range coming in stronger again, and with them other signals from greater distances than we've heard in months. (Other forms of DX may still be largely unpredictable, but here's a kind that you can almost count on, once you understand a little of the correlation between weather conditions and bending of v.h.f. waves. Familiarity with weather patterns, frequent observation of temperature, wind velocity and direction, and barometric pressure, plus regular study of the weather maps, will soon put you in business as a tropospheric DX prophet. The special feature of tropospheric bending is that it usually increases with frequency. If 50 Mc. is good, 144 is often better — and 220 and 420 may be better still. Weather-induced wave bending often brings in 2-meter signals from distances that are seldom or never spanned by this medium on 50 Mc., and it is reasonably sure that we've hardly scratched the surface of our opportunities on the higher bands in this department.

If you're a 6-only man you've probably had your fill of DX in the past several months, but wait till you run into your first real sporadic-E skip session! Here is something that nobody really understands yet, and that very unpredictability is the source of much of its interest to v.h.f. men. How is it related to solar activity? Nobody really knows. Why do some years produce only short, widely-scattered openings, with weak signals fitting in and out before decent contacts can be made, yet other seasons feature openings that last around the clock, with every corner of the country being heard in a matter of a few hours? Again, nobody knows, for sure.

Good sporadic-E skip openings have developed as early as April 15, and yet other years there may not be too much doing until well into June.

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

There is hardly a distance over 300 miles that cannot be worked at some time during a good E<sub>s</sub> season, so if you have despaired of working some of those states that never quite made it during the best of the F<sub>2</sub> DX, this spring may give you your chance. Most of the first 20 or so holders of 50-Mc. WAS made it without the help of F<sub>2</sub> DX, so don't sell sporadic-E short.

50 Mc. WAS

1 W6ZJB	17 W6OGW	33 W6PFP	49 W6FKY
2 W6BJV	18 W7ERA	34 W6BJI*	50 W8LPD
3 W6CJS	19 W3OJU	35 W2MEU	51 W6ZTV
4 W5AJG	20 W6TMM*	36 W1CLS	52 W6CGC
5 W7ZHL	21 K6EDX	37 W6PUZ	53 W2RGV
6 W6OCA	22 W5SPW*	38 W7ILL	54 W1DEI
7 W6OB	23 W6ORE	39 W4DDX	55 W1HOY
8 W6INI	24 W6ALU	40 W6DO	56 W6ANN
9 WHDQ	25 W8CMS*	41 K3DXT	57 W1SUZ
10 W5MJD	26 W6MVG	42 W6ABN	58 W1AEP*
11 W2IDZ	27 W6CNM	43 W6BAZ	59 W5LFH
12 W1ILL	28 W1VNH	44 VE3AET	60 W6NLZ
13 W6DZM	29 W6OLY	45 W6JFP	61 W7MAH
14 W6HVW	30 W7HEA	46 W6OIN	62 W8ESZ
15 W6WKB	31 K6GOG	47 W6WWN	63 W2BYM
16 W6SMJ	32 W7FFE	48 K9ETD	64 W7ACD

\*49

VE7CN	45	XE1GE	30	LU9MA	26	LA7Y	20
KL7AUV	44	KH8CTC	30	ZS3G	26	VQ2PL	18
VE1EF	42	SM7ZN	29	CT1CO	24	JA8AO	18
VE2AOM	38	PZ1AE	28	SM6ANR	24	JASBU	17
KH6UK	37	SM6BTT	28	CU6WW	21	JA1AAT	17
E1ZW	37	CO2ZX	27	LA9T	21	JA1AUH	16
VE4HS	41	ZE2JV	26	SM5CNN	20	ZE2JV	12

If you would get the most out of what is in store for this spring and summer, here are a few hints. First, tune for weak signals. The fellow who never answers anyone unless he is 40 over 9 misses half the fun. Stations 600 to 1200 miles away can be worked with the lowest power and simplest antennas, but the close-in ones may come harder. And when the band is loaded with S9-plus signals from the optimum distances there may be other and weaker signals coming through from roughly twice the distance, by double-hop propagation. Watch for them when the single-hop signals are strong and steady, or just as they begin to fade, in the late morning or middle evening, particularly.

When the band goes dead, or seems to, don't quit. The skip may merely have shifted to an area where activity is low. This is the time to limber up the key, and call some c.w. CQs. It is also the time for careful listening. That weak fading signal in there just might be Nevada, or New Mexico, or Vermont — or one of the others you've been waiting for long.

If Spring, 1959, turns out to be a really hot season for E<sub>s</sub>, the 2-meter men may have a chance now and then, too. Close observation of 6-meter

## 2-METER STANDINGS

Figures are states, U.S. call areas, and mileage to most distant station worked.

W1REZ...	30	8	1175	W5CVW...	11	5	1180
W1AZK...	24	7	1205	W5NDE...	11	5	625
W1KCS...	24	7	1150	W5VY...	10	3	1200
W1RFU...	23	7	1120	W5SWV...	10	3	600
W1AJR...	23	7	1130				
W1HDQ...	23	6	1020	W6NLZ...	12	5	2540
W1MMN...	20	6	900	W6W8C...	12	5	1390
W1WZY...	19	6	875	W6BNG...	9	5	1040
K1CRQ...	18	6	800	W6AJF...	6	3	800
W1AFO...	17	6	920	W6ZL...	5	3	1400
W1ZJO...	17	6	860	W6MMU...	3	2	950
W1CLH...	17	5	450				
W2NLY...	37	8	1390	W7VMP...	15	5	1280
W2CKY...	37	8	1360	W7JRG...	9	4	1040
W2ORI...	37	8	1250	W7LHL...	4	2	1050
K2GOI...	30	8	1200	W7JIP...	4	2	900
W2AZL...	29	8	1050	W7JU...	4	2	353
W2BLV...	27	8	1020	W8KAY...	38	8	1020
K2FEJ...	25	7	1060	W8WXY...	35	8	1200
W2AMJ...	25	6	960	W8PT...	34	8	855
W2DWF...	23	6	925	W8LOF...	33	8	1060
K2HOD...	23	6	850	W8RMIH...	32	8	910
W2PAU...	23	6	763	W8SVI...	30	8	1080
W28MA...	22	6	940	W8SPG...	30	8	1000
W21FH...	22	8	910	W8LPD...	29	8	850
W21WV...	21	6	700	W8GCV...	28	8	860
W2XGJ...	20	6	700	W8WRN...	28	8	680
W2UTH...	19	7	880	W8BAX...	27	8	960
W2RGV...	19	6	720	W8DX...	26	8	720
W2WZR...	18	7	1040	W8LLC...	25	8	800
W2P8K...	18	5	850	W8JWV...	25	8	940
K2RLG...	17	6	980	W8CFN...	23	8	540
				W8NOH...	21	8	975
W3RUE...	30	8	975	W8LCY...	21	7	610
W3GKP...	29	8	1020	W8BLN...	21	7	610
W3KCA...	28	8	1110	K8AXU...	19	6	750
W3TDF...	28	8	915	W8GTK...	18	7	550
W3SCA...	26	7	700				
W3EPH...	22	8	1000	W9KLR...	41	9	1160
W3NKM...	20	7	730	W9WOK...	40	9	1150
W3LNA...	20	7	720	W9GAB...	33	9	1075
W3LZD...	20	7	650	W9AAG...	32	8	1050
				W9RHM...	31	8	850
W4HJQ...	38	8	1150	W9ZIH...	30	8	830
W4HHK...	35	9	1280	W9LVC...	27	8	950
W4ZXL...	34	8	950	W9EGQ...	26	8	820
W4AC...	30	8	1120	W9ZBL...	25	8	700
W4MRV...	29	8	850	W9RCP...	25	7	1030
W4UMP...	28	8	1110	K9AQP...	23	7	900
W4VLA...	26	8	1000	W9BPB...	23	8	820
W4EQM...	25	8	1040	W9LF...	22	7	825
				W9KPS...	22	7	690
W4WNH...	24	8	850	W9PMN...	19	6	800
W4CJ...	23	6	725	W9ALU...	18	7	800
K4RUS...	23	6	765				
W4VVE...	21	6	720	W9SMJ...	29	9	1075
W4KZ...	20	6	720	K9EMQ...	29	7	1110
W4DLK...	20	6	720	W9THD...	27	7	890
W4AIB...	19	7	840	W9RFB...	27	8	1060
W4CPZ...	18	6	650	W9GUD...	25	7	1065
W4TLV...	18	7	1000	W9RUF...	23	7	900
W4RFR...	18	7	820	W9INI...	21	6	830
W4MDA...	17	6	750	W9UOP...	21	7	900
K4YUJ...	16	8	830	W9TGC...	21	7	875
W4LNG...	15	6	1080	W9RYG...	17	8	925
W4RMU...	13	6	920	W9LFS...	16	6	1100
				W9IC...	12	6	1240
W5RCI...	33	9	1215				
W5DFU...	25	9	1300	VE3DIR...	28	8	1100
W5LPG...	25	7	1000	VE3ABE...	26	8	910
W5AJG...	23	8	1360	VE3BQN...	19	7	790
W5KTD...	22	8	1200	VE3AQQ...	17	7	800
W5JWL...	21	7	1150	VE3DER...	16	7	820
W5PZ...	16	1300		VE3AOK...	13	5	550
W5VKH...	15	5	720	VE3BPB...	14	6	715
W5ML...	15	5	700	VE7FU...	2	1	365
W5P8C...	12	5	1390				
WFHEZ...	12	5	1250	KH6UK...	1	2	2540

ionospheric DX on 144 Mc. is less of a long shot than we once thought it to be.

One more word to the 6-meter tyro — and the old-timer, too, if he's still with us. Sporadic-E skip is by no means so frequency-sensitive as  $F_2$ . Marginal openings may just brush the low edge of the band at times, but more often than not there'll be just as good signals at 54 Mc. as at 50,004. Except for long-standing habit, there's almost no reason to hang out on the last ragged edge of the band during an E-layer opening. Move up to 52 Mc. or higher when things are hot. Remember, we used to work plenty of DX above 56 Mc. in the days prior to World War II.

Happy spring!

### Here and There

DX activity on 6 slowed sharply in March, with north-south paths providing the few fireworks. HC1FS and PZ1AE were the principal sources of DX in Northeastern U. S. A., one or the other (or both) coming through 6 week ends in a row, through March 8. The southerly parts of the country caught more openings to South and Central America. Aruba and Nicaragua are among the rarer ones reported worked, along with Argentina, Chile and Peru.

W5SFV, Amarillo, Texas, worked PJ2AO March 1, while his antenna was only two feet off ground. Phil had moved to a new location, and was not expecting to work any DX that day! Other 50-Mc. men in the Amarillo area also worked several KP4s and PJ2AO.

Moving to above 51 Mc. and up has not prevented the 6-meter men of New Zealand from making contacts occasionally, though getting American 50-Mc. operators to look that high has been a problem. W6BJI, Fresno, Cal., worked ZL1BJ on 51.04 Mc. Feb. 26, for what is believed to be the first W — ZL QSO since the New Zealand stations were forced to move to the higher frequency. ZL1DE, ZL1BJ and ZL1AHQ were worked by various Fresno stations on March 1 and 4. There was  $F_2$  to Florida for a short time March 1.

K6RNQ, Oakland, worked ZLQs on March 1, 2, 12, and 14, including the above stations and ZL2DS. Bob says that the signals, including ZL1AHQ on 51.24 Mc., were surprisingly good, indicating that low-edge crowding is more often due to habit than necessity. Incidentally, ZL1BJ told Bob that ZL2AQ has a kilowatt and a large array on 144 Mc., and is open for moonbounce business.

KH6CTC, Kailua, Hawaii, says that openings to the Mainland disappeared after Feb. 23, but South America, Australia and New Zealand have been worked since. LUs were in during the afternoon of March 2 and 3. VK4NG and VK4HD were in well for half an hour beginning at 2100 HST March 6. VK9XX, Port Moresby, was worked at 2350 HST March 8, and VK4s HD and NG were worked again on the 12th, beginning at 2230. On the 13th the band opened at 2320, and KH6CTC worked VK4s NG ZAZ ZBE and ZAK, and several others were heard, up to 0045 HST. Esther says that VK4NG told her that they had been working JAs constantly and that he had just worked his 552nd Japanese station on 50 Mc.!

W3BJG/KH6 hit it on the nose when he fired up on 6 after several months of getting ready. His first night, March 15, he worked several locals, and then hit the late opening to VK4 and VK9. He will be on 144 Mc. soon also.

Here are some interesting prospects for the June V.H.F. Party. W6AZT, with the help of K9CLL, W6CYT and possibly others of the Denver area, will be working on 50, 144, 220, and possibly 432 Mc. from Mt. Evans, one of the highest peaks of the Front Range, weather permitting. The road to the summit is not always open that early, but if Evans is not accessible the boys will be on some other very high spot. A high mountain expedition is being organized by W7BLE and W7NJB of Salt Lake City for the same period, and it is hoped that a station will be in business at Sandia Crest, New Mexico as well.

One country where DX should be good on 6, but which has been heard from very little, is India. W1HZ reports working VU2RM on 14 Mc., and relays the information that Rao is on 50 Mc. daily between 1300 and 1430 GMT, at the low end. His DX thus far includes VS6CJ and KR6AK.

conditions will show whether or not there is a chance of 2-meter DX of the ionospheric sort. The clue is very short skip on 50 Mc. — something under 300 miles or so. Don't be fooled by very strong 6-meter signals from 1000 miles away. The best propagation on 6 occurs when the maximum usable frequency is only just a little above the band. If there is a possibility of sporadic-E skip on 2, signals on 6 may be strong, but they'll be close-in, and the DX opportunity, if any, on 2 will be at a much greater distance. There have been only a handful of ionospheric DX reports in all our experience on 144 Mc., but this is not to say that we shouldn't be on the lookout for them. With today's large arrays, high power, low-noise receivers and alert operating,

Miscellaneous DX information from W5LFM, San Antonio, Texas: ZLIBE was heard Feb. 26 at 1700 CST by K5GEH. (Cal reminds us that W5VY worked all ZL call areas in April, 1958.) March 1 — HC1FS heard, along with back-scatter from W4RMU and W4ZXI, 0900 to 1000. March 4 — K5GEH heard LU3EX on c.w. at 2000 CST, and worked HC1FS, as did K5HVC. March 18 — LUs and XE1PA heard, K5HVC heard KH6UK, 1830 to 1845, and what sounded like JAs. March 19 — K5HVC worked LU4DFN LU6DBE LU3DOH and heard HC1FS. K5GEH worked LU9MA and LU4DFN. This was a typical TE session at about 2000 CST.

March 22 — Excellent TE, with HC1FS working about 10 stations in the San Antonio area. LU4DFN also very strong.

W5LFM remarks that "Local ragchewers and mobiles could help the interference problem by remembering that the band extends above 50.1 Mc.!" The Amateur's Code might well come into play here. You'll find it on Page 8 of any ARRL *Handbook*.

### March Goes Out Like a Lion

Anticipating that auroras and ionospheric disturbances would be more frequent and violent with the waning phase of the solar cycle, we were looking for something good in March. It started the night of the 26th, and ran almost continuously for the next 50 hours or more. "Good" was not the word for it in lower-frequency circles, however. This was a real fade-out, the first in the experience of many newcomers to the game, and on Good Friday the ARRL lines were busy with "What's happened to 80?" calls.

On 50 and 144 Mc. it was a humdinger. Aurora contacts were made over some paths never before covered on 144 Mc. by the buzz method, and areas where auroras are frequent reported this one of the longest and best on record. W7JRG, Billings, Mont., worked W0IC, Denver, Colo., for his first 2-meter aurora QSO. This was at 2052 MST the 26th, and W0IC has a good signal for at least 1½ hours thereafter. W7JRG worked W7LHK, 200 miles over the mountains in Collins, Mont., via the aurora on 50 Mc. at 0854 on the 27th, and was still hearing his buzz signal at 1000 MST.

W0QDH, Salina, Kan., also worked W0IC by the north route, at 2051 CST on the 26th. At 2100 W0IC was the only signal audible at Salina, though many stations to the north and northeast had been heard earlier. At 2300 W0IC and W0RYG were both heard with a much purer note, but still peaking north.

At intervals the quality of the reflection must have been exceptionally good, for more than the ordinary number of voice contacts were made on 50 Mc. The several s.s.b. stations now using 50 Mc. in the northeast were doing very well most of the time, their no-carrier signals being far more readable than the a.m. boys.

The expected aftermath of South American DX broke Sunday morning, March 29, with HC1FS, Quito, Ecuador, working scores of stations all over the eastern half of the country, beginning about 0900 EST.

### V.H.F. TVI Hints — W8NOH

Though v.h.f. TVI causes and cures have been covered for some years in the *Handbook*, some of the newer sets present problems in TVI elimination that may be somewhat different from those encountered in receivers produced when the *Handbook* information was compiled. The portable models, particularly, are giving v.h.f. men a bad time.

These sets are seldom used with anything but the built-in "rabbit-ear" antennas, and consequently they do not have as much signal input as the usual home installation with an outdoor array. Furthermore, most portables and other low-priced receivers are now built without transformer power supplies. They use various types of rectifiers and voltage-doubling circuits, and work directly from the a.c. line. These not only may pick up interfering signal energy on the a.c. line, but their cases or chassis cannot be grounded without creating an electrical hazard. The interference problems in these sets are more like the old a.c.-d.c. receiver BCI than the more common forms of TVI, and the cures are similar to those prescribed for BCI years ago.

W8NOH advises that the first step should be to check with an approved filter. This may eliminate picture interference, which usually comes in on the antenna, but it may not stop audio trouble, which is often picked up by the audio circuits of the receiver, or occasionally conducted into the

set on the a.c. line. If the audio interference persists with a filter installed, or with the antenna disconnected, try a 200- $\mu$ f. ceramic capacitor across the audio volume control. In stubborn cases, insert a 10,000-ohm carbon resistor in series with the grid of the first audio tube, right at the socket. Bypassing the grid with a 200- $\mu$ f. capacitor may help.

In sets having power transformers try bypassing the a.c. line to the chassis. Special dual capacitors are available for this purpose. Disk ceramics of the type commonly used for d.c. bypassing are not recommended for a.c. line use. In hot-chassis sets try a capacitor directly across the a.c. line. Capacitor values around .001 or .002 are recommended. R.f. chokes inserted in the line may help, or traps tuned to the operating frequency may be more effective.

Receivers with plastic or wood cabinets are often wide open to pick up of r.f. energy. Putting foil or screening in the bottom of the cabinet and bonding it to the chassis is often helpful with these. Some sets do not have tube shields. On these a shield over the audio tube may solve the problem. Watch out for possible shorts in sets having printed circuitry when shields are tried. Aluminum foil cemented to the inside of the case, and bonded to the chassis, may be required. If you have a portable of your own, experiment with it until you have cleaned up all interference. This treated receiver can then be used effectively to demonstrate that the transmitter is not at fault. Do not work on the complainant's receiver. That's a job for the serviceman, but you can show him what to do.

A problem that may be corrected by adjustment of the receiver is a tendency to shift during modulation or keying of the transmitter. This is due to the effect on the a.g.c. system of the surge of r.f. Where the a.g.c. resistor is a fixed value, try a lower value. Where an a.g.c. control is included, readjustment of it may correct the trouble. Sometimes a large electrolytic capacitor connected to the a.g.c. point will help, but be sure to check for side effects on the contrast or receiver sensitivity. In adjusting the a.g.c. control, go only as far as is necessary to clear the trouble.

Remember that there are almost as many kinds of TVI as there are makes and models of TV sets. Just because your own set is clear is no proof that your neighbors' sets will be. By locating the troubles when they develop, and then doing your best to see that the interference is corrected, you'll make friends instead of enemies. And that's half the battle, at least!

### 220- and 420-Mc. STANDINGS

220 Mc.			
W1FOS	16	K6GTG	2 2 240
W1HDQ	11 5	W6MMU	2 2 225
W1RFU	11 5	W8LPD	6 4 480
W1OOP	7	W8PT	4
W1GEE	10	W8SVL	6 4 520
W2AGC	13 5	W8WRN	4
K2CBA	8 3	W9BOC	7 4 740
W2DWJ	13 6	W8JFP	6
W2DZA	8 4	W9UFD	4 4 605
W3UJG	8 5	VE3ATB	5 3 350
W4UMF	11 5		420
420 Mc.			
W1FOS	7	W2DZA	5 3 130
W1HDQ	8 2	W2DWJ	6
W1RFU	8 4	W4VVE	6 4 410
W1OOP	7	W9GAB	5 3 355
W2RLV	11 5		360

### With the Clubs and Nets

The boom in v.h.f. interest has brought many new clubs and nets into being. Because such groups are highly effective in promoting the good of all, we are happy to devote QST space to a record of their doings, past and planned. Here is the latest in club and net news.

The Mt. Airy V.H.F. Club of the Philadelphia area is holding its 4th Annual Hamfest and Picnic Aug. 9, at Ft. Washington State Park, Flourtown, Pa. Registration is \$1.00, payable at the park. Games, prizes and free soda for all the family. More information from W3SAO, 829 W. Fishers Ave., Phila. 41, Pa. Rain date: Aug. 16.

The Windsor Central School Radio Club, WA2DNW, Windsor, N. Y., is running code practice sessions on 50.178 Mc. each Saturday, 2000 to 2030 EST. Speed begins at 5 w.p.m., increasing one word each week until 13 w.p.m. is

(Continued on page 188)

# DXpedition to Juan Fernandez Islands

January and February, 1959

BY LUIS M. DESMARAS,\* CE3AG

**J**UAN Fernandez Archipelago is a group of three islands — Más a Tierra and Santa Clara are about 400 miles west of the Chilean coast, while Más Afuera is about 500 miles from the mainland. Only Más a Tierra (commonly called Juan Fernandez Island) has any inhabitants. The principal occupation of these people is lobster fishing, with there also being some agriculture and raising of cattle. Those of you who are up on your history will perhaps recall that it was on this island that the Scottish sailor Alexander Selkirk was left in 1704, and where he lived for five years with only a goat as a companion. His adventure gave rise to the famous Defoe novel *Robinson Crusoe*.

There is little amateur activity on Juan Fernandez. For several years there has been only one active amateur there, CE0ZF (ex-CE2BM), who cannot do much operating because of the lack of electric power. Electricity is available only for about four hours each evening.

Four members of the Radio Club de Chile — CE3AG, CE3HL, CE3GI and CE3QG — decided to carefully plan a DXpedition to Juan Fernandez, and schedule it for our summer vacation. I was able to get quick delivery from the Collins Radio Co. of a 32S-1 and 75S-1 to operate on s.s.b. and c.w., while CE3GI supplied a 32V-1, CE3HL a 75A-1, and CE3QG provided equipment for the 50-Mc. band. I also supplied a 500-watt gas-electric plant (the same one used on the CE0AA Easter Island DXpedition of 1953), while CE3CI lent us a 2-kw. job.



CE0ZA (CE3AG) with the Collins "S" line gear that he used on c.w. and sideband.

The antennas were simply those old reliable half-wave dipoles with 52-ohm coax feedline, duplicated for each of the two stations. That is, we had two sets of dipoles for the 14-, 21-, and 28-Mc. bands.

After much planning, false starts, delays and other difficulties, we sailed off on the *Aka Pinto* transport of the Chilean Navy on January 22. This naval ship makes an annual voyage to Easter Island, sailing from Valparaiso each January and requiring 28 days for the round trip.

We reached Juan Fernandez early on January 24, and by noon we had all our equipment safe and sound on the beach. We were affectionately received by Sergio, CE0ZF, who put at our disposal a beautiful house to serve as our operating headquarters and living accommodations. During lunch (lobster, of course) a great storm of rain and wind descended on the island. Our spirits began to sink, for we still had to install antennas, the electric plants, and so on, and the thought of doing it during all that wind and rain wasn't very cheerful. Fortunately the weather improved by mid-afternoon, and we got to work. We could only get the antennas about 24 feet off the ground, but even so the results were excellent.

That evening we called the first CQ from CE0ZA on 14,030 kc., and were answered with an awful pile up. W2ADP was the first QSO, at 2354 GMT (1954 local time), followed by W9QNO, W2CTN, W6GMF, K4HNA, and another 40 Ws until G6YQ broke the string!

In the meantime, CE0ZB, CE0ZC and CE0ZD, taking turns of one hour each (settled by casting lots), worked on a.m. with the 32V-1 and 75A-1 on 10 and 15 meters.

In brief, our 23-day activity on Juan Fernandez



The phone operators of the DXpedition. From left to right: CE0ZB (CE3HL), CE0ZD (CE3QG), and CE0ZC (CE3GI), with the Collins a.m. gear.

\* P.O. Box 761, Santiago, Chile.



At the right is the CEØZA "shack" and at the left can be seen the antenna mast. That mountain in the background is nearly 3000 feet high.

produced 5657 QSOs, broken down as follows:  
 CEØZA (CE3AG) 3501 QSOs (3201 c.w., 300 s.s.b)  
 CEØZB (CE3HL) 742 QSOs (all a.m.)  
 CEØZC (CE3GI) 754 QSOs (all a.m.)  
 CEØZD (CE3QG) 660 QSOs (all a.m.)  
                   30 QSOs (6 meters)

CEØZA worked 84 different countries, while CEØZB worked 70, CEØZC 66, and CEØZD worked 68. The number of different countries worked by all four stations was 120.

We had decided from the very beginning not to operate on 3.5 and 7 Mc., because in this area conditions on those bands are generally poor. QRN is heavy, and there is much interference from South American a.m., impossible to avoid.

We came back from our DXpedition happy — everything worked out as we had planned. We are grateful to the Chilean Navy for their furnishing of transportation, and to CEØZF and his wife for their thoughtful hospitality during our stay. We also appreciate the many cards and letters we have received commenting on the caliber of the operation from our four CEØZ stations — we cannot thank each person individually, so please let this serve instead.

Cards were printed before the trip, many QSLs were delivered by CE3DG before the end of the DXpedition, and all QSLs received by us will be promptly answered. **QST**

[Editor's Note: CE3AG arrived home the day before the annual ARRL DX contest on c.w., and although he was tired from the long trip, took part in the contest to the tune of 871 QSOs. These, added to the 3501 made as CEØZA, made a total of 4372 QSOs by Luis in 29 calendar days. We don't know whether this is any sort of a record in DX history, but it *does* seem to be a pretty fair performance!]

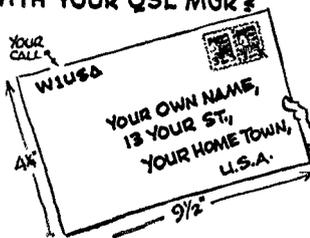
### A.R.R.L. QSL BUREAU

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. Its operation is made possible by volunteer managers in each W, K and VE call area. 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 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass.
- W2, K2 — North Jersey DX Association, Box 55, Arlington, New Jersey.
- W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Pa.
- W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
- W5, K5 — Brad A. Beard, W5ADZ, P.O. Box 25172, Houston 5, Texas.
- W6, K6 — Horace R. Greer, W6TI, 414 Fairmount Avenue, Oakland, Calif.
- W7, K7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon.
- W8, K8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland 10, Ohio.
- W9, K9 — J. F. Oberg, W9DSO, 2601 Gordon Drive, Flossmoor, Ill.
- WØ, KØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn.

- VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
- VE2 — George C. Goode, VE2YA, 188 Lakeview Ave., Point Claire, Montreal 33, Que.
- VE3 — Leslie A. Whetham, VE3QE, 32 Sylvia Crescent, Hamilton, Ont.
- VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
- VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
- VE6 — W. R. Savage, VE6EO, 833 10th St., North Lethbridge, Atla.
- VE7 — H. R. Hough, VE7HR, 1684 Freeman Rd., Victoria, B. C.
- VO1 — Ernest Ash, VO1AA, P.O. Box 8, St. John's, Newf.
- VO2 — Douglas B. Ritcey, Dept. of Transport, Goose Bay, Labrador.
- KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
- KH6 — Andy H. Fuchikami, KH6BA, 2543 Namanu Dr., Honolulu, T. H.
- KL7 — KL7CP, 310-10th Ave., Anchorage, Alaska.
- KZ5 — Catherine Howe, KZ5KA, Box 407, Balboa, C. Z.

### IS YOURS ON FILE WITH YOUR QSL MGR?



# The Amateur and Public Relations

BY HAROLD R. RICHMAN,\* W4CIZ

*This is the transcript of a speech originally presented before the Rock Creek Amateur Radio Association in Bethesda, Maryland, on January 9 of this year. It was later reprinted in Auto-Call, the monthly publication of the Washington Mobile Radio Club. W4CIZ is employed by the FCC in its Field Engineering & Monitoring Division, and is Advisor to the Washington TVI Committee (WTVIC). It's recommended reading for everyone who needs a refresher on how to handle the public when TVI rears its ugly head.*

**T**HE TVI picture is brighter today than at any time in the past, but we must not stop now until we've reached an orbit which will allow unimpeded operations on all amateur frequencies. Let us review the present status of the TVI reduction program generally, before embarking on our topic "The Amateur and Public Relations."

Technical advances in the past few years, equipmentwise, contributed by amateur and industry, have been numerous. Though much more remains to be done, a long-range and intensive educational program recently initiated and widely developed by the Electronics Industries Association for the television service technician assures the support of an informed TV service industry. Three of your WTVIC TVI Aids appear as a part of an EIA Technicians Training Course in its manual titled *Advanced Television Servicing Techniques*.

You are all familiar with recent circuit changes and the addition of preventative rejection circuits by the manufacturers in most all of the newer television receivers. The few manufacturers who do not now incorporate high-pass filters as a part of their receivers readily provide filter and installation, when needed, at no cost to the set owner. So much for progress on the part of industry.

Partly as a result of generous technical assistance and support from your TVI committee, the majority of amateurs now operate with transmitter and transmission system virtually loaded down with devices for the prevention of TVI. For example, K3AKK reports that he can operate 1 kw. and at the same time monitor his own television receiver with its antenna mounted on the same tower as the transmitting antenna.

In another instance W3IIU, with 1 kw. on all bands up to 50 Mc., reports that seven television receivers of different makes—two of them

monitors—can be used interference-free in his own home while he transmits. These are *not* isolated cases.

Here is further evidence of success on the licensee front. Most all 2- and 6-meter TVI complaints are cleaned up by installation of a properly tuned quarter-wave stub at the antenna input terminals of the television receiver. Some television receivers, where the amateur operates on 6 meters, may require, additionally, installation of a high-pass filter with a 52-Mc. cutoff. 21-Mc. i.f. cases are almost always solved with the installation of a specially designed high-pass filter with cutoff around 21 Mc., in addition to the general purpose filter. Color TVI complaints in most instances appear to be due to audio rectification conditions. The cure generally requires a suitable high-pass filter at the tuner of the receiver. If the interfering signal is picked up directly by the receiver's audio section, the only cure is the connection of a simple *RC* filter in the grid circuit of the first audio tube. All manufacturers of color TV receivers are cooperating fully in handling these problems when they arise.

We have covered, briefly, technical advances on the part of industry, and the radio amateur. Now for the third, most difficult, phase of our topic associated with the solution to TVI. Good Neighbor Relations.

My suggestions for peaceful co-existence follow.

Adhere conscientiously to a *Civil* Defense, where necessary, and a Sympathetic and Helpful attitude when acknowledging reports of BCI, TVI, or HiFiI from your neighbor. Use the same strategy of self control and discipline as the case is processed. Of what value is technical knowledge if you cannot put this across to the irate television set owner who complains of TVI. The control of TVI appears to be 75 per cent related to the practice of a "Golden Rule" philosophy by the radio amateur involved, and, remember, first impressions stick. If you start off on the wrong foot, you will find it extremely difficult to get back in step again on friendly terms with your neighbor.

Prompt, sympathetic attention, or courteous acknowledgement of the complaint you receive most always smooths the way for mutual understanding and ultimately brings about an agreeable adjustment for BCI or TVI effects. If you try hard enough you might convert the complainant into the ranks of amateur radio. Several active Washington amateurs are among those who were on the other side of the fence before "joining up." Now they have TVI problems of their own from time to time.

Keep in mind that, though the WTVIC takes the sting from the initial TVI cases you develop,

*(Continued on page 198)*

\* 1110 Lake Boulevard, Annandale, Virginia.

# Nuvistor — Something New in Tube Construction

OVER the years there have been many innovations in vacuum-tube construction — the metal envelope in its day, for example, and the disk-seal technique now widely used in transmitting tubes — but garden-variety receiving tubes have retained certain basic features from the beginning. Typical of these are the use of glass for stems and seals and of mica washers for element supports. We may now be seeing the beginning of another era in receiving-tube construction if the optimism expressed by RCA for its projected "Nuvistor" line of tubes is borne out by future trends.

The Nuvistor construction is the result of several years' study and development in the effort to improve performance and reliability while reducing size and power requirements. Although it is not expected that tubes will be manufactured for quantity sale before next year, samples of a few types — a small triode and tetrode, and a beam power tube — will soon be available to equipment designers. Nuvistor-type tubes are well adapted to mechanized production, and it is expected that they will be competitive in price with ordinary tubes of corresponding characteristics.

Only two kinds of material are used in the Nuvistor — ceramic and metal. The distinguishing constructional features are shown in the cut-away view, Fig. 1, of a developmental triode. The elements are cylindrical, terminating at the bottom in a cone-shaped structure supported on three pillars (only two of which are shown in each case in the picture). These are concentrically mounted on a ceramic disk through which the connection pins project. The whole assembly is covered by a metal envelope in the case of the triode; in the tetrode, a metal top cap is the plate connection. Fig. 2 shows three Nuvistor types in comparison with their conventional counterparts. Advantages claimed for this type of construction are the ability to hold close dimensional tolerances, extreme ruggedness, and ability to stand high temperatures —

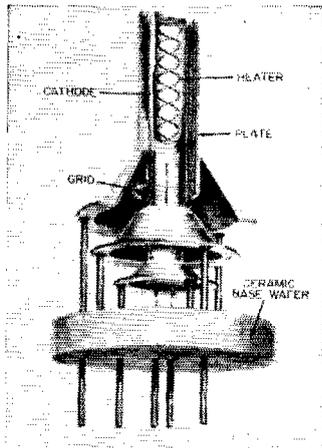


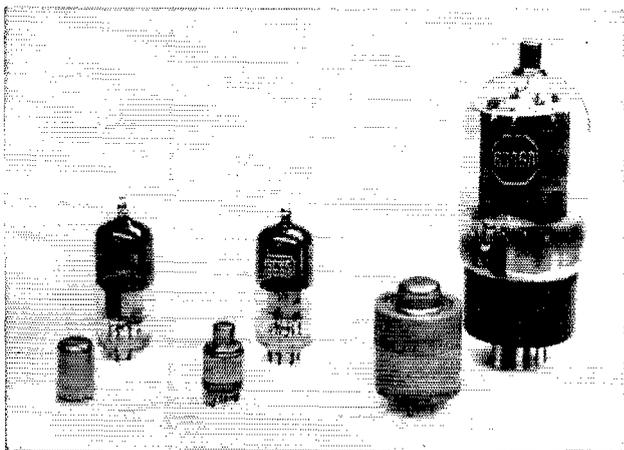
Fig. 1 — "Nuvistor" construction uses concentric electrodes supported at the bottom by pillars brazed to cones. The tube illustrated is a developmental triode.

the last because of the elimination of glass and mica.

The close interelectrode spacing that results from "scaling down" the tube dimensions allows the tubes to operate at comparatively low plate and screen voltages. The triode, for example, has a transconductance of over 10,000 micromhos and will operate well with as little as 40 volts on the plate. The design objective in the beam tetrode is operation at a plate current of 200 ma. with only 65 volts on the plate and screen! Cathode power is smaller, too. New socket designs will be called for, of course.

These tubes, which are comparable in size with transistors of equivalent power ratings, should help keep the vacuum tube competitive with transistors in miniaturization of equipment, and offer the circuit designer those characteristics which are peculiarly the assets of vacuum tubes as compared with semiconductors. — G. G. 

Fig. 2 — Three developmental types of "Nuvistor" tubes with their corresponding current types. Left to right, a small triode, a tetrode r.f. amplifier, and a beam power tube.



## League Endorses Technicians on 2 Meters

### ARRL Petitions Again for C.W. Segments on V.H.F.

Responsive to the FCC proposal in Docket 12728, the League's Executive Committee conducted a mail vote of the Board of Directors with the result that ARRL policy has been established supporting the proposal to permit Technicians to use the 144-Mc. amateur band. The pertinent text of the League's filing follows:

PETITION FOR RECONSIDERATION  
COMMENT OF THE AMERICAN RADIO  
RELAY LEAGUE, INC.

Pursuant to paragraph 9 of the notice of proposed rule-making in Docket 12728. The American Radio Relay League, Inc., files these comments on behalf of some 70,000 FCC-licensed amateurs who are members of the League.

The League supports the proposal to permit operating privileges for Technician Class amateur operators in the 144-148 Mc. amateur band. We agree with the Commission's conclusion that several of the pertinent considerations have undergone changes in the four years since a similar proposal was dismissed, largely at our request. The League feels that, in general terms, the arguments set forth are valid and meritorious.

#### IOWA LICENSE PLATES

The old if-you-don't-succeed adage well describes the spirit of Iowa amateurs in their attempts to obtain call-letter license plates. Unsuccessful in several tries since 1951, last year a special statewide committee was formed, with headquarters at the Council Bluffs Radio Operators Club and a representative from nearly every active club in the state. A well-organized campaign was crowned with success in February, when Governor Loveless affixed his signature to the bill providing that amateur call plates will be available the first of next year for an additional fee of \$2. The Governor, in an announcement transmitted from K0CVT, complimented Iowa hams on their instant preparedness and fine work during disasters. Members of the committee include K0CYP, W0AWX, K0ENN, K0LPJ, K0BLJ, W0YUA, W0KJN, K0ISA, W0MG, W0AFN, W0RVT, W0GQ, W0BQC/0, K0AAG, W0AUL, and K0MMS. Iowa makes it 44 states out of 49, and now every state west of the Mississippi is in the successful LP category!

#### C.W. BANDS ON V.H.F.

As most readers will recall, last year the League petitioned the Federal Communications Commission to establish exclusive c.w. segments of 100 kc. each at the low ends of the 6- and 2-meter amateur bands. After rule-making proceedings, FCC decided to grant such c.w. segments but located them at surprisingly different spots than had been requested. Responsive to requests by the League, and individual amateurs similarly concerned, the Commission postponed the effective date of its order and granted an extension to March 10 of the date by which petitions for re-

opening or reconsideration might be filed. We publish below the text of the League's petition which requests the Commission to establish the c.w. segments at the low ends of the bands.

#### FEDERAL COMMUNICATIONS COMMISSION

In the matter of

Amendment of Section 12.111 of the Commission's Rules, Amateur Radio Service, to provide that only A1 emission may be used in the lower 100 kc. of the 50 and 144 mc. amateur band

Docket 12485

The Commission will recall that in its notice of proposed rule-making issued June 11, 1958, its proposals were for exclusive c.w. assignments at 50.0-50.1 and 144.0-144.1 Mc. These frequencies are identical with those requested by the American Radio Relay League, Inc., in its petition dated May 21, 1958, which led to the initiation of the present docket. Until publication of the report and order of December 3, 1958, there was no indication that the Commission was contemplating any change in its proposal of June 11. During the period available for comment, therefore, the League had no reason to believe that further discussion of the frequency assignments proposed by it was either necessary or desirable.

We believe the Commission's action of December 3 is based on conclusions that, because of errors of fact in its findings in these proceedings, are not justified. These errors appear to have arisen because of incomplete information, or because certain of the comments from opponents of the proposal have created erroneous impressions. Specifically, we believe the findings numbered (6) and (11) in Section 5 of the report and order are incorrect in their references to the 50-54 Mc. band. The conclusions in Section 6 with respect to the assignment of exclusive c.w. frequencies are based principally upon these two findings.

*Concerning Finding (6), Section 5:* A 100-ke. exclusive c.w. segment in a band having a width of 4000 kc. represents one-fortieth or 2.5 percent of the total band. While it is literally true that those amateurs who customarily use A3 operation in the 50.0-50.1 segment would be forced to go "higher in the band," a move of the order of 100 kc. should have no significant bearing on interference to television reception, a result suggested in (7), Section 5. Such interference is confined to regions in which Channel 2 television signals are usable; in other regions the interference is not primarily a function of the part of the 50-54 Mc. band that is used for transmission. Even in Channel 2 service areas there is little difference in respect to television interference between, for example, frequencies of 50.0 and 50.5 Mc.

Television interference aside, it would seem to be self-evident that a 2.5 percent decrease in the space available in the band for A3 transmission does not constitute a serious hardship; no operator is denied the use of the 100 kc. segment, but is merely restricted in the type of emission he may use.

*Concerning Finding (11), Section 5:* It is true that certain types of propagation are not significantly frequency-sensitive within the range covered by either the 50-54 or 144-148 Mc. bands. Tropospheric scatter, meteor-burst propagation, and auroral propagation are examples of such types. In general, propagation having such characteristics is prevalent on both 50-54 and 144-148 Mc.

However, a primary objective in asking for the exclusive c.w. assignment at 50.0-50.1 Mc. was to facilitate amateur investigation of propagation phenomena that have been

demonstrated to be exceedingly frequency-sensitive in the 50 Mc. band. Two such types are regular  $F_2$ -layer ionospheric transmission, and anomalous ionospheric propagation usually involving regular  $F_2$  propagation over some part of the path.

(a) *Regular  $F_2$  layer propagation.* It is well known that this type of transmission exhibits a sharp cut-off frequency, and that even during periods of exceptionally high sunspot activity the limiting frequency is only occasionally as high as 50 Mc. During the current sunspot maximum and the last preceding one, in both of which the sunspot numbers reached higher values than in previously recorded history, amateur observations have shown that only rarely has the maximum usable frequency (m.u.f.) penetrated to the 51-52 Mc. region.

Quantitative data on the frequency dependence of regular  $F_2$  layer propagation are given in a recent National Bureau of Standards Report.<sup>1</sup> It is shown therein that during a sunspot maximum the m.u.f. can be expected to be above 45 Mc. for only one percent of the time in the latitudes of the United States, but that it can be expected to be above 41 Mc. in the same latitudes for 10 percent of the time. Thus, the probability decreases by a factor of 10 in 4 megacycles — in a frequency region, it will be observed, that is at least 5 megacycles removed from the low frequency edge of the 50 Mc. band. If the same rate of decrease were to hold for the spectrum between 45 and 54 mc. the probability that the m.u.f. would rise to a usable value in the 50-54 Mc. band, small at best, would be at least twice as great at 50 Mc. as at 51 Mc. Actually, 50 Mc. is in the region of the absolute peak of maximum usable frequencies, so the odds against the band's being "open" at 51 Mc. when it is "open" at 50 Mc. are, as shown by experience, very much greater.

The current sunspot cycle peak has provided striking evidence of this frequency dependence. A propagation path of major scientific and amateur interest is that between the United States and Japan, both because of its nature and because several hundred Japanese amateurs are active in the 50 Mc. band, thus providing excellent opportunities for observations. By agreement among themselves, Japanese amateurs reserve frequencies between 50.0 and 50.5 Mc. for long-distance work and use frequencies above 50.5 Mc. for local communication. Hence, contacts between United States and Japanese amateurs have been made principally between 50.0 and 50.5 Mc. Also, as an International Geophysical Year effort a "beacon" station has been operated continuously on 50.504 Mc., beginning November 1, 1958, by the Japanese Amateur Radio League. The following tabulation shows the results of reception of Japanese signals by United States amateurs during the month of November, by United States call areas:

Day (Nov.)	CALL AREA									
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W9
4							XX			
5					X	X	X			
6							X	X	X	
7							X	X		X
8					X		X	X	X	X
9							X			
10							X			
11					X	X	X			X
12				X	X	XX	XX		X	X
13				X	X	XX	XX			X
14							X			
15							X	X		X
16				X	XX	XX	XX			X
17							X			
18					X	X	XX		X	
19				X	X	X	X			
20		X					X		X	X
21					X	X	XX		X	X
22					X	X	XX		X	X
23		X	X	X	X	X	X		X	X
24				X	XX	X	X		X	
25		X	X	XX	X	X	X		X	X
26				X	X	XX	X		X	X
27			X	XX	X	X	X		X	X
28				X	X	X	X			
29				X	X	X	X			X
30				XX	X	X	X		X	X

X — Japanese amateur stations heard.  
XX — Beacon station JA1IGY also heard.

These data are from reports of amateurs participating in the ARRL Propagation Research Project (IGY), a group that has been making observations of 50 Mc. propagation with a high degree of regularity. Although Japanese amateur signals were heard in the 7th call area on every November day after the 3rd, only on eight of these days was the continuously-operating beacon signal on 50.504 Mc. heard. The path from Japan to the 7th call area is the most favorable one, in point of distance, of any between Japan and the United States. In the 6th call area, the next most favorable path, Japanese signals were heard on 18 of these days, but JA1IGY was heard only on five of them. This station was not heard at all in other call areas, despite numerous instances of reception of Japanese amateur stations in all call areas except the 1st and 2nd. All the information available indicates that the more difficult the path, as in the 3rd and 4th call areas, the more essential it became for the frequency to be as close as possible to 50.0 Mc. Also, the observers' reports show clearly that on those days when JA1IGY could be heard, its signal was audible for only a small percentage of the time during which Japanese amateur stations working near the 50.0 Mc. edge of the band were heard; typically, in the 6th call area the beacon signal could be heard for only about ten minutes in a three-hour period during which the band was "open" for lower-frequency Japanese signals.

Regular  $F_2$  layer propagation at or just below the m.u.f. offers the principal means by which contact can be established with amateur stations in foreign countries. As shown here, such propagation is far more favorable at the low frequency edge of the band, so most foreign stations work close to 50.0 Mc. An exclusive c.w. assignment in the United States at 50.0-50.1 Mc. favors the successful achievement of such communication by eliminating local interference from United States amateur phone stations, which can be highly destructive of long-distance reception. An exclusive c.w. assignment at 50.9-51.0 Mc. would be of little or no value for this purpose since few, if any, foreign amateur stations operate on frequencies as high as 51 Mc. when attempting to contact United States stations.

(b) *Anomalous ionospheric propagation.* The most interesting propagation phenomena, from the point of view of investigation and discovery, are those which, while usually including regular  $F_2$  propagation over some part of the path, involve additional modes that may not be completely identified or understood. Unlike regular  $F_2$  layer transmission, signals arriving by such propagation modes are always weak, often being detectable only with the best possible receiving equipment and high-gain antennas. Communication usually is possible only with A1 transmission.

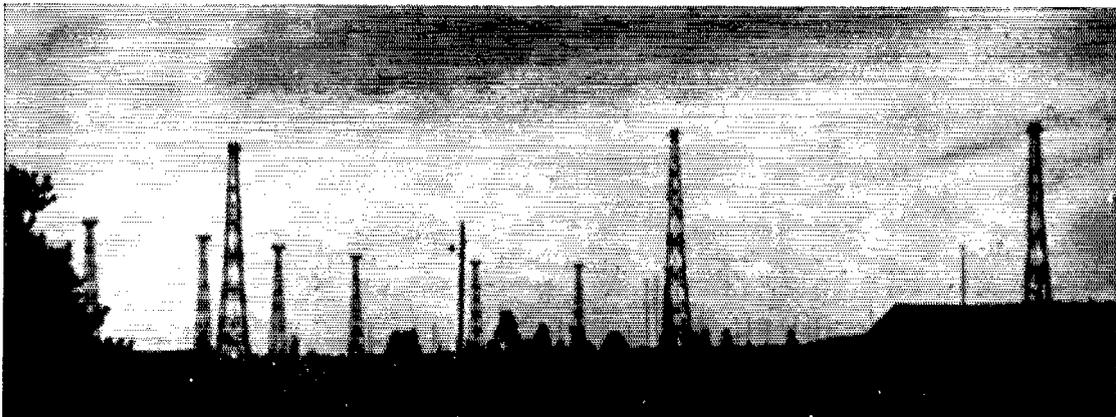
A typical example is the weak scatter-like signal that can be received over long distances at frequencies just above the actual  $F_2$  maximum usable frequency for the path. Because of the relationship it bears to regular  $F_2$  layer propagation, it is equally frequency-sensitive. At times when the m.u.f. for regular  $F_2$  layer propagation is just below 50 Mc., this propagation mode is usable at 50.0 Mc. and just slightly higher. This condition occurs at the beginning and ending of every  $F_2$  opening, and often is responsible for extending by a considerable factor the period during which communication is possible. Its duration is greatest at the lowest available frequency.

Another type of propagation that has considerable experimental interest is the well-known "back scatter", which frequently makes communication possible between two stations within the skip zone or between which there is no direct propagation path available. This is also a weak-signal type of communication and, like other forms of propagation involving regular  $F_2$  layer effects at some point in the path, exhibits the same frequency dependence that has been discussed in this section.

*Concerning Equipment Requirements and Characteristics:* Not mentioned in the Commission's findings and conclusions, but nevertheless of great practical importance, are the characteristics of equipment necessary for the type of work for which the exclusive c.w. assignments were requested. We emphasize, again, that the paramount consideration in requesting these assignments was that of making communication possible with extremely weak signals; c.w. is used because it is the only practicable mode of communication,

(Continued on page 180)

<sup>1</sup>NBS Report 6020; R. C. Kirby, "1958 Critique of VHF Ionospheric Scatter Propagation."



# Russia's Electronic "Iron-Curtain"

A Russian sky-wave jamming center (?). The above photograph, an enlargement of one frame of a movie film, was made by an American tourist. It shows a portion of a very large installation some 10 miles outside the residential area of Moscow, U.S.S.R., which is presumed—on the basis of its resemblance to installations elsewhere—to be a sky-wave jamming center. The photographer estimates that at this particular site there were no less than seventy or eighty lattice towers of the type shown. (Photograph courtesy of Newsweek.)

*W6QYT recently had the opportunity to visit the Munich relay base of the Voice of America. Opinions concerning the ethics of jamming may vary (the author has expressed some of his own in this article) but its existence is an inescapable fact, and we think this account of how it operates is not only interesting in itself but will help explain those weird noises that plague the ham bands.*

## *Some Impressions of the Struggle Between Broadcasters and Jammers in Europe*

BY O. G. VILLARD, JR.,\* W6QYT

SHORT-WAVE broadcasts, in the opinion of many amateurs, are occasionally useful as band-edge markers or as indicators of exceptional band conditions, but some broadcasts represent nuisances which, by a vagary of international law, keep turning up in lower-frequency ham bands where they add immeasurably to the general QRM and confusion. The story behind much international broadcasting at the present time, however, turns out to be a fascinating one, and it was a real eye-opener for the writer to have had an opportunity to learn something of the situation during a brief trip to Europe recently. Unfortunately, the present and probable future growth of short-wave broadcasting makes the future of some of the lower-frequency amateur bands look rather bleak, especially when the coming sunspot minimum is taken into account.

The situation, in a nutshell, is this. Far from being a nuisance, short-wave broadcasting is

regarded as a major facet of the ideological struggle between the so-called "Free World" and what have been designated as the "Iron Curtain" countries. The scale of the effort, which involves broadcasting from one side, and broadcasting plus jamming from the other, has been steadily increasing. When the next sunspot minimum arrives, and the number of usable channels shrinks, the demand for spectrum space will be such that broadcasters and jammers will either have to reduce their effort or operate outside their existing assignments in new territory. The latter alternative seems by far the more likely. And where does the path of least resistance into new territory lead? Directly toward the amateurs bands, alas.

### *An Example of Jamming in Action*

Almost everyone in the United States is aware

\* Stanford University, Stanford, Calif.

of the jamming that is going on in the short-wave bands. But to gain a proper feel for the scope and intensity of this struggle to be heard and to prevent hearing, there is no substitute for a trip to Central Europe. Let's say we are in Munich, at the Hotel Platzl, just across the street from the famous Hofbrauhaus, where Hitler got his start. We have an all-wave receiver and let's see what we hear. To anyone familiar with medium-wave broadcasting on the Continent before the war, the number of U. S. voices which are now audible represents a striking change. Not too long ago, the only spoken English on the radio dial was of British origin. Those who were in Europe during the war will be interested to know that Uncle Sam is even today very much in evidence. At the low end of the broadcast band, for example, we find rock-and-roll and other U. S. entertainment broadcast by a 100-kilowatt station of the Armed Forces Network. Higher up the dial, the U. S. Information Agency's Berlin RIAS station can sometimes be heard with U. S. programs, and two more AFN stations are heard at 872 and 1106 kilocycles. Finally, at 1196 kilocycles is the very powerful Voice of America relay station at Munich. To a visitor from the U. S. A., these home-town accents sound familiar and reassuring, sandwiched as they are between voices speaking in all languages from Albanian through Ukranian.

Now we in the U. S. A. are proud of our way of life, and want the rest of the world to know about it. To that end our taxes support a Voice of America, which broadcasts daily in 37 languages some 96 programs through a network of 85 transmitters, to all parts of the world.<sup>1</sup> Because the auroral zone shields much of Europe and Asia from much of the U. S. A., and because of the distances involved, the VOA makes extensive use of foreign relay bases, of which there are a total of nine. These bases pick up short-wave broadcasts from the U. S. and retransmit them on short, medium and sometimes even long waves. They have between them no less than 55 transmitters. Since the U. S. is especially in-

<sup>1</sup> Martin, Ross and Jacobs, "Technical Development of the VOA International Broadcasting System," *Electrical Engineering*, June, 1955.

terested in having its point of view known in Russia and in the satellite nations, the VOA has an important relay base at Munich, in addition to ones in Greece, Morocco, Ceylon and the United Kingdom.

The medium-wave VOA transmitter at Munich has an output power of 300 kilowatts and is located 10 miles northeast of the city. When broadcasting toward Poland and Russia, it uses a directional antenna having a lobe toward Moscow; Munich lies in a null. From our hotel room we have been listening to an English language program from this monster for several minutes now; here comes the station break. A girl announcer reminds us that we are hearing the Voice of America from Washington, and states that the next program will be Russian. Hello, what's this — sounds like an old-fashioned regenerative receiver tuning up in the background. There ought to be a law against one-tube bloopers like that, nowadays. The program begins: "Govorit BRROUGHRR ZZZMMEESEGRREEZZGRR . . ." The "blooper" was a jammer zeroing in: a jammer of such strength as to drown out the VOA program completely in the city of Munich itself.

Matters can't be so bad, perhaps, on the short waves. After all, maybe that null was exceptionally deep. Ah — here is a program in the 9-megacycle band being relayed by Tangier. Africa isn't very far away — an easy single-hop path. We hear the identifying strains of "Columbia, the Gem of the Ocean." The announcer says that this is the Voice of America transmitter in Tangier, and that the next program will be in Latvian. Maybe this one will slip through; perhaps Latvian is not so important as Russian. The program begins. Was that a whistle in the background? Oh, oh — here comes something. Yes, a jammer, but the program is still clearly audible. Looks as though it may get through anyway. Say — is that *one* jammer or *two*? Yes, there *is* a second jammer — it has a distinctly different sound. Pretty hard to hear the program now, but by straining hard the broadcast can be still distinguished. Ow! — what was that? Not *another* jammer? The racket on the frequency now sounds like a buzz saw going through a knot, and of the broadcast there is no longer any trace. Fig. 1 shows an

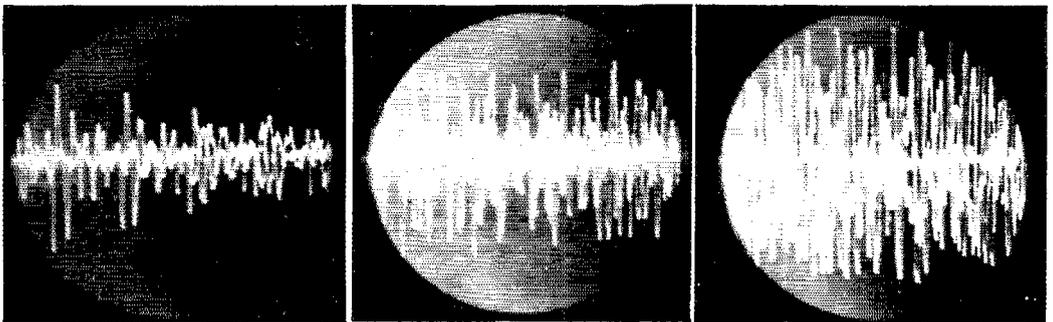


Fig. 1 — Going, going, gone: an oscilloscopic view of the effect of jamming on a VOA program broadcast from the Tangier relay base and received in Switzerland. (A) Shows initial voice signal; (B) Signal shortly after jamming began and (C) Signal after jamming had built up to full intensity. Frequency band: 21 megacycles. Jammer call letters: "WM". Recorded at Zermatt, Switzerland, approximately 6:00 P.M. MET, December 17, 1958.



Fig. 2—In the VOA long-wave station at Munich, four of these ML-5682 tubes in parallel produce a 500-kilowatt carrier at 173 kc. Four more take care of the modulation peaks, in a Doherty high-efficiency linear amplifier circuit. A second set of eight tubes completes the megawatt.

oscilloscopic view of typical jamming, "before" and "after."

It seems to go very much against the Yankee grain to take this sort of thing lying down. The initial reaction is an outraged "They just can't do this to us!" The next symptom is a preoccupation with devising ways and means to counter the jamming, ranging from putting a spitball curve on the transmitted signal, to installing an electronic "sucker-upper" to make the jamming signal disappear. However, no one yet has figured out a successful way around jamming, largely because of a fact of physical life known as the inverse square law, which shows that the transmitter closest to the target receiver will always win. In spite of the affront to the Anglo-Saxon spirit of fair play, the Russians continue to jam with great verve, elan, and effectiveness.

#### *Philosophy of Jamming*

It is possible to work oneself into a considerable snit over this, by arguments involving phrases like "violation of international agreements," "freedom of speech," "law and order," etc., but it is only reasonable to look at the Russian side of the picture. Every sovereign power, they point out, reserves unto itself the right to close its borders to people and ideas said sovereign power doesn't like. For example, the United States will not permit immoral literature to be mailed to its citizens from abroad, and similarly the entry of printed matter advocating the overthrow of government by force is frowned upon. The U. S. has in the past put heavy pressure on a neighboring country to reduce or suppress irresponsible English-language radio broadcasts directed specifically at the U. S. and offering medical treatments of dubious value.

The Russian position is that they do not wish to allow foreign broadcasts to cross their borders in any language that is spoken in the U.S.S.R. As far as they are concerned, the United States is welcome to shout in English until it is blue in the face, but if anyone broadcasts in Hungarian to Hungarians, or Rumanian to Rumanians, and so on, the transmissions will simply be jammed.

If one operates on the assumption that the

same standards of conduct ought to apply between nations as would apply between individuals, it is easy to talk oneself into the position that it is really the United States which is giving offense in the jamming war, because by sending out transmissions which the Russians consider objectionable and thus feel forced to jam, we are putting them to a tremendous amount of trouble and effort — all of which could be avoided if we stuck to our own knitting and broadcast only English.

Nor can the Anglo-Saxon powers claim that jamming is a tactic to which they themselves would never stoop. The fact is that Greek language broadcasts to Cyprus have been jammed by the British.<sup>2</sup> The reason? An understandable one — the broadcasts were inciting riots during the course of which British troops got killed. It is hard to imagine that the United States would behave differently if faced by a similar situation. Certainly, if U. S. occupation troops were being picked off by snipers directly inspired by external broadcasts, there would be a great deal of pressure on Congress by the families of the dead servicemen and others.

Unfortunately, it is not safe to assume that the standard of conduct of governments is necessarily the same as that of individuals. In the Paris edition of the *New York Herald Tribune* for December 17, 1958, there appeared an account (whose source was cited as the Associated Press) which illustrates the extremes to which one government, at least, is prepared to go in order to keep the Curtain intact. It seems that in East Berlin it is a punishable offense for citizens to cross the border into West Berlin and buy a newspaper. The *Herald Tribune* story told of some East Berlin newsboys who had been collecting rewards from the local authorities for turning in the names of East Berliners who were buying their newspapers on the wrong side of town. If this story is true, it helps place in context the enormous Russian jamming effort. That curtain must be kept closed at all costs!

<sup>2</sup> Paulu, *The British Broadcasting*. University of Minnesota Press, Minneapolis, Minn., 1956. See footnote, page 402.

Fig. 3—Control room of the 173-kc. megawatt at Erching. George H. Chapman, DL4BU/W5BEE, manager of the relay base, is speaking on the phone.



### *Types of Russian Jammers*

Jammers are of two types — ground-wave and sky-wave. The latter are evidently connected by a remarkably efficient intercept and communications network, as the ability to whistle up additional jammers in a few tens of seconds so dramatically shows. A photograph of what is probably a Russian sky-wave jamming installation appears at the head of this article. Surprisingly enough, the jammers identify themselves by means of automatically-keyed i.c.w. call letters every 30 seconds or so. This is evidently to assist monitoring and control. Jammers in satellite countries key a letter and a numeral; those in Russia itself send two letters. Apparently to keep foreign eavesdroppers off balance, all jamming stations swap call signs every few weeks.

Western broadcasters have tested the efficiency of the Russian sky-wave net. For instance, the British once tried an experiment whereby they brought up, without warning, a broadcast transmission on a frequency they had never used before. Within a matter of minutes it, too, was completely jammed.

Ground-wave jamming stations have been installed in almost every population center in Russia and the satellites. Being moderately conspicuous, they are readily spotted by visitors. Large cities may have several such installations, which are characterized by antennas clearly intended for local transmission. One is in easy view of the American Embassy in Moscow.

The amount of effort involved in all this jamming activity is formidable. At Munich, the Voice of America has a station on 173 kilocycles (the European long-wave band) running a mere million watts of power. At this frequency, a wavelength is, by coincidence, just one mile long. As a result, directional antennas are — shall we say — a bit impractical. Does this stentorian voice get off scot-free? Not at all — it is also jammed. From signal strength measurements made at widely separated locations, with the knowledge that the jamming antenna is non-directional, it has been established that the jamming station or stations must have a total power of at least half a megawatt.

Amateurs throughout the world who have been annoyed by jamming in the 14-, 21- and 28-Mc. bands may wonder why the U.S.S.R. is jamming the amateur frequencies. These signals are actually the result of harmonic radiation from poorly-designed jamming transmitters operating in the 7-Mc. band — a fact which can be verified by listening to the jammer call sign on the exact harmonic frequencies of the 40-meter signal.

In general, the Russian jamming signals use fairly crude modulation forms. Some involve f.m., and some a.m., with the former perhaps the more common. It is surprising how effective a simple wobbled carrier can be.

### *The VOA's Munich Relay Base*

Under the circumstances it is difficult not to be enthusiastic about the job being done by the Voice of America, and sympathetic in regard to the conditions under which it has to be done. Chief of the Munich Relay Base is George H. Chapman, DL4BU/W5BEE, shown in Fig. 3 in the control room of the 173-kilocycle megawatt. At Munich, in addition to the medium and long-wave stations mentioned above, there are two 75-kilowatt and two 100-kilowatt short-wave transmitters which were liberated from Hitler's government at the end of the war (Fig. 4). Program material for all these transmitters is picked up at a receiving station not far from Munich, at the Bavarian hamlet of Ueberacker. For the most part, transmissions direct from the U. S. A. are relayed, but when magnetic storms knock out the North Atlantic path a double relay via Tangier is often possible. The supervisor of the Munich receiving station is James C. Miller, DL4SV/W9NTV, who is also contributing editor for the s.s.b. feature of the British *Short Waves Magazine*.

Each program to be relayed is broadcast from the United States from several transmitters in several different wave bands. Thus the operators at Ueberacker have a choice of at least three frequencies per program, and there may be as many as four simultaneous programs. Since any given frequency from the U. S. may be less than perfect due to accidental interference, deliberate



Fig. 4—One of the two 100-kw. short-wave transmitters at the Munich relay base. There are also two 75-kw. transmitters, not shown.

interference, or propagation troubles, it is normal practice to have receivers tuned to each available transmission per program. The best of these transmissions is selected as the one to be relayed. The operator on duty constantly monitors the remaining frequencies, and is prepared to select another at the flick of a switch in the event that the program quality of the feeder originally selected deteriorates.

Since every transmission is picked up by three receivers operating in triple space diversity, this adds up to a remarkable array of equipment. Fig. 5 shows a view of the main receiving room. Some 26 dual and triple diversity receiving channels are available. These are fed from nine rhombic antennas through broad-band multicouplers. Since the monitoring operator must "ride gain" as well as select the best feeder, he is often kept about as busy as it is possible for one man to be. The Russians have been known to play a little game by jamming the feeders one by one, in an effort to find out which is being relayed at any given time. Thus far, it has been easy to keep them in the dark.

#### *Methods for Countering Jamming*

Although there is no known procedure for countering ground-wave jamming, there are nevertheless some tricks which can be used in the case of sky-wave jammers. In the first place, the jamming job can be made difficult by broadcasting on a large number of frequencies simultaneously. This increases both the number of jammers and the monitoring effort required. Furthermore, the jammers and monitors must be available

around the clock because broadcasts might conceivably come on the air at any hour of the day or night. As a practical matter, broadcasts are concentrated during the best listening hours, early and late in the day. The BBC, for example, beams all available transmitters directly at Russia for a half hour or so in the morning. A similar Russian-language "barrage" is turned on at night. During the rest of the day, the Corporation gets on with the job of broadcasting in a variety of tongues to every corner of the globe.

The real hope behind the barrage, of course, is the possibility that one out of the many transmissions may escape notice and sneak through. During the evening hours, a more direct anti-jamming scheme can be used. For example, consider the situation at twilight in Munich. Signals crossing the Atlantic from the United States are reflected from the ionosphere in the region where sunlight still exists and the bending power of the layers is high. But a transmission from Russia to Munich must strike the ionosphere within the zone of darkness, where bending power is low. Thus if a transmission from the U. S. is close to the highest frequency usable over a long path at that time of day, it is likely that no propagation at that frequency will be possible from Russia at all. The reverse situation, of course, exists during the morning: New York to Munich is in darkness, and a low frequency is required; Munich to Moscow is in daylight, and any frequency New York uses can be covered by Moscow.

It is also true that during most of the day the bending power of the ionosphere increases as one

*(Continued on page 194)*



Fig. 5—The main receiving room at Ueberacker—a true ham's paradise. The 26 dual and triple diversity receiving channels use SP-600, 51-J, and AR-88 receivers working into Pioneer and Crosby single-sideband adapters and combiners.



# Hamfest Calendar

**Alabama** — The Mobile Amateur Radio Club will sponsor a hamfest in Mobile on May 16 and 17, at the Fort James Wright armory. Transmitter hunts, a dance, and meals. Continuous watch on 29.56 Mc. will be maintained for mobile talk-in. For further information, contact Ole Pearson, W4NU, P. O. Box 4422, Mobile.

**Alabama** — The Birmingham ARC will sponsor the annual Birminghamfest at the Alabama State Fair Grounds in Birmingham on May 3, preceded by a dutch supper Saturday evening, May 2. There will be equipment displays, joint meetings of all state nets, barbecue meal, several contests, and a citizenship award. This is a family affair, and previous attendance has run about 7500. Tickets are \$1.00, and may be obtained from the Birmingham Amateur Radio Club, P. O. Box 603, Birmingham.

**Arizona** — The northern Arizona hamfest will be held on May 30 and 31 at Whitehorse Lake, near Williams. There are plenty of good camp sites, and cabins are available at the lake or in Williams. Reservations must be made early, as this is the rush season. For further info contact hamfest chairman A. D. Fee, W7BFA, 133 North Cortez St., Prescott.

**California** — The San Fernando Valley Radio Club will hold its 3rd annual hamfest and picnic on Sunday, June 7, at the Victory-Van Owen Park, North Hollywood. For further information contact Arnold Dahlman, W6UEI, 14940 Hartland St., Van Nuys.

**California** — The Fresno Hamfest will be held on May 2 at the Fresno District Fairgrounds. There will be open forum discussion, code speed contests, hidden transmitter hunt, mobile judging, special sessions for s.s.b., v.h.f., traffic, CD, YLs, etc. Ticket price is \$6.25, which includes general admission and the evening banquet. Registrations should be ordered from Radio Hamfest, P. O. Box 783, Fresno.

**Georgia** — The Amateur Radio Club of Augusta, Ga., will hold its annual hamfest on May 16 and 17 at the Julian Smith Casino and Park. The night-before activities will include a hamfest eve party with dancing, swimming, and dutch supper, served smorgasbord style. Dinner on hamfest Sunday will be southern barbecue served family style and all you can eat. Tickets are \$3.50 for adults. For more information contact either Bill Towne, K4KAR, 359 Heath Drive, Augusta, or Randy Watkins, W4OKL, Martinez.

**Illinois** — The Starved Rock Radio Club hamfest will be held on June 7 at the LaSalle County 4-H home and picnic area southwest of Ottawa, which is the same place as last year. Follow route 23 to south end of the Illinois River bridge at Ottawa, turn west on route 71, and then follow the big yellow hamfest signs. There is plenty of parking area and adequate facilities for all. Free swap section run on same basis as previous years. Advance registration prior to May 30 is \$1.00, otherwise \$1.50. The hamfest site is a short drive from the Starved Rock State Park and recreation areas. Food is available on the grounds. Free coffee and doughnuts for all those present at 10 A.M. For further information contact George E. Keith, W9QLZ, RFD #1, Box 171, Oglesby.

**Illinois** — The Quad City Amateur Radio Club will hold the annual Mississippi Valley hamfest on Sunday, May 24, at the Gra-ell picnic grounds. These grounds are located approximately 3 miles west of the Quad City airport on route 6, outside Moline. Advance tickets may be purchased for \$1.50, but will be \$2.00 at the rate. Order advance tickets from Bob Horton, K9IDN, 1808 9th St., Moline.

**Illinois** — Please refer to the note on page 10 of last month's issue concerning the banquet sponsored by the Western Illinois Radio Club. The date of this banquet has been changed from May 9 to May 16.

**Kansas** — The 12th annual Hamarama (formerly known as the Christy Picnic) will be held on Sunday, May 17, at Lake Shawnee, Topeka. There will be mobile hunts, activities for the XYLs and YLs, and a covered dish luncheon.

Coffee and soft drinks will be furnished — you bring the covered dish. Ham auction, Boating, Stations on 3920 kc. and 29.6 Mc. for mobile talk-in. Registration is \$1.50. For further info contact D. Dressler, K0LAD, 4717 West Hills Drive, Topeka.

**Missouri** — The North Missouri Amateur Radio Club will hold its annual ham picnic at Moberly, in the Rothwell City park, on Sunday, May 24. Registration is \$1.00, and will commence at 0800. Bring your own lunch. Soft drinks and coffee will be furnished. There will be games and entertainment. Everyone invited. For further information contact Floyd Hughes, Salisbury, Mo.

**New York** — The Doud Legion Post in Rochester will be the scene of a western New York hamfest on Saturday, May 16. A fast-moving program for novice and old-timer alike. Special sessions on v.h.f., sideband, DX, and transmitter design. There will be a code receiving contest and a QSL card contest. Open house at the Antique Wireless Association historical barn museum (see the article on this barn elsewhere in this issue). Ladies' program. Equipment displays. Advance registration \$3.75, at the door \$4.25. Activities commence at 1:00 P.M., banquet at 6:30 P.M. Info and registrations from Rochester Amateur Radio Association, P.O. Box 1388, Rochester.

**New York** — There will be a family get-together and hamfest at Northampton Beach State Park on Sacandaga Reservoir on May 24, with an auction, entertainment, and contests. For further info contact F. H. Topping, K2KTN, Box 44, South Schodack.

**New York** — The Rome Radio Club will present its sixth annual ham family day at Beek's Grove near Rome on May 24, beginning at 1300. There will be transmitter hunts on six and ten, mobile judging, technical talks, and entertainment for the entire family, plus a chicken and steak dinner. Registration: adults \$4.00, children under 12 \$1.25, children under 5 free. Get your reservations from the Rome Radio Club, Box 721, Rome.

**North Carolina** — The annual Charlotte swapfest will be held on Sunday, May 24, at the Army National Guard, Municipal Airport, Charlotte. For further info contact Reagan Rowe, W4FHI, 2421 Weddington Ave., Charlotte.

**Oklahoma** — Beaver's Bend State Park, in southeastern Oklahoma, will be the scene of a hamfest on Saturday, May 30, beginning at 2 P.M. Swimming, boating and fishing. Contests. For more information, write Charles Free, K5DLO, 108 South Central, Idabel.

**Pennsylvania** — The Breeshooters 5th Annual Hamfest is to be held at the Lodge, North Park, Pittsburgh, on May 24 from 1000 to 2100. For further information contact Thomas J. O'Toole, 301 Orchard Spring Rd., Pittsburgh 20.

**Saskatchewan** — The Moose Jaw Amateur Radio Club is sponsoring the 1959 Saskatchewan hamfest on May 17 and 18. There will be a banquet, transmitter hunt, mobile judging, code speed contest, and the usual liars' contest. Registration fee is \$5.00 per couple, \$3.00 single. For further info contact the Moose Jaw Amateur Radio Club, c/o Canadian Legion, Moose Jaw, Sask.

**South Carolina** — The Charleston Amateur Radio Club will sponsor a hamfest on May 30 and 31, on the Isle of Palms, just outside of Charleston. A barbecue dinner will be served on May 31, at a cost of \$2.50. For tickets and further information, write to Raymon Mellard, K4YCT, 402 Hyde Ave., North Charleston.

**Virginia** — The Blue Ridge Amateur Radio Society is holding its fourth annual hamfest on May 17 at the Lakeside Amusement Park, between Roanoke and Salem on U. S. 460. Open house at W4CA on Saturday evening. Mobiles will be monitored on 3835 kc., 29.6 Mc., and 50.1 Mc. Registration is \$1.00, plus \$1.50 for the luncheon ticket. Children under 12 75¢. Plenty of activities for the whole family. For further information contact Ken Wyatt, K4BCP, P. O. Box 2002, Roanoke.

**Washington** — The annual Bremerton hamfest will be held May 16 at the Sons of Norway hall in Bremerton. There will be entertainment and fried chicken. Advance registration is \$4.00, and \$4.50 at the door. For further information and for advance tickets contact Ray McCausland, W7UWT, 3236 Wright Ave., Bremerton.

# History in the Making

## *A Brief Account of an Unusual Organization*

BY BRUCE L. KELLEY, \*W2ICE, ex-W8ACY

This month rounds out 45 years of service by your League, of, by and for the radio amateur. During the course of 45 years many changes have been wrought, not the least of which are in the line of equipment. The Antique Wireless Association, an affiliate of the League, has dedicated itself to preserving some of the relics of amateur radio. Our cover this month shows a typical station dating about the time the League was founded. The other photographs in this article show typical stations that might have existed about the turn of the century, about 1920, and about 1930. (The photographs, incidentally, were taken by ex-W8TQV, who is about to become a ham once again.) Old timers will view these pictures with much nostalgia; hams of more recent vintage will marvel at the equipment used in the "good old daze"; all hands will mentally give a vote of thanks to the Antique Wireless Association for having engaged in such a worthwhile project.

There is excitement in the new; there is equal drama in the old . . . and so it is with amateur radio. Prior to World War II, very little interest was shown in the history of our hobby; however, by 1946 amateur radio was approximately 46 years old, the ARRL had been in existence for 31 years and the large number who joined the amateur ranks in the early 20's were now old timers at the quarter-century mark. As a result, many amateur clubs throughout the country were beginning to have an annual "Old Timer's Nite" and several social organizations

\* 4 Main Street, Holcomb, N. Y.

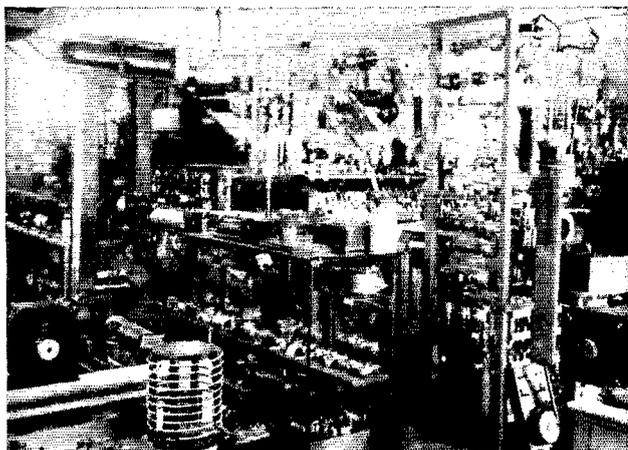
were formed catering to the old-time operator.

As a rule, this sudden interest neglected the material side of early wireless, or radio as we know it today. Aside from a few private collections assembled by some thoughtful old timers, the only historical material available for the amateur was some early equipment on display at the League headquarters and the exceptionally well written history of amateur radio by Clinton De Soto, *Two Hundred Meters and Down*.

It was only natural that some enterprising amateurs would eventually undertake the task of collecting and compiling the historical background of their hobby as a group. The Antique Wireless Association is such an organization.

The nucleus of the club is an original collection of historical equipment and films which I had gathered. Frequent requests for these programs and historical displays proved too great a burden for one individual. W2GB and W2QY, two able old timers, came to my aid in 1953, and thus was born the AWA. Today the organization has several hundred associates in the United States, Canada, Hawaii, England, Germany and South Africa.

The club directs its energies in three directions. It maintains one of the largest amateur club museums in the country. Operating strictly on a non-profit basis, it has collected and tagged, with the donor's name and call letters, thousands of early tubes, receivers, transmitters and pieces of equipment, some dating as early as 1850. Name plates marked Murdock, Clapp-Eastham, Electro-Importing, Grebe, Adams-Morgan, Federal, DeForest, Wireless Specialty, Mignon, Amrad and Marconi are familiar sights on the various shelves or showcases. In addition, one can find a



Here are some of the ten thousand items on display in the museum of the Antique Wireless Association. Makes you want to visit there, doesn't it! Thousands of people from every continent have toured the museum.

vast assortment of magazines, catalogs, photographs and tape recordings on file for the historian. Of particular interest are the four mock setups of amateur stations dating 1901 with coherer and spark coil, 1915 with crystal detector and fixed spark gap, 1922 with regenerative receiver and rotary spark gap, and lastly, a modern setup of the early 30s with an FB-7 receiver and a crystal-controlled transmitter using a pair of 210s in the final.

All of this equipment is on display in a barn museum located on my property. It is a two-story carriage barn crammed full of old gear. Out in front is a small sign bearing the legend "A.W.A. — Bruce Kelley." The barn museum is always open to the public. If visitors can't locate me, they can go across the street and up a few doors to the home of W2VTR, Bruce Elle, who will show them around.<sup>1</sup> We prefer to have groups or special visitors drop us a line in advance so that

<sup>1</sup> Don't be confused by the fact that the *Call Book* shows W2ICE as living in Holcomb, while W2VTR, just up the street a few doors, is in East Bloomfield. The answer lies in an ancient town feud, an interesting story in itself! Ask W2ICE about it when you visit the museum. — Ed.

proper arrangements can be made. Holcomb is located about 23 miles south of Rochester, and about 5 miles south of NYS Thruway Exit No. 45.

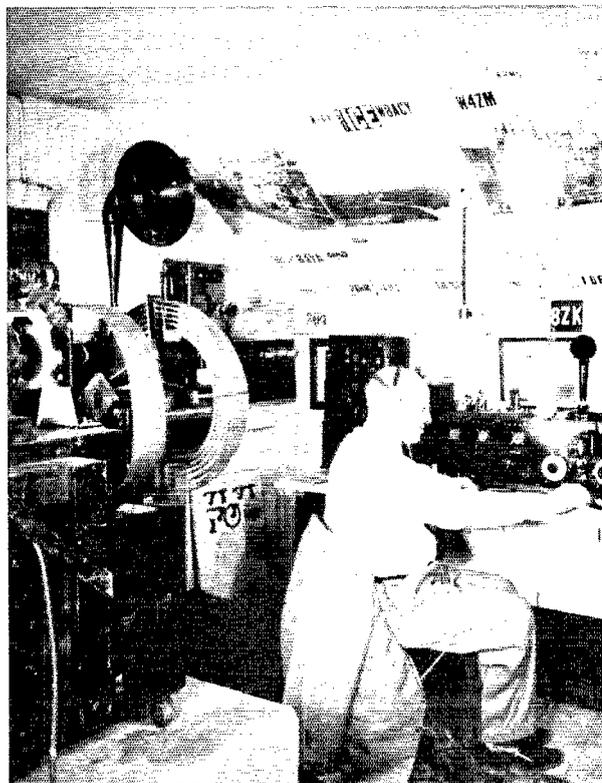
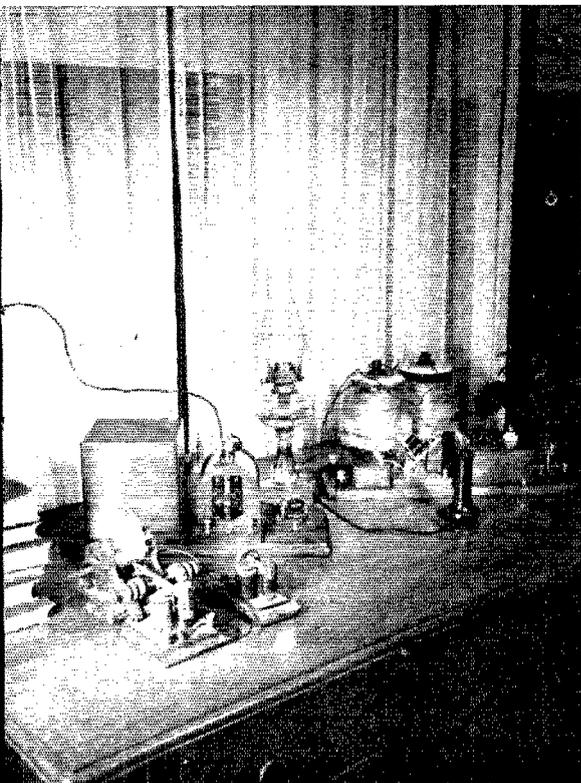
The collection is the result of many hours of traveling countless miles and scrounging through hundreds of dusty attics and cellars. The club's greatest concern is to prevent the amateur from throwing unused antique equipment into a junk barrel.

Using this material for background, the club's amateur photographers have carried out the second objective of the AWA by producing a number of historical movies and slide shows for amateur meetings. These shows are eventually turned over to the League to loan out to affiliated clubs.<sup>2</sup> The popularity of the shows can be measured by the ever-increasing requests. An early production, "The First Thirty Years of Amateur Radio," was rated the most popular show in the ARRL film library for 1957. The organization's

<sup>2</sup> The following two AWA slide collections are available to all affiliated clubs:

- a) "The First Thirty Years of Amateur Radio."
- b) "... The Story of DX" (See page 103 this issue).

In the photograph below at the left is the sort of station that you might have had in about 1901. This one, of course, is a mock setup in the Antique Wireless Association museum. At the left in the photo is a paper tape recorder of the sounder type, and then in the center a straight spark coil without helix, and then a coherer and tapper and primary cells. Note the telephone receiver — in those days the now-common headset had not been invented! In the photo at the right W2GB sits at a mock setup of a typical 1920 station, one that might be described as the end of an era. Over at the left is a spark gap with its oscillation transformer. Below the oscillation transformer (those big coils, kids) is a box which held the glass-plate capacitor. Behind W2GB's head is a Grebe short-wave receiver, while directly in front of him is a longer-wave receiver.





Here we have a mock setup of the early 1930s. Across the table, from left to right, are an FBX receiver, a pre-selector, a power supply, and an SW-3 receiver. The shelf above holds a crystal-controlled transmitter using a pair of 210s in the final. Those were the days!

"Story of DX" set an all-time record when it was presented at the 1956, 1957 and 1958 ARRL National Conventions — the only program ever scheduled at three conventions! A new show in the making is one covering the life of Marconi. Old time operators such as W1SS, W1ZE and W2LF, as well as G. G. Hopkins, Marconi historian of Chelmsford, England, will be seen and heard in this amateur production.

The third objective of the Antique Wireless Association is to display equipment at various gatherings. Handling and transporting such equipment would normally present a problem to an organization working without funds; fortunately the president, W2GB, is in the trucking business and amateurs across the country have had an opportunity to view everything from old loose couplers to huge spark transmitters. Worthy of note is the fact that the AWA exhibit was awarded a first prize at the 1958 ARRL National Convention (Washington) as having one of the outstanding amateur exhibits.

Many recently licensed amateurs visiting the barn museum or viewing one of the shows have wondered at the inclusion of early commercial equipment. There are several explanations. In the early days of wireless the amateur's transmitting range was limited. Hence, DX was strictly on the receiving end and calls such as CC, FL, POZ, and NAA were as familiar as W1AW is today.

Likewise, the early amateur would frequently

operate on a wavelength very close to a commercial station and it was not uncommon for the two to communicate with one another (and interfere!). This sentimental tie is recalled when the visitor views early equipment such as a magnetic detector or a 10-inch spark coil in operation or possibly the  $\frac{1}{4}$ -ton capacitor from old NAA. Apparatus from the historical German stations at Tuckerton and Sayville or the early Marconi installations at New Brunswick, Marion and South Wellfleet occupies a space by itself.

For demonstrating purposes, W2QY, the club's craftsman, spends his evenings restoring or making equipment that no longer can be purchased since the days of the E.I. and Duck Catalogs. Because of his efforts we have perfect working models of coherers, magnetic and electrolytic detectors and other pieces of equipment of a forgotten era. Many of the museum items, as received, require replacement of missing parts as well as a general cleaning. Even some of the early crystal sets and one-tube receivers are mounted in mahogany cabinets with panels covered with a multitude of knobs and binding posts.

The club has in its organization many old timers who can assist the layman interested in seeking information of the past. This group includes W1SS, W2AE, W2ANR, W2BB, W2CTA, W2LF, W2LK, W2PZH, W2ZI, W3YA, W4ZM, W6ELW, W8JDV, W9EWH and G2ML. If your club is planning an "Old Timer's Nite," call on an AWA member; he will be glad to assist. **QST**



# Correspondence From Members -

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

[CORRECTION: In this section of *QST* for March, the call of Edward M. Blaszczyk, W3KVQ, who wrote the letter under the heading "Exclusive," erroneously appeared as W3KVG. Our apologies to both amateurs.]

## STUTTER?

7216 Manitoba Drive  
Jacksonville 11, Florida

Editor, *QST*:

Why why do do so so many many Novices Novices insist insist on on sending sending a a double double "de" "de" between between station station called called and and their their own own call call??

Who who started started this this??

— Harry A. Cole, W4DLL

## NONE . . .

10744 Danube Avenue  
Granada Hills, California

Editor, *QST*:

. . . I notice in the past two years or more that virtually no circuits for building s.s.b. rigs or receivers ever appear in *QST*. To be down to earth for just a moment, you guys pushed this thing on us, told us of its so called great merits, provided a few circuits and then increased your advertising many times by selling commercial gear. I am still old fashioned, build everything — rig, receiver, and antenna. You people continue to publish circuits that create interest and I am still behind your good efforts, but I would like to get into s.s.b. . . .

— John Oliver, W6LZS

## . . . OR TOO MUCH?

P. O. Box 453  
Green River, Wyoming

Editor, *QST*:

I'm letting the *QST* go this year. I'm not interested in s.s.b. and that is mostly what is in *QST* now, so cancel my name from mailing list and ARRL.

— L. C. Strong, W7PJA

## SURVEYS

P.O. Box 243  
Stratford, Connecticut

Editor, *QST*:

I was pleased to read in your editorial in March *QST* that you were soliciting general views from your membership every now and then as to the material they like to see in *QST*. However, as one of the many members who were not included in your random sampling, I believe this questionnaire should be made available to all the members as this would give you what the majority of the members want and not only what a few selected at random want. . . .

— Raymond L. Lasonde, W1LEA

[EDITOR'S NOTE: At one time questionnaires were indeed sent all members and tabulations were made of the thousands returned. However, it was found that a tabulation of a random selection of several hundred produced results identical to the overall survey, so that the larger survey only made extra work for all concerned.]

## RELIGIOUS QSLs — REBUTTAL

Mystic Congregational Church,  
Medford 55, Massachusetts

Editor, *QST*:

It was with considerable interest that I read the letter from Mr. Michels, XE2GR, in the March issue of *QST*. I have been a ham for almost a year and a half now and have never noticed the objectionable religious emphasis on the

bands which Mr. Michels mentions. I think that on the whole most professional religious men are much less obtrusive than, for example, the doctors. For example, I have worked a number of doctors and lawyers but only on one occasion did I work another minister, at least that I knew about. Moreover, no one has ever discussed religion with me, or QSL'd me with religious literature.

I think that when we consider the vast number of professional religious men who are hams and also the tremendous number of hams who have religious affiliation (most of them do!) the number of incidences such as was suggested are very low indeed. However, I would like to point out that the violation of ethics which was pointed out apparently did not occur on the ham bands but rather in the correspondence resulting from the radio contacts. On this point I think it should be noted that no regulation covers this as far as I know. In this country everyone has a freedom to say what he likes, about religion or anything else. If a person includes a religious message with his QSL it is usually the result of sincere concern for others and can hardly be called "careless ham operating." I think Mr. Michels should rejoice that there are people who are concerned about the souls of men, tear up the QSL and forget about it.

Being a ham is a great privilege. It is furthered by cooperation and criticism — but the criticism must be constructive.

— Reverend Ward A. Knights, K1DUN

First Presbyterian Church  
Winamac, Indiana

Editor, *QST*:

I noted with interest XE2GR's complaint at finding religious tracts included with QSL cards. Here is one Presbyterian minister who agrees completely with the complaint. However, I am under no illusions that either his letter or mine will make any difference to those who seek to use amateur radio as a means of furthering their evangelistic efforts. Past experience has taught me that such persons are subject to none of the ordinary canons of good taste. They will continue their efforts blissfully unconcerned at the fact that for every convert made hundreds more are alienated, some permanently. If this letter is published, I shall be surprised if I do not receive several communications accusing me of apostasy.

But I at least want XE2GR and other victims to know that such methods are not normative for American Protestants, and that most clergymen are as repelled as he is.

— Reverend Mayo Smith, K9LTA

## NO EXAM CHANGES

37 Wanton Shippee Road  
East Greenwich, Rhode Island

Editor, *QST*:

FCC has changed the general class examination, effective January 1, 1959. There are now more questions from the Amateur Extra exam, and there are six or seven exams. I would like to know what the new questions are.

— Robert Young, KN1HWK

[EDITOR'S NOTE: There have been no changes in the overall scope of the examination. Often questions are reworded, but anyone who knows and understands the answers to the sample questions is adequately-equipped to pass the exam.]

## INTERNATIONAL FRIENDSHIP

18 Fairfield way  
Barnet, Herts., England

Editor, *QST*:

During the past few years, when the very favorable sunspot maximum conditions have made it so easy for trans-Atlantic contacts on the h.f. bands, a great number of friend-

(Continued on page 182)



# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
GEORGE HART, WINJM, Natl. Emerg. Coordinator  
PHIL SIMMONS, W1ZDF, Asst. Comm. Mgr., C.W.

ROBERT L. WHITE, WIWPO, DXCC Awards  
LILLIAN M. SALTER, W1ZJE, Administrative Aide  
ELLEN WHITE, W1YYM, Asst. Comm. Mgr., Phone

**Hawaii to be 50th State.** Congress has acted once again, this time to make it possible for Hawaii to become the fiftieth state in the U. S. A. We'll all join in this hearty welcome for the KH6s. With over 1200 KH6 calls in the book amateurs striving for ARRL's Worked-All-States Award should have no complaint. As we see it, Vermont and Nevada, or the Dakotas will remain those reputed to be hardest-to-get. Over the next several months it will require the approval of the people of Hawaii in a territorial referendum, and their action then to nominate and elect their own state officials to lay the groundwork to permit another Presidential Proclamation to establish Hawaiian statehood.

Only from the date Hawaii is officially a state, can the KH6 written confirmations start becoming valid pasteboards for a state credit for WAS.

Cards confirming contact prior to such date, while good for DXCC or proof of a general contact, cannot be counted for state-credit until date of the Presidential announcement.

When Hawaii legally becomes our 50th State, the date will be announced by a W1AW and ARRL Bulletin, with confirmation in the earliest following issue of *QST*. Until then do not submit any Hawaiian cards for WAS credits, please.

**WAS Rule to Apply as It Did for Alaska.** In September '58 *QST* (page 78) we explained the situation of Alaska's pending statehood, some four months before it became a fact. (See also Feb. '59 *QST*, p 78.) With Hawaii we have a good parallel. No change is contemplated in processing WAS cards until the date of Hawaii's admission to the Union. The WAS rules already state the simple requirement: *Two-way communication must be established on the amateur bands with each of the states.* This is the second time Congress has re-defined our "each" in this rule. When we know the Hawaiian statehood date (to pass along via W1AW) we expect *again* to allow a six-month's grace period. This is for amateurs who have made their 49 states. It's a period to collect the QSLs and get them in for your certificate "as of the last date" the U.S.A. had only 49 states. WAS would not really carry its true meaning, if the recipient didn't in every case work *all* states as of the time a WAS was issued. Policy has had to be based on that. It looks as though '59 is to be an historic year when for the only time in a half-century, the United States is adding (in quick succession) *two* states. Last month we indicated on this page the calls of those first officially to include Alaska in their WAS-package. In the future, which new WAS will have the first KH6s to be worked after the new statehood proclamation soon coming up?

## A.R.R.L. ACTIVITIES CALENDAR

May 7: CP Qualifying Run — W6OWP  
May 19: CP Qualifying Run — W1AW  
June 3: CP Qualifying Run — W6OWP  
June 13-14: V.H.F. QSO Party  
June 17: CP Qualifying Run — W1AW  
June 27-28: Field Day  
July 2: CP Qualifying Run — W6OWP  
July 18-19: CD Party (c.w.)  
July 23: CP Qualifying Run — W1AW  
July 25-26: CD Party (phone)  
Aug. 5: CP Qualifying Run — W6OWP  
Aug. 21: CP Qualifying Run — W1AW  
Sept. 3: CP Qualifying Run — W6OWP  
Sept. 16: Frequency Measuring Test  
Sept. 19-20: V.H.F. QSO Party

## OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Apr. 25-26: PACC Contest (c.w.), VERON (p. 77, last month)

Apr. 25-26 and May 9-10: Bermuda-U.S.-Canada Contest, Radio Society of Bermuda (p. 78, last month).

Apr. 25-26: New Hampshire QSO Party, Concord Brasspounders (p. 281, last month).

May 2-3: PACC Contest (phone), VERON (p. 77, last month).

May 8-10: West Virginia QSO Party, Mountaineer ARA (p. 156, this issue).

May 16: Armed Forces Day Receiving Competition and QSO Party, Dept. of Defense (p. 67, this issue).

**Club Establishes Novice QSL Service.** In Omaha, Neb. Novices not listed in the *Call Book* are invited to send their call, name, address and telephone number to Box 626, Omaha. The Ak-Sar-Ben Radio Club has set up a local arrangement to help newcomers to amateur radio that might well be emulated by other clubs. Consider good novice programs as a means to stimulate sound and progressive club growth and activity. The following is from *Ham Hum*: "Each month the Club receives a number of QSLs for Novices because of incorrect or lack of address. Since the addresses for new stations are unobtainable for a period, *Ham Hum* compiles a listing of the novice calls. Novices are asked to send lists of other local novices, giving QTH,

telephone number and other information. Should any QSL cards then be received, all these can be routed promptly and properly. Subscription to the club paper is included in the arrangements for membership in the Club."

**Apropos the A-1 Operator Club.** The rules for this recognition of high class operating ability are clearly set forth (page 5 of *Operating an Amateur Radio Station*). A segment of the rather considerable A-1 Operator group is circulated by ARRL Hq. each year just to solicit fresh prospects among both phone and c.w. operators who are active on the air. In this ARRL asks particularly that amateurs be nominated based on critical judgment of their radio operating technique. It takes *two* separate and independent nominations placed on the record to 'make' a new member of the A-1 Operator Club. Readers are referred to page 82 of May '56 *QST* for data on the required spontaneity of such nominations. Some current commentary is excerpted from the *Virginia Ham* as having direct bearing on this also.

"The recent listing in Oct. '58 *QST* of addition to the A-1 Operator Club roster prompted some non-members to approach known members and request nomination! Let it be said here and now, that it has always been a tradition among A-1 ers *never* to nominate one — even though he may otherwise be eligible — who *asks* for it. Such a request can be embarrassing to the requestee, especially if the requester be obviously not worthy. A-1 membership is an *honor*, one that should be earned purely by constant observance of the highest standards of operating procedure, courtesy, judgment and copying ability. It should under *no conditions* be awarded on a basis of friendship alone. To do so merely degrades the certificate to the level of empty wall-paper.

"We have even heard of persons requesting nomination on the basis of a single and relatively casual contact! This is comparable to proposing to a gal on the basis of one quick handshake! It is patently impossible to appraise an operator's overall ability on such short acquaintance, even during a QSO involving an appreciable amount of traffic handling. . . .

"Ergo: If you aspire to A-1 membership, read up on the rules of the air; observe same; *never* under any circumstances request nomination. Thus: when you are nominated you are sure you earned a genuine honor." . . . de W4KX.

**Building Club Membership.** The St. Paul Radio Club, Inc. and other clubs in the (Minn.) area have long encouraged and arranged assistance for the newcomer. This year's sessions for classes are sponsored by the St. Paul Public School's Adult Education Department in co-operation with the club. WØBUO is again this year teaching the code and theory. It is said that during and after each series of lessons the club finds an increase in attendance of around 25 members. All these were encouraged in their efforts through the classes . . . a real club membership-building setup!

**FD Log Forms Now Ready.** Clubs and individuals can now get off a radiogram or postal card to ARRL requesting June Field Day forms. These will be sent gratis (deferred mail rate) unless of course you provide necessary postage and indicate a specified faster type of mail. Even then we urge you *not* to put off sending for the forms, if you are planning to set up afield June 27-28 this year, as *of course* you are. With better than *one thousand* groups going portable or mo-

bile, there are bound to be some bottle necks in stuffing envelopes for those who wait until the last minute. Starting in May, however, we are resolved to keep the decks clear day by day, so (please) let those requests come early, so we can guarantee our best service.

**Are YOU Ready?** Speaking of the "FD," this is bound to go most smoothly, pleasurable, and effectively if you have made some plans ahead of time. Besides a full page discussion of how-to-plan (p. 83 Apr. '58 *QST*), we made reference to this in March '59 *QST* so we're not going to elaborate again. Many operators give their emergency power supplies a workout *every three or four weeks* through the year, so the gear isn't found gummed up, rusted and useless in meeting real disaster needs. Many others we dare say, have good equipment that needs a check up, if not a thorough overhaul after a winter's inactivity and disuse. So may we urge some testing of all the component gear that makes for successful emergency operation well in advance of our Field Day?

Advance planning, building and testing of equipment, whether in net operation, private schedules, as demonstrations for club benefit or combined with family outings and picnics, cannot fail to work toward best chances of fun and success in the FD, or if emergency needs arise. Preparedness pays off. That's why we have our ARRL Field Day. See you there! — P. E. H.

### MEET THE SCMs

William F. Kennedy, Georgia's SCM, still has the call W4CFJ, which he was assigned when he received his first license in 1931.

He holds membership certificates in the Rag Chewers', A-1 Operator and Old Timers Clubs and is active as Official Relay Station, Official Phone Station, Official Experimental Station, Official Observer and Official Bulletin Station. The



SCM W4CFJ

current president of the Georgia Cracker Club, he also is a member of the Atlanta Radio Club, the Confederate Signal Corps and the Albany Radio Club. Six Public Service Awards have been issued to him for noteworthy work in floods, tornados, hurricanes and other emergencies; he has actively engaged in training Boy Scouts toward earning their Merit Badges. In addition, he finds time to take part in ARRL Sweepstakes, DX Contests, LO and CD Parties.

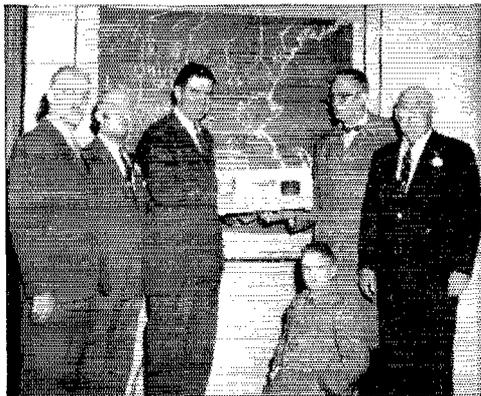
The rig at W4CFJ includes a Heathkit VFO, a 6AG7 buffer-doubler, an 813 buffer and a pair of 357B tubes in push-pull with 1 kw. on all low-frequency bands. A 25-watt homemade mobile also is available. An HRO 5TA-1 and a BC-669 serve for reception and a doublet is in use for an antenna.

Bill's favorite sports are golf and fishing. He previously taught radio and TV nights at Smith Hughes Vocational School, but for the past ten years has been chief engineer at radio station WERD in Atlanta.



A great many amateurs have become accustomed to thinking of the service aspects of amateur radio in connection with some other service. That is, as a stepping stone to something bigger, better. To many amateurs it has been just that. Out of nearly any group of communicators or electronics experts you can always find a considerable segment who got their start out of a youthful interest in amateur radio. That's why our early procedures were patterned after those of commercial services and the military. What good was amateur operating, the reasoning went, unless it prepared you for something better?

But somewhere along the process of evolution, amateur radio has started to emerge as a service in itself. It started being called "the amateur service" in international documents, and the feeling began to take hold that we had something to offer in the way of service on our own bands, in our own name. Our operating procedures began to crystallize, to show slight differences, to adapt themselves to needs that



The New England Weather Net held its annual meeting on Jan. 31 at Radio Station WBZ in Boston. Fifty-seven members were present. During the meeting a ceremonial presentation was made to Don Kent, WBZ weather forecaster, of a crystal-controlled receiver built by W1KVX so that Don could eavesdrop on the net whenever he wished. Shown standing in the picture, left to right, are K1BEN, W1YCR, Mr. Kent, W1KVX and K1BNW.

(Photo by K1BEN.)

are characteristically amateur and not particularly applicable to either commercial or military services. Somewhere along the line, we became aware of the fact that there was such a thing as an *amateur service* which served as typical a need as did any other kind of service. We didn't stop being the reserve of technically-skilled personnel that the armed forces needed, nor the pool of operators, nor the pioneers in the radio art, nor anything else we had ever been before. But we did *start* becoming a service on our own, with our own procedures, methods, objectives and idiosyncrasies. We developed our own emergency and traffic services — always for the purpose of serving the public, mind you, but in our own name and our own way.

This evolutionary process met with some resistance, of course. There were, and still are, those who feel that we should adapt our methods to those used by other services so that we might be better prepared to operate in those services should the occasion warrant. Our own message form, our own phonetic alphabet and our own "lingo" is often looked upon disdainfully by some amateurs whose operator training was in other services or who have become affiliated with other services during their amateur careers. Many of them have brought other procedures to the amateur bands and

put the pressure on us to change ARRL-recommended procedures to conform. Sometimes we have responded to such pressure, sometimes we have not, depending on the apparent willingness or desire of the average amateur to conform and the logic of so doing.

One thing is certain: that as long as we are the *amateur* service, we cannot adopt the procedure and organizational precepts of any other service one hundred per cent and still expect to be universally adaptable to the problem at hand. What kind of communicators shall we be? Red Cross? Civil defense? Military? Civil Air Patrol? Post office? Weather Bureau? State police? Or, perhaps we should split up, you serve your favorite and I'll serve mine? What a dilemma, with so many agencies and organizations trying to use us!

We think that we should be *Amateur Communicators*. Note the capitals. An amateur is not necessarily an unskilled person, but many people have this impression. When we use our amateur frequencies and our FCC amateur licenses to perform a service, we are doing so as the Amateur Service primarily, and only secondarily as sheriff's deputies or civil defense officials or military or naval officers. Let's not be blinded by the glitter of equipment or the glamour of titles; for in our status of amateurs in the Amateur Service lies our chief defense of our frequencies and operating privileges; frequencies and privileges which we have retained because some of us have used them to render services, and which we shall continue to retain only if we continue to so use them — in our own name.

— . . . —  
We're sorry we weren't able to run an announcement on Operation Alert, which was held on April 17-18, and in which AREC units were urged to participate. It wasn't our fault, but we're sorry anyway. We hope that those of you who did participate will forward particulars and comments to your ECs or SECs so that we can have some sort of writeup on the activity in *QST*. If you have any pictures, don't forget to ship them along.

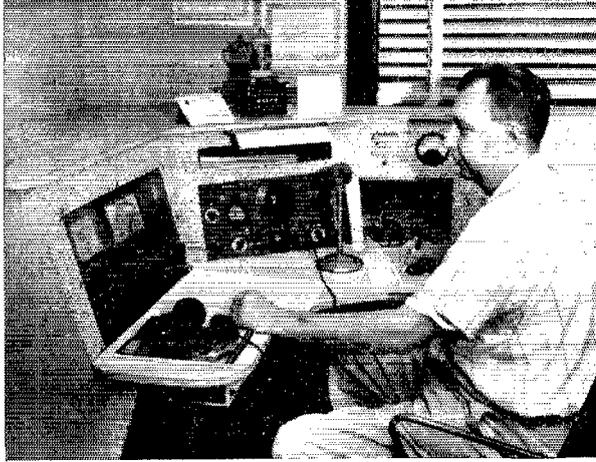
— . . . —  
More information on amateur participation in emergency communications in connection with the midwestern floods and ice storms of mid-January has come to us since the details printed in this column last month. This sort of thing happens frequently. If we had omitted all the dope we printed last month, we'd have been chided for printing it this month as "ancient history." As it is, we only get chided for disconnection in the continuity of activities and possible repetition. Anyway, here's this month's installment:

In Miami County, Ind., EC W9EJC alerted the AREC organization when the Wabash River reached a dangerous flood stage. Flood walls kept the river in place until an ice jam down the river caused it to rise more rapidly, then evacuation started with a vengeance. The AREC offered its services to the police, who were trying to get all families out of the danger zone in Peru, but they had plenty of communications, so the Red Cross was contacted and gratefully accepted help. A six meter portable was set up at Red Cross headquarters, and W9EJC's home station was used as control. Mobile K9s GPO MINI, W9s MLF and QXL were used, with assistants K9s 100 LVK, K9s LVV MKY and MWU, to patrol the river and report danger spots. The AREC received public thanks and praise for its efforts, and the only complaint from the amateurs was that they couldn't find enough to do.

— . . . —  
On January 21, as a result of the severe snow and ice storm in Central Illinois, amateurs in the Peoria area were alerted to aid in establishing communication between Clinton and Pekin for the Illinois Central Railroad. For the first 30 hours W9MXD held down the job alone, operating in the Illinois Emergency Net, and then was relieved by W9IOG. Other operators took part in two-hour shifts as it became apparent that they were needed. Among those not mentioned in April *QST* are W9s NVX IUL NKM FM, K9s KTZ KZO LHP EHP.

— . . . —  
On Jan. 22, the EC for Jefferson County, Ohio, W8ERR, alerted the county AREC unit to supply communication for the Red Cross during the Ohio River flood. A station was set up at Empire, 12 miles north of Steubenville and another at Brilliant, 10 miles south. A base station was located at Red Cross headquarters in Steubenville and two 75-meter mobiles were used as liaison between these stations. The following AREC members served as operators for a total of almost 250 hours: W8s DNQ ERR ZRI AYR JNL OBQ,

Allen R. Breiner, W3ZRQ, the active and energetic EC for Schuylkill Co. (E. Pa.) finished this new operating position just two days before the Simulated Emergency Test last October, and wanted us to have a look-see. Neat, eh?



K8s 1D7O LQM BYF GJN GEH HMJ NAMI, W3ZWH. — W8ERR, EC Jefferson County, Ohio.

During the tornado which struck the St. Louis area on Feb. 10, an emergency net was organized on 3900 kc. with K8SIO, station of the Westminster Amateur Radio Society, as net control. K8DBM was the St. Louis contact and W8OMM was NCS for a short time when W8SIO was having antenna trouble. A total of 43 stations checked into the net and 110 messages were handled between 0800 and 1700. K8SIO was operated by K8BVO and K8LJZ. K8DBM was on the air for nine hours without a break.

On Feb. 11 the Vigo County (Ind.) Office of Civil Defense issued a call for volunteers to combat the devastating flood waters of the Wabash River. The AREC provided "round the clock" communication for this operation for five days, keeping W9CBB, station of the Wabash Valley Amateur Radio Assn. located on the top floor of the Terre Haute City Hall, in operation for five days. Not less than two mobiles were also on hand for the full period at the scene of the construction of the sandbag levee in West Terre Haute. The AREC handled all communication relative to the procurement and proper disposition of 140,000 sandbags, 600 yards of sand, 1200 yards of gravel and enough crushed rock to construct a half mile of roadway along the base of the levee. The AREC group supplied 1532 man-hours of work and burned 162 gallons of gasoline. The amateurs worked in six hour shifts except when no relief was available, in which case they worked longer. Among those taking part were W9s VMI SYM KT MOR KDQ YBN QOX LIG AHN ZSW KOG UUU NZH IHO ZHL, K9s EJO BSM EBK MVI ITK EJU GBI IGS HTR JCR HTN EFO HTL. — W9UUU, EC, Vigo County, Ind.

On Feb. 28 a six-meter mobile emergency net was formed in Seattle's Magnolia Bluff area to assist in a search for a missing 3-year-old boy who had wandered away from home about 1700. K7BAG notified W7BRB, who offered the services of the six meter net to the police, and within an hour and a half twelve mobiles were in the search area with W7BRB acting as NCS. Contact was maintained in this way between the searching teams and Seattle police, coordinating the teams into an efficient search pattern. The boy was found unharmed, and the mobiles stayed on the job until the boy had been returned to his parents and all search teams had been disbanded. Other amateurs participating: W7s UZB PAE FAS RT FSW HFC AGJ DJN KZP FNY CIO C'YQ, K7s BJV DBP AVII BAG ATG AXB HFN. — W7PGY, SCM Washington.

By coincidence, on the same day as above another 3-year-old boy was lost near Elvaton, Md., and the Anne Arundel Radio club had six mobiles join in the hunt. This little boy was also found asleep in the woods, unharmed. — W3UCR, SCM Md.-Del.-D.C.

On March 11, K5SAF heard W3SOX calling for help on 15 meters. It turned out that W3SOX was mobile on the Pennsylvania Turnpike and that he had come upon a bad accident in which several people were injured. After making contact, K5SAF put in long distance calls to the McKeesport Police and the Pennsylvania State Police at Greensburg, both of whom promised to dispatch help at once. At this time there is no further report on this incident.

The rapid rise of the Allegheny River in Warren County, Pa., on Jan. 22, brought the Warren County RACES group into operation. Equipment at the civil defense control center was placed in operation to maintain contact with mobile units and to establish radio links to the key relay station for the Western Pennsylvania CD Network and to MARS. Three ten-meter mobiles were dispatched to flooded residential areas to aid in evacuation operations. A sudden

cold snap avoided the recurrence of floods experienced in previous years, but the amateurs were on deck and ready to go. — W3NQA, Radio Officer, Warren County, Pa.

During the high water in Porter County, Ind. the AREC was continuously on the alert, and information on river conditions was received regularly from W9YEA to W9HKQ. On Feb. 8 W9HKQ called W9EEO to check the Hebron grade bridge for ice jam and possible collapse. W9EEO and W9ORW/m proceeded to the bridge and immediately radioed back the situation. The Porter County acting c.d. director also showed up, and several additional mobiles put in an appearance. Since the bridge seemed to be standing up to the onslaught of the ice, there was nothing to do but stand by and be on the alert. No emergency developed, but the Porter County AREC was on the job.

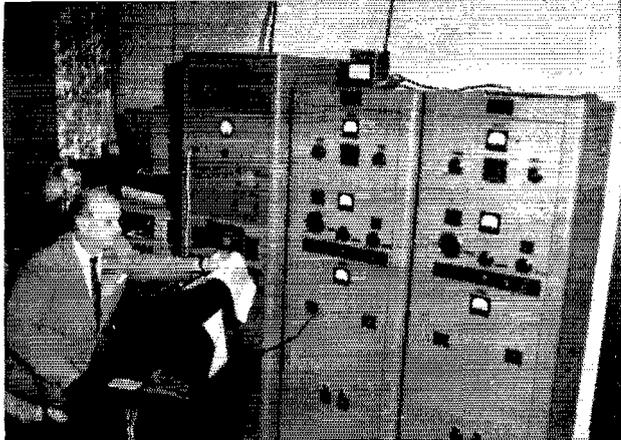
On Feb. 10 at 0830 the Knox County (Ohio) radio officer and EC were alerted for possible flood conditions. K8EEN was activated at an elementary school in the south end of the city and twelve operators showed up. Quick action in sandbagging the dikes prevented extensive flooding, however, so the emergency was declared over at 1800.

Mobile units of the North Penn Amateur Radio Club assisted Telford (Pa.) police in keeping an eye on mischief-makers during the Hallowe'en period. A base station was installed at the Borough Hall and an auxiliary policeman accompanied each mobile in the patrol, which kept a watchful eye on roving bands of mischief-makers to avoid any destructive turns. Three or four cars were on patrol for three successive nights. — W3ZXY, EC Montgomery County, Pa.

On January 20, Southeast Kansas started having freezing rain at 0900. SEC W0IFR called an AREC drill to keep track of icing conditions. Three control stations were set up and stations checking in were asked to report on icing conditions. The SCM, SEC and eight ECs took part to collate and coordinate reports from 91 Kansas stations and 30 stations from out of state. It was a completely unarranged drill, and W0IFR says he is very satisfied with the result. Had an emergency developed, they would have been ready to do a real job.

The Black Hills Amateur Radio Club (S. Dak.) assisted with a March of Dimes marathon on Jan. 10 over a local TV station. A two-meter link was used to pass traffic from the TV studio to two base stations which in turn relayed the messages to nine mobile units. The mobiles collected the money as it was pledged to the station. Almost a thousand dollars was collected by the amateurs with an average of 40 calls per mobile from 2030 to midnight.

The Cuyahoga County (Ohio) AREC took part in the Mothers' March on Polio on Jan. 28. Ten mobiles were used to pick up funds received at 40 collection points. An average of \$18,000 per vehicle was thus handled. This year, because of difficulty in maintaining 100% communication with mobiles in past years, two control stations were set up, one on the east side of Cleveland and one on the west side. They were linked to the portable at the March of Dimes head-



Among our more active ECs in Eastern Florida is W4RWM, whose jurisdiction includes East Volusia County and Daytona Beach. Quite an impressive layout, eh?

quarters and a portable at the police station on a separate frequency. This greatly improved the performance. — W8AEU, EC Cuyahoga County, Ohio.

On Feb. 14 and 15 the Lake Wales, Fla., AREC provided all radio communications for the Annual Air Show. With a base station at the airport office, another in the control tower and three mobile units, a continuous flow of traffic was handled. All operation was on two meters. Novices as well as old timers participated. Airport management and the Chamber of Commerce said it would have been nearly impossible to put on the show without the support of the amateurs, and this was reward enough for the long hours of hard work by the gang to do an effective job. — W4LJM.

On February 27, thirteen units of the Tarrant County (Texas) Six Meter Emergency Net furnished communication for the simulated evacuation of the U. S. Public Health Hospital at Fort Worth. Amateur mobiles were placed at points of traffic congestion and reported to the base station on the movement of vehicles. Partly due to the efficient communication, 150 vehicles were off the reservation and re-entering within 15 minutes. — W5UXP

Nothing like starting the year off with a bang. We received 26 January SEC reports, representing 7716 AREC members. This is a good head start over last January. Sections reporting: Ga., S. Texas, E. Fla., N. C., Colo., San Joaquin Valley, N. Mex., E. Bay, Minn., W. Va., N. Dak., Mo., W.N.Y., Maritimes, Wash., Ind., Vt., Mich., Nevada, Ala., Ont., Santa Clara Valley, Wis., R. I., NYC-LI, Neb.

### NATIONAL CALLING AND EMERGENCY FREQUENCIES (KC.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

### Races News

From the Northern Lights Carrier, bulletin of the Anchorage, Alaska, Amateur Radio Club, we learn that RACES is staging a comeback in Anchorage. The new setup will be completely mobile — that is, will be capable of being taken anywhere, any time, and set up on short notice. Some twenty new 2-meter units are being purchased with this in mind, and these will be distributed to the amateurs in RACES to be used for RACES purposes, and to be retained only if the amateur takes part in RACES drills and activities. This is the latest RACES news from the latest state.



The Portland, Ore., Six Meter C.D. Net operates on 50.55 Mc. each Thursday at 2100 PST. Present membership is about 30 stations with an average 25-station check-in. On the last unscheduled practice alert 18 stations were

checked in within half an hour. NCS is rotated and mobile NCS have been operated from the various official evacuation staging areas with very successful results. — W7RIO.

Did you take part in "Operation Alert" on April 17-18? If so, we'd like to have some dope on what went on so we could include it in the QST write-up. How?

### TRAFFIC NOTES

This is the time of year when we get statistic-happy, by request. At the moment of writing we are not yet prepared to give you full statistics on the 1958 traffic year in general (maybe next month), but advance indications are that we had another big traffic year, again exceeding previous post-war years. This is in line with the increase in amateur activities in most fields. Whether or not interest in traffic handling is increasing out of proportion to other activities is pretty hard to determine. All we know is that it is still on the upgrade.

We think that this might be a good time for us to take a closer look not so much at how much traffic we are handling, but at how well we handle it. Some of our old-time traffic men are worried about the latter. So are we. Arguments are rife on the subject of accuracy versus speed. Lately, we got to thinking this over and came to the conclusion that it can be worked out by formula:  $E = AS$ ; where  $E$  is efficiency,  $A$  is accuracy, and  $S$  is speed. In other words, we want our traffic to be accurate and at the same time to arrive at its destination as quickly as possible. This product of accuracy and speed is the efficiency of our amateur traffic-handling establishment.

It figures. When traffic is garbled (i.e., inaccurate) when it is delivered, this is poor public relations. But it is just as poor public relations to have it arrive two weeks after it originates, even if it is accurate. So what we are really after is a combination of the two rather than emphasis on either of them. What we are really after is efficiency.

In order to achieve this, what is most needed is a lot of common, ordinary horse sense. We suppose that if you don't have it, you just don't have it, and there is no use crying about it. In that case, your best bet is to go strictly by the book. But we strongly suspect that most traffic men have it all right — they just don't take the time to use it.

The other night, on one of our high-level NTS nets, we received a message carrying the check 25/26. Our contact wasn't very strong, and both QRM and QRN were bothersome. When the message was finished, we noticed that it contained only 25 words, according to our count, so we queried him. Nope, he stuck to 25/26. Well, in the QRM and QRN it was easily possible that we could have missed a short word somewhere, so we pursued the matter further. We gave him QTB and started QTbing. Well, to make a long story short, he finally agreed to make the check just plain 25, but it was pretty obvious that he just wanted to settle the matter and thought we were making a big deal out of a trifle. We strongly suspect, also, that he didn't know what QTb meant (do you?).

True, the message made sense the way we had received it, but plenty of small words omitted can leave a message that still makes sense. Example: try omitting "not" from a message text and it will mean just the opposite of what is intended.

A lot of our traffic men who are real hep in other ways are awfully careless in their procedure. If the message comes in

If there was ever a station set up for traffic handling, W6PLG, manager of the Pacific Area Net of the National Traffic System, has it. Clem was stricken with pneumonia shortly after taking over as manager and landed in sick bay for a month or so, but is now back doing what comes naturally to amateurs of his calibre.

with a check of XX, it goes out that way. Wrong! *Count* the words (it can be done without any extra effort or time). If the form of the message is wrong, *correct* it before you send it out — but *don't* change the content. The parts of a message and the procedure that should be used in transmitting them are in the Operating Booklet. There is a reason for every rule, every recommended procedure, and that reason is to increase *efficiency* — that is, to make our traffic handling both accurate and fast. Neither is more important than the other, but both are of paramount importance! Fellows, let's start a drive against sloppiness. That's all it is, in most cases. It's just as efficient to be accurate; *more so!* You phone traffic men, get the marbles out of your mouth. You c.w. men, get control of your keys, especially those electronic monstrosities so many of you use. Let's make 1959 an era of *efficient* traffic handling.

**Net Reports.** W5ZIN reports the 7290 Kc. Traffic Net with 465 messages handled in 39 February sessions with 1363 check-ins. Hudson Traffic Net, per K1CIF, had 28 sessions, 351 check-ins and handled 546 messages. Early Bird Transcon Net, says W2KFV, had 28 sessions and handled 896 messages. Slo Speed Net had 17 sessions, 65 check-ins, 109 messages. Sundown Traffic Net and Sundown Novice Net each had 28 sessions with QTC 84 and 15 and QNI 244 and 152 respectively. Transcontinental Phone Net handled 3450 messages in February. North Texas-Oklahoma Net had 29 sessions, 1031 check-ins and handled 253 messages.

**National Traffic System.** We're pleased that so many net controllers were given assistance by the ideas in this column in March *QST*. The pressure is on for us to get up a form of the kind we mentioned. Well, we asked for it.

Until such time as we get on the ball and accomplish this, here are some suggestions from the field in re possible improvements. K6HLR, RN6 Manager who got us started on this jag, suggests the possibility of using a punchboard made of plastic, to be used under the sheet we described in March *QST*. Little pegs could be punched right through the sheet and would stay there through any bumping. If you want to get real fancy, you could print the QNY data right on the backing board, and at each different net session merely fasten a strip of paper (with cellophane tape) over the part on which you would list reporting stations and their traffic lists.

Or, if you don't want to go to all this trouble (i.e., making the punchboard), you can use a piece of linoleum or heavy cardboard or plywood for backing, and instead of using the hex nuts suggested, use dress-maker or map pins — the kind with the round head on top. You can get these in different colors to differentiate between stations in the net, which may make spotting them even easier. Only trouble is, sometimes the heads pull off these pins. If this should happen when you are in the middle of a real scrabble-net, you could be thrown into a panic!

W2RXL, manager of the New Jersey Net, says the system described is so much like the one he uses that I could have stolen it from him. (Go ahead, sue me!) He also recommends the use of roundhead pins instead of hex nuts, and he makes one more very excellent suggestion, just in case you netters think all this talk about how to *control* a net is not for you; that each net member "make like the NCS" on paper, just for practice. Some day even you may be called on to QNG, just when you least suspect it. Of course keeping an NCS record can be difficult when the NCS occasionally shunts you to a side frequency to clear traffic and you thus lose track of the proceedings, but the thought is a good one especially for those who start getting bored with not having any traffic to handle. Nothing like keeping busy.

Just one precaution about this: remember, there is only one net control station. If he *asks* for assistance, then be Johnny; otherwise, shaddap, even if you think he is lousing



things up. This latter isn't easy to do, and keeping an NCS record makes it even harder, but nothing is more exasperating to a net control than to have some Samaritan break in and give him the dope on what he ought to be doing instead of what he is doing.

February reports:

Net	Ses- sions	Traffic	Rate	Aver- age	Repre- sentation (%)
1RN.....	28	772	.464	27.5	95.4 <sup>1</sup>
2RN.....	56	527	.400	9.6	97.0
3RN.....	56	513	.370	9.2	87.5
4RN.....	54	963	.455	17.8	59.8
RN5.....	56	911	.434	16.3	97.2
RN6.....	56	1266	.527	22.6	92.0
RN7.....	49	606	.296	12.4	44.4
9RN.....	50	1389	.764	27.7	79.0
TEN.....	82	1102	.522	13.4	70.9
ECN.....	36	110	.236	3.1	69.4
TWN.....	28	471	.397	16.8	75.0 <sup>1</sup>
EAN.....	23	1224	.978	53.2	99.3
CAN.....	28	1267	.873	45.2	100.0
PAN.....	28	1546	.827	55.2	100.0
Sections <sup>2</sup> ...	921	8879		9.6	
TCC Eastern	67 <sup>3</sup>	218			
TCC Central	28 <sup>3</sup>	1213			
TCC Pacific	92 <sup>3</sup>	1129			
Summary...	1521	24106	EAN	14.2	CAN/PAN
Record.....	1374	19708	1.001	19.1	100.0

<sup>1</sup> Regional net representation based on one session per day. Others are based on two or more sessions.

<sup>2</sup> Section nets reporting: NJN (N. J.); SMN (Md.); S. Dak. 40 Phone, S. Dak. 75 Phone, S. Dak. CW; SCN (S. C.); TLCN (Iowa); WSSN (Wis.); GSN (Ga.); WVN (W. Va.); CPN & CN (Conn.); SCN (Calif.); Minn. Noon Phone, Minn. Evening Phone; KMG & MSN (Minn.); HNN & CWXN (Colo.); Colo. Emerg. Fone; Tenn. Sect.; QMIN (2 Mich. nets); NWFN, Gator, FMTN & FN (Fla.); KYN, KPN, Early KPN & MKPN (Ky.); VN (Va.); QKS (Kans.); AENP Morning, AENP Evening, AENO & AENB (Ala.).

<sup>3</sup> TCC functions reported, not counted as net sessions.

The year 1958 was the best ever for NTS, and so far 1959 is even better. In '58, NTS nets and the TCC reported 233,344 message handlings, a gain of 30,000 over 1957. Over 2,000 more net sessions were reported, and 85 more reports were received. Data were up from '57 at all levels, and substantially so.

What pleases us most of all is that there now seem to be plenty of "takers" to fill managership vacancies. Where previously we had to beat the bushes for someone to take over a managership vacancy, now all a manager has to do is mention he'd like to resign and we get three or four letters from traffic men eager to take the job. This *could* be

surprising, because being an NTS net manager is no picnic, doesn't pay a thing, and no one bubbles over with gratitude for the job being done. But we're not surprised, because we know that the volunteers are proud of NTS and the part they play in it and are eager to do more to help make it even better.

Now comes the summertime with its QRN, diversionary weather, vacations and "daylight saving" time. This combination has always thrown the system for a loss, but in the fall it has always bounced right back, and even in the summer months the progress shown over the same month of the previous year has been right in step with overall progress. We want at this time, however, to enter our customary precaution: don't let the summer doldrums throw you. Don't forget your NTS commitments, but at the same time don't let this prevent you having a good summer. Now's the time when we can use all these eager volunteers to good advantage, so step up gents, and you'll be put to work.

W1BVR has issued 1RN certificates to K1s BUJ GRP, W1s NJL, OBR ROX and SMU. W2PHX is the new manager of 2RN, replacing K2RYH. W3UE reports that 3RN has a bunch of fine youngsters reporting in now. K6HLLR puts out a complete summary sheet for RN6 every month. A 9RN certificate has been awarded to K9ISP. W0TOL changed his mind about resigning as TEN manager. W9DO, CAN manager, isn't a regular NCS of that net, but is almost always around, just in case; in February, he had to QNG only once. W6YHM reports again for W6PLG, PAN manager, but Clem is back in action now.

*Trans-continental Corps.* We would like to introduce our new PAN-TCC Director, W6EOT. Cecil has been handling TCC schedules for quite some time and knows what this TCC bit is all about. He replaces W6BPT, who wants a rest but does not intend to bow out altogether.

**February reports:**

Area	Func-tions	(%) Successful	Traffic	Out-of-Net Traffic
Eastern.....	27	88.1	1456	218
Central.....	68	78.6	1568	1213
Pacific.....	92	94.6	2155	1129
Summary... ..	187	89.8	5179	2560

**W1AW SUMMER SCHEDULE**

(Effective April 26, 1959)

(All times given are Eastern Daylight Saving Time)

*Operating-Visiting Hours:*

Monday through Friday: 1300-0100 (following day).

Saturday: 1900-0230 (Sunday). Sunday: 1500-2230.

Exception: W1AW will be closed from 0100 May 29 to 1900 May 30 in observance of Memorial Day.

A map showing how to get from main highways (or from Hq. office) to W1AW will be sent to amateurs advising their intention to visit the station.

*Official ARRL Bulletin Schedule:* Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules.

*Frequencies (kc.):*

C.w.: 1820, 3555, 7080, 14,100, 21,075, 28,080, 50,900, 145,600.

Phone: 1820, 3945, 7255, 14,280\*, 21,330, 29,000, 50,900, 145,600.

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibration purposes.

*Times:*

Sunday through Friday, 2000 by c.w., 2100 by phone.

Monday through Saturday, 2330 by phone, 2400 by c.w.

*General Operation:* Use the chart on facing page for times and frequencies for W1AW general contact with any amateur. Note that since the schedule is organized in EDST, the operation between 0000 and 0100 each day will fall in the evening of the previous day in western time zones.

*Code-Proficiency Program:* Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and at 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday are made on the above-listed frequencies (except 1820 kc.). Code practice starts at 2130 each day. Approximately 10 minutes' practice is given at each speed. On May 19 and 22 and June 17, instead of the regular code practice, W1AW will transmit certificate qualifying runs and a frequency measuring test.

\* Single sideband.

**BRASS POUNDERS LEAGUE**

Winners of BPL Certificates for February traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL.....	278	1901	1396	494	4069
W2KEB.....	220	1836	1352	279	3687
W0BDR.....	10	1383	1265	27	2685
W7BA.....	33	866	841	19	1759
W4FL.....	12	740	703	20	1475
W8DPH.....	14	684	619	59	1376
W0LGG.....	31	653	665	19	1369
K17ALZ.....	0	652	651	0	1303
W0IA.....	34	622	612	9	1277
W9DO.....	18	570	113	475	1176
W0LCK.....	30	565	543	22	1160
W8SCA.....	14	551	549	2	1116
K2UTV.....	27	537	520	17	1101
K1BCS.....	141	486	443	23	1093
K6HLR.....	28	546	491	26	1091
W9JOZ.....	40	488	528	12	1068
W0JCF.....	37	531	470	28	1066
K0JNE.....	164	428	418	10	1020
K2QHR.....	4	498	491	9	1002
K2TEZ.....	197	422	202	181	1002
K2GWN.....	13	501	483	2	999
W6CQY.....	118	366	413	30	977
W6GYH.....	134	419	415	9	977
K5GPF.....	316	345	34	27	972
W5RCF.....	6	448	412	26	916
W4PCC.....	10	29	836	22	897
W1CNT.....	246	313	313	0	872
K1CTE.....	163	381	298	21	863
W6BPT.....	5	420	399	44	858
K2MBS.....	30	374	374	21	839
K4ELG.....	18	400	382	25	823
K2SHL.....	13	370	350	22	755
K4EZY.....	36	361	328	11	738
W7PGY.....	23	349	314	31	717
W7DA.....	10	353	352	1	716
W6CG.....	2	324	324	17	690
W5DWB.....	6	347	257	87	677
W0KQD.....	38	315	277	32	662
W0OME/5.....	28	315	309	6	658
K0DCW.....	324	322	2	2	650
K0DXX.....	1	308	304	32	645
W4TKS.....	642	0	0	0	642
W7ZB.....	11	319	286	26	649
K6LVR.....	31	307	293	8	639
K6OWQ.....	0	309	268	41	618
K4QES.....	190	211	208	7	616
K4RHD.....	35	289	287	1	612
K6YBV.....	32	293	271	14	610
K4URR.....	16	285	274	11	588
W9DYG.....	20	284	238	44	586
K4KNP.....	9	295	273	0	577
W1SMU.....	18	282	242	27	569
W9PZO.....	5	288	261	11	565
W5CFZ.....	16	288	210	33	537
K3WBX.....	49	245	89	156	539
W5DNI.....	2	268	265	3	538
K8IPS.....	6	267	257	6	536
W8DAE.....	57	235	110	134	536
W7BDU.....	7	266	266	250	522
W4GXR.....	14	258	227	31	530
W0CPI.....	17	267	222	17	523
K4OID.....	42	242	228	2	514
K4GAT.....	3	269	237	2	511
K6OEA.....	20	247	225	20	509
K1BYL.....	8	250	245	1	504

Late Reports:

W4PL (Dec.)..	12	416	390	9	827
W6CQY (Jan.)	95	171	208	59	533
W9IDA (Jan.)	14	246	238	8	506

**More-Than-One-Operator Stations**

Call	Orig.	Recd.	Rel.	Del.	Total
K4WCZ.....	60	937	787	12	1796
K4SWP.....	62	788	780	8	1638
W4PFC.....	13	437	429	8	887
K17CUD.....	674	0	0	0	674
K61DT.....	157	175	33	140	505

Late Reports:

W8ZJB (Jan.)	259	559	377	22	1257
W4PFC (Jan.)	6	259	245	3	513

**BPL for 100 or more originations-plus-deliveries**

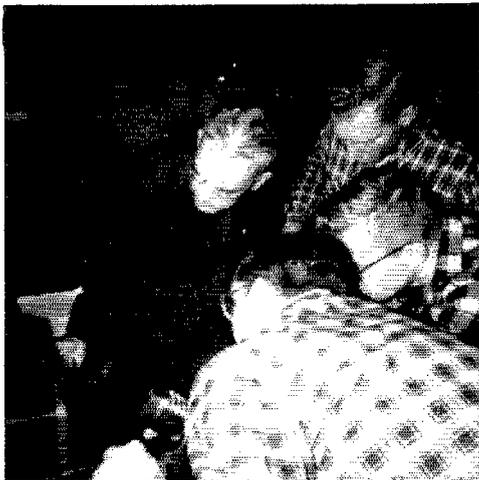
W4SHJ 289	K4QER 112	K0ARF 105
W4GDY 254	W7APS 110	K0JPJ 105
K4DLG 252	K6CZ 109	K1CMS 105
W9KON 205	K8JFF 109	W1EFT 102
W9DGA 161	K9LXD 109	W3UIU 102
W9FJR 157	K4UCS 108	WV2ATC 101
W9PCQ 147	K2QBW 107	WV2AYI 101
R3JAD 128	K2YVL 107	W3FTN 101
W9CFR 128	K3AET 106	Late Reports:
K5RYX 121	W2RUF 105	K4LLB (Dec.) 231
K2SSX 113	W0ANA 105	W9PCQ (Jan.) 111

**More-Than-One-Operator Stations**

W1AW 117

BPL medallions (see Aug. 1954 QNT, p. 64) have been awarded to the following amateurs since last month's listing: K28OW, K4QER, W4SRK, K0KBD.

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



A "hot message" comes in during a drill of the Concord (Mass.) RACES group on June 12. Eighteen amateurs participated in a two-hour drill on 10, 6 and 2 meters. That's EC-RO W1WNP tuning the receiver in the back, and around the receiver clockwise are KN1GGS, K1BRO and K1CDN. W1LMZ was there too, but somebody had to take the picture.

### TRAINING AIDS ADDITION

The ARRL Training Aids section announces the addition of a new slide collection entitled "Story of DX," and ARRL coded, SC-5. This is a historical collection of color slides (35 mm.) accompanied by hi-fi magnetic sound tape covering the history of DX (and coinciding with the slides) between the years 1921 and 1957. The show provides fine ham entertainment for everyone, and lends one an opportunity to see station layouts from the earliest to modern day. Don't miss this one!

We expect tight hookings on SC-5, and, as in the past, we ask that clubs give us plenty of leeway in requesting it. We have only one copy, but will do our best to satisfy all bona fide requests.

Special thanks is again given the members and associates of the Antique Wireless Association, whose main objective, to "preserve, restore and document" the early history of wireless, has indeed been evidenced by the fine slide collections they have produced in the past.

ARRL also maintains "The First Thirty Years of Amateur Radio," (coded SC-4), another excellent by-product of A.W.A. This too, is available to all affiliated clubs.

### SUPPLEMENT TO NET DIRECTORY

The following list of nets will supplement and correct the listing on page 91, Nov. *QST*; page 89, Jan. *QST*; and page 84, Mar. *QST*. Only those nets devoted to an emergency or traffic purpose are listed. This brings the records up to date as of March 17, 1959. Since these additions and changes were made subsequent to publication of the master net directory (CD-50), they can be used to amend your copy of the directory. An asterisk (\*) indicates correction from one or more of the above-mentioned listings; otherwise, the net is new for the 1958-59 season. This is the last *QST* net supplement before fall re-registration. All nets must be re-registered after August 1.

*Important note:* ARRL lists of nets are for *information only*. They do not carry any official significance. Nets are registered as closely as possible in accordance with information given by the registrant.

Name of Net	Freq.	Time	Days
Arctic Amateur Net	3866.5	1830 AST	Mon.-Fri.
Cape Cod Novice Net (CCNN) (Mass.)	3707	1400 EST	Sat.
Fond du Lac (Fox River Valley) 6 Meter Emerg. Net	50,100	2100 CST	Mon., Wed.
High Noon Net (Detroit Mike and key club)	3820	1200 EST	Daily
Kansas Slow Speed Net (QKS SS)	3610	1930 CST	Sun., Tue., Thu., Sat.
Manitoba Phone Net	3760	1245 CST 1900 CST	Daily
Mike Farad Traffic Net (MFD)*	7239	1200 EST	Mon.-Fri.
Minn. Jr. Net (MJN)*	3690	1700 CST	Mon.-Fri.
Nevada Net (NVN)	7106	1700 PST	Mon., Wed., Thu.
N. J. Slow Speed Net (NJSS)*	3748	1800 EST	Mon.-Fri.
N. M. AREC Net (NM AREC)	3980	1900 MST	Tue.-Sat.
North Ala 6 meter Net (AEN-O)	50,550	1915 CST	Mon., Wed., Fri.
Northeast VHF Net*	145,800	2000 EST	Daily
Northwest Tenn. Emerg. Net	3820	1400 CST	Sun.
Peanut Whistle Net	3850	0830 PST	Mon.-Fri.
Sangamon County AREC Net (Ill.)	3877	1330 CST 1900 CST	Sun. Thu.
Slow Speed Net (SSN)	3703	1915 CST	Daily
So. Ill. Emerg. Net (SIN)	3875	1730 CST	Mon., Fri.
Tenn. Teen-Age Net (TTAN)	3980	1730 EST 1630 EST	M., W., Fri Sun.
Trans Continental Relay Net (TCRN 4)*	3521	2300 GMT	Daily

### W1AW GENERAL-CONTACT SCHEDULE

(In Effect April 26, 1959)

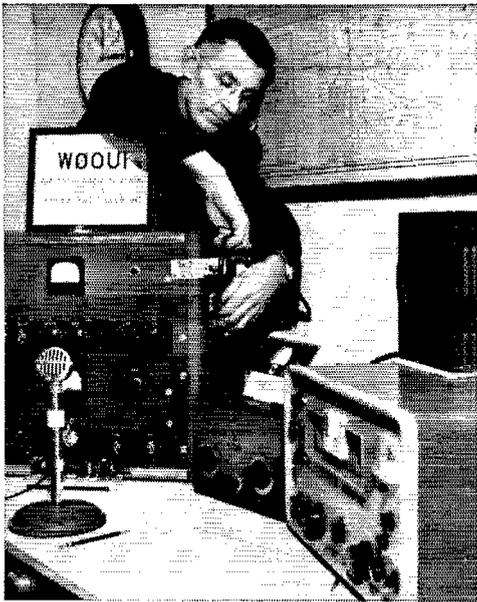
W1AW welcomes calls from any amateur station. Starting April 26, W1AW will listen for calls in accordance with the following time-frequency chart.

Time (EDST)	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000-0100 <sup>1</sup>	.....	.....	3555 <sup>3</sup>	.....	3945	7080 <sup>3</sup>	.....
1300-1400 <sup>2</sup>	.....	21/28 Mc.	21/28 Mc.	21/28 Mc.	21/28 Mc.	21/28 Mc.	.....
1500-1600	.....	7080	14,100	7255	14,100	7080	.....
1600-1700	.....	14,280	7080	14,100	14,280	14,100	.....
1800-1900	.....	14,280	14,280	14,280	14,100	7255	.....
1900-1930	.....	7255	.....	21,075 <sup>3</sup>	.....	14,280	.....
1930-2000	.....	14,100	.....	3555	.....	14,280	.....
2000-2030 <sup>1</sup>	14,280	3555 <sup>3</sup>	14,100	14,100	7080 <sup>3</sup>	14,100	.....
2030-2100	14,280	3555	14,100	14,100	7080	.....	.....
2100-2130 <sup>1</sup>	145.6 Mc.	21,330	145.6 Mc.	50.9 Mc.	21,330	.....	.....
2230-2300	.....	.....	1820	.....	1820	.....	.....
2300-2330	.....	.....	3555	.....	3945	.....	.....
2330-2400 <sup>1</sup>	.....	3945	7255	3945	7255	3945	.....

<sup>1</sup> Starting time is approximate. General-contact period on stated frequency begins immediately following transmission of Official Bulletin, on c.w. at 0000 and 2000, on phone at 2100 and 2330.

<sup>2</sup> Operation will be on 21,075, 21,330, 28,080 or 29,000 kc., depending on band and other conditions.

<sup>3</sup> W1AW will listen for Novice Class licenses on the Novice portion of this band before looking for other contacts.



Denver area EC W0LO hooks up the coax to the Denver Radio Club station, W0OUI. The club opened the station recently as control for Denver area AREC and RACES. Equipment was donated, begged, borrowed and built. Quarters are provided rent-free by the Denver Red Cross, which has the best 10-meter location in the city.

### HIGH SPEED CODE WINNERS

Although copy is still being received, so far the following winners have been announced in the WINJM high speed code test transmitted on March 15 (see p. 80, March 1959, QST): 55 w.p.m., W1KYK, W1ZDP, W5JPC, W9BRD; 50 w.p.m., W3GJY, W4ZKU, KN4VUR, VE7CQ; 45 w.p.m., K2KIR, W8ZCW, W9YZO, K0ILM; 40 w.p.m., W1WPR, K2ACP, W2LYH, W2ZVW, K4CAX, W4LYV, W4ORB, W4YE, W7LVU, W8APL, W8DQG. Each has been awarded a club code proficiency certificate by the Connecticut Wireless Assn., Inc.

Honesty can be a heart-rending business. Some of those who failed to make the grade came so close that the temptation was there to stretch a point; but, "get thee behind me, Satan!" The following get an A for effort: W1FPS, W2CQB, W2CVW, K2QBW, W3AHX, K4ELG, W8YCP, K9DJM, K9DJN, K6BHM, KH6BSY/1, KH6CDC/1, VE3ATR.

WINJM says there will probably be another high speed test in the fall — no date set as yet. Meanwhile, the high speed code practice continues Sunday evenings at 2030 EST. This will not change to "daylight saving" time.

### CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying in from W1AW will be made May 19 at 2130 Eastern Daylight Time. Identical texts will be sent simultaneously by automatic transmitters on 3555, 7080, 14,100, 21,075, 28,080, 50,900 and 145,600 kc. The next qualifying run from W6OWP only will be transmitted May 7 at 2100 PDST on 3590 and 7128 kc.

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.

Code-practice transmissions are made from W1AW each evening at 2130 EDST. Approximately 10 minutes' practice is given at each speed. Reference to texts used on several of

the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of QST text sometimes is reversed. To improve your fist, hook up your own key and audio oscillator and attempt to send in step with W1AW.

### Date Subject of Practice Text from March QST

- May 1: *A Hybrid Communications Receiver*, p. 19
- May 5: *The "K4HWY Special" Antenna*, p. 24
- May 11: . . . *VHF and UHF Reception*, p. 35
- May 14: *Complete Civil Defense System . . .*, p. 48
- May 21: *Magic Mountain to Malibu*, p. 56
- May 26: *My First SS*, p. 62
- May 27: *The Big Thrill*, p. 166

### RTTY NOTES

The RTTY Society of Southern California announces these first returns, based on logs received by March 9, on its 6th Anniversary RTTY Sweepstakes of February 13 and 14. W0BP appears to have topped all entrants with 96 contacts, 44 sections, and a score of 8448. Runner-up was W3PYW and 94 QSOs, a 42 multiplier, 7854 points. Others scoring over 1000 points were: W2TKO 6396, KH6JJ 4292, W5YM 3968, W6AEE 2880, W8FBU 2214, W8CRY 2208, W9BMV 2162, W7LPM 1872, W1BGW 1848, W8IJV 1794, W8CAT 1449, W0PQW 1344, KL7ALZ 1080. W7s AW GNS MB RMH WEW, K2HHH, W3s CRO MHD, W4EHU, W5TVG, W6s AAN GDO OCG ZNU, K6ZBL, W7s HRC IE JMH PQJ, W8s LEX NIY RTZ, W9s COW ROQ YT, K0BRL, W6s AJL ITX JHS LFH TOB YMB, KR6AK, VE6UB, VE7EP, and VK3KF were also reported active in the winter beedle-beedle contest.

— . . . —

Late word on New Zealand RTTY regulations comes via ZL1WB. As of March 4, 1959, ZL amateurs may use zero to 850 cycle f.s.k. in the lowest 50 kc. of the 3.5 and 7 Mc. bands and in the first 100 kc. of the 14, 21, and 28 Mc. bands.

### RESULTS, JANUARY CD PARTIES

The highest claimed scores follow. Figures after each call indicate score, number of contacts and number of different ARRL sections worked. Final and complete results appeared in the April CD Bulletin.

#### C.W

K6SXA . . . . . 209,300-592-70	W37HQ . . . . . 123,600-407-60
W1TYQ . . . . . 205,530-656-62	W9NLJ . . . . . 121,510-413-58
W1PUO . . . . . 200,850-611-65	W2DRV . . . . . 121,245-404-59
W3GRF <sup>2</sup> . . . . . 199,680-618-64	W4AGI <sup>3</sup> . . . . . 120,590-382-62
W9MAK . . . . . 185,500-547-67	W2MTA . . . . . 120,360-403-50
W3KLA . . . . . 185,535-589-63	W6ISQ . . . . . 118,080-362-64
W6BES . . . . . 182,650-555-65	W8NOH . . . . . 115,500-380-60
K2PHF . . . . . 173,880-545-62	K5BSZ . . . . . 115,420-393-58
W0NYU . . . . . 173,250-543-63	K9DVK . . . . . 111,500-409-54
VE3BZB . . . . . 156,465-509-61	W8TZO . . . . . 109,430-346-62
K9EIT . . . . . 154,500-511-61	K4IXG . . . . . 108,950-340-62
K4CAX . . . . . 153,450-552-55	K4DRO . . . . . 108,580-350-61
W8IBX . . . . . 152,960-473-64	W1SMU . . . . . 107,445-377-57
W4PNK . . . . . 145,485-477-61	W1AW <sup>4</sup> . . . . . 105,315-350-59
W3DQG . . . . . 143,500-496-57	K2MES . . . . . 105,205-392-53
W2SZ . . . . . 139,995-453-61	W9NH . . . . . 105,050-376-55
W1ARR/6 . . . . . 138,775-420-65	W4RZE . . . . . 104,965-364-57
W3NF . . . . . 136,290-455-59	W3TJW . . . . . 103,880-388-53
W0BDR . . . . . 134,815-457-59	W1ECH . . . . . 103,400-369-55
W8GYP . . . . . 133,925-482-55	W8PBO . . . . . 102,960-392-52
W1DGL . . . . . 130,800-431-60	W4WKQ . . . . . 102,870-381-54
W7VIU . . . . . 127,360-393-64	K0IDV . . . . . 102,600-375-54
W9LNQ . . . . . 126,300-416-60	K8DEY . . . . . 100,500-330-60
K5JCC . . . . . 124,785-418-59	W4KFC . . . . . 100,440-317-62
W1JTD . . . . . 124,620-395-62	W4ZM . . . . . 100,440-319-62
K4BAI . . . . . 123,830-421-58	K9AUE . . . . . 100,920-344-58

#### PHONE

W1ECH . . . . . 33,660-180-36	W8NOH . . . . . 19,080-101-36
K2PHF . . . . . 32,160-194-32	W0ALW . . . . . 17,860-102-34
W1FYF . . . . . 23,250-155-30	K1CAU . . . . . 17,690-118-29
W9YT <sup>5</sup> . . . . . 22,035-107-39	K0LDV . . . . . 15,300- 97-30

WØALW, Minnesota OPS, avers the January Phone CD Party was definitely the best one yet. Chuck's 17,860 points and 102 contacts was tops for WØ and sixth nationally.



K1BEB.....15,120-123-24	K3ANS.....9765- 80-21
W1VW.....15,080-100-29	K2EIU.....9720- 75-24
W3NF.....14,715-102-27	K1BCS.....9120- 70-24
K9ALP.....14,100- 94-30	W4LK.....9085- 79-23
WØTUS.....12,035- 83-29	KØLYV.....8680- 60-28
W2COB.....11,880-108-22	KØLWC.....8640- 77-24
W3MSR.....11,385- 92-23	W2EFU.....8300- 72-20
W3CUL.....9960- 76-24	W1GKJ.....7800- 73-20

<sup>1</sup>W1WEF, opr.; <sup>2</sup>K3GUR, opr.; <sup>3</sup>W4YZC, opr.; <sup>4</sup>W1WPR, opr.; <sup>5</sup>W9SZR, opr.

### DX CENTURY CLUB AWARDS

**HONOR ROLL**

W1FH.....292	ZL1HY.....284
ZI2GX.....291	W6CUG.....284
W6AM.....291	W9RBI.....284
PY2CK.....289	W3KT.....284
W4HGW.....289	G2PL.....283
W3GHD.....289	W7BXA.....283
KV4AA.....287	W1ME.....283
W3JNN.....286	G3AAM.....283
W6SYG.....286	W8MDM.....283
W8BRA.....286	W6DZZ.....283
W5ASG.....286	W2HUQ.....283
W8JIN.....286	W8BES.....283
W2AGW.....284	

W6GFE.....283	W8BKP.....282
W6ADP.....282	W9YFV.....282
W9YFV.....282	W8EBG.....282
W7AMX.....282	G4CP.....282
W6MX.....282	W6MX.....282
W7GTV.....281	W5ADZ.....280
W6WTS.....280	W8RIA.....280
Z86BW.....280	

K4LPW.....202	W4COC.....169
W3GEN.....201	W6RAN.....169
W45HT.....201	W5BQJ.....163
W6AEL.....201	CR7LU.....163
W7DAA.....200	W00AQ.....162
DL1GU.....200	DU78V.....161
DJ2BW.....200	W2VYX.....160
W6UOY.....199	W3AYD.....160
V47MD.....198	W8ZAL.....160
V47VC.....198	K4DEO.....160
W6FFC.....198	K6RWO.....160
W6BSY.....195	W71AA.....159
W1NHJ.....194	VE3BB.....159
W11JR.....193	SPNCK.....158
KZ5WZ.....193	W1JSS.....153
W91A.....191	W1KXP.....151
W3LEZ.....190	W0JJW.....150
W4UNI.....190	ZL3JU.....150
W7FBD.....190	G5JCK.....147
DL1DX.....190	W81QA.....146
W1ICW.....182	W9LTF.....145
K8JFE.....182	W9UXS.....144
W8ONA.....182	W4BFE.....143
W1LQ.....180	K21AD.....142
W2FXA.....180	W3KA.....142
W4NWW.....180	W0SNL.....142
W0AJG.....180	V84DD.....142
SM3EP.....180	W1RWH.....141
W4JAT.....179	W11UU.....141
W4OPM.....175	K6GLC.....141
W9HKL.....175	K9GXP.....141
W3BQA.....172	W2FLD.....140
K6DMY.....172	W2NTY.....140
1B8NU.....171	W28TY.....140
KH6WW.....171	K4LEX.....140
W2CGJ.....170	K4LTA.....140
W4COG.....170	K6OXU.....140
VE1HG.....170	W9ROK.....140
VE3IE.....170	W4LTF.....137
G6GH.....170	W1LFL.....136
SM6KM.....170	F3ZU.....136
	K6CTV.....135

K6GLC.....134	W1ALK.....133
W3EIS.....133	W9GCO.....133
W3IPG.....132	W14KL.....132
K2MIO.....131	W6HJL.....131
W1EKO.....130	W1WKW.....130
W3DDY.....130	W3IFD.....130
W4OMW.....130	K6GCF.....130
W0DEL.....130	W1UCA.....125
W2FZY.....125	W6TMX.....125
K2UPD.....123	W5GSE.....122
K6SXA.....122	K9BCK.....122
SM5AJR.....122	W1YXD.....121
W8VOW.....121	G2KL.....121
W1NF.....120	K2IRO.....120
W2MGR.....120	K2ZAU.....120
W6JFV.....120	W91MJ.....120
K0HGB.....120	G31TZ.....120
KH8DKA.....120	K2YOR.....114
DL6DS.....112	K4DKE.....112
W5BLL.....112	W9NFX.....110
K8CVQ.....110	

**Radiotelephone**

PY2CK.....280	VQ4ERR.....278	W9RBI.....272
W8GZ.....280	W8HW.....277	W6YY.....269
Z86BW.....280	W3JNN.....277	W8KML.....269
W1FH.....279	W8FP.....275	W6AM.....268
	ZL1HY.....274	

From February 1, to March 1, 1959 DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

**NEW MEMBERS**

W1HZ.....223	VE3DCI.....106	K6IXS.....101
K4GSU.....210	W2HAC.....105	W7PFG.....101
K201J.....161	W8JW.....105	W8DW.....101
W8MCC.....149	K9GVE.....105	K8GHG.....101
W4IBB.....146	K9ESH.....105	W0WAN.....101
K5BEU.....143	V01BD.....105	EA1CP.....101
111V.....134	G3ISX.....104	K2LIP.....100
DJ1KR.....126	SM2CAA.....104	W8HIB.....100
W00BW.....123	W2ZLQ.....103	W2NQB.....100
K2YUI.....121	K6IEC.....103	K4BOM.....100
PA0XM.....121	11ZCN.....103	W4EIN.....100
K4EME.....120	OH2WW.....103	W4WSF.....100
K6LAE.....119	YU3OR.....103	K6BTV.....100
0A4FM.....114	W6UDR.....102	W6TMC.....100
OH3UN.....114	W7LQB.....102	W6MPZ.....100
K6HFA.....111	W7ZAS.....102	K6VKX.....100
K4BCN.....110	W9UBI.....102	W8OTI.....100
W4TVQ.....110	W9WUF.....102	K9AYQ.....100
K3BQB.....109	ET3GB.....102	W9ITV.....100
W6JH.....108	LU4HU.....102	W9WME.....100
W2PV.....107	PJ2CJ.....102	K4PRK.....100
JA1BF.....106	K48XR.....101	ZK2AD.....100
	K6BX.....101	

W9JIV.....102	Y81JR.....102	W9PVU.....101
W1ZSU.....100	W1ZSU.....100	W4PAH.....100
W4PAH.....100	W4PAH.....100	W4PAH.....100
VE3DYB.....100		

**Radiotelephone**

W4IBB.....119	W00BW.....110	K4BCN.....107
W5RHO.....118	K4LPW.....106	W9VU.....102
W9WKU.....115	SP8CK.....106	CK1AK.....106
W6AMR.....113	W6QFE.....111	K9BQU.....104
W6GFE.....111	11YD.....110	K8FCU.....103
W6GUE.....110	EA1CW.....103	

**Radiotelephone**

CO2BL.....243	W7AUS.....163	W9LTR.....136
W9WHM.....240	W4CVW.....162	W6BSY.....135
W9Y8X.....223	W0QVZ.....161	W7DAA.....133
W7HIA.....220	W1LLF.....160	W1BTH.....132
CT1P.....220	W8HBL.....160	W4PBF.....131
W7ADS.....210	G2MT.....160	W8GUZ.....130
W4ADY.....206	W3GHN.....156	W9U7C.....130
W5GXP.....202	W0FUH.....151	W6YMD.....127
W5VU.....201	W1JSS.....150	5A1TB.....125
O27FG.....200	W1KRS.....150	W3OGR.....121
W6CHV.....196	W3FWD.....150	W3MS.....120
W6YV.....194	W5HWX.....148	F8VU.....120
W3MAC.....192	SM3EP.....147	W2GBC.....113
W21J.....191	W3HCO.....142	W3BNU.....112
Z81DO.....190	1BRN.....142	W6YK.....112
W8ZET.....179	K5BBU.....141	CT1HF.....111
W2GEB.....171	W2GEC.....140	W18SO.....110
W1GRK.....170	DL4WF.....140	K18X.....110
W8SYK.....170	PY7VE.....140	W5NFX.....110
H89NU.....170	W5BQJ.....139	K9GUM.....110
	W6MFL.....138	

### U.S.-Canada Area and Continental Leaders

W4TO.....276	VE2WV.....240	VE6NX.....214
W4TM.....276	VE3DFI.....212	VE7MZ.....265
W0ELA.....272	VE4XO.....180	VE8AW.....195
KL7PL.....202	VE5RU.....163	W01DX.....199
VE1EP.....220		4X4DK.....287

### Radiotelephone

W2BXA.....241	KL7AFR.....190	VE8RU.....166
W4BA.....239	VE1NH.....22	VE8TF.....121
W5BGP.....241	VE2WV.....176	VE7ZM.....235
W7PHO.....235	VE3KF.....224	G2PL.....257
W0AIW.....233	VE4RP.....102	4X4DK.....260

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

**ATLANTIC DIVISION**

**EASTERN PENNSYLVANIA**—SCM, Richard B. Mesirov, W3JNQ—SEC: DVB, PAM; TEJ, RM; AXA. PEN meets on 3850 kc, Mon, through Fri, at 1800. The E. Pa. Net meets on 3610 kc, Mon, through Sun, at 1830. New appointments: K3ANS as OO, OBS and ORS. BJJ is on 50 and 144 Mc. from KH6-Land, K3CVF is on with a 180-watt rig on 6 meters and ZMC is on 80 through 10 meters with the same power. K3AFW is on 420-Mc. TV with a home-brew camera. DVB has a new triband vertical for 40 through 10 meters. His XYL passed the Novice Class exam. K3CTC enlisted in the Air Force and left for Texas Mar. 6. ZRQ lost an antenna during a snowstorm but has it working again. K3DZN installed a TR switch and is now operating break-in. K3ALD operated in the DX Test. AXA still needs outlets in Reading and Lebanon for the E. Pa. Net. Please contact the RM or SCM. HNK received a WWCNY Award and sent in QSLs for the Keystone Award. K3ETL and K3DNT dropped the "N" from their calls. K3ALL received his WAC. The new radio club at the E. Stroudsburg H.S. received the call K3HOD. Prexy is ZIV. K3ANU entered the NR and DX Test. KJJ is working lots of DX on 80 meters. UEU has moved to W. Pittston, out of E. Pa. The Carbon Co. Net meets Mon. and Thurs. on 145,380 Mc. at 2000. All stations are welcome. UTU made the BPL on deliveries, and received WDEL certificate No. 257. K3ANS received Keystone Award No. 38. K3AET received his 30-w.p.m. code sticker and made the BPL on deliveries. EU has another grandson, FKE, K3AOX, K3AQP and KN3HPO won first prize at the Boy Scout Adventurama sponsored by the Bethlehem Council of Boy Scouts. OUL's traffic total was boosted by three fairs; Mae now has a complete kw. station composed of Hallcraftier equipment. K3ASH has been accepted at Muhlenburg and will study E.E. K3ERY and ZXV have new YL Jr. operators. JSA is on 6 meters. The North Penn RC will hold its Club Family Night Dinner May 16. GTC and EQZ represented the North Penn Club at the Delaware Valley convocation held at WCAU. VST has a pair of mobile Gonset "twins." General N. D. Cota addressed the Montgomery Co. RACES Feb. 13. FCI is QRL with school work. EAN blew the modulation transformer in his Apache, but is on c.w. Traffic: (Feb.) W3CUL 4069, K3AHT 369, W3UIU 243, K3ANU 94, W3TEJ 76, ZRQ 74, K3DZN 71, W3AXA 67, WIP 64, K3ANS 54, W3DVB 54, K3ASH 43, W3FKE 31, BNR 30, AMC 18, ELL 16, NQB 16, ZLP 16, K3ALD 15, W3BFF 14, HNK 4, CNO 4, MET 4, PCI 3, ADE 2, KF 12, KJJ 2, PUY 1. (Jan.) K3ANS 54, DFS 36, W3MJM 24, TEJ 13, LHA 2.

**MARYLAND-DELAWARE-DISTRICT OF CO-LUMBIA**—SCM, Louis T. Cronberger, W3UCR—Asst. SCM for Delaware: Ray de Churcelle, 3DQZ. SEC: YYB. New appointments: K3BBV and K3CBQ as OOs. Section nets: MDD, M-S, 1915 EST; MEPN, 3820 kc. MWF 1830, SS 1300 EDST; DELEN, 3905 kc., 1830; M6MEN, 50.25 Mc. Wed, 2100. The new ham club at Ft. Meade is known as the Free State Amateur Radio Club. Officers are NNM, pres.; IPO, vice-pres.; EBF, secy.-treas.; and K3CJW, supply officer. OBR was guest speaker at the Mar. 2 meeting. The B&O ARC had another nice write-up in the *B&O Magazine*. PZK spoke on "How to Convert a 522 Transmitter" at the RCARA meeting Feb. 13. K3CJM spoke on "The Use of the Oscilloscope in the Ham Shack" at the Feb. 27 meeting. The final report of the 10th ARRL National Convention has been released by the Foundation of Radio Amateur

Clubs. The work was headed up by OMN, with NL, PZZ, K4LMB, the XYLs of OMN and PZZ, the executive committee, and others assisting. The foundation officers are PRL, pres.; YYB, 1st vice-pres.; ECP, 2nd vice-pres.; RE, treas.; and K4MXF, secy. The NCVHFS's new officers are OJU, pres.; K4RFR, vice-pres.; and K4SYP, secy.-treas. MMD net certificates have been earned by EEB, HXN and K3GPN. KDC, of Cumberland, is a radio operator on the USS *English*. RDZ reports for duty on the USS *Roman* and K3GXB, of Port Deposit, is RAIC on the USS *Haley*, presently at Cuba. BVL reports that HWU has earned B&O certificate No. 2. The AARC did some fine emergency work with local officials in providing communications in search of a 3-year-old. EDA had write-ups in the *Herald Mail* (Hagerstown daily) on Jan. 27 and Feb. 7. EPV has showed up on an AN on phone. K3WBV and TN made BPL again. JME reports the BCEN had nice write-ups in the local papers. IWJ of the Kunz family, reports he is handling traffic on 2-meter i.c.w. and the family has a new 6-meter beam. It is with mixed emotions that I write this final column. Much was planned during my term as your SCM, some has been accomplished, but more remains to be done. It is a rare occasion that the SCM has the opportunity of being an active participant in a National Convention, as was my pleasure. The cooperation that I received was tremendous. It was my desire and still is to visit as many of the clubs and meet as many amateurs of the section as possible. During the first 13 months I feel that this was accomplished; however, in Oct. of '53 I was transferred to the Navy at Portsmouth, Va., and this precluded any planned travel. Since then I have not been as active in section affairs as I desired. It is thus that I leave the MDD to a new SCM who I am sure will be able to be more active than I have been. It is with reluctance that I leave with so much to be accomplished, but again with a feeling of relief that the members of the MDD can now have the type of representation they deserve. Your new SCM has a big task before him. He deserves and needs your cooperation in order to accomplish only a small part of the huge task. He needs your club bulletins and meeting notices as well as news of your membership so he can write a balanced column. Every club should put the SCM on its mailing list for all club information. I would like to thank the many job easiers as your SCM. Traffic: (Feb.) K3WBJ 539, W3UE 358, MCG 221, CWF 152, TN 134, QCW 112, BUD 99, NNM 73, PQ 56, AHQ 54, IWJ 34, DAG 30, WSE 12, CN 9, JZY 2, OYX 2. (Jan.) W3NNM 130, IWJ 17.

**SOUTHERN NEW JERSEY**—SCM, Herbert C. Brooks, K2BG—Sec: W2YRW. RMs: W2RZJ, W2HDW, W2YRW and W2ZL. Appointment this month—K2YBN, Levittown, is a new Official Observer. The Gloucester County Radio Club elected the following officers: W2KE, pres.; K2AQL, vice-pres.; W2JOZ, treas.; K2JJC, secy. Meetings are being held in Glassboro. NJ 75-Meetr Phone Net certificates have been issued to K2YYB Northfield, K2CJB Bridgeton, K2DVE Villas and W2QWC Salem. W2RG, Merchantville, has built a new QRP transistor transmitter and receiver. K2JGU, Glassboro, has a new antenna. W2ZI, Trenton, is back on the air at his new QTH. W2BAY, Haddonfield, has been monitoring the satellites. Mercer County RACES and State C.D. were hosts to the Army Reserves, demonstrating their RACES equipment and net procedure. K2BNS, reporting Burlington S.W. Radio Club activities, advises a new antenna has been added. W2BEI, Audubon, is back handling traffic after several years of inactivity. W2BLV was the SJRA's top scorer in the recent V.H.F. Contest. Brothers Joe and Hal, K2ITP and K2ITQ, did outstanding work in the same contest. With regret we report the passing of W2QEG. W2RXL, NJN Mgr., reports a February traffic total of 346. W2RXL issued a fine monthly net bulletin. W2TE is the SJRA's top DX'er with 221 worked. K2OEA and W2ZX also have over 200. W2ZAS is Radio Officer of Haddon Heights and Camden. K2SOL, Gloucester Co. EC, is back in business after a serious illness. Traffic: (Feb.) K2DEI 175, W2RG 130, W2BZJ 110, K2JGU 86, W2ZI 16. (Jan.) K2DEI 148.

**WESTERN NEW YORK**—SCM, Charles T. Hansen, K2HUK—SEC: W2GBX. RMs: W2RUF and W2ZRC. PAMs: W2PVI and W2LXE (v.h.f.). NYS C.W. meets on 3615 kc. at 1800. ESS on 3500 kc. at 1800. NYSTPEN on (Continued on page 124)

## AN ULTRA-STABLE, LINEAR V.F.O.

**I**N THE COURSE of our extensive development project on the FPM-200, which is being readied for fall production, many interesting sub-assemblies of the completed unit have emerged from the lab.

**O**NE SUCH MODULE is the transistorized, permeability-tuned oscillator. This unit, which employs conventional Colpitts circuitry, and covers 500 kc. from 8.25 to 8.75 mc., provides virtually drift-free frequency control, combined with calibration accurate to less than 1 kc across its operating range.

**T**HE UNIT TAKES advantage of the fact that transistors, in such an application, generate essentially no heat. Thus the only drift which must be compensated for stems from changes in outside temperature and voltage variations.

**C**ONVENTIONAL capacity temperature compensation effectively solves the problem of outside temperature variations. Minute voltage changes, which may come from the regulated voltage source, are compensated for in a unique varicap bridge circuit. This voltage sensitive semi-conductor supplies a change in capacity which corrects for frequency fluctuations as the applied voltage is varied.

**L**INEARITY IS ASSURED by precision winding the variable pitch inductor and careful selection of the powdered iron slugs which tune the inductance. Naturally, the drive mechanism must be accurately machined.

**T**HE OSCILLATOR is a 2N371 drift transistor, operated grounded base, the equivalent of grounded grid in vacuum tube circuitry. This stage is followed by a 2N371 buffer which provides  $\frac{1}{4}$  milliwatt output, sufficient for receiver frequency control. For transmitter applications, additional amplification will usually be necessary.

**O**THER NEW DEVELOPMENTS resulting from FPM-200 research will follow on this page.

— TOM STUART, WØREP

*Buell Ballou Jr.*   *W. J. Halligan W9AC*   for **hallicrafters**

# Viking transmitters

Yes, dollar-for-dollar and feature-for-feature you'll get more of everything in a Viking transmitter... that's why Viking transmitters out-sell all others! Write for your free Viking Amateur Catalog and you'll soon see why your best transmitter buy is a Viking!



**NEW!**

**Crystal-controlled—  
instant bandswitching  
6 and 2 meters—available  
in 4 output ranges!**

**WRITE FOR DATA SHEET 711 — LISTING  
FREQUENCY RANGES AND RECEIVER  
CROSS-REFERENCE CHART.**

## "6N2" CONVERTER

**Maximum Sensitivity! Low Noise Figure!  
Excellent Image and IF Rejection!**

Compact... complete with self-contained power supply, this new Viking "6N2" Converter is instant bandswitching... converts 6 and 2 meter signals to your choice of 4 receiver ranges! (Data sheet No. 711 lists ranges and complete receiver cross-reference guide.) Utilizes the new 6ES8 dual triode with "frame grid" construction in a Cascode RF amplifier circuit... tube transconductance, 12,500 micro-mhos per section. High frequency overtone crystals in series mode operation produce outstanding oscillator stability—eliminating the multiplicity of sum and difference frequencies. Advanced IF amplifier design with a grounded cathode stage and a low plate resistance value insures stable operation and an effective impedance match to 50 or 75 ohm output coaxial cable. Silver-plated chassis and three silver-plated interstage shields. Available completely wired and tested or as an easy-to-assemble kit.

*Watch for more  
exciting new Johnson  
6 and 2 meter  
equipment*

Catalog Number	Range	Amateur Net
250-43-1..Kit	26 to 30 mcs.	\$59.95
250-43-2..Kit	28 to 30 mcs.	\$59.95
250-43-3..Kit	14 to 18 mcs.	\$59.95
250-43-4..Kit	30.5 to 34.5 mcs.	\$59.95
250-43-12..Wired	26 to 30 mcs.	\$89.95
250-43-22..Wired	28 to 30 mcs.	\$89.95
250-43-32..Wired	14 to 18 mcs.	\$89.95
250-43-42..Wired	30.5 to 34.5 mcs.	\$89.95

**E. F. JOHNSON COMPANY**

2805 SECOND AVENUE S.W.

# outsell all others!



## "KILOWATT" AMPLIFIER

Here's the most exciting unit you've ever seen . . . the unit that puts the whole world at your fingertips! Brilliantly designed and engineered, the Viking "Kilowatt" is the only power amplifier available which will deliver full 2000 watts SSB\* input and 1000 watts CW and AM! Continuous coverage 3.5 to 30 mc. Excitation requirements: 30 watts RF and 10 watts audio for AM; 10 watts peak for SSB.

Cat. No. 240-1000..Wired and tested.....\$1595.00 Amateur Net  
 Cat. No. 251-101-1..Matching top, back and pedestal..FOB Corry, Pa.

\$132.00 Amateur Net

\*The FCC permits a maximum of one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of 2000 watts or more depending upon individual voice characteristics.

## "PACEMAKER" TRANSMITTER/EXCITER

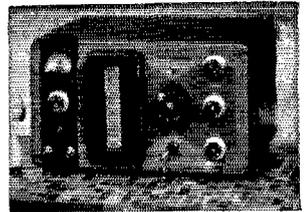
An outstanding power bargain when used as a transmitter or exciter! 90 watts SSB P.E.P. and CW input . . . 35 watts AM. Highly stable built-in VFO. Instant bandswitching 80, 40, 20, 15 and 10 meters. VOX and anti-trip circuits. Wide range pi-network output. Effectively TVI suppressed. With tubes and crystals.

Cat. No. 240-301-2..Wired.....\$495.00 Amateur Net

*Viking*

FIRST CHOICE AMONG THE NATION'S AMATEURS

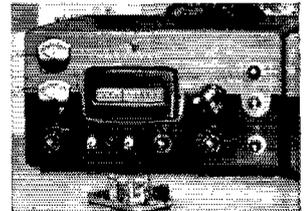
WASECA, MINNESOTA



## "COURIER" AMPLIFIER

This power-packed Class B linear amplifier is rated 500 watts P.E.P. input with aux. SSB exciter—500 watts CW and 200 watts AM! Continuous coverage 3.5 to 30 mc. May be driven by the Viking "Ranger", "Pacemaker" or other unit of comparable output. Drive requirements: 5 to 35 watts. Employs two 81A triodes in parallel—wide range pi-network. TVI suppressed. With tubes.

Cat. No. Amateur Net  
 240-352-1..Kit.....\$244.50  
 240-352-2..Wired.....\$289.50



## "THUNDERBOLT" AMPLIFIER

Here's real power and peak performance in a compact desk-top amplifier. Rated 2000 watts P.E.P.\* input SSB; 1000 watts CW; 800 watts AM linear! Continuous coverage 3.5 to 30 mc.—instant bandswitching. May be driven by the "Ranger", "Pacemaker" or other unit of comparable output. Two 4-400A tetrodes in parallel, bridge neutralized. Wide range pi-network output. With tubes.

Cat. No. Amateur Net  
 240-353-1..Kit.....\$524.50  
 240-353-2..Wired.....\$589.50



## "FIVE HUNDRED" TRANSMITTER

More than one-half kilowatt of power and operating convenience! 600 watts CW input . . . 500 watts phone and SSB (P.E.P. with auxiliary SSB exciter)—instant bandswitching 80 through 10 meters! All exciter stages ganged to VFO tuning. High gain push-to-talk audio system. Highly stable, built-in VFO or crystal control. Wide range pi-network output. Low level audio clipping—effectively TVI suppressed. With tubes, less crystals.

Cat. No. Amateur Net  
 240-500-1..Kit.....\$749.50  
 240-500-2..Wired.....\$949.50

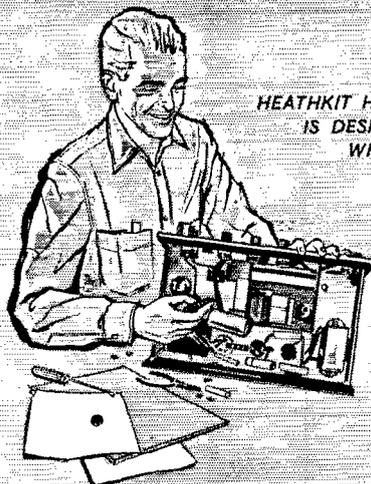
# BUILD YOUR OWN



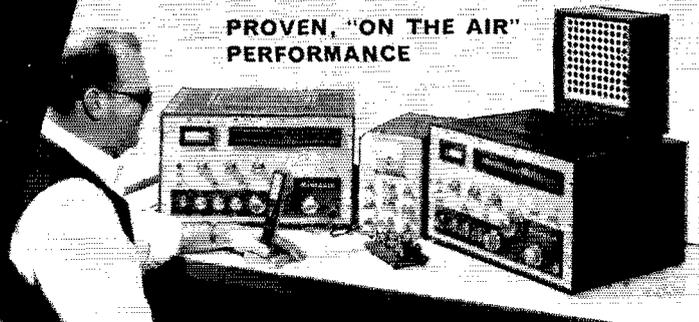
**HEATHKIT**

# HAM GEAR

HEATHKIT HAM EQUIPMENT  
IS DESIGNED BY HAMS  
WHO KNOW YOUR  
PROBLEMS AND  
NEEDS.

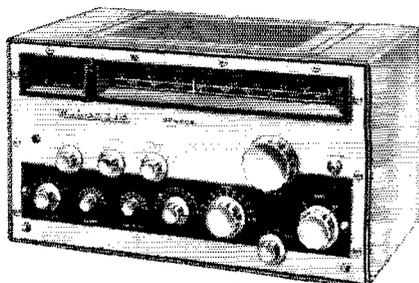


PROVEN, "ON THE AIR"  
PERFORMANCE

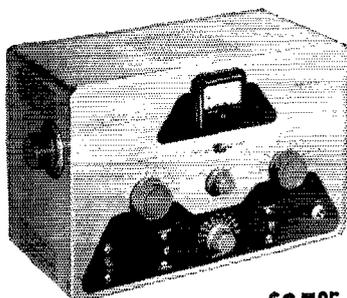


## "SENECA" VHF HAM TRANSMITTER KIT

Beautifully styled and a top performer of highest quality throughout. The "Seneca" is a completely self-contained 6 and 2 meter transmitter featuring a built-in VFO for both 6 and 2 meters, and 4 switch-selected crystal positions, 2 power supplies, 5 radio frequency stages, and 2 dual-triode audio stages. Panel controls allow VFO or crystal control, phone or CW operation on both amateur bands. An auxiliary socket provides for receiver muting, remote operation of antenna relay and remote control of the transmitter such as with the Heathkit VX-1 Voice Control. Features up to 120 watts input on phone and 140 watts on CW in the 6 meter band. Ratings slightly reduced in the 2 meter band. Ideal for ham operators wishing to extend transmission into the VHF region. Shpg. Wt. 56 lbs.



HEATHKIT VHF-1 **\$159<sup>95</sup>**



HEATHKIT DX-20 **\$35<sup>95</sup>**

## DX-20 CW TRANSMITTER KIT

Designed exclusively for CW work, the DX-20 provides the novice as well as the advanced-class CW operator with a low cost transmitter featuring high operating efficiency. Single-knob bandswitching covers 80, 40, 20, 15 and 10 meters using crystals or an external VFO. Pi network output circuit matches antenna impedances between 50 and 1,000 ohms. Employs a single 6DQ6A tube in the final amplifier stage for plate power input of 50 watts. A 6CL6 serves as the crystal oscillator. The husky power supply uses a heavy duty 5U4GB rectifier and top-quality "potted" transformer for long service life. Easy-to-read panel meter indicates final grid or plate current selected by the panel switch. Complete RF shielding to minimize TVI interference. Easy-to-build with complete instructions provided. Shpg. Wt. 19 lbs.

**HEATH COMPANY** Benton Harbor, Michigan

 a subsidiary of Daystrom, Inc.

# Mobile Gear...for the Ham on the Go!

## "CHEYENNE" MOBILE HAM TRANSMITTER KIT

All the fun and excitement . . . plus the convenience of mobile operation are yours in the all-new Heathkit "Cheyenne" transmitter. The neat, compact, and efficient circuitry provides you with high power capability in mobile operation, with low battery drain using carrier controlled modulation. All necessary power is supplied by the model MP-1 described below. Covers 80, 40, 20, 15 and 10 meters with up to 90 watts input on phone. Features built-in VFO, modulator, 4 RF stages, with a 6146 final amplifier and pi network (coaxial) output coupling. High quality components are used for long service life and reliable operation, along with rugged chassis construction to withstand mobile vibrations and shock. Thoughtful circuit layout provides for ease of assembly with complete instructions and detailed pictorial diagrams to insure success. A spotting switch is also provided. A specially designed ceramic microphone is included to insure effective modulation with plenty of "punch". Plan now to enjoy the fun of mobile operation by building this superb transmitter. Shpg. Wt. 19 lbs.



HEATHKIT MT-1  
\$99<sup>95</sup>



## "COMANCHE" MOBILE HAM RECEIVER KIT

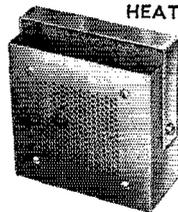
Everything you could ask for in modern design mobile gear is provided in the "Comanche" . . . handsome styling, rugged construction, top quality components . . . and, best of all, a price you can afford. The "Comanche" is an 8-tube super-heterodyne ham band receiver operating AM, CW and SSB on the 80, 40, 20, 15 and 10 meter amateur bands. A 3 mc crystal lattice-type IF filter permits the receiver to use single conversion without image interference, and at the same time creates a steep sided 3 kc flat top IF bandpass characteristic comparable to mechanical type filters. The neat, compact and easy-to-assemble circuitry features outstanding sensitivity, stability and selectivity on all bands. Circuit includes an RF stage, converter, 2 IF stages, 2 detectors, noise limiter, 2 audio stages and a voltage regulator. Sensitivity is better than 1 microvolt on all bands and signal-to-noise ratio is better than 10 db down at 1 microvolt input. One of the finest investments you can make in mobile gear. Shpg. Wt. 19 lbs.



HEATHKIT MR-1  
\$119<sup>95</sup>

## MOBILE SPEAKER KIT

A matching companion speaker for the "Comanche" mobile receiver. Housed in a rugged steel case with brackets provided for easy installation on fire wall or under dashboard, etc. Uses 5 PM speaker with 8 ohm voice coil. Measures 5" H. x 5" W. x 2 1/2" D. Shpg. Wt. 4 lbs.

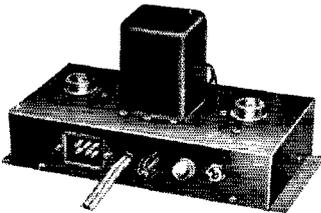


HEATHKIT AK-7  
\$5<sup>95</sup>



HEATHKIT AK-6  
\$4<sup>95</sup>

HEATHKIT MP-1  
\$44<sup>95</sup>



## MOBILE POWER SUPPLY KIT

This heavy duty transistor power supply furnishes all the power required to operate both the MT-1 Transmitter and MR-1 Receiver. It features two 2N442 transistors in a 400 cycle switching circuit, supplying a full 120 watts of DC power. Under intermittent operation it will deliver up to 150 watts. Kit contains everything required for complete installation, including 12' of heavy battery cable, tap-in studs for battery posts, power plug and 15' of connecting cable. Chassis size is 9 1/16" L. x 4 3/4" W. x 2" H. Operates from 12-14 volt battery source. Circuit convenience provided by self-contained relay which allows push-to-talk mobile operation. Shpg. Wt. 8 lbs.

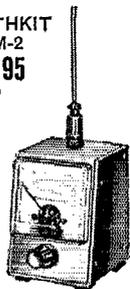
## MOBILE BASE MOUNT KIT

The AK-6 Base Mount is designed to hold both transmitter and receiver conveniently at driver's side. Universal mounting bracket has adjustable legs to fit most automobiles. Shpg. Wt. 5 lbs.

## POWER METER KIT

This handy unit picks up energy from your mobile antenna and indicates when your transmitter is tuned for maximum output. A variable sensitivity control is provided. Features a strong magnet on a swivel-mount for holding it on a car dashboard or other suitable spot. Has its own antenna or may be connected to existing antenna. Sensitive 200 ua meter. Shpg. Wt. 2 lbs.

HEATHKIT  
PM-2  
\$12<sup>95</sup>





# COMPANION UNITS



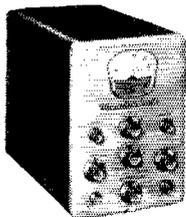
HEATHKIT TX-1 \$234<sup>95</sup>

## "APACHE" HAM TRANSMITTER KIT

The many features and modern styling of the "Apache" will provide you with just about everything you could ask for in transmitting facilities. Emphasizing high quality the "Apache" operates with a 150 watt phone input and 180 watt CW input. In addition to CW and phone operation, built-in switch selected circuitry provides for single-sideband transmission using the SB-10 External adapter. The newly designed, compact and stable VFO provides low drift frequency control necessary for SSB transmission. A slide rule type illuminated rotating VFO dial with full gear drive vernier tuning provides ample bandsread and precise frequency settings. The bandswitch allows quick selection of the amateur bands on 80, 40, 20, 15 and 10 meters. This unit also has adjustable low-level speech clipping and a low distortion modulator stage employing two of the new 6CA7/EL34 tubes in push-pull class AB operation. Time sequence keying is provided for "chirpless" break-in CW operation. The final amplifier is completely shielded for TVI protection and neutralized for greater stability. A cooling fan is also provided. The formed one-piece cabinet with convenient access hatch provides accessibility to tubes and crystal sockets. Die-cast aluminum knobs and control panel escutcheons add to the attractive styling of the transmitter. Pi network output coupling matches antenna impedances between 50 and 72 ohms. A "spotting" push button enables the operator to "zero beat" an incoming frequency without putting the transmitter on the air. Equip your ham shack now for top transmitting enjoyment with this outstanding unit. Shpg. Wt. 110 lbs. Shipped motor freight unless otherwise specified.

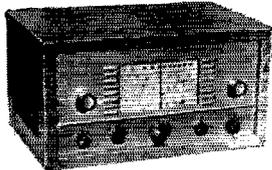
## HEATHKIT SB-10 SINGLE SIDEBAND ADAPTER KIT

\$89<sup>95</sup>



Designed as a compatible plug-in adapter unit for the TX-1 "Apache" transmitter, this unit lets you operate on SSB at a minimum of cost, yet does not affect the normal AM and CW functions of the transmitter. By making a few simple circuit modifications, the DX-100 and DX-100-B transmitters can be used, utilizing all existing RF circuitry. Extremely easy to operate and tune, the adapter employs the phasing method for generating a single-sideband signal, thus allowing operation entirely on fundamental frequencies. The critical audio phase shift network is supplied completely preassembled and wired in a sealed plug-in unit. Produces either a USB, LSB or DSB signal, with or without carrier insertion. Covers 80, 40, 20, 15 and 10 meter bands. An easy-to-read panel meter indicates power output to aid in tuning. A built-in electronic voice control with anti-trip circuit is also provided. 10 watts PEP output. Unwanted sideband suppression is in excess of 30 db and carrier suppression is in excess of 40 db. An EL84/6BQ5 tube is used for linear RF output. Shpg. Wt. 12 lbs.

MODIFICATION KIT: Modifies DX-100 and DX-100-B for use with the SB-10 Adapter, Model MK-1. Shpg. Wt. 1 lb. \$8.95.



HEATHKIT AR-3

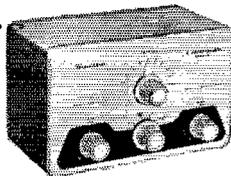
\$29<sup>95</sup>

(less cabinet)

## ALL-BAND RECEIVER KIT

A fine receiver for the beginning ham or short wave listener, designed for high circuit efficiency and easy construction. Covers 550 kc to 30 mc in four bands clearly marked on a slide-rule dial. Transformer operated power supply. Features include: bandswitch, bandsread tuning, phone-standby-CW switch, phone jack, antenna trimmer, noise eliminator, RF gain control and AF control. Shpg. Wt. 12 lbs.

CABINET: Opt. extra. No. 91-15A. Shpg. Wt. 5 lbs. \$4.95.



HEATHKIT QF-1

\$9<sup>95</sup>

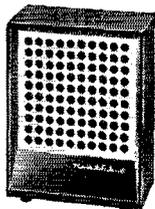
## "Q" MULTIPLIER KIT

Useful on crowded phone and CW bands, this kit adds selectivity and signal rejection to your receiver. Use it with any AM receiver having an IF frequency between 450 and 460 kc that is not AC-DC type. Provides an effective "Q" of approximately 4,000 for extremely sharp "peak" or "null". The QF-1 is powered from the receiver with which it is used. Shpg. Wt. 3 lbs.

# OF DISTINCTIVE QUALITY

## ACCESSORY SPEAKER KIT

Handsomely designed and color styled to match the "Mohawk" receiver this heavy duty 8" speaker with 4.7 ounce magnet provides excellent tone quality. Housed in attractive 3/8" plywood cabinet with perforated metal grille. Speaker impedance is 8 ohms. Shpg. Wt. 7 lbs.



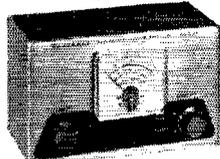
HEATHKIT AK-5  
\$95



HEATHKIT RX-1 \$274<sup>95</sup>

## "MOHAWK" HAM RECEIVER KIT

Styled to match the "Apache" transmitter the "Mohawk" ham band receiver provides all the functions required for clear, rock-steady reception. Designed especially for ham band operation this 15-tube receiver features double conversion with IF's at 1682 kc and 50 kc and covers all the amateur frequencies from 160 through 10 meters on 7 bands with an extra band calibrated to cover 6 and 2 meters using a converter. Specially designed for single sideband reception with crystal controlled oscillators for upper and lower sideband selection. A completely preassembled wired and aligned front end coil bandswitch assembly assures ease of construction and top performance of the finished unit. Other features include 5 selectivity positions from 5 kc to 500 CPS, bridge T-notch filter for excellent heterodyne rejection, and a built-in 100 kc crystal calibrator. The set provides a 10 db signal-to-noise ratio at less than 1 microvolt input. Each ham band is separately calibrated on a rotating slide rule dial to provide clear frequency settings with more than ample bandwidth. Front panel features S-meter, separate RF, IF and AF gain controls, T-notch tuning, T-notch depth, ANL, AVC, BFO, Bandswitch tuning, antenna trimmer, calibrate set, calibrate on, CW-SSB-AM, receive-standby, upper-lower sideband, selectivity, phone jack and illuminated gear driven vernier slide rule tuning dial. Attractively styled with die-cast aluminum control knobs and escutcheons. No external alignment equipment is required for precise calibration of the "Mohawk". All adjustments are easily accomplished using the unique method described in the manual. An outstanding buy in a communications receiver. Shpg. Wt. 66 lbs. Shipped motor freight unless otherwise specified.



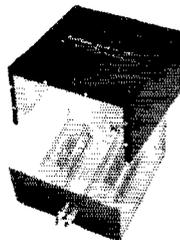
HEATHKIT AM-2  
\$15<sup>95</sup>

## REFLECTED POWER METER KIT

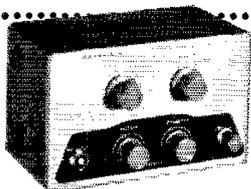
The AM-2 measures forward and reflected power or standing wave ratio. Handles a peak power of well over 1 kilowatt of energy and covers 160 through 6 meters. Input and output impedance provided for 50 or 75 ohm lines. No external power required for operation. Use it also to match impedances between exciters or RF sources and grounded grid amplifiers. Shpg. Wt. 3 lbs.

## BALUN COIL KIT

Match unbalanced coaxial lines, found on most modern transmitters, to balanced lines of either 75 or 300 ohms impedance with this handy transmitter accessory. Capable of handling power input up to 200 watts, the B-1 may be used with transmitters and receivers covering 80 through 10 meters. No adjustment required. Shpg. Wt. 4 lbs.



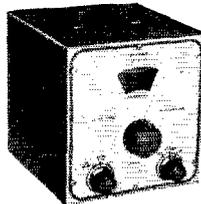
HEATHKIT B-1  
\$8<sup>95</sup>



HEATHKIT VX-1  
\$23<sup>95</sup>

## ELECTRONIC VOICE CONTROL KIT

Eliminate hand switching with this convenient kit. Switch from receiver to transmitter by merely talking into your microphone. Sensitivity controls allow adjustment to all conditions. Power supply is built in and terminal strip on the rear of the chassis accommodates receiver and speaker connections and also a 117 volt antenna relay. Shpg. Wt. 5 lbs.

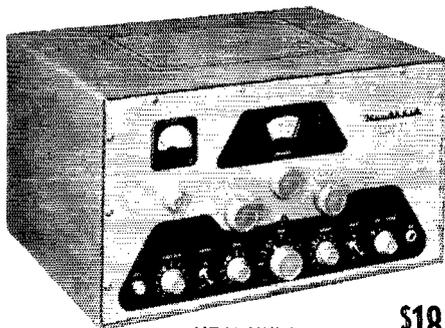


HEATHKIT VF-1  
\$19<sup>50</sup>

## VFO KIT

Far below the cost of crystals to obtain the same frequency coverage this variable frequency oscillator covers 160, 80, 40, 20, 15 and 10 meters with three basic oscillator frequencies. Providing better than 10 volt average RF output on fundamentals, the VF-1 is capable of driving the most modern transmitters. Requires only 250 volts DC at 15 to 20 ma, and 6.3 VAC at 0.45 a. Illuminated dial reads direct. Shpg. Wt. 7 lbs.

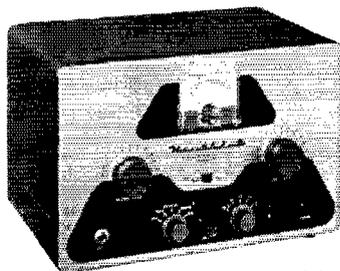
# Save 1/2 or more...with Heathkits



HEATHKIT DX-100-B **\$189<sup>50</sup>**

## DX-100-B PHONE AND CW TRANSMITTER KIT

A long standing favorite in the Heathkit line, the DX-100-B combines modern styling and circuit ingenuity to bring you an exceptionally fine transmitter at an economical price. Panel controls allow VFO or crystal control, phone or CW operation on all amateur bands up to 30 mc. The rugged one-piece formed cabinet features a convenient top-access hatch for changing crystals and making other adjustments. The chassis is punched to accept sideband adapter modifications. Featured are a built-in VFO, modulator, and power supply, complete shielding to minimize TVI, and a pi network output coupling to match impedances from 50 to 72 ohms. RF output is in excess of 100 watts on phone and 120 watts on CW. Band coverage is from 160 through 10 meters. For operating convenience single-knob bandswitching and illuminated VFO dial on meter face are provided. A pair of 6146 tubes in parallel are employed in the output stage modulated by a pair of 1625's. Shpg. Wt. 107 lbs. Shipped motor freight unless otherwise specified.

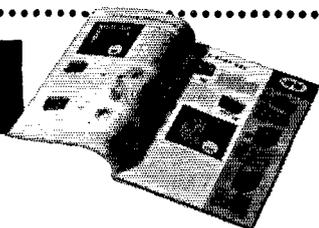


HEATHKIT DX-40 **\$64<sup>95</sup>**

## DX-40 PHONE AND CW TRANSMITTER KIT

An outstanding buy in its power class the DX-40 provides both phone and CW operation on 80, 40, 20, 15 and 10 meters. A single 6146 tube is used in the final amplifier stage to provide full 75 watt plate power input on CW or controlled carrier modulation peaks up to 60 watts for phone operation. Modulator and power supplies are built in and single-knob bandswitching is combined with the pi network output circuit for complete operating convenience. Features a D'Arsonval movement panel meter. A line filter and liberal shielding provides for high stability and minimum TVI. Provision is made for three crystals easily accessible through a "trap door" in the back of the cabinet. A 4-position switch selects any of the three crystals or jack for external VFO. Power for the VFO is available on the rear apron of the chassis. Easy-to-follow step-by-step instructions let assembly proceed smoothly from start to finish even for an individual who has never built electronic equipment before. Shpg. Wt. 25 lbs.

**Free** Send now for latest Heathkit Catalog describing in detail over 100 easy-to-assemble kits for the Hi-Fi fan, radio ham, boat owner and technician.



**HEATH**

*pioneer in do-it-yourself electronics*

**COMPANY BENTON HARBOR 9, MICH.**

 a subsidiary of Daystrom, Inc.

Send latest Free Heathkit Catalog.

All prices and specifications subject to change without notice. Please include postage on orders to be shipped parcel post. 20% deposit is required on all C. O. D. orders. All prices are NET F. O. B. Benton Harbor, Mich., and apply to Continental U.S. and Possessions only.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

QUANTITY	KIT NAME	MODEL NO.	PRICE

# 1959 EDITION

## The RADIO AMATEUR'S HANDBOOK

*A*N INVALUABLE reference work and text for everyone—hams, engineers, lab men, technicians, experimenters, students, purchasing agents.

Distributors throughout the Nation have the 1959 Edition in stock. Better get your copy of this complete Handbook now. The demand is terrific!

In the pages of this latest edition will be found, in addition to accumulated knowledge since the first Handbook was issued in 1926, the latest proved findings and experiments invaluable to ham and engineer alike. Every field of ham radio is covered: transmitting, both c.w. and 'phone; receiving; propagation; antennas; construction; theory; charts; diagrams; circuits; transistors; miscellaneous data; procedures; station operation, etc.

For instance, the 1959 Edition carries

- Sections on Theory; Electrical Laws and Circuits, Vacuum Tube Principles, Semiconductor Devices, High Frequency Communication, Antennas, Transmission Lines, Modulation V.H.F. and U.H.F.
- Sections which include How-to-make-it articles dealing with Receivers, Transmitters, Power Supplies, Radiotelephony, V.H.F., U.H.F., Antennas, Mobile Equipment, radioteletype, transistorized equipment, etc.
- A separate section on test and measuring equipment
- 32 pages of data on vacuum tubes and semiconductors, a great time-saver to both engineer and ham
- Many pages of valuable catalog/advertising sheets, containing manufacturers' and distributors' products and services . . . a useful supplement to the editorial section
- Plus thorough treatment of such subjects as assembling and operating a station, BCI and TVI, construction practices, etc. — and fully indexed and completely illustrated throughout. You can locate in a jiffy what you want.

▶ **\$3.50** U.S.A. Proper **\$4.00** U.S. Possessions and Canada. Elsewhere, **\$4.50**. Buckram bound Edition, **\$6.00** everywhere. All prices postpaid.

The AMERICAN RADIO  
RELAY LEAGUE, INC.

West Hartford 7, Conn. • U.S.A.

## IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked— with only 65 watts and a \$16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California  
January 31, 1959

GOTHAM  
1805 Purdy Avenue  
Miami Beach 39, Florida

Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,  
Thomas G. Gabbert, K6INI (Ex-TI2TG)

List of 105 countries/stations worked with 65 watts and a V-80 vertical

BY1US	KG4AI	VK3YL
CE3DZ	KG6FAE	VK9XK
ZL5AA	KH6J	VK9AT
CQ2WD	KL7BUZ	VK6CJ
CN2BK	KM6AX	VP2KFA
CN8FB	KP4ACF	VP2AY
CR9AH	KP6AL	VP2DW
CT1CB	KR6BF	VP2MX
CX2FD	KS4AZ	VP2LU
DL1FF	KV4AA	VP2SW
DU7SV	KW6CA	VP5CP
EA1FD	KX6AF	VP5BH
EI4N	KZ5CS	VP6TR
F8VQ	LA3SG	VP7NM
FB8ZZ	LU2DFC	LU1ZS
FG7XE	LZ1KSP	VP9BK
FK8AL	OA4AU	VR2DA
FM7WT	OE9EJ	VR3B
FO8AD	OH2TM	VS1HC
G3DOG	OK1FF	VS2DW
GC8DO	ON4AY	VS6LN
GI3WUI	OZ1AX	XE1PJ
GM3GJB	QZ2KK	XW8AI
GW3LJN	PA8FAB	YN1JW
HA5KBP	PJ5AA	YU3FS
HC4IM	PJ2ME	YV5HL
HC8LUX	PY2EW	ZC5AL
HE9LAC	PY8NE	ZE1JV
HP1LO	SM5AQB	ZK1BS
II1AV	SP6BY	KH6MG/ZK1
JA1ANG	TI2LA	ZK2AD
JZ8HA	UA1AU	ZL1ABZ
W1AW	UA8KKB	ZL3JA
KB6BJ	UQ2AB	ZM6AS
KC4AF	VE8OJ	ZS1OU

## SOME QUESTIONS AND ANSWERS

Why are all Gotham beams of the Yagi type, all metal, and grounded at the center? Answer: To get the maximum strength for the minimum weight, to get maximum efficiency, and to avoid the use of wood, tuning stubs, traps, or other substitute devices, all of which are undesirable and unnecessary. In addition, grounded beams are lightning-proof and protect your home.

How do Gotham beams gain compare with higher priced antennas? Answer: No beam, regardless of price, can give more gain, for a given boom size, than a Gotham beam. Obviously, the more elements, the more gain. Our gain figures are published in our literature, and are available, free, on request.

Why is the Gotham price so very low? Doesn't the low price mean a lack of quality? Answer: The Gotham price is low because we sell in quantities and make only a fair profit on each antenna. We do not add on a tremendous overhead and engineering charge. As for quality, we have always used the best materials, and every antenna is doubly inspected before shipment. Thousands of Gotham antennas are in use the world over.

What is the difference between the Standard and the Deluxe beams? Answer: The Standard beams in the 6, 10, and 15 meter bands use 3/8" and 3/4" tubing elements; the Deluxe models for these bands use 1/2" and 1" tubing. In the 20 meter beams, the Standard beams have a single boom, while the Deluxe beams use twin booms. All 20 meter beams use full 12 foot booms. In the 20 meter bands and in the Twobanders and Tribanders, only 7/8" and 1" tubing are used.

Is it advantageous to use a Gotham Twobander or Tribander beam? Answer: Hundreds of these beams are in daily use. They are compromise beams, but by having each element a full half-wave, their gain figures are more than reasonably good. Of course a single three element beam on a single band will outperform a Tribander on that band, but the Tribander permits beam operation on three bands.

Do the Gotham verticals perform well on all bands? Answer: Yes, thousands of ham users attest to their efficiency on all bands from 6 to 160 meters. Reports of tremendous DX on low power are common.

Are mounts supplied with the vertical antenna? Answer: Yes, four mounting straps for side mounting are furnished with each vertical.

Are radials needed with a Gotham vertical? Answer: No, except a few rare locations. 99% of the installations are done without radials.

How much power can be used with a Gotham vertical? Answer: Anything up to the legal limit.

Is much space required for installing a vertical? Answer: No, only a few square inches are needed.

Can you give details on the loading coil used in the Gotham verticals? Answer: Yes, it is made for us by Barker and Williamson. It is 3" in diameter and exceptionally rugged. No other loading coil in the antenna industry has a higher Q.

Do you need a separate loading coil for each band? Answer: No, a V160 loading coil will cover 160, 80, 40, 20, 15, 10 and 6; a V80 loading coil will cover 80, 40, 20, 15, 10, and 6; a V40 loading coil will cover 40, 20, 15, 10, and 6 meters.

What antennas are best for a novice? Answer: The V80 vertical and the S153N beam are the most popular choices.

Why should a ham buy a Gotham antenna? Answer: The tremendous progress of the amateur radio art makes it imperative that hams graduate from the antiquated antennas of years past to a modern antenna system. We will be glad to send, free of charge, our technical literature on our 50 antennas, or you can order for immediate shipment.

73,  
GOTHAM

**FREE literature ? YES**  
**FREE specifications ? YES**  
**FREE beam gain calculator ? YES**  
**OR ALL THREE AND IMMEDIATE SHIPMENT**  
**IF YOU ORDER FROM THIS LIST OF 50 ANTENNAS**

**Airmail Order Today — We Ship Tomorrow**

**GOTHAM** Dept. QST  
**1805 PURDY AVE., MIAMI BEACH, FLA.**

Enclosed find check or money-order for:

**TWO BANDER BEAMS**

A full half-wave element is used on each band. No coils, traps, baluns, or stubs are used. No calculations or machining required. Everything comes ready for easy assembly and use. *Proven Gotham Value!*

- 6-10 TWO BANDER.....  \$29.95
- 10-15 TWO BANDER.....  34.95
- 10-20 TWO BANDER.....  36.95
- 15-20 TWO BANDER.....  38.95

**TRIBANDER**

Do not confuse these full-size Tribander beams with so-called midgets. The Tribander has individually fed (52 or 72 ohm coax) elements and is not frequency sensitive, nor does it have baluns, coils, traps, or other devices intended to take the place of aluminum tubing. The way to work multi-band and get gain is to use a Gotham Tribander Beam.

- 6-10-15 \$39.95  10-15-20 \$49.95

**2 METER BEAMS**

Gotham makes only two different two meter beams, a six-element job and a twelve-element job. They are both Yagi beams, with all the elements in line on a twelve foot boom.

- Deluxe 6-Element 9.95  12-El 16.95

**6 METER BEAMS**

New records are being made every day with Gotham six-meter beams. Give your rig a chance to show what it can do, with a Gotham six-meter beam.

- Std. 3-El Gamma match 12.95  T match 14.95
- Deluxe 3-El Gamma match 21.95  T match 24.95
- Std. 4-El Gamma match 16.95  T match 19.95
- Deluxe 4-El Gamma match 25.95  T match 28.95

**10 METER BEAMS**

Ten meter addicts claim that ten meters can't be beaten for all-around performance. Plenty of DX and skip contacts when the band is open, and 30-50 miles consistent ground wave when the band is shut down. Thousands of Gotham ten meter beams have been perking for years, working wonders for their owners, and attesting to the superior design and value of a Gotham beam.

- Std. 2-El Gamma match 11.95  T match 14.95
- Deluxe 2-El Gamma match 18.95  T match 21.95
- Std. 3-El Gamma match 16.95  T match 18.95
- Deluxe 3-El Gamma match 22.95  T match 25.95
- Std. 4-El Gamma match 21.95  T match 24.95
- Deluxe 4-El Gamma match 27.95  T match 30.95

**New! Ruggedized Hi-Gain 6, 10, 15 METER BEAMS**

Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

- Beam #R6 (6 Meters, 4-El)... \$38.95
- Beam #R10 (10 Meters, 4-El).. 40.95
- Beam #R15 (15 Meters, 3-El).. 49.95



**15 METER BEAMS**

Fifteen meters is the "sleeper" band. Don't be surprised if you put out a quick, quiet CQ and get a contact half-way around the world. Working the world with low power is a common occurrence on fifteen meters when you have a Gotham beam.

**15 METER BEAMS**

- Std. 2-El Gamma match 19.95  T match 22.95
- Deluxe 2-El Gamma match 29.95  T match 32.95
- Std. 3-El Gamma match 26.95  T match 29.95
- Deluxe 3-El Gamma match 36.95  T match 39.95

**20 METER BEAMS**

A beam is a necessity on twenty meters, to battle the QRM and to give your signal the added punch it needs to over-ride the high power boys. Hundreds and hundreds of twenty meter beams, working year after year, prove that there is no better value than a Gotham twenty meter beam.

- Std. 2-El Gamma match 21.95  T match 24.95
- Deluxe 2-El Gamma match 31.95  T match 34.95
- Std. 3-El Gamma match 34.95  T match 37.95
- Deluxe 3-El Gamma match 46.95  T match 49.95

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

**ALL-BAND VERTICAL ANTENNAS**

You could work the whole world, and get fantastic reports, with a Gotham vertical and only 55 watts, like VP1SD.

You could work tremendous skip and DX, and be surprised at the way your Gotham vertical brings them in, as R. E. C. of Washington, D. C., found out.

You could have a simple, easy-to-install-and-operate vertical antenna, and switch from band to band, as thousands of Gotham customers have done.

- V40 vertical for 40, 20, 15, 10, 6 meters. \$14.95**
- V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters.....\$16.95**
- V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters.....\$18.95**

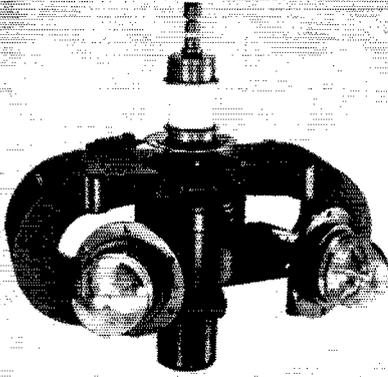
**HOW TO ORDER.** Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

**FREE! WITH EACH ANTENNA OR REQUEST FOR FREE BROCHURE, THE NEW GOTHAM BEAM CALCULATOR.**

Name.....  
 Address.....  
 City.....Zone.....State.....

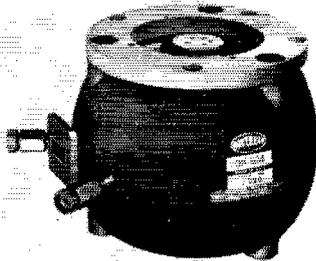
*Engineers—BS or advanced degree*

## ENJOY REWARDING WORK

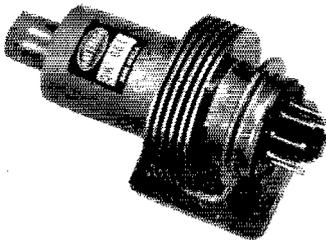


100 MEGAWATTS is potentially available from Amplitron\* microwave amplifier—a Raytheon invention. Uses: multi-mega-watt radar; space transmission.

### SIX ADVANCED MICROWAVE TUBE TYPES PRODUCED BY RAYTHEON



M-TYPE BACKWARD WAVE OSCILLATOR, just declassified, covers 8,150-11,000 mc. Can be AM/FM modulated at over 10 mc per second. Uses: counter-measures; FM/CW radar.



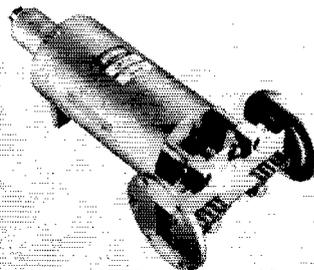
FIRST ONE-WATT KLYSTRON to cover entire government band, QK-661 is a mechanically tuned, reflex-type tube with integral cooling fins, wave-guide output.



8 OZ., 400-WATT MAGNETRON, 2-in. long, 1½-in. diameter, typifies tiny, lightweight magnetrons developed by Raytheon for missiles and beacons.



NEW, 1000-LINE DUAL GUN storage tube simultaneously stores and displays signals in 1/60-second, has unique tetrode electron gun for higher resolution and linear transfer characteristics.



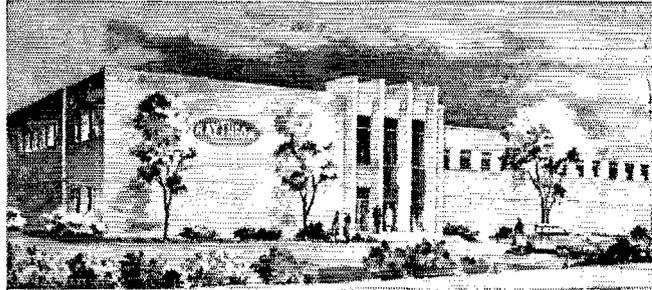
20 DB. GAIN is achieved by QK-542, a 5-watt, low-noise traveling wave tube. Under development: electrostatic focusing; high-power TWTs.

\*Raytheon Trademark

*in EE, ME, Physics, Math/Physics, Physical Chemistry*

## **ON THE FRONTIER OF MICROWAVE TECHNOLOGY**

**- IN THE LARGEST AND MOST  
MODERN LABORATORY IN THE  
U. S. DEVOTED EXCLUSIVELY TO  
RESEARCH AND DEVELOPMENT  
OF MICROWAVE DEVICES**



Spencer Laboratory, Burlington, Mass.

**THESE ARE GREAT OPPORTUNITIES FOR QUALIFIED HAMS  
MICROWAVE TUBE EXPERIENCE DESIRABLE**

Once or twice in your life an opportunity comes along which is a major "crossroads"—a chance to change the course of your life. A chance, perhaps, for you and your family to enjoy a fuller life . . . for your children to gain the advantages you want so much to give them.

The opening of the Spencer Laboratory has created unique opportunities for additional engineers and scientists. You work on the very frontier of microwave science—with associates of acknowledged stature—in experimental or applied research, development, instrumentation, production and applications related to advanced devices.

You'll be working in an intriguing field with a still greater growth potential in the years ahead—in a solid, stable operation that adds up to security for you and your family.

You can live in Lexington, Concord—or any one of a dozen historic, picturesque New England towns. Exceptional schools, white-spired churches, modern stores, unmatched beaches and mountains for health and relaxation, as well as Boston's fine opportunities for educational advancement—these, too, you'll enjoy.

Your salary depends on your ability and experience. We need high-caliber men who can make significant contributions to microwave R&D, as a consequence salaries are very attractive. You should have a BS or advanced degree in EE, ME, Physics, Math/Physics or Physical Chemistry. Relocation allowances are extremely liberal—we want to give qualified men every reason to join with us. Please write in complete confidence to Percy L. Spencer, WIGBE, Senior Vice President and Division Manager.



*Excellence in Electronics*

Microwave and Power Tube Division  
Raytheon Manufacturing Company, Waltham, Mass.

**A LEADER IN CREATIVE MICROWAVE TECHNOLOGY**

# Hy-gain

for 10, 15 and 20 meters

From the "World's Largest"

# Trap

- ★ Automatic 10, 15 and 20 meter operation with ENTIRE WHIP OPERATIVE on all three bands for MAXIMUM EFFICIENCY.
- ★ Unique three band frequency selective circuits select proper amount of inductance for high efficiency CENTER LOADED whip operation on 15 and 20 meters. Loading coil is automatically shorted out for full sized quarter wave whip operation on 10 meters.
- ★ Coil is high Q air wound of No. 14 copper wire on ribbed high impact styron form. Entire assembly is enclosed in completely weatherproof, air tight plastic cover. Air foil design, only 1½" wide and 4½" high.
- ★ May be used with any standard 3' base section and 5' whip, or Hy-Gain's new telescoping base and whip assembly. Telescopes down to only 3' for easy garaging. No base spring necessary. Especially designed high pressure knurled knobs maintain perfect mechanical and electrical contact in telescoping sections when whip is fully extended.
- ★ Designed for 52 ohm Coax, SWR less than 2:1 on all bands.

Trap traveller mobile automatic three band loading coil Model No. T-3. May be used with any standard three foot base and 5' whip or with Hy-Gain telescoping base section and top whip assembly. Air foil design only 1½" wide by 4½" high.

Ham Net **\$14<sup>95</sup>**

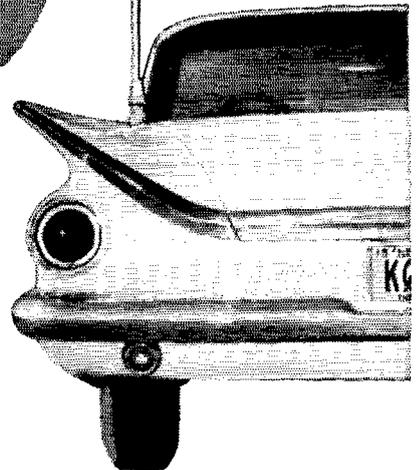
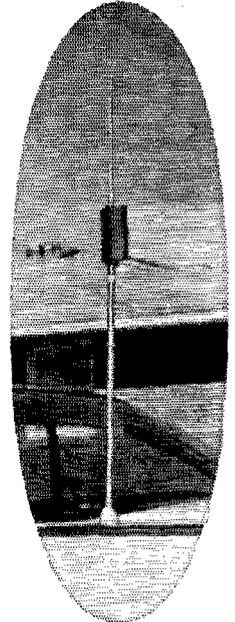
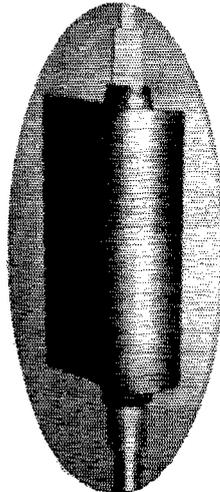
Especially designed Hy-Gain telescoping base section and top whip assembly Model TBW. Base section, 5/8" OD and 1/2" OD chrome plated high tensil strength steel. Base stud 3/8" x 24 threads. Fits all standard mobile mounts. 5' top whip 250,000 PSI stainless steel. Electrical and mechanical connections at all telescoping joints maintained by positive grip knurled knobs. When used with trap traveler three band mobile coil, total extended height will be 8'4½". Telescopes down to approximately 3' for easy garaging.

Ham Net **\$15<sup>00</sup>**

AVAILABLE NOW AT LEADING DISTRIBUTORS

**Hy-gain** antenna products

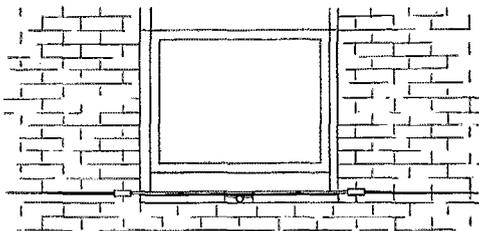
1135 NO. 22nd ST. • LINCOLN, NEBRASKA



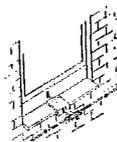
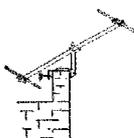
Manufacturer of Amateur Communications Antennas

# Traveller

## Trap Traveller PORTABLE Micro-Dipole



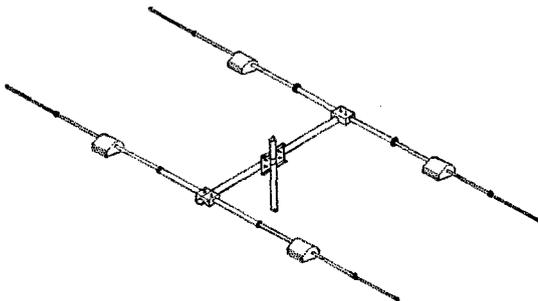
The Hy-Gain Trap Traveller dipole kit utilizes two trap traveller three-band loading coils and makes into a midget high efficiency dipole for 10, 15 and 20 meters. It mounts anywhere, matches 52 ohm coax line with low SWR across all three bands. The trap traveller dipole is all aluminum construction. Approximately 16' overall when extended, the sections collapse down to only three feet for easy carrying and transportation. Complete with all hardware and dipole mounting bracket which fits most sizes of masts. Requires two trap traveller three band loading coils. Model TDK. Ham Net \$9.95.



The Hy-Gain Universal Mounting Bracket assembly consists of a uniquely adjustable screw driven clamp mechanism together with a 2' mast. It mounts easily and quickly to window sill frames, building fire walls, vent pipes, chimneys, trees, posts, roof overhangs and many others. Both the trap traveller dipole and trap traveller micro midget beam mount quickly and easily on the universal mounting bracket assembly. Mast is adjustable through a 90 degree arc from vertical to a horizontal position. Model UB. Ham Net \$9.75.

## First COMPLETELY PORTABLE Tribander

### MICRO-BEAM



The Hy-Gain Trap Traveller Beam Kit uses four trap traveller three band loading coils and makes up into the world's first truly miniature, completely portable two-element three-band beam. All elements and boom are aluminum. Elements when fully extended are approximately 16' overall; boom length is 6'. The entire Micro-Midget beam collapses into a three foot long package for easy transportation and carrying. It requires 4 trap traveller three band loading coils. Model TBK. Ham Net \$19.95.

## Plastic Carrying Bag . . .

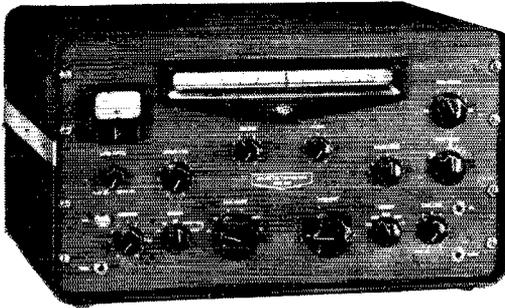


A convenient and attractive plastic carry bag with full length zipper. Holds either trap traveller dipole or micro midget trap traveller two element beam. Plenty of space for all necessary trap traveller loading coils and/or universal mounting bracket. Model TCC. Ham Net \$8.95.

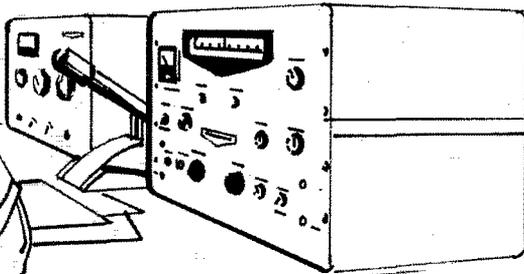




# NEW GONSET SSB Xmtr and SSB LINEAR AMPLIFIER...



GSB-100 SSB TRANSMITTER



## GSB-100 SSB TRANSMITTER

The GSB-100 operates on SSB with selectable sidebands. When used on AM, it transmits both sidebands, which makes 100% modulation possible without the distortion that accompanies highly modulated carrier-and-one-sideband signals when received on a conventional AM receiver.

**Exclusive Filter-Phasing** • Uses Gonset's exclusive filter-phasing system that greatly improves SSB quality. Unwanted sideband suppression 45 db.

**Carrier Elimination** • Quartz crystal filter suppresses carrier by more than 60 db, eliminates need for adjusting carrier balance and sideband suppression.

**Selectable Sidebands** • AM, PM, or CW, with excellent keying characteristics.

**Frequency Control** • By fixed quartz crystals and exceptionally stable VFO. Complete band coverage with 5-kc calibration on 10 1/2" drum for each band. Only band in use shows. Precision 100:1 gear-ratio dial drive.

**VOX** • Voice-operated control system. Complete with anti-trip circuit. Biasing voltage available for linear amplifier cut-off when receiving.

**Coverage** • Flexible pi network output, quick band change in 80, 40, 20, 15 and 10 meters. All operation controls on front panel.

**Power Supply** • Built-in heavy-duty AC.

GSB-100 SSB Transmitter, Model 3233...479.50

*Write for technical data,  
specifying equipment  
in which you are interested*

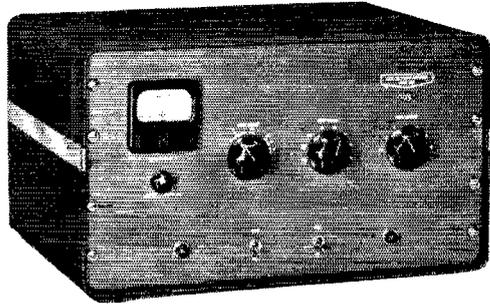
# GONSET



# POWER-PER-DOLLAR OUT DX THEM ALL!

*Some people are still driving jalopies, others are roaring down the road in powerful new sportscars. If you're still plodding through the airways with out-dated equipment, there's no better way to roar down the bright new road of single sideband than with the power-packed Gonset GSB-100 SSB Transmitter and the Gonset GSB-101 SSB Linear Amplifier!*

*The 100-watt P.E.P. power input makes the GSB-100 a complete transmitter. When used as an exciter with the GSB-101, it gives you far-reaching power at an unmatched price! Alike in styling, both units have exclusive features that give you the best power-for-dollar your money can buy!*



GSB-101 LINEAR AMPLIFIER

## GSB-101 LINEAR AMPLIFIER

If you've been reading a lot of claims about **input** these days, consider what you're really getting in **down-to-earth watt-per-dollar output**. Gonset's **GSB-101 Linear Amplifier** gives you up to **65% efficiency!**

**Built-in DC-Operated Antenna Relay** • Means quiet operation. Four 811A tubes and two 866A rectifiers.

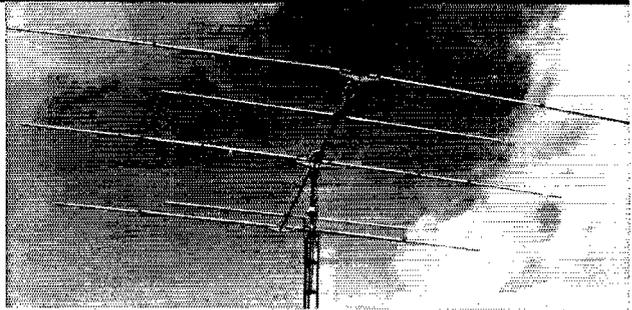
**Power Input** • 1000 watts P.E.P. Grounded grid principle does not waste drive power by swamping exciter. Driving power appears in output of final.

**Driving Power Required** • The Gonset GSB-100 easily supplies the required 60 to 70 watts. Similar 100-watt-class transmitter may be used.

**Coverage** • 80, 40, 20, 15 and 10 meters.

**Other Features** • Full bandswitching; easily loaded, flexible pi network output—matches 30-200 ohms; built-in power and bias supplies.

**GSB-101 Linear Amplifier, Model 3262 \$439.50**



### COIL-LESS GONSET 3-BANDER CAN BE TUNED WITH A TAPE MEASURE!

The new Gonset 3-element full-length beams, with improved mechanical design, give you high-gain and superior performance in 10-, 15-, and 20-meter bands—without coils of any kind to blow out! Unique, multiple-sleeve concentric elements are pre-cut to correct electrical length. Tuning sleeves resonate concentric cavities to isolate element sections which act together for 20M, and electrically disconnect successive sections for 15M and 10M.

#### SPECIFICATIONS:

**Frequency Coverage** • 14-14.35 mc; 21-21.45 mc; 28-29.7 mc.

**Typical Forward Gain** • 10M, 8.4 db; 15M, 8.1 db; 20M, 8.2 db.

**Front-to-Back Ratio** • 24-28 db.

**Typical VSWR** • Not more than 1.4 to 1 across the phone or CW band segments at heights greater than 35 feet.

**Feed** • Beam is fed with single RG8/U cable.

**Weight** • 65 pounds.

**Capacity** • Beam will handle 1 KW AM, 100% Modulated.

**3-Element Beam, #3220 . . . 124.50**

**2-Element Beam, #3219 also available at 84.50**

## DIVISION OF YOUNG SPRING & WIRE CORPORATION

801 South Main Street  
Burbank, California

SEE AD ON OPPOSITE PAGE

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W6UOU  
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# WORLD'S BIGGEST TRADE-IN

Write us... get Henry's trade-in  
offer first... and save money!



HQ-170

**HAMMARLUND**

## Single Sideband at Its Very Best!

Triple conversion HQ-170 • 20 monthly  
payment \$17.77. \$35.90 down. CASH PRICE  
\$359.00. Radio amateur's ideal for modern  
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## Station Activities

(Continued from page 106)

3925 kc. at 1800, NYS C.D. on 3509.5 and 3993 kc. at 0900 Sun., TCPN 2nd call area on 3970 kc. at 1900, LSN on 3970 kc. at 1600. We are pleased to announce the appointment of the following ECs: W2EZF, Clinton Co.; K2GSO, Livingston Co.; K2MTU, Cortland Co.; and W2YIY, Steuben Co. K2MES was appointed OPS and K2SSX, ORS. Endorsements as ORS include W2BLO, K2KIR, K2KTK, K2SIL and K2UJZ. K2UJZ received WAC on 28-Mc. c.w. using 80 watts. W2IEP reports that a new equipment display with prizes was very successful at a recent meeting of the Greene ARC attended by 177 area hams, Wyoming Co. C.D. meets on 29,093 Mc. at 2000 Thurs., reports K2DZO. W2EIMV received a 220 sticker for DXCC. The Syracuse V.H.F. Club is building 15 mobile 6-meter units as a club project. K2EQB received a club award from the Niagara RC. K2CUQ has a sticker for YLCC/200. The Kenmore High School RC made recent tours of local TV and FM stations and now has a 2-meter rig and a 500-watt all-band rig on the air. K2MIXA is going on 220 Mc. K2JZAI reports that K2MTZ demonstrated a 10,000-Mc. rig to the high school radio club. K2BU has home-brew s.s.b. on 20 meters. K2JSF regularly transmits Official Bulletins on 50.25 Mc. at 2300 on Tue., Thurs. and Sun. in the Buffalo Area. The 6-Meter Mobile Association of W.N.Y. (Buffalo) elected K2QJJ, pres.; K2LXD, secy.; and K2EAK, treas. K2TDN passed the General Class exam. The Elmira Club (W2ZJ) is conducting classes for Novices, reports K2UOV. K2INI got DXCC. K2YPG and K2UYU have built 6-meter converters. Don't forget the RARA Hamfest to be held May 16 at Doud Post, Rochester. K2UMY received his DXCC. Congratulations to K2GWN, K2QHR, W2RUF and K2SSX on making BPL Traffic: (Feb.) K2QHR 1002, K2GWN 999, K2MES 839, K2SIL 755, W2RUF 370, K2SSX 280, W2EZB 179, K2KQC 138, W2TPV 128, K2AOQ 111, K2RTN 100, W2RUT 98, W2OE 89, K2UJZ 89, K2RYH 85, W2ABL 84, W2PTA 80, K2RWV 68, K2JBX 65, W2FEB 58, K2QDT 53, K2GOU 37, W2COB 31, W2OBU 24, W2RJJ 24, RQF 24, K2TQC 23, K2IYP 20, W2CYM 18, K2OFV 15, W2ZDL 12, K2DOZ 10, W2BLO 6, K2KTK 6, W2MTA 6, W2BKC 5, K2HUK 4, K2EQB 3, W2ZRC 2. (Jan.) K2QHR 288, W2RUT 110, K2OFV 16, K2UJZ 15, K2IYP 10, W2ZRC 10, W2BLO 2.

**WESTERN PENNSYLVANIA—SCM.** Anthony J. Mroczka, W3UHN—SEC: OMA, RMs: GEG, NUG and LXU. PAMS: AER and TOC. The WPA Tfc. Net meets Mon. through Fri. at 1900 EST on 3585 kc. The Pennsylvania Fone Net (PFN) meets Mon. through Fri. at 1800 EST on 3850 kc. New appointees are LXU as RM and UEM as OBS. BMK has gone s.s.b. FBX and ZIJ are mobile. K3COT is on 10-meter phone. KNQ is trying to find time to operate. K3AMY is going s.s.b. Members of the ATA visited TV station WIIC on channel 11 for their March meeting. LXU has a new Viking Ranger/Courier. Up Erie way: K3BTP has been keeping regular schedules with his brother, HLM, located on an Arctic ice flow north of Greenland; NMP now is heading the TVI committee; WDK and LSS are compiling a listing of all county c.d. operators; YWM went and got himself married. DTZ now has his General Class license. The Eta RC reports via the *Oscillator*: Orchids to K3BZP who gave his Globe Chief to KN3HAO, a handicapped ham in Meadville; K3BZP is active on 10- and 15-meter phone: The Breeze Shooters Hamfest is going to be held May 24; congratulations to K3AIS on receiving her General Class license at the age of 69; the Uniontown RC (PIE) has announced that its hamfest will be held July 11. The Steel City ARC reports via *Kilo-Watt Harmonics*: Steel City is going A5, has received an FB TV picture from QVV at an airline distance of 16 miles; MPK is constructing a TV bean for the club and ZPZ is purchasing transmitter gear including a camera; SVJ now is with the Army in Europe; YDP is on 6 meters; NKM is waiting for his HT-32A and Thunderbolt amplifier. The AKARA reports getting some new committees organized for the benefit of the club; IWG is building a new rig. WSX now is operating s.s.b. Traffic: W3KUN 236, LXU 198, NUG 30, UEN 26, K3COT 15, W3KNQ 10, LOD 4, WRE 4, TOC 1.

## CENTRAL DIVISION

**ILLINOIS—SCM.** Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, 9GME, SEC: HOA, RM: PCQ, PAM: RYU. EC Cook County: HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CST. The week end of August 22 and 23 has definitely been selected for the combined Central and Midwest Division Convention. The host city will be St. Louis, Mo., and the activities will be held at the Chase Hotel in that city. Reports still are

(Continued on page 126)

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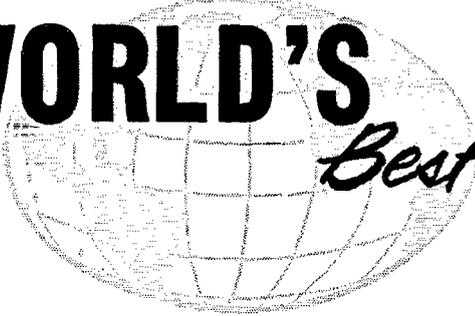


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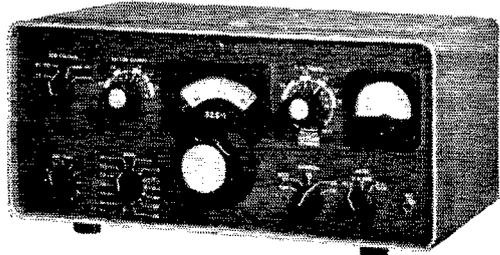
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coming in with fine results of the amateur participation in the January ice and sleet storm that tied up communications and railroads. The railroads were without telegraph wires for several days and the various nets were working on around-the-clock schedules to keep the railroads rolling. K9ISP has earned his 9RN certificate. IRL and JLN are winners of the c.w. and K9EED and ZUV are winners of the Phone S.S.B. Contest, sponsored by the Hamfesters (Chicago). HPG reports that he is making the rounds of the clubs in his new capacity as Vice-Director. PCQ reports that the ILN cleared 287 messages in 23 sessions and CSW and the North Central Phone Net says that his gang's traffic total was 600 for the month. KN9PCS notices us that the new traffic net operates in the Chicago Area on 7,180 Mc. Mon., Thurs. and Sat. at 2000 CST and is known as the Evening Novice Net. K9KQP is now sidebanding with a new rig. W1BDL, of the Headquarters staff, visited the Peoria and Bloomington Clubs and made a presentation at the Starved Rock Radio Club's 25th ARRL Affiliation Dinner. K9LLD, secy.-treas. of the National Trail Amateur Radio Club at Effingham, reports that the club received its ARRL affiliation club papers. RNM and BJE called a meeting of all interested clubs and amateurs that would cooperate with c.d. officials in the establishing of a state-wide storm-reporting system. EU has completed his DX list now with 221 countries confirmed. Four hundred persons were rescued by an amphibious duck when the Rock River went over the flood stages and communications were carried on by RYU, OWN, UCZ and K9EUF. MXT, K9KXP and K9KQB were elected as new officers for the coming season of the Collinsville Amateur Radio Society. The Starved Rock Radio Club's Annual Hamfest will be held at the same place as last year on Sun., June 7. UYP has just finished construction of a new Mohawk receiver. K9DTB is working PB DX on 50 Mc. with 40 states. PSP's XYL has the call K9ONX. K9HWC has a new Globe 6-2. K9CSI is going mobile with his new MG. VWJ and the Montgomery Council Civil Defense Net is making good progress and the gang down there is having fine Friday night drills. The NCS of the ILN requests that those members who do not report their traffic to this column please send it to him and he will forward it. Traffic: W9DO 1176, IDA 716, PCQ 298, K9MHW 275, W9FAW 230, USR 198, K9ISP 170, W9MAK 132, OFR 128, K9JSV 122, W9VWJ 104, SXL 93, CSW 60, EU 42, KN9LOO 30, K9IXK 28, W9SZK 27, K9GSR 19, KN9OUU 17, K9JIN 15, W9HPG 9, SKR 6, PRN 5, K9BTE 3, ERH 1, W9GFF 1.

**INDIANA**—SCM, Arthur G. Evans, W9TQC—Asst. SCM; Seth Lew Baker, 9NTA. SEC: SNQ, PAMs: BDG, BKJ, KOY and UXK. RMS: DGA, TT and VAY. Net skeds: IFN (a.m.) 0800 daily and 1800 M-F on 3910 kc.; ISN (a.s.b.) 1830 daily on 3920 kc.; JIN 1900 daily and RFN 0700 Sun. on 3656 kc. SNQ has obtained two new ECs, K9GMH for Cass Co. and ZSL for Madison Co. Other station appointments were MEK as OPS, NTI as OBS and OPS and ZSA as OO Class I. The Duneland ARA will hold its annual banquet May 2 in Valparaiso. The Indiana Memorial Union RC has been formed at Bloomington with BOS, pres.; K9OFFI, vice-pres.; AMR, secy.; K9APH, pub. Another new club is the Gibson Co. with URQ, pres.; FJL, vice-pres.; K9LLK, secy.-treas. and K9HKL, IIV and ZZR, dir. New officers of the Northeast ARC are ALDC, pres.; QWL, vice-pres.; and K9AIN, secy. K9JJC is editor of an outstanding new paper being put out by the Delaware ARA. The Wabash Valley gang is organizing a 6-meter net. JBQ reports four new calls as a result of the classes held by the Clark Co. ARC. K9DWK has worked 94 and FYM 140 countries. Bud, ex-9HXR is now WA6DWA. Watch for DL4GY; the operator is K9HHV. K9HMN is building a linear with a pair of 811s to run 500 watts. K9DCX is completing plans for a panel truck complete with a.c. generator for the Howard Co. AREC. SYM is building a rig for 6 meters. MEU has a new 75A-4. VAY reports FJR, ZYK, JOZ and VAY made the QIN Honor Roll. QIN traffic was 608. RFN traffic, as reported by TT was 95. BDG had a big month to start him out on his PAM job as IFN traffic for the morning net was 168 and the evening net 484. KOY reports a traffic count of 145 for ISN. K9GLL reports traffic on IMO as 37. DGA, FJR, K9IXD, JOZ and NZZ made BPL. This is BPL No. 96 for NZZ. Traffic: (Feb.) W9JOZ 1068, NZZ 872, FJR 507, ZYK 450, TT 329, VAY 323, DGA 178, K9IXD 172, W9JBQ 146, HLZ 133, TQC 133, ETM 128, SVL 105, BDG 99, KOY 94, SWD 91, EGV 73, MEK 69, K9GBB 65, W9SNQ 63, IMU 60, K9KBW 56, AYI 53, W9DOK 55, EHZ 51, PMT 49, K9JKK 45, W9GJS 41, RUQ 40, CDW 39, NTI 34, RTH 34, DDT 31, K9BSU 27, W9QWI 26, K9HMC 24, W9ZSL 24, EJW 22, YX 21, ZPP 21, ENU 20, DZC 19, GPD 19, CC 17, K9PTS 17, W9BDP 16, K9EEK 16, W9QR 15, FYM 14, AB 10, HUF 10, K9AOM 9, DWK 8, HWN 8, W9UXK 4, K9GSV 3, W9NTR 2, VQP 2. (Jan.) W9SYM 17,

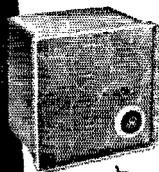
(Continued on page 128)

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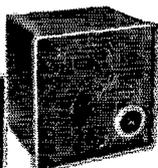
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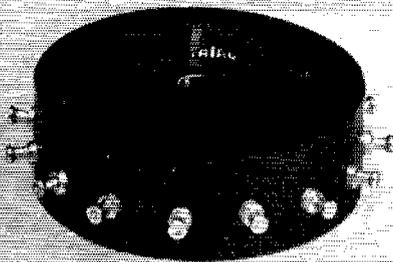


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**WISCONSIN**—SCM, George Woida, W9KQB—SEC: YQH, PAM; NRP, V.H.F. PAM Northern Wis.; GFL, V.H.F. PAM Southern Wis.; K9IQO, RMs: SAA, K9AEQ, K9ELT, K9LCA is a new OPS and ORS, KN9PQT, following in his Dad's (RQM) footsteps, made 303 contacts in 61 sections in the Novice Roundup. UTV and NLJ are new DXCC members, OMZ and GIL have DXCC, phone only. Net certificates were received by DQS, DUQ and K9QBH, members of the WTN, operating on 51.1 Mc. New officers of the BARS of Madison are W3ZLA, pres.; K9EOP, vice-pres.; K9BRJ, secy.-treas.; VOO, trustee; LPL, chief engineer. The Oshkosh Club's 1815-kc. net meets Sun. at 2000 CST. RH, one of the MRAC's oldest members, is recovering from a heart attack. The Milwaukee Club lists among its members amateurs in nine states plus FL8AC, formerly of French Somoliland, now in Lagos, Nigeria. Add to the list of stamp-collecting Wisconsin amateurs, K9PDJ, CCO, chairman of the newly-organized Explorer Post at White-water, is teaching its members the art of ham radio. The new v.h.f. club at Milwaukee lists its officers as K9IQO, pres.; MMA, vice-pres.; K9LMW, secy.; ZDI, treas.; JCI, program dir. Activity reports are being received from but 4 clubs of the 32 registered with the SCM. Among the recent graduates of the U. of Wis. were LYH, VBR, HZF and K9KCS. VHP is building a new receiver to make his station completely homebrewed. Those desiring to keep up their code speed and learn traffic-handling will find the WSSN on 3617 kc. Mon. through Sat. at 1830 the answer. Traffic: (Feb.) W9DYG 586, KON 392, K9DAC 342, W9SAA 208, KQB 124, K9GYQ 101, ELT 83, W9ZZG 71, K9DTH 57, IQO 47, LMX 29, DOL 27, W9IKY 25, CCO 24, YT 18, NLJ 16, VHP 16, WJH 16, CBE 15, K9JMS 14, W9FXA 12, SIZ 11, K9PDJ 10, W9PJT 10, K9LMW 9, W9VIK 8, K9CEF 5, ESN 2, GDF 2, LCA 2, W9RQM 2. (Jan.) W9NQW 356, NLJ 6, SIZ 3.

### DAKOTA DIVISION

**NORTH DAKOTA**—SCM, Harold A. Wengel, W0HVA —SEC: K0JLW, PAM: YCL, RAI; K0CNC. The North Dakota C.W. Net reports 10 sessions with 46 check-ins. NCSs are JBM and K0ATK. The Jamestown Amateur Radio Club has elected AIU, pres.; EOZ, vice-pres.; and K0CNC, secy.-treas. K0CNC uses "lineman's gloves to change flashlight batteries after a regrettable incident with 1200 volts d.c." At the February meeting of the Theodore Roosevelt Amateur Radio Club the following were elected: K0AZX, pres.; NAD, vice-pres.; K0MEF, secy.-treas.; K0KBV, pub. chairman; and ZGM, act. mgr. Further plans were made for the State Convention and Hamfest to be held in Dickenson July 11 and 12. The new officers of the Central Dakota Radio Club are HVA, pres.; K0JLW, vice-pres.; K0COV, secy.; K0ESO, treas.; and IKW, station trustee. Traffic: (Feb.) K0CNC 41, ITP 32, KJR 26, W0DNR 14, K0TAB 11, ADI 10, GGL 10, AZX 9, W0CAQ 6, K0JLV 5, LBD 5, GGI 4, OLM 4, PLY 3, W0HAM 2, K0MHB 2.

**SOUTH DAKOTA**—SCM, Les Price, W0FLP—Asst. SCM: Gerald F. Lee, 0YKY. SCM assistants: FKE and NEO. SECs: YOB and GDE. PAM: SCT. RM: K0BMQ. The 75-Meter Phone Net, which meets daily at 6:30 p.m. CST and Sun. at 9:30 a.m. CST on 3870 kc., reports 32 sessions; K0BQR 4, GWA 4, CTZ 3, EXX 3, K0DUR 4, K0BMY 1, YVF 3. SCT 10: QNI 991, high 45, low 13, average 31; traffic 101, high 9, low 0, average 3.156; informals 127, high 17, low 0, average 4. The SD 40 Meter Net which meets Mon. through Sat. at 12:15 p.m. CST on 7227 kc., reports 24 sessions, K0LXF 16, SCT 8; QNI 478, high 25, low 14, average 19.91; traffic 80, high 11, low 0, average 3.33; informals 81, high 7, low 0, average 3.375. The SD C.W. Net, which meets Mon., Wed. and Fri. on 3645 kc. at 7 p.m. CST, reports 12 sessions, K0BMY 8, K0DYR 3, SCT 1: QNI 79, high 8, low 5, average 6.5; traffic 20; informals 9. The SD Weather Net reports 24 sessions: QNI 368, high 22, low 10, average 1.58; QTC 354, high 20, low 10, average 14.8. The S.S.B. 75-Meter SD Net reports 26 sessions: QNI 701, high 38, low 17, average 26.9; QTC 23, high 5, low 0, average 9. The S.S.B. 75-Meter SD Net reports 30 sessions: QNI 634, high 31, low 14, average 21; QTC 22, high 5, low 0; informals 87. Recently K0PAM, K0LXH and K0OXU visited K0AIW and made some improvements in his station for him. K0BYV and wife looked up SCT Feb. 1, but found no one to greet them but the dog, EXX, GWA, ZVV, K0EYJ and Don Heins were among visitors at the Sioux Falls ARC auction Feb. 2. The PDARC meeting at Yankton was devoted to rewiring the connecting rack of an SCR-522 2-meter transmitter and receiver unit, building a power supply, and getting the receiver to work. A new net member is K0LKE. Crystal-controlled on the North Dakota frequency, he

(Continued on page 130)

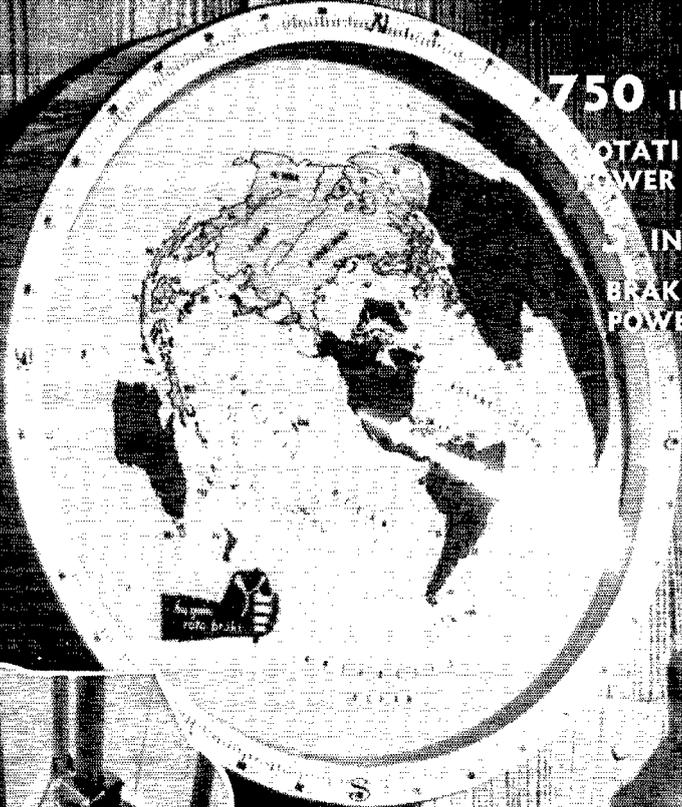
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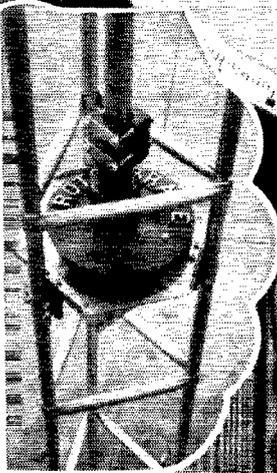
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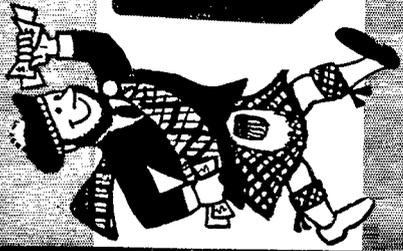
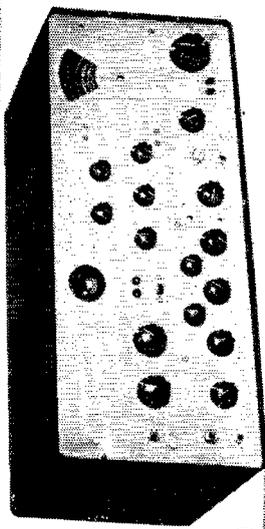
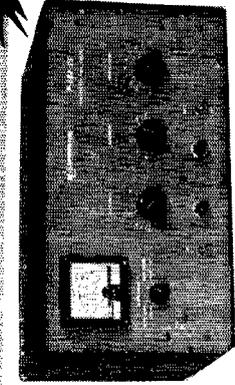
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has been loaned an SD net crystal. KØLXH obtained a Viking II with a damaged case at a very low price and had it on the air the same day. Among the many new hams from the Sioux Falls ARC classes is the granddaughter of DIY with the call KNØRWO. Traffic: WØSCT 272, ZWL 248, KØARF 160, BMG 124, BMQ 124, WØDVB 73, NEO 48, ZLB 29, CTR 25, KØAIE 22, DZG 21, LKH 20, BYV 19, RKJ 14, WØF 12, DHA 11, WØYBF 11, FJZ 10, KLR 9, LXH 8, WØCFP 8, KØTKU 8, CWJ 6, WØDKJ 6, TKU 6, AZJ 4, KØMML 4, MTZ 3, WØEWJ 2, KØIAW 2, WØNNY 2, KØOMP 2, PQW 2, JAB 1.

**MINNESOTA**—SCM, Lydia S. Johnson, WØKJZ—Asst. SCM; Rollin O. Hall, ØLST. SEC: TUS. RM: KØGCN. PAMS: QVR, TCK and TUS. This section salutes our former SCM, KLG for a job well done! The first WAM certificate goes to KØMNY. New ECs are HPN and KØOIW, GIX, PBY, PRJ, RYO, LUP, YNY, KØJCF and KEJ had their EC certificates endorsed. HEN earned an OPS certificate after a record 59 check-ins in two months. New Novice, KNØTEC in Cokato, is on the air using a Globe Chief 90-A. KØKYK moved to Jasper. WMA kept a daily schedule for two weeks with KØGFAE, handling traffic between a Cokato family and their son, a Navy lieutenant, and his paralyzed wife. ZOB and his wife with their daughter (airline stewardess) vacationed in Hawaii. LUP spent his vacation building a tower and a beam. The St. Cloud Hamfest will be held Aug. 9 at Wilson Park. The new officers of the St. Cloud Radio Club are RVO, pres.; SV, treas.; ZCA, secy. KNØRHK, of Duluth, has worked 46 states with 42 confirmed. KØGQX visited KLG, Litchfield hams KØJNX, LLZ and ZQB are handling phone traffic. Six Little Falls stations check into the phone net. They are BNA, NYM, KØMPG, OIU, QEJ and QEK. The first Minnesota visually handicapped operator to go s.s.b. is KØAEE. Little Falls High School Club station LYG is active on 40-meter c.w. LUX, of Winona, spoke and showed colored slides of his DXpedition to the Galapagos Islands at the SPRC and MARC in the Twin Cities. GBG and his wife are spending the winter in Arizona. The Highland Park Junior High School, St. Paul, has a newly licensed amateur radio station with the call KØSSS. Our sympathy goes to the family of KØJYA, who has joined Silent Keys. Traffic: KØIDV 318, ORK 210, WØKJZ 206, KØEWC 95, WØTUS 72, KLG 68, KØMGT 42, WØTWG 42, UMX 39, KØKYK 36, WØOPX 36, OJK 35, KØGCN 32, IZD 23, WØKFN 28, KØEPT 27, MAH 25, WØNNJ 22, ALW 21, KØMIJ 21, WØLST 20, QVR 20, RIQ 19, KYG 18, PET 18, OJG 16, WMA 16, KØMPG 14, WØBUO 12, TCK 11, PPG 10, HEN 9, KØHJC 8, MNY 8, OIW 8, QEK 7, WØOOU 6, RHI 6, OET 5, QXF 2. (Jan.) KØMNY 20, WØHEN 8.

**DELTA DIVISION**

**ARKANSAS**—SCM Ulmon M. Goings, W5ZZY—SEC: K5CIR. PAM: DYL. Sgt. Jack Fowler, K4LYY/5, of Blytheville AFB, has been transferred to DL4-Land. KØJEY/5 has been transferred to Joplin, Mo. YHT is working portable in Fayetteville. He is studying electrical engineering at U. of A. WØBED/5 has received his new call, K4TYW, and has been appointed as RM for Arkansas. K5HSJ is building an electronic keyer. BM is now at Biloxi, Miss. working with Keesler AFB. 6BMM/5 still is continuing his classes in code practice and theory at Monticello. Interest continues and some of the boys are getting along fine. IAL, of Lake City, is operating portable in Texas. ZZY wishes to express appreciation for the sympathy and kindness shown him by the many amateurs during the illness and passing of his mother. Traffic: (Feb.) K5IPS 536, H5J 118, TYW 118, W7BED/5 54, W5CEU 22, ZZY 16.

**LOUISIANA**—SCM, Thomas J. Morgavi, W5FMO—SKW, Lake Charles Area EC, is doing a bang-up job with his 32 AREC members and 3 Asst. ECs to help. INL, Westside New Orleans EC, holds weekly drills on the air with 18 AREC members. K5EFS, EC for Rapides Parish, has a going organization with 12 full AREC members. K5DZT who took over the EC job from K5MMP when he was transferred to Houston, is getting things rolling in the Shreveport-Bossier City Area. During a recent telethon held in Lake Charles, the Amateur Radio Club of Southwest Louisiana, through its base stations and mobiles, helped in the collection of donations. K5JQC was the organizer who worked with the local Optimist Club which sponsored the program featuring George DeWitt of TV's "Name That Tune." Those participating were K5JQC, LKK, ARH, BZB, RQT, CTQ, CRE, GSI, CXB, MIMQ, MQM, ESN, PYN, PPK, W5BZW, UJP, SKW, K4MFN and K7GXU. The Net mgr. for the SWLA Emergency Net is KRJ. The net meets each Sun. at 2 P.M. Jefferson ARC officers are QHP, pres.; GAD, vice-pres.; K5HEK, treas.; IZD, secy. CEZ made BPL again. CEW, who has 257 countries worked and 246 confirmed, has 156 countries confirmed on phone. KRX is active on 75- and 80-meter

(Continued on page 132)

# What is a Mercury Battery?



*How does this battery differ from zinc-carbon batteries in construction and performance?*

Mercury batteries are ideally suited to modern trends toward miniaturization such as vest-pocket portables, hearing aids, instruments, electric wrist watches, and military equipment.

The electrical characteristics of the mercury cell differ considerably from those of the zinc-carbon cell. Its high capacity-to-volume ratio gives it from 2 to 15 times the capacity of other primary cells of the same volume—or, by the same token, substantially reduced volume for the same battery capacity.

The mercury battery—a mercuric oxide, alkaline primary cell—was invented during WWII, and developed by P. R. Mallory & Co. Inc. Chemically, this battery consists of a depolarizing mercuric oxide cathode, an anode of pure amalgamated zinc, and a concentrated aqueous electrolyte of potassium hydroxide saturated with zincate.

Mechanically, the cathode and anode are pressed shaped structures which are assembled into a steel container. Currently, there are two basic physical designs—the flat, button-like unit, and the cylindrical unit resembling an ordinary pen-light battery. Both structures are self-venting for protection against circuit abnormalities such as shorts or reverse currents:

Longer shelf life is possible because deterioration during inactivity is minimum. This is important where batteries must be installed in equipment which operates at widely separated intervals or only in case of an emergency.

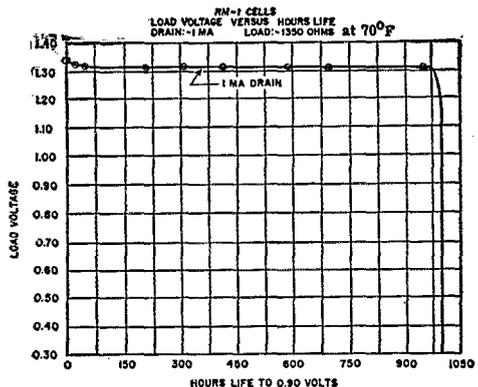
When used at current drains within design specifications, no "recuperation" is required to maintain a mercury battery's efficiency. The most important electrical feature, however, is the mercury battery's constant voltage. The measured potential of this battery, under a given set of conditions within its ratings, stays substantially the same to the end point of its life. (See performance curve.) Over long periods of time, voltage regulation within 0.5% is maintained—for shorter periods, regulation of

0.1% may be realized. This enables the use of these batteries in such services as a reference point in a regulated power supply, computers, and other critical circuits.

Mercury batteries have an exceptional ability to withstand severe shock and acceleration, and have extremely high resistance to moisture and corrosive conditions. Momentary short circuits will cause no permanent damage, with almost complete recovery to full open circuit EMF within minutes. Excessive load currents cause no damage, with almost immediate EMF recovery.

Mallory Mercury Batteries are available through Mallory distributors. For those who desire more complete engineering information, a copy of the Mallory Technical Data Bulletin on Mercury Batteries may be had by writing me in care of the Mallory Ham Shack, P. R. Mallory & Co. Inc., P. O. Box 1558, Indianapolis, Ind.

Lem Temple, WIDI



A typical mercury battery performance curve showing voltage vs. life. Note the constant potential to the end.

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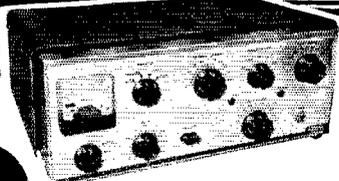
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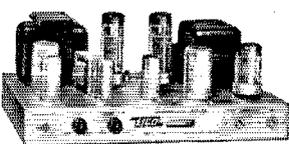
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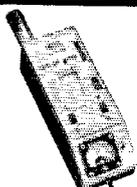
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c.w. handling traffic. K5DMA reports the Carville project is going strong with 4 new Novices in the making. MXQ has a nice traffic count. MO, in the process of building a new secondary standard, is having a time constructing a good crystal oven. Apply to your SCM for ARRL appointments. Check expiration date of present certificates and mail them in for endorsement. Traffic: W5CEZ 547, MXQ 210, KRX 88, K5DMA 14, W5EA 8.

**MISSISSIPPI**—SCM, John Adrian Houston, sr., W5EHH—K5IHQ reports that the MMEH held 24 sessions in February and handled 32 pieces of formal traffic. The Biloxi ARC gave an appreciation supper for Treasurer ISV, who is leaving the coast to work for Collins in Dallas. The new treasurer is K5LUX. The Biloxi Hamfest will be held June 6-7 at the Biloxi Community House. First prize will be an Apache and an SB-10; second will be a Tribander beam and a rotator. New members to the club are HAV, FBW, 3AXI and 4AWC. K5DXL has an emergency set-up at the Natchez Electric Power Assn. for emergency use. CQJ is going strong on s.s.b. ZNY recently moved from Cleveland to join our neighbors in Eudora, Ark. K5BGG is in Alabama training for instructor's rating. We regret very much to report the passing of PFC, a real friend to many hams who knew him on the air and in person. Our deepest sympathy to VQE, his wife, and PFD his son. Traffic: K5QNF 392, QNE 125, MFY 17, W5EHH 14, BV 6.

**TENNESSEE**—SCM, R. W. Ingraham, W4UIO—We welcome PL back on the reporting list. Congratulations to BPL winners: PL (twice), 5RCE and K4LLB. PL reports a sick spell and that the NC-300 is the best c.w. receiver he has ever owned. IFN reports the following news from the Jackson Radio Club: TBS is portable with a DX-35; COY is planning high power; PWW is s.s.b. with an SB-10; RHO is trading his a.m. final for s.s.b. linear; JRD/KS4 is looking for Milan and Jackson at 1800 CST on 14,230 and 14,260 kc.; IFN is busy with club duties. ZJY sends regards to all from France, YRM reports 6-meter DX with HC1FS. OGG says he is NCS on Tenn. Phone, 5RN and CAN. FEP has converted a Valiant to run 60 watts on 6 meters. K4LLB says he hopes to be on RTTY soon. VNE reports that he has completed WAZ after 25 years effort. K4ILU has a "scope hooked up to his receiver and is active in OO work. Traffic: (Feb.) W4PL 1475, W5RCF 912, W4OGG 410, K4JNK 254, LLL 85, W4DMS 84, CXY 67, VJ 50, IGW 38, UIO 35, PEP 31, PAM 27, NHT 25, PQP 22, JVM 17, UVL 16, K4KYL 12, OUK 12, W4TZG 11, TDZ 10, EIN 8, K4ILU 6, W4LLJ4, PSN 4, (Jan.) W4PL 488, K4LLB, 110, W4FEP 9. (Dec.) W4PL 327, K4LLB 417, W4VNE 14.

## GREAT LAKES DIVISION

**KENTUCKY**—SCM, Robert A. Thomason, W4SUD—Asst. SCM: William C. Alcock, 4CDA. SEC: BAZ, RMs: K4AS and LHQ, PAMs: GTC and K4MMW. S.S.B. PAMs: NGN and K4HBF, V.H.F. PAM: K4LOA. YZE topped the February Kentucky QSO Party, taking home a Johnson SWR meter for his efforts. Another contest is scheduled for June, with a Q multiplier (contributed by Heath Company) as first prize. Suggestions on new rules are invited. Full details will appear in *May Kentucky Ether Clippings*. A radiogram to your SCM will insure you a copy. February OO reports were received from ELG, K4GAG, GEZ and BUB. EJA is a new OO. PAM GTC reports that 1630 CST KPN is doing very well. REZ helped with St. Louis tornado traffic. K4CC has a new 32S1-75S1 working all the section nets. K4HTC is working with ham-to-be Scouts. KKG says "QSO Party fun—what's next?" K4PNA has an HQ-170. KIN has shoes for his 10A. He hooked everything in the shack (including brother KIO) to the new Drake. K4LOA reports Warren County should have 13 stations on 6 meters soon. QES SPJ is awaiting his Conditional Class license. ELG has a new QTH. OBS NRH is active. K4AIT is back at Ga. Tech. HTD and K4SBL are QRL school. IFB was active in the DX Contest. Traffic: K4AIS 328, W4BAZ 234, JSH 163, K4ZLM 159, W4SUD 155, K4VDL 148, CSH 137, W4KKG 123, K4UCS 112, W4RHZ 104, GTC 98, K4SBL 97, MMW 93, WBG 72, QCN 60, W4NGN 65, K4IFB 58, KIN 55, W4CDA 51, YVI 51, K4LHQ 44, W4SZB 39, OGY 38, K4JOP 33, PNA 32, MPY 31, QHZ 25, AIT 24, VTY 19, QCQ 14, QYP 13, HCK 12, W4HTD 12, EJA 9, HOJ 8, K4KIS 8, W4SZL 6, ELG 5, K4KYZ 5, W4JUI 4.

**MICHIGAN**—SCM, Thomas G. Mitchell, W8RAF—SEC: YAN. RMs: OCC, FWQ and QQO. Field Day seems to be the next large order of business for the fraternity. Reports of the last FD operations are just fading and now we are preparing for the next one. Lots of luck to all participating units. Examination will disclose quite a few new calls listed in the traffic report this month. It is gratifying to see them listed and their presence is appreciated. RTN is QRT for a tour of Army

(Continued on page 154)

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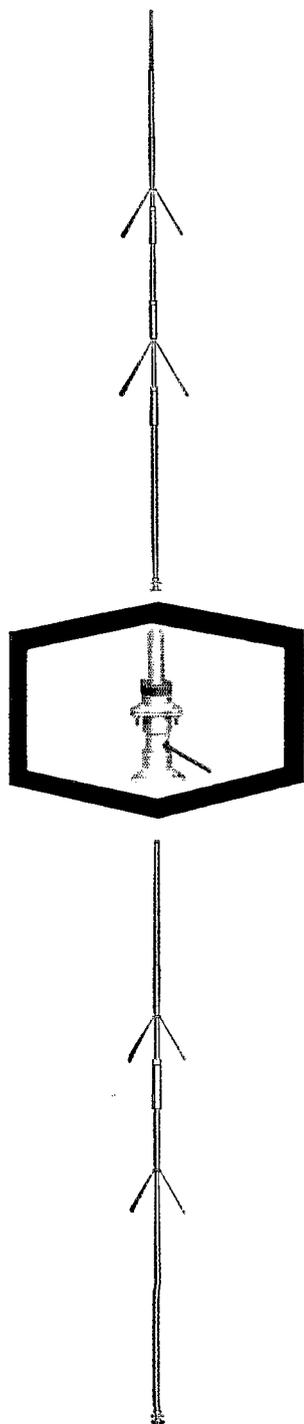
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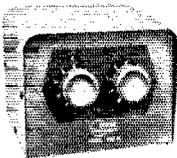
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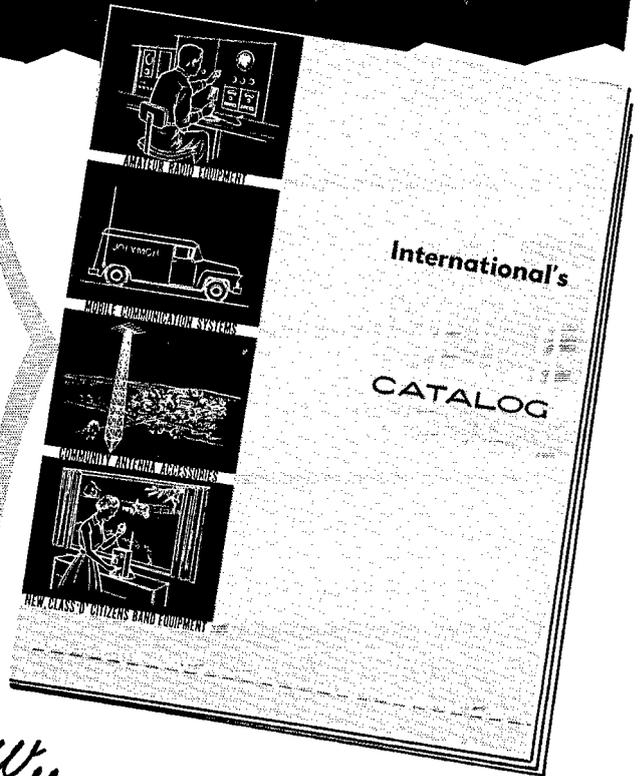
duty. K8CKD is conducting code and theory classes at home two nights each week for fellows in the Loudington Area. Q1X is undergoing eye operations for the removal of cataracts. HKT still is climbing the DX ladder. The Niles Amateur Radio Club has elected the following new officers: LZZ, pres.; JFF, vice-pres.; QBE, secy.; and NLO, treas. The Holland Area Radio Club published the first issue of its bulletin, *SPARK GAP*, as of February, with DYI as editor. Congratulations to MGQ and AMB, who were "coupled" on Feb. 5. May their "QSO" be long, happy and QRM-free. As mentioned in this report last month we were to have had a new SCM by this date. Because of some technical difficulty, the selection has not been announced as yet, so I will continue in an acting capacity during the interim. As soon as the selection is made, I will see that the word is circulated via the established nets. Traffic: (Feb.) W8OCC 260, QQQ 183, FWQ 147, K8XVV 146, W8YAN 138, NOH 135, JkX 119, FX 105, K8HVQ 96, W8SCW 66, RTN 63, K8NAV 35, AXL 30, W8MHZ 29, ILP 27, DSE 24, K8CKD 23, W8AUD 21, WXO 20, RAE 16, WVL 16, K8AEM 15, W8ALG 9, HKT 9, Q1X 8, K8ABW 6, GJD 6, W8MMI 6, SJF 4, TIC 3, K8KMQ 2, W8EGI 2. (Jan.) K8HVQ 63, W8NUL 20, K8AXL 17, CKD 17, GJD 17, ILB 12, W8FSZ 7, K8BTH 6, KAMQ 2. (Dec.) W8AHV 19, K8CKD 18.

**OHIO**—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, SDAE, SEC: UPB, RMs: DAE and VTP. PAMs: HPP and HZJ. AQ worked EI, SM, KH6 and KL7 on 50 Mc. HZJ has a new Mosley Trapmaster beam. BZX has a new HQ-110. THJ is in Florida. MJC and K8GVV have new three-element 10-meter beams. JHJ and KLD were in the hospital. RO now has an SX-96. KN8LCZ and KN8LDA are man and wife. K8s: MZS, MZT and NLI were in California. The Seneca RC's 1959 officers are K8BCK, pres.; and Ken Hydman, secy. K8EZN received a WAS certificate. Those who aided during the January flood at Steubenville were AYR, DNQ, ERR, NJJ, OBQ, ZRI, ZWH, K8s BYF, DTO, GEH, GHN, HMJ, LQM and NAM. Those in Henry County who participated during the flood were UPLM, SMW, FDK, QCL, K8s ESU and MHO. Those in Seneca County who helped were WAB, JWD, JIL/M, RBT/M, SWL, VKB/M, CUZ/M, GJL, POH, FYW, SGT/M, K8s BCX, BIL and KN8LCZ. In the Cuyahoga County Area the following were active during the flood: AEU, ANB, ASW, BAH, BDZ, BHR, BPN, BUQ, CPP, CZM, DGK, EFB, ENB, EFM, FAG, FAT, FEZ, FQM, HKG, IDM, IY, KEK, LFY, LHX, LMF, MDL, MPP, MVU, MWE, NZD, NZI, OIS, OXS, OXY, OYS, PBZ, RAE, SLE, SQU, SZU, TFW, TXZ, UEM, UKW, VFU, WZS, ZEP, K8s AAG, AAP, ABA, BWH, CDA, CFI, CTI, DFB, DBJ, DKU, DPA, DOB, DZY, GBH, GCF, GJW, GVK, GZY, HCS, HSI, HVC, IHC, IJG, IKA, ILX, IMF, IPS, JHG, JHZ, JJC, KBE, KKO, KKP, KNE, LMF, LMV, MBU and W5TY8. Our recent flood emergency brings my plea again for need of ECs in Ashland, Brown, Carroll, Champaign, Clinton, Defiance, Delaware, Erie, Gallia, Hancock, Hardin, Harrison, Holmes, Huron, Marion, Monroe, Morrow, Paulding, Perry, Portage, Preble, Sandusky, Scioto, Union, Vinton, Warren and Williams Counties. Please volunteer and write to our SEC, D. E. Cartwright, UPB, 2979 Observatory Ave., Cincinnati 8, Ohio, for information. The Xavier Univ. R.O.T.C. RC's 1959 officers are K9OQC, pres.; MWY, vice-pres.; AUU, corr. secy.; and QIZ, secy. The club call is K8WBL. Lake-Geauga County ARC's 1959 officers are OED, pres.; MFT, vice-pres.; and QKX, secy.-treas. The club meets the 1st and 3rd Mon. of the month and has a code class for Novices conducted by IMH and FKP. DNC was named Canton ARC vice-pres. in place of K8HED. K8DHJ received the WTPA award. AL received WFRG and W-Del. K8JPA has a new Valtant. Columbus ARA's *Curscope* states that THU showed how to build a crystal calibrator. K8DDT went to Florida. IOV has his General Class ticket. Toledo's *Shark Gossip* names ESN as it's "Ham of the Month." KN8NGH is a new ham. QCT is on 6 meters. SUT is in the hospital. KTX is at a Naval Base in California. OSD, the daughter of QOV, married K8BYT. The Tusco RC reports that GAC spent two weeks at Ohio Bell School in Columbus. FMW and GAB have a new SP-600JX receiver. JHJ was named president of Tusco as K8JSZ's working hours made it impossible for him to attend. DAE and UPH made RPL. New appointments: WNJ as EC and K8HRR as OES. The Greater Cincinnati ARA supplied amateurs in the area with a real complete amateur directory. WXG is head of the Red Cross in Springfield. TZO completed his Seneca VHF-1. LT is on 6 meters with a 6N2 and an NC-300 with converter. QCU is 6-meter mobile with a Little Gem and a Saturn. REQ has a Globe Scout for a stand-by rig. K8IHQ has a DX-40 and an HQ-140X. IBX received OHA award No. 1001. K8CZJ is home from college. Akron's BSRA started a code class with 75 pupils and

(Continued on page 136)

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Q-5-59

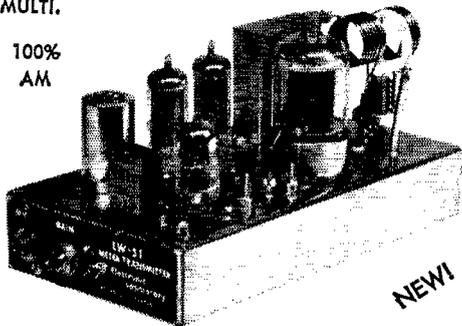
# LW-51

## 6m Transmitter

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Final  
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**ELECTRONIC  
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ROUTE 2, JACKSON, MICHIGAN

recently graduated a class of 18. Traffic: (Feb.) W8UPH 1376, DAE 536, AL 391, K8CZJ 312, W8SZU 216, IBX 173, K8DHJ 116, W8QJ 88, YGR 84, K8EKJ 53, W8GQD 30, BEW 28, K8DDG 26, W8WE 24, SYD 18, QIE 17, K8HDO 15, W8STR 14, HUY 13, PLQ 10, BZX 7, LT 7, WYS 7, DDW 6, HPP 6, K8JX 6, W8LMB 6, LGR 4, QCU 4, PSX 3, K8LFV 2, JZZ 2, KR D 1, MSI 1. (Jan.) W8PMJ 75, K8HVT 42, W8EEQ 17, AQ 2. (Dec.) W8SMW 6.

### HUDSON DIVISION

**EASTERN NEW YORK**—SCM, George W. Tracy, W2EFU—SEC: W2KGC, RM: W2PHX, PAMs: W2JJG and W2NOC. Section nets: NYS on 3615 kc. at 1900, NYSPTEN on 3925 kc. at 1800, IPN on 3980 kc. at 1530, ESS on 3590 kc. at 1800, ENY (emerg.) on 29,490 (Thurs.) and 144.35 Mc. (Fri.) at 2100, MHT (Novice) on 3716 kc. Sat. at 1300. Congrats to our three BPL certificate winners: K2UTV, K2TEZ and WV2ATC. New appointment: W2ZBS as OO. An NYS Net certificate was earned by K2MBU. Officers of the Yonkers ARC are K2MQR, pres.; K2HGN, secy.; K2BFU, treas.; K2BIG, editor; W2LWK, tech. advisor. The talk on "Oscilloscopes" at the club's February meeting drew a large crowd. New General Class licensees include K2ETC, K2RHX and K2SIL. WV2CQM has a new Ranger. A higher-powered rig is under way at WV2AKK. Two new 6-meter stations in Poughkeepsie are W2ROE and WA2DAP. K2CVG reports 23 states on 6 meters. On the DX side, 58/28 is the score at K2YTK. K2KUA has a new 25-w.p.m. sticker. W2AMJ, OF Hammarlund, was guest speaker at the Schenectady Club meeting. The Yonkers Kiwanis heard a talk on amateur radio by K2BIG. We are sorry to lose W2JZK, who is moving to Owensboro, Ky. See page 11 of this QST for an article by W2RDL and W2UKL, who established a new DX record on 21,000 Mc. last fall. Both are members of General Electric's Research Lab. W2PHX and K2UTV are net controls on 2RN. New Ellenville Club officers are K2LUS, pres.; K2KRP, vice-pres.; K2OCB, publicity. Ulster Co. has a new 6-meter RACES Net. K2CJ is the club call of the Communications Club of New Rochelle. K2WI says a transmitter hunt will be held Apr. 4 on 145.38 Mc. Traffic: (Feb.) K2UTV 1101, K2TEZ 1002, K2YZI 297, K2UYK 183, K2MBU 171, K2YTD 151, WV2ATC 112, W2ATA 89, W2EFU 86, W2PHX 29, K2BIG 24, K2GKK/2 22, WV2AKK 18, W2FVP 18, K2CKG 13, W2ZBS 6, K2BAB 4, W2TYC 2. (Jan.) W2ZBS 12.

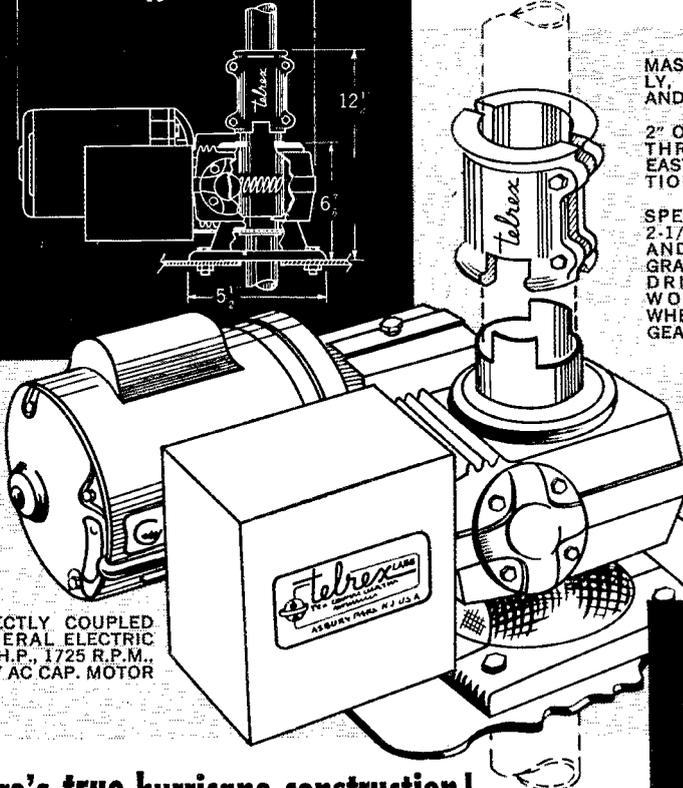
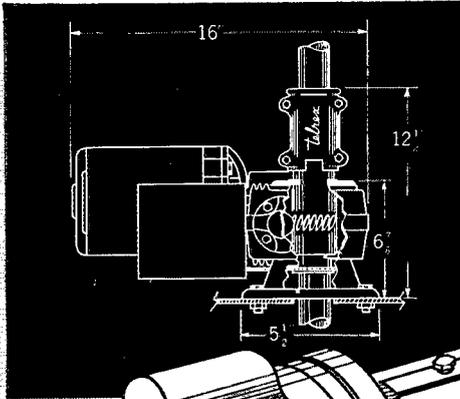
**NEW YORK CITY AND LONG ISLAND**—SCM, Harry J. Dannels, W2TU—SEC: W2ADO, RM: W2VDT, PAM: W2UGF, V.H.F. PAM: K2EQH. Section nets: NLI 3630 kc. nightly at 1930 EST and Sat. and Sun. at 1915 EST. NYC-LIPN, 3908 kc. Mon. through Sat. from 1730 to 1830 EST. NYC-LI AREC, 3908 kc. Sun. at 1730 EST. V.H.F. Traffic Net, 145.8 Mc. Tue. through Sun. at 2000 EST. BPL cards were earned by W2KEB and K2QBW, the latter on originations plus deliveries. New officers of the Fordham RC are K2JVB, pres.; K2CQB, vice-pres.; W2KQX, rec. secy.; K2OFD, corr. secy.; and K2QBW, act. mgr. K2KXT received his CP-35 certificate and the traffic total is soaring. W2BO soon will be off on a trip to KH6-Land. W2DRD is now sporting a new HQ-170. The Columbia URC added a new 6 meter four-element beam. K2HYV completed his surplus-converted mobile for 75 meters and MARS. The Manhasset c.d. station added 23- and 220-Mc. gear. W2LKG enjoyed working the YL-OM Contest. W2DID is now operating his 75-watt mobile rig on 75 and 10 meters. For those who wonder if 6 meters is active, the following figures are quoted for February from the 6-Meter L.I. Emergency Net, courtesy of K2YIK: 95 different stations reported, 61 stations average per session with 71 high and 49 low. W2PVQ is using a 16-ft. 40-meter "Wonderbar" with good results. W6GGP is mobilizing in our section looking for contacts. K2OEG picked up Asia for his last continent. K2OFD passed the General Class exam and is using a Knight receiver. New Equipment for 220 Mc. has been added at K2SVY. K2TMI keeps daily skeds with the Texas Tower Net. WA2AQQ is looking for anyone interested in fax work. WV2COG received the 1st-class radiotelephone license at the age of 13! W2OTA's XYL signs WV2DTZ and is active on 2 meters with 75 watts and the low frequencies with an Adventurer. K2VDR completed an EICO 720 rig with 730 modulator K2RBS announces a "6 Meter Needle Net" certificate for anyone contacting charter members W2LAW, K2RBS, K2RCP and WA2BRY and abiding by the rules of the net. Contact any of the boys for exact details. K2HGR reports the formation of the Bayside ARC with a club frequency of 28.8 Mc. All amateurs in the Bayside-Flushing Area are invited to join this new group. A new call heard on 6 meters is W2BCH. W2GIE reports successful contact with his brother, VQ5FS, after a long wait. A Globe Champion 300 and SX-96 dd the trick. WA2DCQ received his General Class

(Continued on page 138)

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 ROTATOR/INDICATOR SYSTEM

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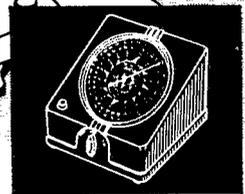
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2" O.D. MASTING FEEDS THRU ROTATOR FOR EASY, SAFE INSTALLATION AND SERVICING

SPECIALLY DESIGNED 2-1/8" I.D. HARDENED AND CHROMED INTEGRAL MAST COUPLING DRIVE, TWO STAGE WORM AND WORM WHEEL 1200/1 BOSTON-GEAR REDUCER

CONTROL HOUSING—Telrex quality thruout. Black japanned aluminum housing. Tri-colored azimuth rose with large direct and reciprocal readings. (Selsyn indication.)

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 GENERAL ELECTRIC  
 1/6 H.P., 1725 R.P.M.,  
 115V AC CAP. MOTOR



Here's true hurricane construction!

This is the system that carries on, where others fail! Rotates and holds large arrays in winds up to 120 mph. Lifetime lubricated and protected from minus 55° to plus 400°F. Rotating power 5,000 in./lbs.; braking power 12,000 in./lbs. Limit of rotation and selsyn indication built-in. Special motor and circuitry requiring only 8 conductor cable. Azimuth indication by selsyns. Price \$435.00 f.o.b. Asbury Park, N. J., U.S.A.

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 3/4 to 40 METERS  
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 ROTATOR/INDICATOR SYSTEMS  
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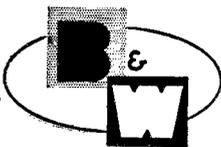
Those who have been searching for a proven work-horse that can be used with confidence on various amateur bands.

Those who want versatility and maximum power into the antenna, consistent with power rating, on CW or high level modulated AM and—SSB when desired at a later date.

Novice Class operators who must comply with FCC regulations—75 watts, crystal controlled on restricted band sections, but, who want full power as soon as they are General Class, without added expense.

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ticket and CP-20 endorsement. Excellent club newspapers were received from the NYRC, Levittown ARC, Fordham RC and the Amateur U.H.F. Club. Thanks are extended to these clubs and a request is made for other clubs to send their news each month. All appointees are urged to check their appointments for renewal. Traffic: (Feb.) W2KEB 3687, K2QBW 414, K2KXT 293, W2VDT 249, K2VCO 190, K2UBG 135, K2IRS 119, W2EW 86, W2BO 82, K2MIG 45, W2DRD 43, W2AEE 42, W2GP 34, W2JBQ 34, K2BH 28, W2DUS 28, K2JVB 28, K2HVV 26, W2UAL 20, W2LGG 18, W2DSC 15, W2PF 12, K2MEM 10, W2DID 9, K2MYS 6, W2EC 4, K2PIH 3, K2VIX 3, W2KQX 2, K2VDR 2, W2VPQ 1, K2RBS 1. (Jan.) K2HVV 35, K2VQY 25, K2MYS 6.

**NORTHERN NEW JERSEY**—SCM, Edward Hart, jr., W2ZVW—SEC: W2IIN, RMs: W2RXL, W2ADE. PAMs: K2KVR-u.h.f., K2VAC-NJPN. The New Jersey Net meets daily at 1900 on 3695 kc. Manager W2RXL reports an average attendance of 17.9 stations with 12.35 messages handled per session. The net bulletin is sent to all members. The New Jersey Phone Net meets on 3900 kc. at 1800. W2AYI made BPL and gives credit to the NJSS Net, with a big assist from K2ZHK. This may be the first Novice BPL in the Northern New Jersey section. K2MFF took a crack at the N.M.T. K2AGJ continues his fine code lessons on 2 meters, K2ZSQ made 20-w.p.m. CP. W2NIY was the first in New Jersey in the Mass. QSO Party. K2EQP had trouble with the rig, but all is well. W2DRV is on the night shift and spent some time in the hospital. W2RON is working on a modulated light beam. W2TSQ spends time on MARS. The Rutgers University ARC's officers are W2BYE, pres.; K2KLR, treas.; W1BPV, secy. W2BYE is working on RTTY. W2GVU received a Worked New Hampshire award. W2GVU will retire from the Army May 31. K2VVL has the tower and tri-beam back up. K2VAB is working DX and snagged LZ2FN. K2GIF is back on with a p.p. 813 rig. W2QFB is NCS for the Eastern States Net. K2TXE now is General Class. W2PTS is a new OBS in Plainfield. K2UMH has a new 2-meter v.f.o. W2CVW worked 94 countries. K2PBP has a new converter using 417A. K2UKQ needs one card for DXCC. W2GKG and W2LAN assisted the local police when their radio went dead. The New Jersey Slow Speed Net had 20 sessions with an attendance of 36 and handled 93 messages. Traffic: (Feb.) K2ZHK 344, W2OPB 191, K2VVL 182, K2VAB 153, W2RXL 121, W2CQB 110, W2AYI 109, W2ZVW 105, K2EQP 75, K2AGJ 74, W2RZO 46, W2CVW 41, W2EBG 40, K2MFF 35, W2KFR 31, W2BRC 16, W2ADE 10, K2KVR 10, K2GIF 8, K2JTU 7, W2RON 6, W2BYE 4, W2TSQ 4, W2WJF 4, K2ZSQ 3, W2CJX 2, W2DRV 2, W2NIY 2, K2UKQ 2, K2VLU 2, W2EWZ 1. (Jan.) K2YJH 17, K2VAC 12.

## MIDWEST DIVISION

**IOWA**—SCM, Russell B. Marquis, W0BDR—QVA was reelected president of the Burlington Club with K0AFN reelected secy.-treas.; and DRY elected vice-pres. The Central Iowa Club reelected K0GVG, pres.; SLC, vice-pres.; and EPL, secy.-treas. New officers of the Graceland College Club are K0DFF, pres.; SQOE/0, vice-pres.; and Florence Harper, secy.-treas. New officers of the Cedar Valley Club are DGF, pres.; LPK, vice-pres.; R. Weeks, secy.; and K. Roland, treas. K0LRK is the newest member of the TLN. EXN received an OPS appointment. Renewals: BRE and MJH as EC and SLC as OPS. QVA is starting a new code and theory class for prospective amateurs. ZYB is building a new shack and tower at a new QTH. EEG and KJN vacationed in the South. The RACES plan for Sioux City has been approved by the State and has been forwarded to Washington. The annual TLN Party is planned for the latter part of May. Traffic: (Feb.) W0BDR 2685, LGC 1369, LCX 1160, SCA 1116, PZO 565, GXQ 302, K0CLS 193, GXP 124, W0QVA 75, K0AGJ 60, W0BLI 57, UTD 50, K0BLJ 48, W0SLC 45, K0APL 32, W0NTB 28, K0MMZ 25, W0NYX 25, K0EXN 23, W0OFV 23, K0KPF 22, BRE 21, DON 21, W0JPJ 21, BTX 19, NGS 19, K0CLI 18, W0LSF 18, BQJ 17, K0GBB 16, GQJ 16, W0IUZ 16, RQA 15, K0GOT 14, W0VOY 14, K0EYX 12, W0GQ 12, K0LHH 12, IDN 11, K0MFX 10, RZO 10, W0UHO 10, K0HBD 9, KAQ 9, W0SWD 9, AYD 8, HTP 8, K0BPR 7, ITC 7, W0EEG 6, K0LBZ 6, QVZ 6, W0YD 6, BRT 5, III 5, K0KBX 5, OFK 5, K0QWM 4, W0COD 3, FMZ 3, K0JTL 3, W0ADB 2, K0HFQ 2, W0PTL 2, FDM 1, QVZ 1. (Jan.) K0LHH 9.

**KANSAS**—SCM, Raymond E. Baker, W0FNS—SEC: IFR, Asst. SEC: LOW, RM: QGG, PAM: LEW, V.H.F. PAM: HAJ. KSN went into operation Mar. 9 on 3840 kc. to track storms. All emergencies will be handled on the KPN frequency of 3920 kc. Sorry this report is not complete as SCM Baker is in the hospital but your SEC will do the best he can. The Federation of Clubs is well on its way with clubs lining up. Thanks to those

(Continued on page 140)

# HEAVY DUTY MOBILE BASE MOUNTS

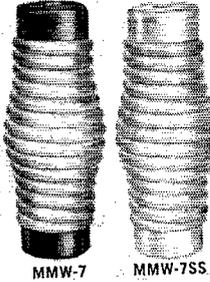
**NEW!**



MMW-3AE Polished Finish \$7.95  
 Ebony Finish, S. S. Hardware..... \$8.95  
 Polished Finish, S. S. Hardware..... \$9.25

**PROTECTS YOUR MOBILE ANTENNA**

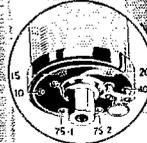
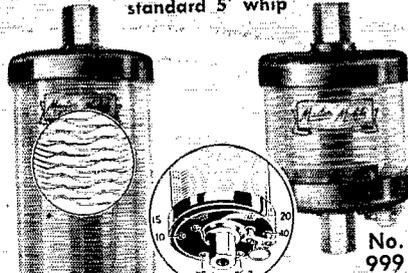
## NEW HEAVY DUTY MOBILE SPRINGS



MMW-7 Cad. plated, black painted ends \$4.50  
 MMW-7HC Heavy Cad. plated—Ex Protection \$5.50  
 MMW-7SS Deluxe Stain. Steel..\$8.95

# NEW MULTI-BAND ANTENNA COILS

New Plug-In type coils for the Ham, designed to operate with a standard 3' base section and standard 5' whip



**YOUR CHOICE METERS \$14.95**

- No. 900 10-15-20-40-75 METERS  
 • Rigidly tested & engineered—found to have "Q" of 525  
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**NEW! SLIM-JIM ALL-BAND BASE LOADING ANTENNA COIL**

96" WHIP

FOR 10, 11, 12, 15, 20, 40, 80 METERS

SIZE 1 3/4" X 19"

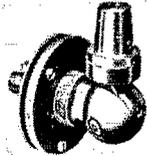
NO. B-1080

Positive action, just slide whip in or out to loading point and lock nut into position.

**\$17.95**

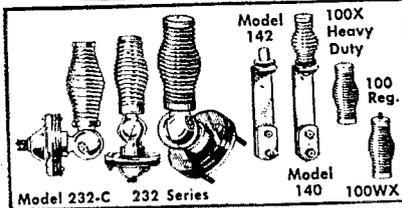
**Leaders in the Design and Manufacturing of Mobile Communication Equipment & Antennas**

**No. 321 BODY MOUNT \$7.95**



**MASTER MATCHER & FIELD STRENGTH METER**  
 6 or 12 volt models **\$24.95**

Automatically tunes the entire band from the drivers seat!



## MASTER-MAGIC WAND

New easy-to-install, single band, top-loaded plastic covered fiber glass mobile antenna provides maximum performance at the most useful radiation frequencies.

- 10 Met-5 Ft.L. \$12.95
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- 20 Met-5 Ft. L. 12.95
- 40 Met-6 Ft. L. 14.95
- 80 Met-6 Ft. L. 14.95
- NEW CITIZENS BAND 27.255 mc . . . \$12.95**

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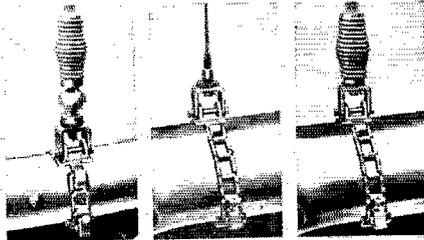
The Feather-Weight Antenna with Spring-Steel Strength!

The completely weather-proof, breakproof antenna with special flexibility that prevents accidental shorting-out against overhead obstructions which sometimes cause loss of signal or serious damage to your equipment.

- FG-60 60" . . \$4.95
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- FG-84 84" . . \$5.15
- FG-96 96" . . \$5.20

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No.444 \$17.80 No.445 \$7.95 No.446 \$13.45

Adjustable to any bumper. No holes to drill, easy to attach. High-polished Chrome Plated. 3/8" - 24 thread, to fit all antennas. Precision engineered.

## SUPER HY-GAIN CITIZEN BAND

Citizen band mobile stacked coaxial antenna provides 5 to 6 DB gain. 42" high from ground plane. Furn. with 12" extension for bumper mount. **\$21.95**

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# Hy-gain Halo

## New VHF Mobile System

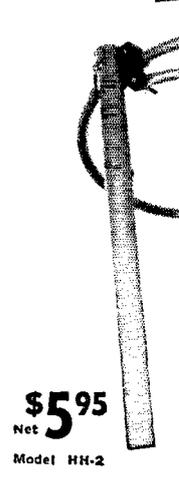
FROM THE "WORLD'S LARGEST" MANUFACTURERS OF AMATEUR COMMUNICATIONS ANTENNAS



**for 6 meters**

High mechanical stability with minimum wind resistance made possible by 1" diameter tubing, heavy duty hardware, and high impact styron insulators. Resonating capacitor completely weather-sealed in polyethylene cover and cap assembly. **THE FIRST ALL-WEATHER PROTECTED HALO.** Perfect match to either 52 or 72 ohm coax made possible through use of hy-gain's exclusive gammamaxial gamma match system. No external matching sections required.

**Net \$12<sup>95</sup>**  
Model HH-6



**for 2 meters**

Extremely small and light weight, weighing less than 1 lb., and only 14" in diameter, the 2M Halo is constructed of high strength heavy wall 1/2" aluminum tubing. Adjustable over the entire 2M Band and providing up to 15 db gain over Vertical Whips when working other stations using horizontally polarized antennas. Perfect match to either 52 or 72 ohm coax made possible through use of hy-gain's exclusive gammamaxial gamma match system. No external matching sections required. Available stacked for additional 3 db gain. Stacking Kit for 2-Meter hy-gain Halo, complete with all hardware and matching sections. (Order two model HH-2 Halos). Model HHS-2 Net 3.00.

**Net \$5<sup>95</sup>**  
Model HH-2



**for 6 & 2 meters**

Unique hy-gain development permits combination of both 6 and 2 meter Halos to form high efficiency Duo-Bander Halo for operating either band with a single feedline and low SWR. Order both HH-2 and HH-6. Come complete with simplified instructions for assembly.

Eight ft. telescoping aluminum mounting mast complete with threaded stud for any standard mobile mount. For use with either 6M or 2M hy gain Halo, stacked or single.

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who devoted so much time. Sorry we don't have HAJ's report handy as we know the v.h.f. boys would like to know more about what's going on. BBO is the new EC for Zone 15. IHN is the new EC for Zone 12. A nice report was received from the EC on Zone 14, BZK, ATS and TTG are liaison to the Weather Bureau. Your SCM should be on the air by the time you read this. Traffic: (Feb.) K0GYA 452, W0FNS 165, Q0C 159, S0AF 153, SYZ 116, K0BIX 67, W0IFR 55, A0J 48, K0KIMZ 47, W0UTO 47, K0RL 44; W0VUI 26, K0JUV 25, J1D 17, W0LEW 16, M0MF 12, W1Z 9, K0HVD 6, W0LEA 6, VRZ 6, FHT 5, K0GIG 5, W0LIX 5, WFD 5, K0EFL 4, W0ASY 1, FHU 1. (Jan.) K0GYA 320, IRL 33, W0ASY 3.

**MISSOURI**-SCM, James W. Hoover, W0GEP-Net reports: MON; 3580 kc. 7 p.m. Mon. through Sat.; 48 sessions; QNI 261, QTC 261, NCSs, OUD 23, RTW 7, KBD 6, ONK 5, ARO 2, MEN; 3885 kc. 6 p.m. Mon., Wed., Fri.; 11 sessions: QNI 423, QTC 140; NCSs, OHC 4, OMM 4, VPQ 2, OVV 1. K0JJP has added voice-control operation. K0OEP has a new 40-ft. tower and beam. K0OJC received WAS and 15-w.p.m. code certificate. WAP has been active on 147.12 Mc. with JUR. K0SGJ lost an eight-element beam to the Feb. 9 wind. New officers of the Aurora Radio Club are K0BVI, pres.; UUG, vice-pres.; K0AJL, secy.; KN0SYN, treas. The Missouri School of Mines Radio Club station, EEE, is on 6 meters regularly. K0JZW has a new HQ-110. IBZ is on 40-meter RTTY after being inactive several years. K0IPL received a Worked All Connecticut Award. MINW, EC, and IGU, RACES RO, offered the services of AREC and RACES after the St. Louis tornado on Feb. 9, but amateur communications were not needed. Amateurs in the St. Louis Area handled numerous welfare inquiries as a result of long-distance lines being tied up. Those reporting include WFF 100, CPI 60, RTW 30, KIK 15, TPB 12 and WLC 10. I wish to express my appreciation to all of the individuals and clubs who have participated in ARRL Communication Department activities since I have been SCM. Your continued activity and support will help the new SCM, BUL, build a stronger organization. Traffic: (Feb.) K0ONK 1020, KBD 612, W0CPI 523, VPQ 327, BVL 193, K0JJP 133, OEP 114, W0WFF 111, OUD 110, OMM 104, RTW 102, KIK 73, K0OJC 73, W0ARO 69, TBI 59, OVV 51, K0LGP 17, W0BUL 16, K0LWX 16, IHY 14, W0KA 9, G0E 8, GBJ 6, K0IFM 5, W0WAP 3, K0SGJ 2. (Jan.) W0VZB 106, K0HIM 72, W0KA 8.

**NEBRASKA**-SCM, Charles E. McNeil, W0EXP-W0 are all sad to hear of the passing of MAO. Jerry was very active in amateur radio and Nebraska net activity and held several ARRL appointments. Jerry was PAM and NC for the Nebraska 75-Meter Emergency Phone Net. The Nebraska Morning Phone Net meets daily on 3980 kc. and K0DGV reports QNI 515 and QTC 134. Those reporting 100 per cent were K0DGV, VXJ and ZJF. There are 36 stations on roll call with K0KJK added. The Western Nebraska Phone Net meets daily on 3850 kc. and NIK reports QNI 604, QTC 58. The Nebraska C.W. Net reports QNI 165, QTC 58. Radio classes sponsored by the Blue Valley Radio Club are going strong with several new Novice tickets. On Feb. 14 the sideband boys from Great Bend and Phillipsburg, Kansas, held a sideband dinner at Phillipsburg which was attended by several of the boys from Western Nebraska. Traffic: W0ZJF 151, K0DGV 71, W0NYU 68, K0BDF 53, LJW 45, W0ZOU 44, NIK 39, K0KUA 36, W0OKO 36, URC 26, K0HKI 16, W0KDW 16, VZJ 12, LJO 11, KLB 8, K0MSS 8, ELQ 7, W0QRR 7, VEA 7, FXJ 6, HTA 6, OCU 6, K0QLN 5, W0LEF 4, K0LXS 4, W0BOQ 3, ZNI 3, K0KJP 2, LLU 2, W0HOP 1, K0RRL 1.

### NEW ENGLAND DIVISION

**CONNECTICUT**-SCM, Victor L. Crawford, W1TYQ-SEC; EOR, RM; KYQ, H.F. PAM; YBH, V.H.F. PAM; FHP, Traffic nets; CPN, Mon.-Sat. 1800, Sun. 1000 on 3880 kc.; CN, daily 1800 and 2130 on 3640 kc.; CVN, Mon., Wed. and Fri. 2030 on 145.98 Mc.; CTN, Sun. 0900 on 3640 kc. KIJAD and AW made BPL. New Officers of the Stratford ARC are ASO, pres.; SBR, vice-pres.; Sam Burke, secy.; ZNU, treas.; TCW, comm. officer. KYQ advises that CN handled 546 messages, including 93 on the second session, during 28 sessions with an average of 10 stations. High QNI goes to KIJAD, RFF and ROX. Retired VV is going on RTTY. KNIGBL passed General Class exam. VXJ is assistant EC for Cheshire. FYF added 8 new countries for a total of 62. BFS has a new Apache. KIACC now has an 81 DX total. KICSY is pleased with his Apache. ZZK is on s.s.b. UCA is building an s.s.b. adapter for his DX-100. YBH reports CPN handled 249 messages during 28 sessions with an average attendance of 27. QNI honors go to FHP, VQH, YBH, 28; DAV, 27; MWB, 26; KIBEN, MDB, 25; TVU, 24; K1AQE, 23. LJL will spend the summer on Ice Island T-3. ZTY is mobile in a new car.

(Continued on page 142)

# Transistor Power Supplies\* and Components

\* Complete Units

## D SERIES (Standard)

Continuous operation at 30 watts. Selective taps at 200, 250 and 300 volts; intermediate voltage at 1/2 selective taps. Both voltages can be drawn simultaneously if total power does not exceed continuous ratings. Positive or negative ground operation. Input and output filtering included except for intermediate tap.

Size: 4 3/4" x 3 1/4" x 1 1/8" Wt.: 10 oz. 6- or 12-V Input: **\$39.95** 24-V Input: **\$61.95**

## DA SERIES

Continuous operation at 45 watts. 450 volts and 225 volts simultaneous if total power does not exceed continuous ratings. Intermittent duty to 90 watts, 450 volts at 150 MA; 225 volts at 100 MA (5 min. on, 20 min. off). Positive or negative ground operation. Input (primary voltage) filtering; partial high voltage filtering provided.

Size: 4 3/4" x 3 1/4" x 1 1/8" Wt.: 14 oz. 12-V Input: **\$57.50** 24-V Input: **\$79.50**



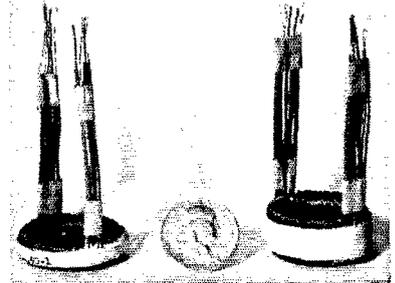
# Toroid Transformers for Transistor Power Supply Application

## H SERIES

- H-6-450-1** Input: 6-VDC. Output: 450-VAC center tapped... 450 and 225 VDC from bridge rectifier... 45 watts.
- H-14-450-12** Input: 12/14-VDC. Output: 450-VAC center tapped... 450 and 225-VDC from bridge rectifier... 55 watts.
- H-28-450-15** Input: 24/28-VDC. Output: 450-VAC center tapped... 450 and 225-VDC from bridge rectifier... 65 watts.
- H-6-100-125-150-D** Input: 6-VDC. Output: Voltage doubler configuration. Secondary tapped for either 100, 125 or 150-VAC. DC Output: 200, 250 or 300-V at 100 MA.
- H-12-100-125-150-D** Input: 12/14-VDC. Output: Voltage doubler configuration. Secondary tapped for either 100, 125 or 150-VAC. DC Output: 200, 250 or 300-V at 125 MA.
- H-24-100-125-150-D** Input: 24/28-VDC. Output: Voltage doubler configuration. Secondary tapped for either 100, 125 or 150-VAC. DC Output: 200, 250 or 300-V at 150 MA.

Without Encapsulation (2 ozs.). 1-10 units: **\$16.00 ea.**

With Encapsulation (3 ozs.). 1-10 units: **\$18.50 ea.**



## HD SERIES — 2000 CPS

- HD-14-225-300-2-D** Input: 12/14-VDC. Output: Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC. DC Output: 450 or 600-V at 200 MA.
- HD-28-225-300-2-D** Input: 24/28-VDC. Output: Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC. DC Output: 450 or 600-V at 200 MA.

Without Encapsulation (3 1/2 ozs.). 1-10 units: **\$18.50 ea.**

With Encapsulation (4 1/2 ozs.). 1-10 units: **\$21.50 ea.**

## HDS SERIES — 2000 CPS

- HDS-14-225-300-3-D** Input: 12/14-VDC. Output: Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC. DC Output: 450 or 600-V at 300 MA.
- HDS-28-225-300-3-D** Input: 24/28-VDC. Output: Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC. DC Output: 450 or 600-V at 300 MA.

Without Encapsulation (3 1/2 ozs.). 1-10 units: **\$21.50 ea.**

With Encapsulation (4 1/2 ozs.). 1-10 units: **\$24.50 ea.**

## 400 CYCLE SERIES

- 14-115-1.5-400** Input: 12/14-VDC. Output: 115-V at 1.5 amp.
  - 24-115-1.5-400** Input: 24/28-VDC. Output: 115-V at 1.5 amp.
- Dim: 3" dia. x 1" thick. Without Encapsulation (12 ozs.).  
With Encapsulation (16 ozs.). Per Unit: **\$76.00.**

Matched Pair HD Transformers:  
12/14-V operation—**\$11.00 per pr.**  
24/28-V operation—**\$21.00 per pr.**

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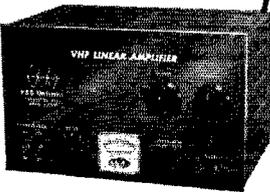
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300 on AM-PM

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- New built-in TR switch uses gain and selectivity of output tuned circuit; has approximately 10 db gain, with one 12BH7A tube.



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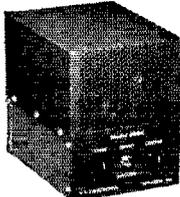
- Built-in heavy-duty power supply furnishes 700 watts; excellent static and dynamic regulation. • Forced-air cooled PL4D21A in class AB2; up to 60% efficient. • 6 db switchable attenuator for AM-PM (tune for max. input and output... just switch in attenuator). • 3-position meter reads: (1) RF drive voltage input (tune exciter for max. input); (2) Final plate current (shows dc input to final); (3) instantaneous RF amps output (tune for max. output into antenna).

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approximately 60 ohms; delivers up to 10 watts RMS output into any low impedance load between 25 and 100 ohms. Powered by separate power supply or in some cases by transmitter or exciter such as 20A or 10B. Requires 300 volts at 100 ma dc, 150 volts negative bias and 6.3 volts at 1.5 amp filament. Size only 5x7x7 inches.

Model 600A Complete, less Power Supply.....\$49.95

Model PR 600A Power Supply for above..... 39.95

Model 600A-PR Complete with Power Supply..... 87.50

**LA-400 Series Linears—75 thru 10 meters**

LA-400-C Kit, complete for assembly.....only \$149.95

LA-400-B, same unit wired and tested..... 199.95

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8020 for 75A-2, -3, -4 Collins receivers.....\$129.95

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**High Power RF Choke—Model 160-6**

Max. rating of 5000 volts dc at 2.5 amps. Inductance 162 uh at 1 kc. Operates on all amateur bands, 160 thru 6 meters. Each.....\$3.50

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BEA, URC, HHU and TCW are mobile on 6 meters. The Stratford ARC holds code classes each Wed. evening. FHP advises CVN handled 41 messages in 12 sessions with a total of 136 stations checking in. High QNI goes to K1BML, K1BMM, FHP, JZA, HJG, 12; K1HMU, 10; PFP, ZUG, 9; FDO, 8. The CQRC handled 8 messages during four sessions with 38 stations checking in. ZLV won a field-strength meter sponsored by Creative Electronics at a CQRC demonstration. URM is on s.s.b. LIG has the bugs out of his DX-100. EWK and ZGE are on with ARC-5s. CHR is back on CN. KKK is building 220-Mc. equipment. GWW joined MARS. SUZ worked HC1FS on 6 meters. IGG has a new NC-109 with converters. K1CKZ built a 12AT7, 5763, 8146 rig for 6 meters. FOM worked QVF and FOR on 220 Mc. with 50 watts and a dipole in his basement. K1AOX is building a 2-meter s.s.b. rig. YOL worked Vermont for No. 21 on 6 meters. K1BGG and K1EKG are on 6 meters. KNIJTU is building a DX-40. E4H has a new Viking Challenger. New appointments are K1BNQ and K1HAIU as OBSs. KN1BNQ and LCG as OOs, K1HMU as OES, TXI as EC. Appointments renewed: K1BEN, FHP, FFP, ZTQ as ECs; K1AQB, K1BML, GIX as OPSs; BDI, FOM, FVV, MWB as OESs; AMJ, DHP, GIX, MWB as OOs; BDI and TD as ORSS; GIX as ORS. Reports received: OES from K1CKZ, FOM, K1AOX, FVV, LGE, YOL; OO from K1CKZ, CDM, GIX, VW, QFD. Traffic: W1EFW 368, KYQ 363, AW 317, YBH 295, TYQ 179, KLJAD 175, W1QJM 144, ROX 142, NJM 112, OBR 107, MWB 81, FHP 77, RFJ 56, BDI 44, FVF 38, K1AQE 36, W1CUH 28, K1ACC 25, W1K1K 23, K1FC 12, W1HJG 12, YBI 12, K1DFH 10, W1EIH 10, K1BFJ 6, W1FPF 6, GIX 6, BFS 5, K1BMM 4, W1RGB 4, K1BML 2, DDY2, W1JZA 2, YOL 2.

**MAINE—Acting SCM, Charles F. Lander, W1QJA—SEC: QJA, PAM: VVA, V.H.F. PAM: JMN, RM: EFR, Traffic nets: The Sea Gull Net meets on 3940 kc. Mon.-Sat. at 1700; The Pine Tree Net on 3596 kc. Mon.-Sat. at 0800. Among those in Florida for the winter as K1GPP and FBI and PTL and his XYL. Also down there are W4BU, K4BL, K1ALQ/4, W1FNT/k and W1LNI, who all call into the "Southern Exposure" of the Barnyard Net regularly. UDD is now Radio Officer for the Portland Area. Mobiles from the Portland Area stand by for emergency use in the hunt for the lost plane in New Hampshire but were not required in the search. K1JWT is a new ham in Livermore. Three lusty cheers for Mary, K1ADY, who received the c.w. certificate as high scorer for New England in the YLAP Contest. K1BAZ is on with a DX-40 when he can get it away from his dad, K1BAY. JHA has had his share of snow and plans to bask in Tampa's tropical wx. EWM now is calling into the PTN. K1ERG is vacationing in Florida. K1BLI is located in the high school lab in the motion picture "Peyton Place." BX, of "underground antenna" fame, has a new one—he is going to work WAM with his v.f.o. The Nasson College Radio Club has purchased a DX-40 kit. Keep tuned, fellows, and we will have some news on coming hamfests next month. Send in your plans for coming events, fellows. Traffic: W1GPY 212, CEV 108, QJA 88, UDD 81, HYD 48, EFR 40, K1GAV 20, BZD 17, BYE 16, W1ISO 12, K1DLP 11, W1OTQ 11, K1JWT 10, W1BX 7, EWM 3.**

**EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP—New appointments: OFK as OPS, K1DIO as OES, Endorsements: IPZ Shirley, HRY Wellesley, BCN Sector 2-C, PSG Gloucester, PYT Ipswich, COL Cambridge, QQL Lynn as ECs; BCN as OBS, MX as OPS; MX and AUQ as ORSs; LGO and THO as OOs; THO as PAM for 6 meters. DDF is on 40-meter phone. INZ has a DX-100 and an SX-71. Heard on 75 meters: AEB, 3W1W/1, K1CSO, QGG, KWW, K1BZE, DOJ and JBV. Heard on 2 meters: BIR, UVC, SIV, LUW, KLQ, COX, ZMJ (has 6N2), KNIJNL, GTX, K1HGW and ADU. LMZ worked 3BYF, his first Aurora QSO on 2 meters. K1GYM has a new Telrex eight-element beam for 2 meters. K1GPH moved to Burlington. BIO had an operation and is coming along fine. ASI is not on the air very much. K1DIO will have a rig on 220 Mc. soon. AWA and K1DGI are home after a trip to W6-Land. IPZ is on 6, 10 and 75 meters. NF worked VK0TF and VPSDN. K1GRP writes about a Cape Cod Novice Net on 3707 kc. Sat. at 1400. The Braintree Club held a meeting and MPT and JOB gave talks. K1BVB has a Ranger and a Gonset III. KNIJNL has a Globe Scout 680-A and an HWR9-A. PSG has a new rig for 2 meters. K1CEH was in the hospital. QXX has a Pan-adaptor. CLS, FOS and IWK are using s.s.s.c. on 6 meters. QRM spoiled a QSO for K1EGP with K1EGP on 6 meters. K1EDV is working on WAS. SBP spoke at the Framingham Club. AUQ is working overtime. WAJ and K2KIR visited ARRL. K1BCL, the Swampscott High School Club, is active on many bands. UNA is the instructor. The North Shore Radio Assn. held an**

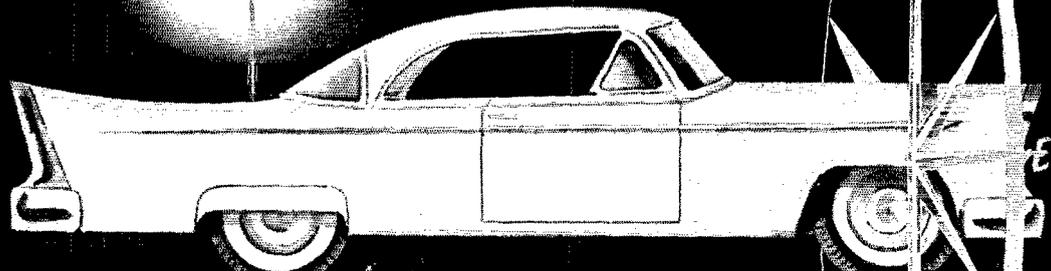
(Continued on page 144)

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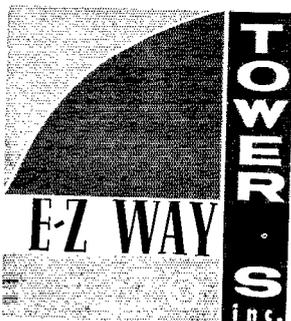
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auction. MFZ spoke at the QRA. The Federation of Eastern Mass. Clubs is going ahead with a hamfest to be held May 17 at the New Ocean House in Swampscott. The South Shore Club had an auction. The Arlington Club is working with police in a "School Patrol!" EZZ is Asst. EC for Beverly. The 1-9 Club met at Harold Baker's QTH. COL is working with the Red Cross setting up a communications system. KBN applied for OBS and OES appointments. OFK has had 200 new contacts on 2 meters since May. KNIGVR moved to California. VUE is back on Beacon Hill, also WDD bought a house up there. New Novices in East Boston: JNJ and JTF. The Cape Cod & Islands ARA has a certificate now for working one or more in each of the 3 counties, by working 100 members. FSG is on 6 meters. New calls on 6 meters: HVU, INH, JEL, KZD, NBN/1, YVT, DWF, EHL, EHF, EPA, ETL, LHV, LZP, NJH, OQQ, SQW, KIs ASH, BHL, CRV, DCJ, DTF, EAQ, GBK, GVO, HMV, HNZ HOA, JNS, BCI, BJH, BKN, BOW, BXR, CNQ, CQX, DOJ, DVJ, GDE, GQN, HGF, HSV, IIN, IKX, IMW, IZM and JDH. HIL has a new Apache transmitter. DBY Chelmsford and HKG Malden were endorsed as ECs. NJL is moving to Waban. DEL writes from aboard the *U.S.S. Cambria*. DFS has appointed NTK as Asst. PAM for 75 meters. These Counties make up this section: Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth and Suffolk. All others are in the Western Massachusetts section. Traffic: (Feb.) KIBYL 504, WINJL 422, EMIG 344, EUT 285, AYA 252, KIGRP 242, CMS 206, DIO 175, WIEAE 175, QPU 171, UKO 167, OFK 94, KIGYM 93, WIUIR 85, KIADH 81, WIHGN 74, LMZ 61, HGO 52, ZSS 42, TY 39, QFO 26, KIGPH 14, WIQOI 13, KYC 12, AKN 11, KIHVS 10, WISV 10, ATX 8, WU 8, ALP 7, KIJNL 6, CFH 4, WIGEK 4, KIZZ 4, WITQO 4, LGO 3, KIUSA 3, WIAHP 2, KIBUF 2, WIDTB 2, IBE 1. (Jan.) KIGYC 33, WILGO 23, KIHVS 10, GPH 5.

**WESTERN MASSACHUSETTS**—SCM, John F. Lindholm, WIDGL—Asst. SCM: Richard J. Kalagher, HKGJ. SEC: BYH. RM: BVR. PAM: MNG. The West Mass. C. W. Net meets on 3560 kc. at 1900 EST Mon. through Sat. The Mass. Phone Net meets daily on 3870 kc. at 1800 EST. The West Mass. Novice and Slow Speed Net meets Tue., Thurs and Sat. on 3744 kc. at 1830 EST. Congratulations to the Podunk Amateur Radio Club on being accepted as an ARRL Affiliated Club. MUN has been endorsed as OO, Class I. The SEC, BYH, requests that all ECs and RO report all AREC/RACES activity in their area to him. K1BOX is building a frequency standard and a kilowatt power supply. AJX still has a 2E26 transmitter on the drawing board but is listening with a new 6-meter converter. BVR sports a new HQ-170 receiver and reports the development of many FB operators on the WMNN. All West Mass. Novices are invited to report in. See listing above. QKC has a new Viking Kilowatt. KGJ has earned an EAN certificate. OT RB has been heard on 20-meter s.s.b. with a new Collins 32S-1. What about the activity of other OTs in the section? TAY has been active with a RACES Net in the Amherst Area. The Montachusett Amateur Radio Club of Fitchburg plans a hidden transmitter hunt this spring. The Mass. Phone Net will miss JSH/1, who has left the section. HNE has a new HQ-160. No less than 44 stations participated in the January V.H.F. Contest from the Springfield Area. Anyone interested in an OES appointment? Traffic: (Feb.) WIBVR 218, KICAU 138, WIKGJ 80, DGL 56, KICSW 28, WITAY 24, DZV 23, AGM 22, AJX 21, DVV 12, DVV 12, BYH 5, ZPB 3. (Jan.) WIDZY 109, BYH 18.

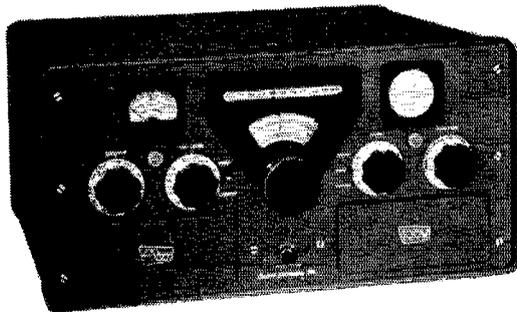
**NEW HAMPSHIRE**—SCM, Robert H. Wright, WIRMH—SEC: BXU. RMs: COC and KIBCS. PAM: IQ. V.H.F. PAM: TA. The GSPN meets at 1900 Mon. through Fri. and at 0900 Sun. on 3842 kc. The NHN meets nightly at 1845 on 3685 kc. The Northeast V.H.F. Net convenes nightly at 1930 on 145.8 Mc. The NH RACES Net meets Sun. at 1300 on 3993 kc. With the deepest regret I report the passing of KIBKE, of Henniker. The GSPN certificate award is now available. For details check into GSPN or contact the net manager, YHF. Several New Hampshire amateurs supplied communications during the search for the missing aircraft containing two doctors in northern N. H. The Manchester Radio Club held a 20th Anniversary Banquet on Feb. 7 with 75 in attendance. PFA reports that the combined Salem, N. H., and Methuen, Mass. C.D. Net meets Mon. at 2000 EST on 51.240 Mc. with PFA as net control. Fourteen stations are now in the net and anyone is welcome to check in. KIBCS relayed the news of a fatal automobile accident in front of his QTH via ham radio to ALJ, who in turn notified State Police by phone when KIBCS was unable to contact the local P.D. HKA has cards for WAC and has worked Wyoming, completing WAS. Traffic: (Feb.) KIBCS 1093, CTF 863, BOO 69, WIYHF 30, MOI 27, IIQ 24, AIJ 10, KICSJ 10, WIDKD 4. (Jan.) WICW 8, IIQ 3.

(Continued on page 146)

# NOW IN FULL PRODUCTION!

**THE REVOLUTIONARY NEW  
CENTRAL ELECTRONICS 100V  
EXCITER-TRANSMITTER**

**BROADBAND! ONLY  
ONE TUNING CONTROL,  
THE VFO ITSELF.**



CENTRAL ELECTRONICS, THE PIONEER OF AMATEUR SSB IS PROUD TO BRING YOU THE FINAL RESULT OF THREE YEARS OF THE KIND OF PATIENT ENGINEERING, TESTING AND IMPROVING THAT MAKES FOR A SUPERIOR PIECE OF ELECTRONIC GEAR.

MANY OF THE TRIED AND TRUE PRINCIPLES AND FEATURES OF THE ORIGINAL MULTIPHASE EXCITERS HAVE BEEN RETAINED IN THE NEW 100V, ALTHOUGH IN VASTLY IMPROVED FORM. THE USE OF PATENTED BROADBAND CIRCUITRY THROUGHOUT PRACTICALLY ELIMINATES "COCK-PIT" TROUBLE.

REGARDLESS OF YOUR PREFERRED MODE OF OPERATION, IT'S ALL IN THE 100V. SSB, DSB, AM, PM, CW AND FSK . . . AND ALL AT THE FLIP OF ONE SWITCH. ALTHOUGH THE 100V WILL PROBABLY FIND ITS GREATEST USE AS A SINGLE SIDEBAND SUPPRESSED CARRIER EXCITER-TRANSMITTER . . . NO ONE HAS BEEN "LEFT OUT IN THE COLD" IN ITS DESIGN. THIS IS THE KIND OF A RIG THAT HAMS DREAM ABOUT!

## CHECK AND COMPARE THESE FEATURES

**STABILITY:** The new patented two tube permeability tuned VFO circuit is exceedingly stable and is immune to the effects of line voltage fluctuations and tube ageing. Built like a battle ship, it is tuned by a husky precision lead screw assembly running in ball bearings. This is a VFO to end all VFO's.

**FREQUENCY COVERAGE:** 80 METERS — 3.5 to 4.5 Mc. 40 METERS — 6.5 to 7.5 Mc. 20 METERS — 13.5 to 14.5 Mc. 15 METERS — 20.5 to 21.5 Mc. 10 METERS — 27.7 to 29.7 Mc. A spare X position provides for the installation of broad-band coils for 160 meters, MARS, etc. OR any 1 Mc. portion of the spectrum between 1.5 Mc. and 25.5 Mc. OR any 2 Mc. portion of the spectrum between 25.5 Mc. and 29.7 Mc. YOU DON'T SETTLE FOR HALF A LOAF OF FREQUENCY COVERAGE WHEN YOU HAVE A 100V!

**THE TUNING DIAL:** Band scales in the large slide rule window change with the band switch and are calibrated at each 100 KC point. Frequency is read directly in 1 KC increments by the circular KC dial without any computation whatever. Approx. 12 feet of bandspeed on each band. A smooth running two-speed tuning knob allows fast tuning at 100 KC per turn and slow tuning at 750 CYCLES per turn. Calibration accuracy is 250 cycles between any two 50 KC points.

**METERING:** Reads POWER INPUT (0-200 watts) RF AMPS OUTPUT, AC LINE VOLTAGE and CARRIER SUPPRESSION IN DB DOWN TO 70 DB.

**MONITORING:** A 2" scope provides an instantaneous visual check on non-linearity resulting from improper loading. Also indicates proper setting of carrier injection for 100% AM modulation. Scope presents trapezoid pattern.

**OTHER INDICATORS:** Below the meter a neon indicator provides a check on the operation of the NEW AUDIO LIMITER CIRCUIT. Below the scope a second neon indicator starts operating if you have the antenna or load mis-matched.

**NEW AUDIO FILTER-LIMITER:** The new filter is composed entirely of R-C components, yet has the steep side response and rejection characteristics of a four toroid tuned filter but without the usual harsh, ringing effects. Bandpass is 200 to 3700 cycles. This filter precedes the phase shift system and will maintain 50 DB SUPPRESSION OF THE UNWANTED SIDEBAND. The new audio limiter maintains audio drive to the balanced modulator WITHIN 1 DB, REGARDLESS OF HOW HARD THE MIKE IS HIT. IT'S IMPOSSIBLE TO OVERDRIVE THE 100V BALANCED MODULATOR! Inverse feedback circuits allow 10 DB OF CLIPPING with negligible distortion.

**NEW PS-2 AUDIO PHASE SHIFT NETWORK:** A twelve cross-over point network is composed of heat-cycled components having .1% accuracy. Even changing the balanced modulator tubes has no effect on its maintaining 50 DB OR BETTER suppression!

**POWER OUTPUT:** The husky, ultra-linear type 6550 tubes in the final of the 100V will deliver 100 WATTS OF SINGLE TONE POWER, EVEN ON TEN METERS! AND WITHOUT GRID CURRENT FLOW. Two tone third order distortion products are down in excess of 40 DB. A new POWER OUTPUT CONTROL eliminates the need for power dividers when driving AB1 or AB2 linears, since power output is continuously variable from 10 watts to full output.

**SET AND FORGET CONTROLS:** These seldom used controls are all located behind the flip down magnetic doors on the front.

**GENERAL CIRCUITRY:** Crystal controlled master SSB generation is at 8 MC. VFO injection is 5 to 6 MC. Crystal controlled heterodyne oscillators operate into mixer stages for various bands. This system, originally developed by C. E. is today the standard of the industry. Blocked grid keying of mixers and final amplifier provides perfect CW and PHONE BREAK-IN.

**PHYSICAL DATA:** Panel is standard 19" width by 8 3/4" high. Finish is smooth grey. Attractive heavy duty rounded corner cabinet is 15" deep, is finished in grey wrinkle and has a latch type access lid. Shipping weight approx. 90 lbs.

MULTIPHASE 100V complete..... Amateur net.....\$595.00

Easily removed from the cabinet for rack mounting.

## COMING UP! MORE SUPERIOR GEAR FROM C. E. THE SSB PIONEER

A NEW COMPANION RECEIVER: Which will TRANSCEIVE THE 100V or separate the two VFO's at the flip of a switch. The 100Y has the interlock control sockets built in.

A NEW 2500L BROADBAND LINEAR AMPLIFIER. Big brother to the famous 600L.

A NEW HETERODYNE CONVERTER: To cover all of the 2 and 6 meter bands with the 100V. Interlock control sockets are in the 100V.

MULTIPHASE  
  
EQUIPMENT

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1247 W. Belmont Ave.

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A subsidiary of Zenith Radio Corp.

WRITE FOR  
LITERATURE ON  
THE COMPLETE  
MULTIPHASE LINE

# QUARTZ CRYSTALS FOR EVERY SERVICE



All crystals made from Grade "A" imported quartz—ground and etched to exact frequencies. Unconditionally guaranteed! Supplied in:

**FT-243 holders**  
Pin spacing 1/2"  
Pin diameter .093

**DC-34 holders**  
Pin spacing 3/4"  
Pin diameter .156

**MC-7 holders**  
Pin spacing 3/4"  
Pin diameter .125

**FT-171 holders**  
Pin spacing 3/4"  
Banana pins

## MADE TO ORDER CRYSTALS

.01% Tolerance.....	<b>\$2.00 ea.</b>
.005% Tolerance.....	<b>\$2.75 ea.</b>
<b>2601 KC to 9000 KC:</b>	
.005% Tolerance.....	<b>\$2.50 ea.</b>
<b>9001 KC to 11,000 KC:</b>	
.005% Tolerance.....	<b>\$3.00 ea.</b>
<i>Specify holder wanted</i>	

## ANY AMATEUR, NOVICE, TECHNICIAN BAND CRYSTALS

.01% Tolerance... **\$1.50 ea.**—80 meters (3701-3749 KC), 40 meters (1752-1798 KC), 15 meters (7034-7082 KC), 6 meters (8335-8550 KC) (within 1 KC).

## FUNDAMENTAL FREQ. SEALED CRYSTALS

- In HC6/U holders
- From 1400 KC to 4000 KC.; .005% Tolerance. **\$.495 ea.**
- From 4000 KC to 15,000 KC any frequency;
- .005% Tolerance..... **\$.350 ea.**

## SEALED OVERTONE CRYSTALS

- Supplied in metal HC6/U holders
- Pin spacing .486, diameter..... .050
- 15 to 30 MC.; .005 Tolerance..... **\$.385 ea.**
- 30 to 45 MC.; .005 Tolerance..... **\$.410 ea.**
- 45 to 60 MC.; .005 Tolerance..... **\$.450 ea.**

- **AIRCRAFT CRYSTALS** in HC6/U holders from 118.1 MC to 123.9 MC..... **\$.385 ea.**
- Pin spacing 1/2"; Pin diameter..... .050

## SUB-MINIATURE AIRCRAFT CRYSTALS ALL FREQUENCIES \$6.75 ea.

- **RADIO CONTROL CRYSTALS IN HC6/U HOLDERS**
- In stock for immediate delivery (frequencies listed in megacycles) sealed crystals 26,975, 27,045, 27,095, 27,145, 27,195, 27,255, tolerance .005% 1/2" pin spacing... specify pin diameter .093 or .050 **\$.295 ea.**

## NEW CITIZEN BAND CLASS D CRYSTALS \$2.95 ea.

- In HC6/U holders 1/2" Pin spacing... .050 Pin Dia.; Tolerance .005%
- Following frequencies in stock (frequencies listed in megacycles) 26,965, 26,975, 26,985, 27,005, 27,015, 27,025, 27,035, 27,055, 27,065, 27,075, 27,085, 27,105, 27,115, 27,125, 27,135, 27,155, 27,165, 27,175, 27,185, 27,205, 27,215, 27,225

FT-241 lattice Crystals in all frequencies from 370 KC to 540 KC (all except 455 KC and 500 KC)..... **50¢ ea.**  
Pin spacing 1/2"; Pin diameter .093  
Matched pairs = 15 cycles **\$2.50 per pair**

200 KC Crystals, **\$2.00 ea.**; 455 KC Crystals, **\$1.50 ea.**; 500 KC Crystals, **\$1.50 ea.**; 100 KC Frequency Standard Crystals in HC6/U holders **\$4.50 ea.**; Socket for FT-243 crystal **15¢ ea.**; Dual socket for FT-243 crystals, **15¢ ea.**; Sockets for MC-7 and FT-171 crystals **25¢ ea.**; Ceramic socket for HC6/U crystals **15¢ ea.**

(Add 5¢ per crystal for postage and handling)

Write for free catalog complete with oscillator circuits

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See big red display... if he doesn't stock them, send us his name and order direct from nearest factory

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All Phones: **Gladstone 3-3555 (River Grove, Ill.)**  
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River Grove, Ill. OR  
Texas Crystals  
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Ft. Myers, Florida

## ATTACH THIS COUPON TO YOUR ORDER FOR SHIPMENT VIA 1ST CLASS MAIL AT NO EXTRA COST

**TERMS:** All items subject to prior sale and change of price without notice. All crystal orders must be accompanied by check, cash or M.O. with **PAYMENT IN FULL**. NO COD'S. Add 5¢ per crystal for postage and handling charge. Q 59

**RHODE ISLAND—SCM, Mrs. June R. Burkett, W1VXC—SEC: PAZ, PAMs: KCS and YRC, RM: BBN.** New appointments this month include OMC as EC of Scituate, VBR as EC of Foster, K1IIT as EC of West Warwick; OMC and VBR as new OPSS. A Section Net certificate has been awarded to RMU. PAZ has been endorsed as SEC. LSP has received his 49th card for WAS. TXL has installed an oscilloscope for monitoring. K1DUY is a new member of the RIN. TGD had perfect attendance in the RIN for February. SMU earned BPL in February. The CRA was represented at the Brotherhood Dinner by POP and K1ABR. Officers of the Lincoln Amateur Radio Association are K1DWY, pres.; KNIGFW, vice-pres.; K1DWH secy.; KNIGGC, treas.; and VZP, KNLJOX, KNIGOV and K1DPR, board of trustees. K1DWH has his General Class license. Several members of the EPARA completed a Red Cross First Aid Course in March. The EPARA was recently approved for affiliation with ARRL. Traffic: (Feb.) W1SMU 569, BBN 76, VBR 61, LSP 23, TXL 16, YRC 13. (Jan.) W1YRC 75, LQJ 33, OMC 27, QR 16.

**VERMONT—SCM, Harry A. Preston, Jr., W1VSA—SEC: EIB, RM: K1BGC, PAM: ZYZ, Asst. PAM: K1GLO.** Traffic nets: VTPN, Sun. 0900, on 3855 kc.; GMIN, Mon.-Sat. 1700 on 3855 kc.; VTN, Mon.-Sat. 1830 on 3520 kc.; VEPN, Sun. eve at 1700 on 3855 kc. New appointments: K1AUE as OES; HFS as EC; K1CEG and K1GFB as OPSS; FPS as ORS. All copies of the excellent *Green Mtn. Signal* were sent out through the efforts of EIB. W1KJG rebuilt three RME LF90s for a special project. EIB will install quad antennas for 20, 15 and 10 meters. K1CEG's mobile is back in business on 10 meters. K1BQB and AD spent many hours at their equipment supplying valuable communication during the search for two doctors in N. H. EXZ completed the 220-Mc. crystal-control converter and also worked HC1FC on 6 meters. To meet the FCC requirement of c.w. operation, check in to the C.W. Net on 3520 kc. Mon.-Sat. at 1830. Two-meter "club savers" are appearing in Middlebury and soon will in Burlington. K2SFF/1, of Panton, is on with an excellent 2-meter signal from Addison County. New amateurs: K1J1YP Burlington, K1CPC Winooski, K1GKL Essex Jct. K1J1YP, K1CPC and W1OJU are brothers. Club meetings: BARC Inc., the last Sat. of each month. Middlebury Mike and Key, the 1st Fri. of each month. Tri-County, the 1st Mon. of each month. Traffic: (Feb.) W1OAK 297, K1BQB 35, W1HRG 29, FPS 24, EIB 22, KFG 22, ELJ 14, UWS 5, K1BOL 4, CEG 4, W1TXY 4, ZJL 1. (Jan.) W1TXY 9.

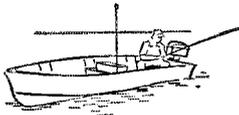
## NORTHWESTERN DIVISION

**ALASKA—SCM, Eugene N. Berato, KL7DZ—The PARKAS, Anchorage YL club, did it again, handling 674 messages in six days during the Annual Fur Rendezvous. K6OWQ is taking the bulk on RTTY. ALZ was relay stations. The club requests that additional stations scattered around the 48 states help out next year. DZ and BVC are en route to EA-Land. AN is pinch-hitting for the SCM. APV now is s.s.b. GJ and BVQ are sporting complete S line. PIV and BHE now are in Burbank, Calif. CDG is back in Anchorage after a long absence. IOD left the 49th state for good. BLL and AUV are vacationing in W6-Land. The C.D. net meets nightly on 145.3 Mc. All KL7s should start thinking about nominations for Alaska Ham of the Year. Send your letter to KL7AA. AYZ forgot to renew his license. CRJ passed the General Class exam. Traffic: KL7ALZ 1303, CUD 674, KG1DT 505, K1MIF 4.**

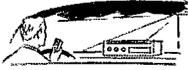
**IDAHO—SCM, Rev. Francis A. Peterson, W7RKI—The W7/K7 QSL Bureau, Box 61, Salem, Ore., reports a lot of QSL cards for Idaho are being burnt because you haven't sent them an envelope. Also other states and countries are requesting Idaho contacts for WAS. Are there any hams in the State still working 20-meter c.w. who would send QSL cards for WAS? Get-well wishes are sent to NTQ, who just got out of the hospital. WNR finally got his home-built s.s.b. transmitter on the air. GGV gave 167 Idaho contacts during the YL/OM Party. She wants to start an Idaho YL net. The Twin Falls Club held a luncheon and auction at its March meeting. The Pocatello Club is buying a member give a short technical talk at each meeting. Pocatello and St. Anthony are starting some a.m. 2-meter activities. FYR has almost finished DXCC. DPD is the first to send in an EC report. Where's yours? Keep up the c.d. work.**

**MONTANA—SCM, Vernon L. Phillips, W7NPV/WX1—SEC: KUH, PAM: FOI, RM: K6J. MPN meets Mon.-Wed.-Fri. at 1800 MST on 3910 kc. MSS meets Tue.-Thurs.-Sat. at 1900 MST on 3530 kc. Governor Aronson signed the amateur license plate bill into law Feb. 27. The Senate vote was 45-1 and the House vote 83-4. FTD was responsible for getting the bill through. CJN was named Station Manager of the Year for North-**

(Continued on page 148)



SPORTING



MOBILE

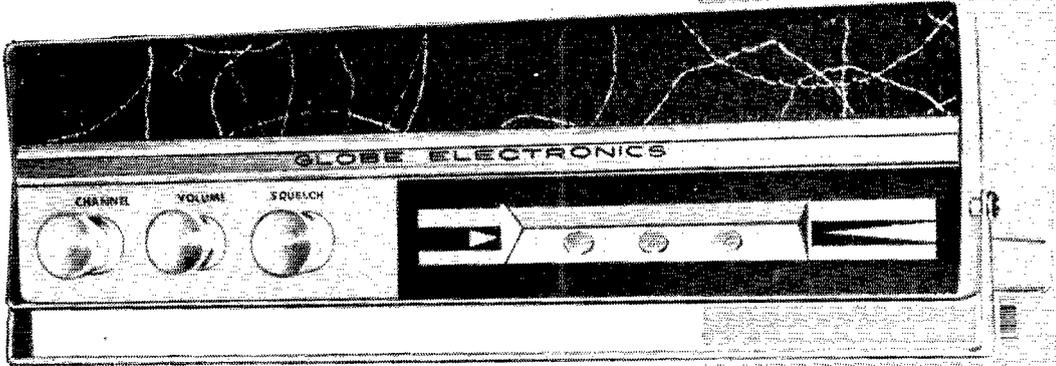
# Announcing

THE NEW GLOBE ELECTRONICS

## Citizen's Broadcaster

COMPLETE 11 METER BAND TRANSCEIVER

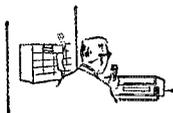
May Be Used by Anyone!  
NO EXAMINATION REQUIRED



IN THE FIELD



IN THE HOME



FOR OFFICE OR INDUSTRY

COMPLETE WITH CRYSTALS  
FOR ONE CHANNEL AND  
PUSH-TO-TALK MICROPHONE

**\$129<sup>95</sup>**

### ★ Features of the New Citizen's Broadcaster

- ★ Universal operation. One unit works on 115V AC or 12V mobile. Operates in Home, Office, Car or Field. No tests or examinations required.\* Any citizen over 18 years of age may use any of the FCC-assigned 22 channels in the 27mc range (11 meters) for transmitting and receiving.
- ★ EXCLUSIVE! Channel switch allows choice of three channels for operation. Receiver and broadcaster units are tuned to same channel simultaneously.
- ★ Operation extremely easy; only three controls; Channel, Squelch and On/Off/Volume. Squelch control subdues background noise for muted standby operation. Offers push-to-talk operation for instantaneous transmission or reception.
- ★ 10Tube Receiver/Transmitter is crystal controlled for stable operation. With proper crystals, all channels are covered. Tested pairs available for any channel.
- ★ Power Input: — 5 watts. AM modulated. Compact: — only 3½x13x10½". Light weight, 9 lbs. Meets all FCC requirements.
- ★ Modern "living room" design. Carrying handle also acts as tilt stand for fixed operation or mounting bracket for permanent installation, making the Broadcaster extremely versatile.

\*Simply fill out FCC Form 505-D

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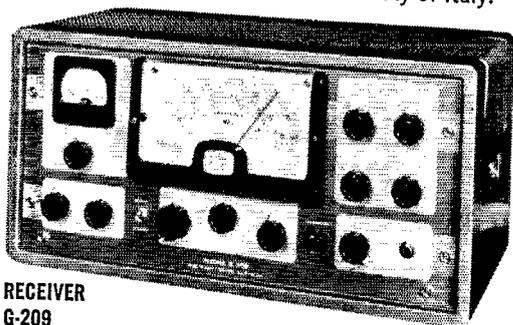
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## DESIGNED

by John Geloso, a pioneer ham gear designer — now Europe's largest manufacturer of amateur equipment.

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yes, each custom-built instrument personally tested and approved by Geloso engineer Pippo Fontana, (IAAY) President of ARI, the ham society of Italy.



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G-209

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internationally for its rugged chassis design, superior quality construction, substantially lower cost.

- Double-conversion superhet
  - 10 thru 80 meters
- Easy S. S. B. selection
- Accurate stable tuning
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west Airlines and won an all-expense-paid trip for two to the Hawaiian Islands. DXM is the Chief Queen Groundhog for 1960. K7BFJ was Kampus Kutie at EMICOE for February. AU is in FAA School at Oklahoma City. New officers of the Butte Radio Club are KLB, pres.; CJN, vice-pres.; K7EGO, treas.; and KNTEGE, secy. The Central Montana Hamfest will be held in Lewistown June 6 and 7. The Ham Picnic at Malta will be held June 21. The Silver Jubilee of the Glacier-Waterton International Peace Park Hamfest will be held July 18 and 19 at Apgar. Recent appointment: K7AWD as OBS. Traffic: K7EWZ 127; W7YHS 119, K7AEZ 68, BYC 35, CFA 33, DVZ 12, W7TNJ 11, DWJ 10, K7BKH 8, W7TPE 8, K7CTI 7, W7CQC 6, NPV 6, YQZ 5, DJL 4, TGM 4, MQI 3, OLP 3, DKF 2, YUB 2.

**OREGON**—SCM, Hubert R. McNally, W7JDX—The XYL of RCL passed the General Class exam and is now K7BII. DEM and K7CNZ are busy ragchewing these days. DIC has been going to Portland lately and we all hope the doctor will get Bessie back to normal soon. Old sign painter MW is trying to get on 2 meters without interference. EZH has a nice outfit and has been doing some 10-meter DX. EPA is busy on 6 meters but is working on gear for 420 Mc. also. The OSN had another good month in February with new stations checking in. AJN, as RM, still is on the lookout for some c.w. operators to fill out the net. AZZ, ZB and BDU made BPL. Nice reporting letters were received from YSL and EZH. Wish more of the gang would send letters to the SCM telling about themselves and their stations. The Columbia River V.L.F. Society now is incorporated. Activity is on 6 meters with several nets and the club handles traffic for the local Sea Scouts. According to GLZ the membership is about 125. A fine report from SAR tells all about the rescue traffic handled some time ago for the CAA when a plane with 3 people was lost in the Cascade Mountains. The net formed had K7ALA as NC and those on the net were TMF, UFU, BXU, SAN, TGR, UFB, FVF, FSU, EXB, SPB, BSY, POJ, VWG, TAZ, WEP, NES, IBP, LHW, CTQ, MW, CSO, GUE, ADW, ADX, UBN, ISO, BLN, ZKH, K7s, GLQ, ADW, DAIL, BKU, AJB and ADX. Traffic: W7ZB, 642, BDU 532, ZEH 116, K9CLL 63, W7RVN 443, AJN 27, BVH 28, K7CNZ 25, W7LT 24, OMO 24, DIC 21, K7CNZ 15, W7DEM 8, GNC 4, AFW 4, RCL 3.

**WASHINGTON**—SCM, Robert B. Thurston, W7PGY —The VARC, Inc., of Puyallup held its annual banquet Feb. 21, with PGY as guest speaker. New club officers are ISM, pres.; OIV, vice-pres.; IYU, secy.; PA, treas.; DNU, sgt. at arms. A new General Class licensee in the Puyallup Area is K7CZA. MCU now is chief operator at KW6CGA. QJC is working portable KG-6. HZ was awarded a life membership in the VARC. OIV is the proud possessor of a new rotary. CPJ has a new Apache transmitter. The Pierce County RACES Net meets every Sun. at 2000 PST on 29.51 Mc. and averages about fifteen check-ins each session. REC is net control of WARTS each Thurs. QLH still is working on a 2-meter converter. AIB is back from a trip to Virginia and Florida. WNTUR is awaiting the new General Class ticket. The Bremerton Amateur Radio Club is sponsoring a new certificate for working all Washington counties. All Wenatchee mobiles use 3980 kc. and also use the same for mobile support for the county c.d. net. HCJ is busy with plans for the Annual Membership Banquet in Spokane. CWN has the new 10-meter beam up. GFM has the new tower and quad beam up. EMX is working on a new amplifier for 6 meters. K7AVH received his General Class license. KN7DFM received his Technician Class license. DPW is working on c.w. break-in. The Bremerton Hamfest will be held May 1 in Bremerton, Wash. USL and EQU are instructors of the code classes sponsored by the Spokane Radio Club each Fri. 7-9 p.m. CWC is new in the Washington section. OIV is a new OPS in Puyallup. RGL is a new OQ and renewed his OBS certificate. CCB joined the ranks of Silent Keys. CAM has a new tower up and a new Tribander is going up soon. PGY is NCS of RN7 Wed. nights, 3575 kc. QPX is coming back from the Philippines in May. PA is active again on 80-meter c.w. IST works 10-meter phone. GSP is working on a new cubical quad for 10-15-20 meters. The Washington State Net (WSN) held 20 sessions with 186 QNI for February. WAH is attending Pacific Lutheran College. The West Seattle Amateur Radio Club is holding a membership drive which will run until June 15, 1959. LCS has a new DX-100. CO received a certificate for 40 w.p.m. from MARS. All active clubs in the State who do not have an active EC are requested to appoint one and notify the SCM. The Annual Washington Amateur Radio Traffic System (WARTS) Picnic will be held in July. Keep an open date and listen for the time and date on 3970 kc. APS made BPL on delivery and originations. Traffic: W7BA 1759, PGY 717, QLH 43, DZX 423, APS 213, DPW 171, IFU

(Continued on page 160)

# "HAM-M" ROTOR by CDR

Thousands in use

## COMPLETE PACKAGED SYSTEM.

Nothing else to buy. Can be installed atop *any* tower, and inside most towers.

## EXTREMELY RUGGED.

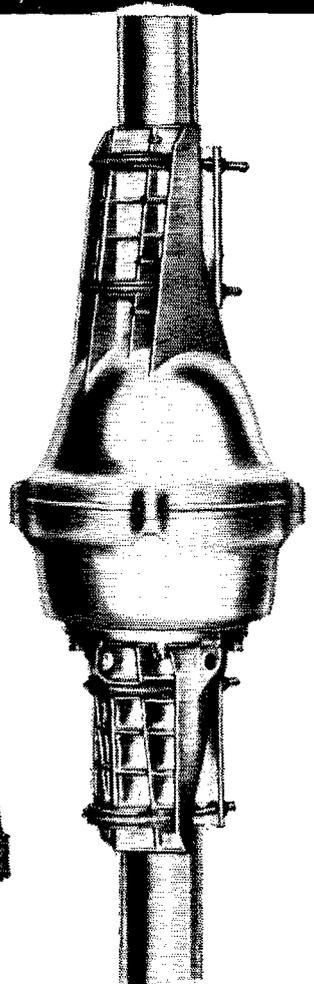
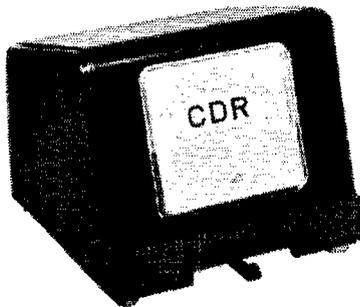
Extra heavy-duty. Thousands of "Ham-M" rotors are now in operation in every kind of climate, rotating every conceivable antenna combination. "Ham-M" is wind-proof, ice-proof, moisture-proof! Won't drift. Provides 3500 in.-lb. resistance to lateral thrust.

## FIELD KITS FOR EASY INSTALLATION.

North-Center Meter Scale kit. Base plate for internal tower mounts. Anti-meter flutter kit. Mounts on shaft or flat on plate in 30 minutes.

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JEWELRY FREE! Hand-  
some rhodium-finish tie-  
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purchase of the "HAM-M."  
Both bear amateur radio  
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for only \$3.60 (tax in-  
cluded), a \$7.20 value for  
half price. See your CDR  
distributor for details.

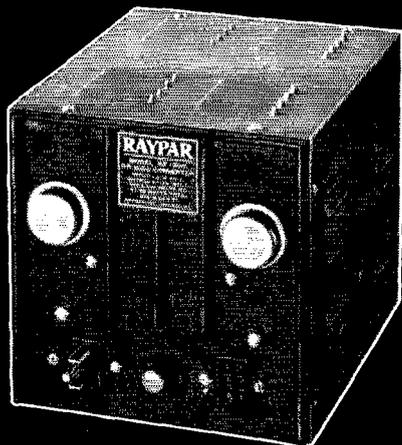
# CDR

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**CONVERTS 12-14 VOLTS DC TO  
450 & 225 VOLTS DC AT 90 WATTS  
FOR MOBILE/PORTABLE APPLICATIONS**

- Heavy cast aluminum heat sink for low (20° F) temperature rise.
- Works in environmental temperatures up to 158° F.
- 88% over-all efficiency.
- Contains remote-control relay.
- Protective input and output connectors supplied.
- Includes RF "hash" filter.
- One-hole mounting hardware provided.
- Over-all size, 6" H., 5 3/4" W., 7 3/8" D.

Model RP-800 Power Supply, \$68.75 User's Net  
Request Descriptive Bulletin RP159-10

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44, HUT 43, AMC 42, EHH 33, OEB 27, EKT 20, K7CHP 17, WKZ 17, UWV 17, LFA 12, REC 12, USO 12, K7ETP 9, W7FRU 8, EMX 7, EVW 7, GFM 5, K7CKK 4, W7CWN 3, JEY 1.

## PACIFIC DIVISION

**HAWAII**—SCM. Samuel H. Lewbel, KH6AED—The following was sent in by Asst. SCM, George R. Crisp, KG6AHY: KH6FAE is holding down the Air Force end of Guam and continuing its five-year sked with W6KCK4. This station is open to skeds on 10, 15 or 20 meters and is looking for RTTY skeds. WTTUX is operating KG6KFAE while rebuilding his station for s.s.b. K5MSA will be on s.s.b. soon with 500 watts and a 20A exciter. KH6AHX is always ready for a ragchew on s.s.b. with 600 watts, KG6AHJ also is s.s.b. with 150 watts, KG6ACG is now KG6AFA. KH6AIH, ex-KH6CIM, is now on with a new HT-32 and triband beam. KH6CEG/KG8 is on 6 meters and has a 1200-Mc. rig under construction. KG6AE is back on after an overhaul. KG6AHF is down but should be on soon. K4KOQ/KG8 has come up with a Heath DX-100. Look toward Florida for future QSOs with him. W8JWU/KG8, one of many Guam stations active in the Pacific Net, is running 200 watts with an ART-13 on 10 and 20 meters. Club station KG6NAC is back on with a Globe King and an SX-100. Mike Qureton and Frank Laird have passed the Novice exams. Assistant SCM KG6AHY invites comments or reports from this area. Contact him via KG6FAE or mail a letter to Box 145, Agana, Guam.

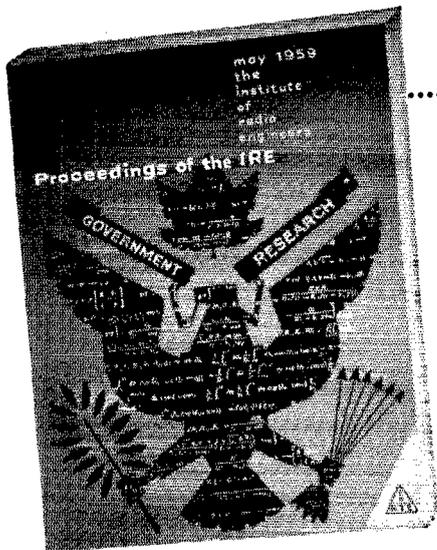
**NEVADA**—SCM. Charles A. Rhines, W7VIU—MAH reports 6 meters is pretty dead. The Reno Two-Meter Net has about ten members now. AZF is QRL school most of the time. VIU still is handling traffic on NVN, RN6, PAN and TCC. QYK has gone s.s.b. with a 20A. UPS broke down and got the 32S1-75S1 layout. KOI has voice control on his Viking II. IWT, BJY and lately K6EE/7 are faithful check-ins on NVN at 1700 PST on Mon.-Wed.-Thurs. on 7106 kc. The net needs coverage in the Reno, Las Vegas-Boulder City, Winnemucca and Ely Areas to be really successful. How about it, some of you guys? K7AIA has gone s.s.b. with a BC-458. I can't write the news if you boys don't send me any. Traffic: W7VIU 243, IWT 9.

**SANTA CLARA VALLEY**—SCM. W. Conley Smith, K6DYX—Asst. SCM; Frank J. Paerter W6VMY, PAM; W6ZLO. RMs: K6EWW and W6PLG. Many clubs and groups are making plans for Field Day. K6JJU is in charge of SCARS preparations. W6DEF is planning an effective mobile lineup. The West Valley ARC was visited by W6HC and your SCM at its Mar 3 meeting. K6DYX gave a talk on the ARRL field organization. Besides Field Day plans the WVARC is busy organizing the Pacific Division Convention jointly with the SCCARA. K6MPX proxy of West Valley, promises a real hang-up affair and judging from the enthusiasm of this newly-affiliated club it will be one. Recent appointments: K6VQK as OO and OPS; W6CGQ as OPS; K6SRG as OO; W6TFH as OO; W6ASH as ORS. W6OII complains about the scarcity of stations in the Phone CD Party. W6OWP completed a new hand-pass coupler. W6YBV is working on a 4D21 amplifier for his signal shifter. W6RSY uses a coiled Windom just 73 inches long! K6GID has the RTTY receiver completed. W8MMG reports the North Peninsula Electronics Club (NPEC) is trying to get going again. W6QIE has an "Explorer" electronics post. W6ZLO is recovering from the same kind of eye trouble that plagued Bob Hope. W6CLT will have his third WAS soon. W6BPT resigned as director of Pacific TCC. "Not mad, just tired." W6PLG is trying to plan PAN operations for the summer to please everyone. Traffic: (Feb.) K6DYX 645, K6GZ 120, K6HGV/6 119, W6QMO 102, K6GID 98, W6YBV 92, W6HC 83, W6AIT 74, W6ZLO 50, W6DEF 45, K6YKG 36, W6FON 18, W6OII 18, W6BPT 2. (Jan.) W6OWP 4.

**EAST BAY**—SCM. B. W. Southwell, W6OJW—Asst. SCM; Mary E. Lorenz, W6PJR, SEC; W6CAN, ECs; W6LGV, W6ZFF, W6IUZ, K6EDN, K6JNW and K6ZQG. W6AL, W6VJN, K6IGV and W6NZ attended the S.S.B. Convention in Santa Barbara. K6QHC is QRT the U. S. Navy. W6EY is alternate Radio Officer for Oakland C.D. RACFS. The CCRC held its February meeting at the Richmond ARC. The EBRC heard W6PYM speak on 144-Mc. teletype at its February meeting. W6DKE is now KH6DDA and is looking for the Hayward gang on 15 meters. W6CQP is a new member of the HARC. K6SWY is ready to roll on s.s.b. The HARC heard an FB talk on relays and their applications by Jack Pitts. W6CQK, W6ICU rejoined the MDARC after a long absence. K6YLL is building a new rig. K6RPZ is busy on phone. K6ZBL is a new OBS. W6ASJ resigned as OBS. Charles has been putting out bulletins on 2-meter RTTY regularly. W6WFR is on with an ARC-5. W6LGV is the new president of the Central California Radio Council. W6AGA is working with K6ILH at the sheriff's office.

(Continued on page 152)

# IRE Salutes Government Research



PARTIAL CONTENTS OF THIS GOVERNMENT RESEARCH ISSUE:

- "The Basis of Our Measuring System" by A. G. McNish, National Bureau of Standards
- "The DOFL Microelectronics Program" by T. A. Pruge, J. R. Nall & N. J. Doctor, Diamond Ordnance Fuze Labs.
- "VLF Propagation Measurements for the Radux-Omega Navigation System" by C. J. Casselman, D. P. Heritage & M. L. Tibbals, U. S. Naval Electronics Lab.
- "Submarine Communication Antenna Systems" by R. W. Turner, U. S. Naval Underwater Sound Lab.
- "Some Characteristics of Persistent VHF Radio Wave Field Strengths Far Beyond the Radio Horizon" by L. A. Ames, E. J. Martin & T. F. Rogers, Air Force Cambridge Research Center
- "Phenomena of Scintillation Noise in Radar Tracking Systems" by J. H. Dunn, D. D. Howard & A. M. King, U. S. Naval Research Lab.
- "On Models of the Atmospheric Radio Refractive Index" by B. R. Bean & G. D. Thayer, National Bureau of Standards
- "Image Intensifiers and Image Converters for Military and Scientific Use" by M. W. Klein, Engineering Res. & Dev. Labs.
- "A Light-Weight and Self-Contained Airborne Navigational System" by Staff, Defense Research Board, Canada
- "The CAA Doppler Omnirange" by S. R. Anderson & R. B. Flint, U. S. Dept. of Commerce
- "Pulsed Analog Computer for Simulation of Aircraft" by A. W. Herzog, U. S. Naval Training Device Center
- "Progress and Problems in Army Communications" by R. E. Lacy, U. S. Army Signal Res. & Dev. Labs.
- "The Engineering of Communication Systems for Low Radio Frequencies" by J. S. Belrose, W. A. Hatton, C. A. McKerrow & R. S. Thain, Defense Research Board, Canada
- "Numerical Approach to Electronic Reliability" by J. J. Naresky, Rome Air Development Center

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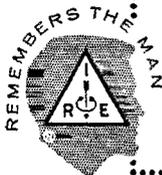
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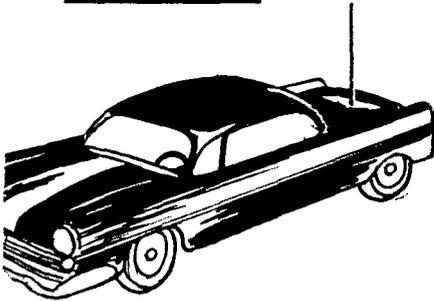
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Amateur net



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W6IDY is celebrating 26 years in ham radio. W6CBF is policing bands as an OO. W6DJD is moving to the San Francisco section. That's all the dope for this month, gang. Your report of station activities and traffic is needed for this column. Please mail a Form 1 report card to ye SCM on the last day of each month. Remember, this is your column; I only write it. Traffic: K6GK 349, W6DMW 101, W6JOH 87.

**SAN FRANCISCO**—SCM, Fred H. Laubscher, W6OPL—Want to thank our Asst. SCM, Ed Olmstead, K6LCF, for the PB job he did on last month's report. It is good news for all of us to learn that the San Francisco Naval Shipyard Club and the HAMS Club are holding regular combined meetings at Red Cross Headquarters. TBF is leaving Hamilton AFB for McKinley AFB at Klamath Falls, Ore. ZUB is taking over the MARS V.H.F. Net. ZAU is on 20 meters with a new KWM-1. FFT and YME are all set up with new emergency generators. EQA is joining GQA's MARS Net to bug the net control station. Our ever faithful AI, of GQA fame, always comes through with an interesting station activity card. EKC, up Fortuna way, reports that the radio club is starting to make its plans for Field Day. SLX of Eureka, reports a new call in that city. WA6DFA, and one changing the Novice call, WV6BPS to WA6BPS. Many happy years of hamming to you both. YOM still is in there pitching on NCN 7 and 10 p.m. on 3635 kc. Bud also tells us that the Fortuna Union High School has a new club call, K6UQI, and that the Far West RC had a visitor, K4SKH. K6BAQ, "the Voice of the Tibouron Peninsula" is now the editor of QSA-6, the official publication of the Marin Amateur Radio Club. All are invited to attend the Tamalpais Amateur Radio Club the 3rd Fri. at 8 p.m. at 1086 Machin St., Novato. Recently John Reinartz gave one of his most interesting talks at the San Francisco Radio Club. We all enjoy your talks, John. We hope by the time this goes to press WV6CVJ will have recovered completely from surgery. At this writing we can't give you too much information on K6UDT except that her visit from the stork might turn out to be a "double feature." Our ORS and Asst. Dir., W6GQY, is really back in business again. Joe has been active on RN-6, PAN, TCRN and RN-7. It's always nice to hear from you, Joe. By the way, this GQY fellow turned in a traffic report of 977. Thanks a lot for all the reports, gang. See you next month. If we can be of service please drop us a line. See address page 6, Q87. Traffic: (Feb.) W6GQY 977, W6YOM 116, K6BAQ 5. (Jan.) W6GQY 533.

**SACRAMENTO VALLEY**—SCM, Jon J. O'Brien, W6GDO—Asst. SCM: William Van de Kamp, W6CKV, SEC: W6SLR, RM: W6CMA, PAMS: W6ESZ, W6JDN and W6PIV. OOs: W6WLI, K6ERT, W6RPT and W6SXX. OPSs: W6HSB, W6HTS, W6MWR, W6PIV, W6SXI and K6IXU. OPSs: W6HSB, W6OJB, W6PIV, W6QAC and K6QKB. OBSS: W6AF, W6GGW, W6HX, W6MWR, W6SBH, K6CFF, W6RPT, W6YOU and W6YBV. ORSs: W6CMA, K6GL, W6ORT, W6SXA and W6YBV. Our thanks to K6CFF for a job well done as SCM. W6YRK, W6GGC, W6LOE, W6LZM, W6HST, W6MST, W6WYO, W6HIW, W6WWW, W6ULO, W6NVQ, W6QDM, W6AD, W6JEQ, K6HQ, W6AUC, W6RHG, W6OHG, W6LFZ, W6RHD, W6SBL and W6SEA operated radio gear at the 1959 Winter Olympic Trials held at Squaw Valley. W6JEQ was chairman. W6GDO, W7KME, W6OJB, W6PIV, W6QAC and K6OCY met at the QTH of W6OJB with San Francisco Area v.h.f.ers. The GEARS is saving coffee-can wind-up bands towards a coffee maker. K6GPE, W6HOI, W6PWH, W6ESZ, W6GGW are now on 2 meters. Civil defense now has a radio operating room at the Mt. Shasta Ski Lodge. Sincere condolences to W6AF, who lost his son in an auto mishap. Members of the CHURPS YL Club sent certificates to stations worked commemorating the Sacramento Camellia Festival. W6JDN and W7LKA are now on s.s.b. W6MLN and K6HTZ are exploring 220 Mc. W6CMA is looking for CCDN operators (2000 PST M-F 3501 kc.) W6OPY took a vacation in Mexico. W5SRN is now W6CXD. W6YLQ is active on 6 and 2 meters from Chico. K6CFF has a new tower and beam. W6ZF is working on a frequency counter. WV6DQI is on 7160 kc. K6SXX hears UAØ on 80 meters. W6OJB worked Mt. Shasta on 2 meters. K6YBV made BPL again. W6FKI is now mobile. W6SXI worked new ones in the Phone DX Contest. WA6DBM is conducting radio classes. Traffic: K6YBV 610, W6CMA 108, K6SXX 15, W6ZF 13.

**SAN JOAQUIN VALLEY**—SCM, Ralph Saroyan, W6JPU—K6TNZ got the coveted Boner Trophy sponsored by the Stockton Radio Club. W6LOS is playing around with a Model 26A teletype. W6PPO is back on 15 meters working DX like mad. W6FXV is running a pair of 811s in GG on 75-meter s.s.b. K6HTM is having gremlin troubles with his crystal filter s.s.b. exciter. W6QOS is back on 75 meter mobile. K6LKI is working DX on 15 meters with his "S" line. W6SJS is cleaning house.

(Continued on page 154)

# PENTA BEAM PENTODES

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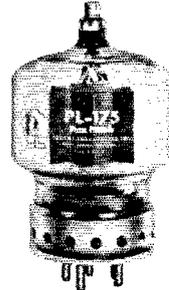
PL-172



PL-177A



PL-6549



PL-175

Here are four tubes for linear amplifier service—higher power output at lower plate voltages with minimum distortion. The PL-6549 and its zero-suppressor-voltage version, the PL-177A, are for 50- to 200-watt peak output service. The PL-172, a 1000-watt type, features the exclusive Penta vane-type suppressor grid which makes possible extra efficiency and linearity. The new PL-175, a 400-watt tube, also has the vane-type suppressor grid, and gives 25 to 30 per cent more output in Class AB<sub>1</sub> linear amplifiers than tetrodes with similar ratings.



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Type	FILAMENT		Max. Plate Dissipation (Watts)	USEFUL OUTPUT* CLASS AB <sub>1</sub> LINEAR AMPLIFIER Plate voltage in volts				
	Voltage (Volts)	Current (Amps)		1000	1500	2000	2500	3000
PL-6549	6.0	3.3	75	96W	140W	210W	—	—
PL-177A	6.0	3.3	75	96W	140W	210W	—	—
PL-175	5.0	14.5	400	—	—	470W	605W	710W
PL-172	6.0	7.8	1000	—	—	1020W	1280W	1540W

\* Actual power output delivered to load from typical amplifier.

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## A word from Ward . . .



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A friend of mine—a much brighter scholar than I am—told me that Latin phrase, "Caveat Emptor!" had its inception at a Thieves' Market which flourished in ancient Rome many years ago. "Caveat Emptor!" means simply, "May the buyer beware!"

What a wealth of shady practices that slogan brings to mind! I can almost see a fly-by-night operator, with a name like Polonius Maximus, conning a customer in fast-talking Latin. "Oh, worthy friend," says Polonius, "look at this genuine, super de luxe, guaranteed Arabian camel! Look at its teeth! By the brow of Jupiter, I swear this noble beast was last owned by a kindly old lady in Passadenium—and isn't even broken in yet!" Naturally, the noble beast dropped dead at the city gates.

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WJH

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K6VAZ is working as a guard at San Quentin. K6ZPZ has a kw. on 75-meter phone. K6RUQ is on 6 meters with a new rig. K6RBB and K6LNZ are editors of the Stockton Radio Club paper, *Flysheet*. W6RRM and K6AXV have designed some new gear for 6 meters. W6FBT, K6MLU, K6APE, W6OPP, K6DXU and K6SWR helped with communications for the Boy Scout Parade in Bakersfield. All amateurs in Tulara County and surrounding areas are invited to check into TCN at 1000 Sun. mornings. W6SUV is heard back on 75-meter mobile. W6NKZ started a filter s.s.h. exciter for 75 and 20 meters. The Fresno County RACES plan has been approved and K6BGO is looking for any or all to sign up in RACES. It is wise to support all c.d. nets and check into them regularly. Contact your respective Radio Officer and sign up in RACES. Remember, during a real emergency only operators who have signed up will be allowed to operate on RACES frequencies. Traffic: (Feb.) W6NQM 93, W6ADB 76, K6EJT 74, W6ARE 5, K6SWR 5, K6SNA 2. (Jan.) K6EJT 399.

## ROANOKE DIVISION

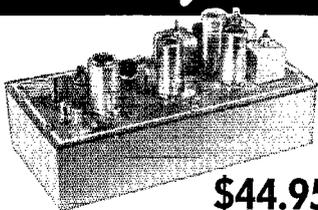
**NORTH CAROLINA**—SCM, B. Riley Fowler, W4RRH—SEC: HUL. PAM: DRC. V.H.F. PAM: ACY. BAW, who has devoted much time to the North Carolina Net (c.w.) on 3509.5 kc., informs me that PNM is now net manager. How about one of you fellows who meet the net accepting an appointment as Route Manager and seeing to it that we have at least one operator in the Fourth Regional Net each evening? All reports attendance is very irregular, but the following report into the NCN each evening at 7 p.m.: K4AAV, BFQ, K4BNP, AJT, K4MSM, ROB, SOT, FDV, K4EIB, PNM, BCE, BAW and K4WCZ, Ft. Jackson, S. C. I know there are many who work c.w. all the time in the State. How about you guys getting on 3509.5 kc. each evening at 7. It surely would be appreciated by the Net and Ye SCM. Two-meter activity is on the increase each month. Fellows, that is the medium we need in the AREC-RACES areas. If you don't believe it will work, just you give it a try. Everywhere it is used the operators are delighted with the results. You won't need power to work several counties. Seven watts is ample. Search the surplus market for equipment such as the 522, ARC-1 and T-23. Crystal control both the receiver and transmitter. If you are interested in longer contacts, build yourself a converter and a 50-watt transmitter. ZVF has a ham's dream for a shack. Traffic: W4GXR 530, WE 25, BAW 12.

**SOUTH CAROLINA**—SCM, Dr. J. O. Dunlap, W4GQV—SEC: K4PJE. RM: K4AVV. PAM: K4IE. Our thanks to YOS for serving as PAM for the last year and we are sorry that he had to resign because of the pressure of duties at Clemson. The Palmetto RC elected K4DWE, secy.; and DNR, treas. K4WCZ handled 1796 messages in February. K4ANY worked long and hard in the contest and deserves to win. TWV is in the hospital and sorely missed on the S.S.B. Net. This net had 530 participants in February. New officers of the Rock Hill RC are VEP, pres.; HPV, vice-pres.; K4DFM, treas.; OLD, secy.; Cliff Wylie, property officer. K4HDX is net manager of the Piedmont Local Area Net on 6 meters and edits PL4N, an excellent bulletin. The Spartanburg "Ragchewers" Net, on 3940 kc., held 20 sessions in February. SV6WB (W4SSG) is active on 10, 15 and 20 meters and looking for South Carolina contacts. The Mar. 8 RACES meeting in Aiken was well attended and interesting, thanks to ZRH, K4AI, regional and state c.d. officials, and the Aiken RC. The M.C. was SEC K4PJE, who also was appointed as a c.d. coordinator. Traffic: (Feb.) K4CWZ 1796, GAT 511, W4AKC 237, K4AVU 90, W4PED 87, K4BVX 79, HQK 60, PTA 53, BLF 51, W4DAW 51, CHD 48, CJD 36, K4HJK 32, IVI 22, W4KVF 20, K4LNI 17, IIE 13, W4CNZ 12, BHR 10, HDR 4. (Jan.) W4PED 48.

**VIRGINIA**—SCM, John Carl Morgan, W4KX—There were eight BPLers in February, including OM/YF K4QES/QER, with the former also garnering Africa for WAS on 80 meters. OOL, ATQ, UGX and K4ZJJ gave a demonstration to the high school science class. K4ASU is off on what should be his last Navy cruise before retiring. He plans to be on from 3A2 and SV6 on 14,053-ke. c.w. and 29,120-ke. phone answering calls 10 kc. lower. K4AET's son W3DAD, now FT2US, headed back for Baltimore and college. Welcome to Virginia to EEU, ex-1JZQ, and 3MGL/4, both in Norfolk. K4MJZ is settled in the new Falls Church QTH and says the entire house is devoted to ham radio. K4HTA is hunting a new QTH to cease cliff-dwelling. K4VKE reports that K8NVR joined the operator crew at PFC, the Quantico Marine Corps School's station. APM anticipates a new rig for his 21st birthday. PVA still is grinding at night school and suggests that hams passing through Staunton visit KN4BOA, Danny Dyer, at Va. School for Deaf and

(Continued on page 166)

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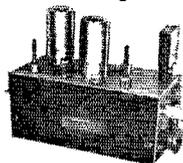
Model TR 20/220 (1 1/4 meter band) 6AU6 Osc. 5763 buf/mult.-6360 buf/mult.-6360 Power Amplifier. 20 watts input.

- All models employ 12AX7 as speech amplifier/driver, and 2 6AQ5 tubes as CL A Modulators.
- Requires 6.3V or 12V AC or DC for filaments and 250V DC for plate supply.
- Compact—only 9 1/2" L x 5 1/2" W x 5" H. Shipping weight, 5 lbs.

Complete with Crystal & Tubes  
Amateur Net

**\$59.95**

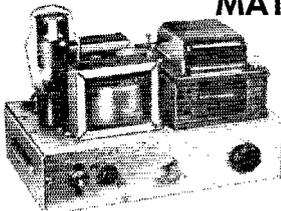
THE MINI-VERTER  
Designed For Mobile Use — Utilizes the broadcast band of receiver for tuning.



All Models Are Complete With Crystal And Tubes

- Model M6..... 6 meters.....\$25.95
- Model M10..... 10 meters.....\$23.95
- Model M15..... 15 meters.....\$23.95

## MATCHING A.C. POWER SUPPLIES

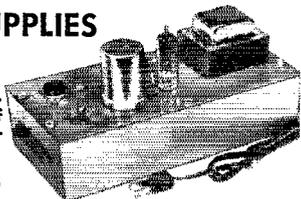


MODEL PTR2  
Provides power for any Tecraft transmitter. It will also power the companion converter.

**\$39.95**

MODEL P1  
Provides power necessary for any of the Tecraft converters.

**\$19.95**



On Model PTR2—a send/receive switch is incorporated to power the converters and disable the transmitter during listening periods, and to disable the converter while transmitting.



A Product Of EQUIPMENT CRAFTERS

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# GUARANTEED CRYSTALS!

**HERMETICALLY SEALED CRYSTALS** 1/2" Spac. .050 or .093

**Amateur & Novice Fund. — .01% tol. ea. \$2.50**  
**Marine & Aircraft Fund. — .005 tol. ea. 4.10**  
 10 to 30 Meg. tol. .005% ea. \$3.75  
**Overtones: 30 to 54 Meg. tol. .005% ea. 4.10**  
 54 to 75 Meg. tol. .005% ea. 4.25  
 75 to 90 Meg. tol. .005% ea. 5.40

## Special! FT-243 Prec. Calib. to 1st Decimal

**2 Meters** Exam: \*8010.6 x 18=144.190  
 Exam: \*8010 x 18=144.180  
 Note—10 KC difference between the above  
**6 Meters** Exam: \*8340.6 x 6=50043.6  
 Exam: \*8340 x 6=50040  
 Note—3.6 KC difference between the above  
**Calibrated FT-243 as exam. above\* spec. ....ea. \$1.29**  
**Thin-Line FT-243—6 Mel=50 meg. to 52.44 meg....ea. \$1.79**  
 52.45 meg. to 54 meg....ea. \$2.39  
**2 Meters, 144 meg. to 148 meg....ea. \$1.79**  
**Hermetically Sealed Fund. .01 Tol.....ea. \$2.50**

**Stock  
Freq.  
Only**

## NOVICE BAND FT-243 Fund. or DC-34 Freq... \$1.29

**80 Met. 3701-3748—Steps of 1 KC. FT-243 or DC-34**  
**40 Met. 7150-7198—Steps of 1 KC. FT-243 only**  
**Dbl. to 40 Met. 3576-3599. Steps of 1 KC. FT-243 or DC-34**  
**15 Met. 5276-5312—7034-7083 Steps of 1 KC. FT-243**

4035	4995	5880	6362	6815	7316	7558	7710	7875	8064	7	8283	8575
4045	5010	5995	6478	6932	7375	7618	7770	7935	8124	8	8343	8635
4050	5020	6000	6483	7037	7480	7723	7875	8040	8229	9	8448	8740
4055	5030	6006	6488	7042	7485	7728	7880	8045	8234	10	8458	8750
4100	5127	5925	6410	6964	7407	7650	7802	7967	8156	11	8368	8660
4120	5165	5940	6408	6962	7405	7648	7800	7965	8154	12	8378	8670
4165	5208	5984	6406	6960	7403	7646	7798	7963	8152	13	8388	8680
4175	5235	5995	6404	6958	7401	7644	7796	7961	8150	14	8398	8690
4190	5245	5973	6450	6990	7430	7671	7823	7988	8176	15	8408	8700
4215	5327	5995	6473	6940	7406	7647	7800	7965	8154	16	8418	8710
4230	5385	5995	6475	6950	7406	7647	7800	7965	8154	17	8428	8720
4255	5397	5995	6500	6973	7416	7658	7810	7975	8160	18	8438	8730
4260	5435	6006	6506	6975	7416	7658	7810	7975	8160	19	8448	8740
4285	5437	6025	6525	7000	7433	7676	7828	7993	8190	20	8458	8750
4300	5485	6040	6540	7006	7440	7680	7832	7997	8196	21	8468	8760
4310	5500	6042	6550	7025	7447	7695	7847	8002	8200	22	8478	8770
4340	5565	6050								23	8488	8780
4355	5582	6073								24	8498	8790
4375	5587	6100								25	8508	8800
4445	5645	6100								26	8518	8810
4490	5680	6106								27	8528	8820
4515	5675	6120								28	8538	8830
4535	5687	6140								29	8548	8840
4540	5700	6142								30	8558	8850
4580	5700	6150								31	8568	8860
4610	5725	6173								32	8578	8870
4620	5730	6200								33	8588	8880
4635	5740	6215								34	8598	8890
4660	5750	6240								35	8608	8900
4685	5760	6265								36	8618	8910
4710	5770	6275								37	8628	8920
4735	5775	6285								38	8638	8930
4760	5780	6290								39	8648	8940
4785	5782	6290								40	8658	8950
4815	5800	6273								41	8668	8960
4830	5806	6270								42	8678	8970
4840	5820	6275								43	8688	8980
4845	5825	6275								44	8698	8990
4852	5840	6296								45	8708	9000
4880	5850	6315								46	8718	9010
4900	5852	6325								47	8728	9020
4930	5860	6356								48	8738	9030
4950	5873	6340								49	8748	9040
4980	5875	6358								50	8758	9050

**GOVT.  
STOCK  
FT-243  
79¢  
FUND. FREQ.**

**1000 KC-DC9-LM-BC 221 Std. ....\$2.25**

**FT-243—From 1005-2999. Steps of 5 KC ea. ....\$2.39**

**Citizens Band—11 Meters—Freq. from 26.965 to 27.225 Herm. Sealed or FT-243 Holders....ea. \$3.75**

### SPECIAL ITEMS

**FT-241 55B Matched Pairs.....Pr. \$1.95**  
**FT-241 55B Low Freq. Xtals—370 to 540 KC.....ea. 59¢**  
**AN/TRC-1 FT-241 holders. 729 to 999 KC.....ea. 75¢**  
 1001 to 1040 KC.....ea. 75¢  
**1000 KC FT241 .....ea. 1.99**  
**100 KC Marker Std. ....ea. 4.95**  
**FT-241 200 KC or 500 KC.....ea. 1.00**  
**DC-34/35 1690 to 4440 KC. Steps of 10 KC.....ea. 79¢**

**Marine & C.A.P.—All Freq. Available**  
**2009—2182—2637 etc. Tol. .005% .....ea. \$2.99**

### SEND FOR CATALOG — SE HABLA ESPAÑOL

Include 5c per crystal for postage (U. S. Only) Calif. add 4% Tax. No. C.O.D.'S. Prices subject to change. Inc. 2nd choice; substitution may be necessary. **Min. Order \$2.50.**

**U. S. CRYSTALS, INC.**

1342 So. La Brea Ave., Los Angeles 19, Calif.

Blind. Your SCM attended the Edison Award Dinner in Washington and enjoyed old home week with a goodly number of Virginians. K4EZZL took time off from BPLing to be the only teen-ager there besides K2KGGJ, the award winner! JMB reports there is a second rig at K4KZGS, the club station at the Norfolk Submarine Base. K4HIA is seeking a printer for the RTTY rig. JKK reports 12 stations QNTed VN over 100 times in '58. Traffic: (Feb.) W4PFC 887, K4ELG 823, EZZL 736, QES 616, KNP 577, W4QDY 402, SHJ 361, K4QLX 323, AET 191, JKK 186, W4SNH 142, K4QER 140, W4BZE 43, OOL 43, RHA 41, K4MEV 40, W3MGL/4 36, K4ASU 34, W4BGP 29, K4HIA 29, W4YVQ 27, K4JRE 26, W4KX 26, ATQ 17, K4ZGS 14, W4CXQ 8, AAD 6, K4HTA 4, W4JUJ 3, (Jan.) W4PFC 14, SNH 141, K4MEV 60, W4PVA 11, (Dec.) W4LW 28.

**WEST VIRGINIA**—SCM, Albert H. Hix, W8PQQ—Asst. SCM; Festus R. Greenhouse, 8PZT, SEC; HZA, PAM; GAD, V.H.F. PAM; K81YU, RMs; GBF, FNI, PBO and VYR. Please make plans to attend the W. Va. Hamfest at Jackson Mills July 11, 12 and 13. Adequate accommodations exist for family groups and individuals to stay overnight at the Mill. We will miss K8HRO, who is moving to Florida in June. HBF has two five-element 6-meter beams in use. K8GXR is the new Huntington V.H.F. Weather Net manager. All v.h.f. hams who are active in this section are urged to report their activities to K81YU, the V.H.F. PAM, so that Tom can better coordinate and plan future v.h.f. activities, etc. A storm blew down the antenna of K8CRM. K8DDB has a 20-A and is building a final for s.s.b. 4VAN and SSA visited PQQ. K8BLR is very active and doing a fine job of dx operating. K4CQA/8 is busy with research work at the University but manages to do a lot of fine OO work. TVO and CSG are doing lots of OO work and took part in the recent Frequency Measurement Test. ESH has a new 2-meter Rx. On Sept. 6 there will be a picnic at Bass Lake. The first prize will be a GQ-170 receiver. Mark your calendar for this event. NYH is very active on 75 meters with traffic and ragchewing. K8GAG is a new OO. Traffic: (Feb.) K8JLF 423, W8VYR 89, K8CNB 72, W8FNI 68, PBO 53, HZA 42, K8BRM 31, W8BWK 28, SNP 27, NYH 22, K8DDB 21, HRO 8, IYU 8, CSG 7, W8IBF 2, K8BLR 1, W8TVO 1.

## WEST VIRGINIA QSO PARTY

**MAY 8-10**

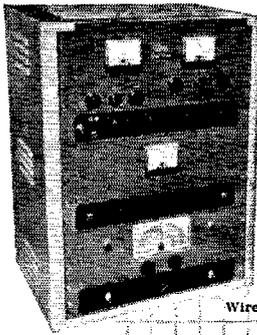
The Mountaineer Amateur Radio Association will sponsor a W. Va. QSO Party from 6:00 P.M. EST May 8 to 6:00 P.M. EST May 10. The contest is open to all West Virginia amateurs and to all others who have held calls in W. Va. in the past. Only these contacts may be counted. There are no power or band limitations and the same station may be worked on different bands for credit. C.w.to-phone QSOs are allowed but cross-band contacts are not permitted. Score 2 points for each completed contact, exchanging the following information and submitting it with your logs: date; call; time; city, county. When contacting stations outside of W. Va., obtain the ex-call of the former W. Va. station. Mobiles operating in more than one county may be worked once in each county by a fixed station, and the mobile can count the fixed station once from each county. Each contact with stations in Morgan and Hardy county will count 6 points for a complete exchange. Multiply the final score by the number of counties worked. Prizes for first and second place. To be eligible, logs must be postmarked not later than May 25 and mailed to Donald B. Morris, W8JM, MARA Secretary, Box 909, Fairmont, W. Va.

## ROCKY MOUNTAIN DIVISION

**COLORADO**—SCM, B. Eugene Spoonemore, W8DWL—SEC; NIT, PAMs; IJR and CXW. According to the K8QMH *Splatter*, KN8SSJ is a new ham in the area. K8BWI was home from school on a visit. K8GEU has a new operating table and the club house had a stove-pipe raising through the efforts of K8EDH, K8EDK, K8EGJ, K8EDG and UNM. K8ILU received an appointment to Annapolis. ZJO gave a club talk. K8HXC was M.C. The BARK's new officers are A. pres.; ZFJ, vice-pres.; and K8DTJ, secy.-treas. K8IYE soon will have a ham TV station on the air. K8IYF is now owner of an SX-28. RRV and FQK are working DX. ANX, K8OOL, YJO and K8GBS are on the auction committee of the Pikes Peak Radio Amateur Assn. K8HRS has a

(Continued on page 158)

## Known World-Wide by its Audio



### Globe King 500C

New filtered keying system virtually eliminates key clicks. New modified pi-net. New heavy-duty power transformer. Adjustable bias control. Improved VFO circuitry. Antenna switching relay unit. Separate power supply for modulator. Commercial type compression circuit. Optional Xtal operation. SSB input & operation; no add'l relay needed. Better TVI-protection than ever before.

Wired & Tested:  
**\$795.00**

Completely Bandswitching, 10-160M, 540w AM & CW; 700w max. on DSB or SSB (PEP), with 15-20w external exciter.

## Tops on 6 and 2M



### Globe Hi-Bander

60w CW, 55w AM input on both 6 & 2M. Single control bandswitching, 4-stage RF section allowing straight through operation. Good harmonic and TVI-suppression. RF stages metered. Provisions for mobile use. 52-72 ohm coax output. New duo-band final tank circuit eliminates switching. Variable antenna loading control. Reserve power socket on rear chassis apron for accessories.

Wired & Tested:  
**\$149.95**  
In Kit Form:  
**\$129.95**

### 90w CW

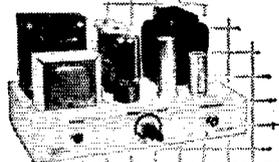


### Globe Chief 90A

Completely bandswitching 10-160M; Compact (8x14x9"), well-filtered, with built-in power supply. Pi-Net matches most antennas 52-600 ohms. Modified Grid-Block keying. Provisions for VFO input & operation. Can be converted to fone with Globe Models UM-1 or SM-90 Modulators. Shielded for TVI-reduction. Kit contains all tubes, pre-punched chassis, etc.

Wired & Tested: **\$74.50**  
In Kit Form: **\$59.95**

### Modulates RF inputs to 100w



Kit: (less tubes) **\$32.50**  
In Wired Form: **\$49.95**

### Universal Modulator UM-1

Class A or AB-2 modulator, driver for higher power modulator, or PA amplifier. Matches output impedances 500-20,000 ohms. Carbon or crystal mike usable. Supplies up to 45w audio with proper output tubes. Provisions for addition of external meter for monitoring modulator cathode currents; for remote control of modulator. Perforated steel cover, \$3.00 extra.

## And Announcing Globe's GREAT NEW

### CITIZEN'S BROADCASTER

COMPLETE TRANSCEIVER FOR 11 M

See Complete Details Page 147

### Speech Booster FCL-1



Wired & Tested:  
**\$24.95**  
In Kit Form:  
**\$15.95**

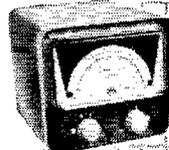
Peak limiting audio preamplifier that clips and filters speech frequencies exceeding pre-set amplitude. Increases modulation intensity for most penetrating audio. Includes harmonic suppression. Plugs directly into Scout & Hi-Bander. Adaptable to other Xmitters.

### Power Attenuator PA-1



Wired & Tested:  
**\$10.95**

General purpose attenuator for exciter's up to 70 watts input. Suitable to attenuate drive between many exciter-amplifier combinations. Standard coax input and output connectors. Tap switch to select any of three attenuation positions or straight through.



### Globe VFO 6-2

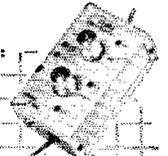
Wired & Tested:  
**\$59.95**  
In Kit Form:  
**\$49.95**

Perfect zero beat. Built-in power supply with voltage regulation. Ideal for driving 6 and 2 meter transmitters. Temperature compensated for utmost stability. Excellent for use with Hi-Bander. Approx. 50V RF output in 8-9 mc. range. 13:1 tuning ratio, king-size tuning scale. Sideband stability.

Wired & Tested:  
**\$29.95**  
In Kit Form:  
**\$21.95**

Model: GPMIC

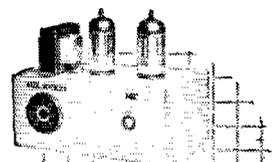
### 6M Converter



New, improved circuit for higher gain, greater signal/noise ratio. Printed circuit for ease in kit assembly. Models for fixed or mobile stations or 12-volt filaments. I.P. output of 10-14 mc. on fixed, 600-1600 kc. on mobile model. Highly stable, completely shielded, crystal controlled, complete with tubes, crystal, cables. 3x5 1/2 x 4 1/2".

In Kit Form only: **\$11.95**

### Screen Modulator SM-90



Ideal for use with Chief, but instructions for use with similar CW Xmitters. Permits radio-telephone operation at minimum cost. Self-contained. Printed circuit board, all parts and complete instructions.

Visit Your Favorite Distributor for Details!

#### OTHER TOP FLIGHT GLOBE PRODUCTS

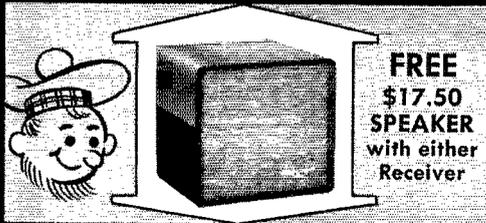
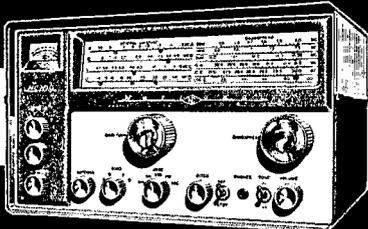
globe champ, w/t: \$495.00; sidebander dsb-100, w/t: \$139.95, kit: \$119.95; globe linear la-1, w/t: \$124.50, kit: \$99.50; vfo-755a, w/t: \$59.95, kit: \$49.95; vox, w/t: \$24.95, kit: \$19.95; qt-10, w/t: \$9.95; globe matcher sr. at-4, w/t: \$79.50, kit: \$69.50; globe matcher jr. at-3, w/t: \$15.95, kit: \$11.95; globe scout 680a, w/t: \$119.95, kit: \$99.95; power booster pb-1, w/t: \$21.95, kit: \$14.95.

**GLOBE**  
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COUNCIL BLUFFS, IOWA

LEW BONN'S  
*Bonnafide Bargain*  
OF THE MONTH

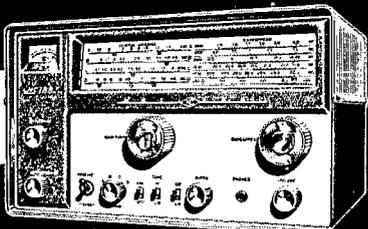
Check the Lew Bonn Co. for all your needs! . . .  
and make savings like this: FREE \$17.50 Speaker  
with the purchase of these NC Receivers.

NC 109  
\$199.95



FREE  
\$17.50  
SPEAKER  
with either  
Receiver

NC 188  
\$159.95



NC-109 covers 540 kc to 40 mc in 4 bands. Calibrated bandspread for 10-80 meter amateur bands. Exclusive "MICROTOME" filter provides 5 degrees of super-sharp selectivity. Sensitivity: 1-2 microvolts with 10 db signal/noise ratio. Separate high frequency oscillator with temperature compensated ceramic coil forms reduces drift to .01% or less. Separate product detector for SSB makes the NC-109 America's lowest priced SSB receiver.

NC-188 covers 540 kc to 40 mc. Directly calibrated for 4 general coverage ranges and 5 bandspread ranges for 10-80 meter bands. Has RF amplifier stage, two IF stages and two audio stages. Has tone control, antenna trimmer, S-meter, separate RF and AF gain controls, automatic noise limiter. Has temperature compensated and ventilated high frequency oscillator for increased stability.

10% Down (\$19.95)

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Distributors of Nationally-Known Amateur Equipment  
Dept. Q5, 1211 LaSalle, Minneapolis 3, Minn.

beginners' code class and K6JSR an advanced class group. YAE, K6JSQ and K6JST are working 6 meters. UPS lost a rotator in a recent windstorm. According to the *RF Carrier*, the WSRC is making big plans for the coming year such as hamnicks, picnics, boat races, etc. ANA soon will be on RTTY. New 6-meter calls in Denver are K6LES, MTD, CYT, K6EYJ, SSJ, K6HWO and WQG. Those operating amateur TV on 428 Mc. were K6RRR, K6JSD, K6OKO, K6MOH, K6CLJ and KBTO. with V.H.F. PAM IIR acting supervisor. Traffic: (Feb.) W6IA 1277, KQD 062, K6DCW 650, W6ANA 427, K6DXF 105, W6TVI 95, DQN 69, K6EDH 64, EDK 46, W6QOT 46, ENA 45, K6TAA 38, WBB 34, W6CBI 21, K6EYV 19, W6NIT 17. (Jan.) W6WME 148. (Dec.) W6WME 218.

UTAH—SCM, Thomas H. Miller, W7QWH—Asst. SCM; John H. Sampson, 70CX. SEC: FSC, PAM: BBN. RM: JBV. V.H.F. PAM: SP, K7HHH has been appointed as EC for Salt Lake County, making a total of four in the section. FSC is now a net control station on the Beehive Net. BLE has quite an antenna farm. He has a 35-ft. pole with a Tribander, a 50-ft. tower with a new 40-meter beam and numerous other antennas. KN7GKE has just received his ticket. K7ELE has a new SX-99. EII is working on some microwave equipment and will enter it in the local science fair. JBV has been trying hard to make BPL but finds it is pretty tough in this area. AREC membership is steadily increasing. The Beehive Net meets each Sun. at 1230 MST on 7272 kc. Traffic: (Feb.) W7JBV 198, OCX 105, BLE 5, QWH 5, K7BHE 4, ELE 1. (Jan.) W7JBV 208.

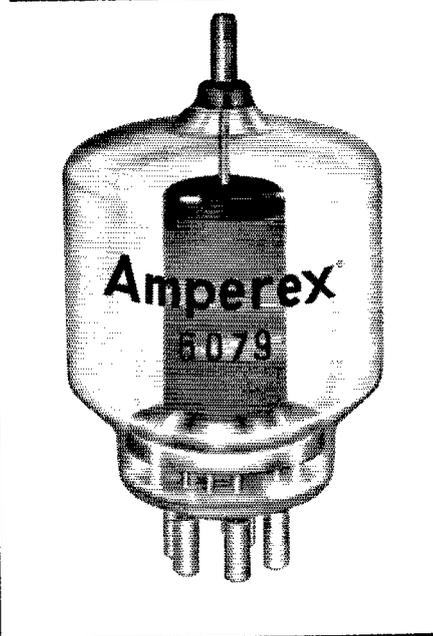
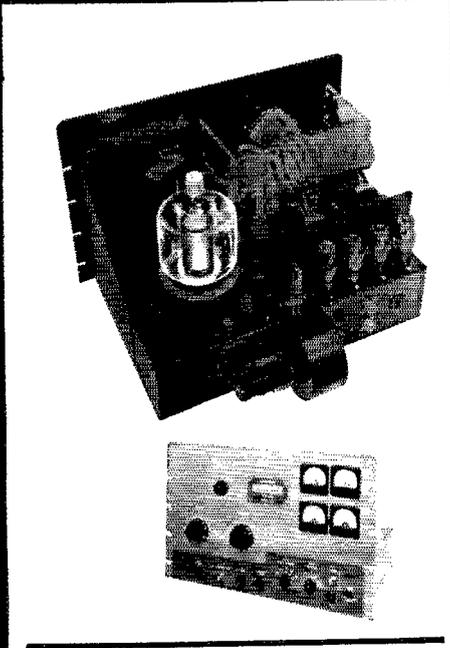
NEW MEXICO—SCM, Allan S. Hargett, K5DAA—SEC: CTN. PAM: ZU. V.H.F. PAM: FPB. Please check into the following nets as often as possible: NMEPN, Sun. 3838 kc. 0730 MST, Tue. and Thurs. 3838 kc. 1800 MST; the Breakfast Club, Mon. through Sat. 3838 kc. 0700 MST; the AREC Net, 3980 kc. at 1900 MST Tues. through Sat.; the TWN, Sun. through Sat. 1900 MST. The TWN needs New Mexico operators very badly. New OBSS are K5MSE, K5LFE, K5PRR, W8OME/5 and K5GOJ. K5LOV visited in Santa Barbara and attended an enjoyable local meeting. WNU is recuperating from an operation. Albuquerque mobiles had a drill to see how fast they could find an unmarked car just knowing the last two numbers of the license. It was found in 45 minutes. The Farmington Club is presenting a course in ham radio for anyone interested. Gallup had its Annual Sweetheart Banquet with an attendance of 25. K5RIT is active on the ham bands after receiving his Conditional Class call. QSL cards are supplied by the Chamber of Commerce of Albuquerque to hams for \$1.00. K5GOJ had 9UJZ as a recent visitor. 9RUJ, Mary of the YLRL is heard on the LCL Net. Traffic: (Feb.) K5KWKSP 1638, W5DWB 677, W8OME/5 658, K5IPK 51, W5CIN 22, K5DAB 16, W5HJF 9, K5DAA 7, IQL 6, W5BQC 4, GD 4, K5HRK 4, W5WNU 4, K5LWN 3, W5VC 3, ZU 3, ESN 2. (Jan.) K5IPK 31.

WYOMING—SCM, Lial D. Branson, W7AMU—SEC: CQL. ECs appointed: Natrona County, YXM; Sublette Co., AEC; Johnson Co., BFL; Uinta Co., K7BGR; Weston Co., NMW; Sweetwater Co., PJX. Dr. L. G. VanSilve, HX, of Basom, Wyo., joined Silent Keys Feb. 2. AHO reports he made a nice trip to Mexico with a lot of deep-sea fishing. The Wyoming Hamfest will be held west of Buffalo July 25-26. The Pony Express Net meets Sun. at 0830 MST on 3920 kc. The Wyoming Jackalope Net meets Mon. through Fri. at 1200 MST on 7255 kc. for traffic. The YO Net is a c.w. net and meets Mon., Wed. and Fri. at 1830 MST on 3610 kc. Traffic: W7DXV 62, AXG 56, BFL 34, BHH 21, CQL 6, LKQ 3, AMU 2, BEI 2, DTD 2, ION 2, YXM 2.

**SOUTHEASTERN DIVISION**

ALABAMA—SCM, Clarke A. Simms, jr., W4HKK—SEC: WJX. PAMs: DGH and K4BTO. RM: RLG. It is my pleasure to announce the appointment of WJX, Adrene D. Christian, as the new SEC for Alabama. ECs, please send reports to 8436 Seventh Ave., North, Birmingham. K4VMU, the NYL of KQN, has passed the General Class exam. Welcome to a new member of AENB, K4ZXX, and it's nice to have old members ZGE and WOG back again. K4PHH is very proud of the confirmation of his 75-meter phone contact with Midway Island. Welcome to a new ham in Birmingham, KN4EDF. Congratulations to AEM; it's a boy. The Selma Club has been issued a charter by ARRL. Hope you are all making plans to attend the Birmingham Hamfest May 3. Mobile's Hamfest will be held May 16-17. See you there. Those sporting new gear: ZSH, a Globe King 500; K4RWV a Heathkit Seneca; BTN, a new tower and 20-meter beam; HPE, DDH, K4JSP and IFP new homebrew rigs. Traffic: (Feb.) W4RLG 460, K4PFM 126, W4KIX 88, PVG 87, K4SSB 75, W4YRO 60, K4BTO 49, W4MT 31, CIU 29, DGH 27, K4SAV 19, AOZ

(Continued on page 160)



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Economically powered by the famous AMPEREX Type 6079 tetrode, the conservatively designed "AIR MASTER" kilowatt sideband amplifier, Model H-316 by CREATIVE ELECTRONICS is outstanding for its unremitting ability to provide continuously efficient operation in the face of extremely rugged operating conditions. Complying in full with FCC requirements, the "AIR MASTER" offers complete coverage 80 through 10 meters, requires only 15 watts driving power, and provides 1 Kw average input two-tone, 1 Kw single-tone input, 1 Kw CW input, 650 watts AM linear input, and 2 Kw peak envelope power\* with 3rd order distortion products at 30 db minimum—all at CCS ratings.

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8M, 5E  
9 db. Forward Gain  
Net wt. 8 lbs.  
Boom length 15 ft.

**\$15.95** New pre-fabricated "Gamb" dipole. Panama Match assembly with coaxially formed reactance canceling capacitor built in makes possible for the first time a perfect 1:1 SWR. Coax connector for 52 ohm feed included.

**2 METERS**

12.95 M

2M, 5E  
12.4 db. Forward Gain  
Net wt. 13 lbs.  
Boom length 12 ft.

**\$12.95**

**1 1/4 M**

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1 1/4M, 5E  
14.2 db. Forward Gain  
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**\$6.95** All 1 1/4-gain 2M beams incorporate the hairpin dipole matching circuit. Perfect 200 ohm match for K-200 low-loss balun. 1/2 wave balun and 74 ohm coax. 300 & 450 ohm balanced lines. 2x and 1 1/2M beams use ratio dipoles adjusted for perfect match to 450 ohm coax.

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18, 1P7 11, QON 11, W4HKK 10, CEF 9, K4HFY 9, K4JSP 8, PHH 7, KAK 5, KJD 2, W4ZSH 2.

**EASTERN FLORIDA—SCM.** John F. Porter, W4KGG—SEC: IYT, RM: K4SJH, PAMs: TAS and RMU. New officers of the Indian River Amateur Radio Club are NLX, pres.; K4TZC, vice-pres.; K4PTK, treas.; K4YUT, corr. secy.; VQY, rec. secy.; and HCG, act. chairman. The BARC picked up donations from Browardites in the United CP Fund Drive. Net control stations were DLM and K4HGY. K4EAC is the new secy. for the Suncoast V.H.F. Club. The club now has 31 members. The MSR Club is conducting code and theory classes. Second and third places were won by K4RNS and BIL in the WAFB Contest. DCV has a new 75A-4 and Collins Kw. The LV AREC provided all the communications for the LAKE Wales Annual Air Show. The DEN 6-meter section has now grown to 62 check-ins. FNR now has 44 states and 17 countries on 6 meters. 50 Mc. is picking up in the Jacksonville Area, according to RMU. Allen is running a TE test with South America, using 900 watts A1 and 500 watts A3. Hollywood has a new club. Officers are K4OYR, pres.; PVP, vice-pres.; PM, secy.-treas.; and K4JRC, club EC. New officers of the Lakeland ARS are K4RDG, pres.; UDB, vice-pres.; K4PSL, secy.; K4VQB, treas.; and K4LTX, publicity. The Hillsborough County Six Meter Net (AREC) began operations Feb. 18. The net operates on 51.45 Mc. and K4LLG is looking for new members. Collier County now has an AREC Net on 29.6 Mc. The Southwest Fla. Fair was a big success with the Ft. Myers Club handling 642 messages. TKS/4 was in operation during the whole affair. K4BLM won the Dade ARC WAS Contest. The Manatee ARC booth at the De Soto Celebration proved a big success. ZCD, SJZ and KGJ have moved into new ham shacks. The Dade ARCACS held its annual meeting and elected IYT, chairman; and K4AHW, K4ENN and JO, vice chairmen. The Red Cross has agreed to purchase new 6- and 2-meter base stations before July. K4SJH, K4QLG and FPC made BPL. K4TCM is the new OPS and K4BY is new ORS. QDZ is the new Hillsborough EC. K4LDR is a new OO. After the Orlando Hamfest let's all push the Silver Springs Statewide Test. Traffic: K4SJH 1066, W4FPC 897, TKS 642, K4RZQ 407, KDN 359, QLG 334, BNE 251, ILB 180, AX 152, BY 137, W4WY 119, K4COO 115, BLM 99, RNS 96, W4FFF 87, K4ODS 80, W4SMK 78, K4AHW 77, LCD 58, LCF 44, W4LMT 39, K4PAD 34, MBB 31, W4AHZ 27, EIW 24, K4VEJ 24, MTP 22, W4EHW 21, K4MTH 19, W4DQS 14, K4SLR 10, IWT 8, LDR 7, BZ 6, W4SJJ 4.

**WESTERN FLORIDA—SCM.** Frank M. Butler, jr., W4RKH—SEC: PQW, RM: AXP and BVE, Port St. Joe: K4RZM, K4RZF, MXN, KYLQQ, ALN and SGG took part in an AREC drill. RZF and MXN are mobile. LQQ has been appointed c.d. director of Gulf Co. CCA is now active in Wewahatchka. Tallahassee: CHZ, BKV, YUU, K4PVU and GAA are active in the 2-meter C.D. Net. Fort Walton: The local hams sponsored a dinner meeting, with hams from Pensacola and Panama City attending, at which CXP was guest speaker. New hams in the Playground Area are SED, NIV and 3HWQ. K4HXV has a new Heath Seneca v.h.f. rig. The NWFN now meets daily 1700-1800. NCSs at present are K4OID, K4RZQ, K4PVU, BVE and K4UBR. Pensacola: Through the efforts of SRK, a drill message was originated by the Mayor of Pensacola to Governor Collins in Tallahassee. Total time from origination to receipt of reply was only 11 minutes. Others participating were K4SOI, K4LQC and K4PVU. NAS Radio Club officers are K4LQC, pres.; WLW, vice-pres.; K4UKG, secy.-treas.; BVW, trustee. Meetings are held the 2nd and 4th Thurs. in Bldg. 1588. New hams in town are K4EAP, KN4DSV and DSW, K4TSZ, K2ARN, 3DRG, and 8TIF. PIQ has Gosnet Twins in the new buggy. K4HYL ran his kw. up to full power and set the tri-band beam on fire! Traffic: K4UBR 588, OLD 514, W4BVE 123, SRK 121, K4PVU 58, W4GAA 8.

**GEORGIA—SCM.** William F. Kennedy, W4CFJ—SEC: PMJ, PAMs: LXE and ACH, RM: PIM. GCEN meets on 3995 kc. at 1830 EST Tue. and Thurs. 0800 Sun.; GSN, Mon. through Sun. at 1900 EST on 3595 kc., PIM as NC; the 75-Meter Mobile Phone Net each Sun. at 1330 EST on 3995 kc., MV as NC; the Atl. Ten-Meter Phone Net each Sun. at 2200 EST on 29.6 Mc., KWC as NC; the GTAN, Sat. at 1000 EST on 7290 kc.; the GPYL Net Thurs. on 7260 kc. at 0900 EST, K4CYV as NC; the GAN, 7105 kc. at 1800 EST Mon. through Fri., K4KZP as net mgr. We hams of Georgia were sorry to hear of the passing of Mrs. Harris, the wife of MNZ. We also are sorry to learn of the passing of the wife of TSN, ARRL's President. K4RCJ's XYL is now KN4BDZ. K4LVE is now RT-1, Box 90-D, Warner Robbins, Ga. The Atlanta Teen-Age Club is increasing with new members. K4OQY has an 813 in the

(Continued on page 162)

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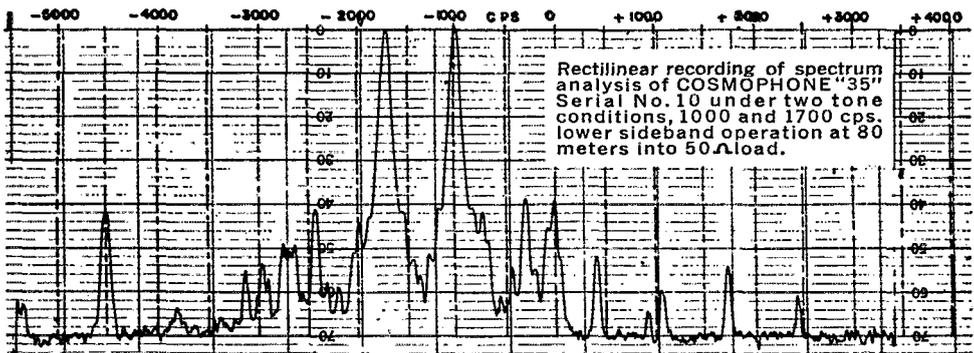
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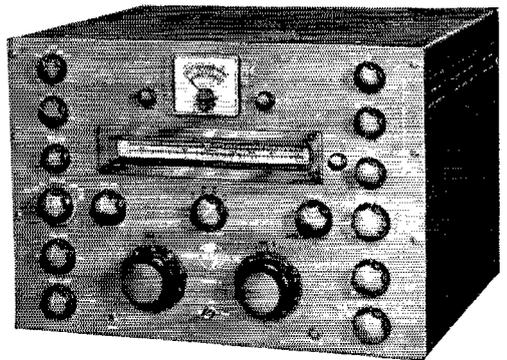


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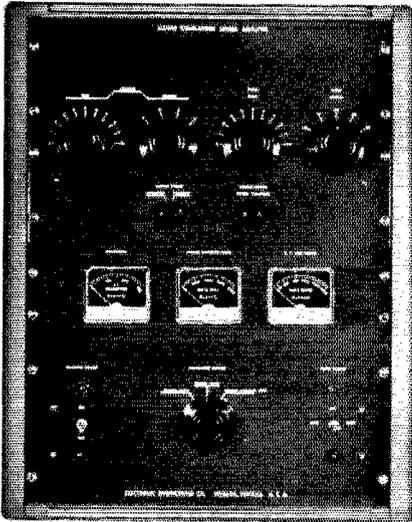
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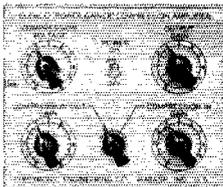
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final running 300 watts. K4HOU is making modifications on the DX-100. K4HOU will be on the engagement list when school is out. We are sorry to hear of the passing of K4JGP. Chattanooga, Tenn. K4KWC is doing a nice job as net control of the Atl. Ten-Meter Phone Net. K4KWC also has a new NC-303 RX. ZWT turned in an excellent Official Observer report for February. The Middle Ga. Club elected RZX, pres.; K4AT, vice-pres.; K4DNB, secy.; K4DXX, treas.; K4ARL, act. mgr. The South Georgia Racehavers Annual Hamfest will be held at Thomasville, Ga., May 10. The Augusta, Ga., Annual Hamfest will be held May 16-17. Check your League appointments to see if they need to be renewed. Traffic: W4PIA 292, DDU 182, K4LYE 102, BAI 78, UWJ 70, QCY 13, VHC 12, OLQ 7, HJZ 6.

**WEST INDIES**—SCM, William Werner, KP4DJ—SEC; AAA, KD qualified for "W-DEL" and "Gay-lark" certificates. He is up to 241 for DXCC and 92 for phone DXCC. W6TT and NYL and K3EPR and NYL visited KD. KP4IQ is now KX6CW and his XYL, KP4KQ, is KX6CM. YT has a new Valiant transmitter. AMG continues as NCS of the P.R. Amateur Emergency Net on 3925 kc. at 7 p.m. Wed. AMG installed doublets for 20 and 10 meters in addition to the present 40- and 80-meter doublets and is building a p.p. 813 final. CK replaced the 10-15 cubical quad with a 10-15-20 cubical quad. AIS is a new station on 3925 kc. with a new NC-303. APV is working Pacific DX on 20 meters using a 32V-3 while building a p.p. 4-250A final. The PRARC Annual Hamfest and election of officers was held Mar. 15. JM, ABN, AHE, AHX and AJK are working Argentina and Chile on 50 Mc. CH is on 80-meter c.w. using low power after an eight-year absence from ham radio. WP4API worked WV6s and OZ7CF on 15 meters and is writing an interesting Novice column for the PRARC *Ground Wave*. WT reports to the 3925 kc. Net Wed. The Antilles Weather Net 7 a.m. daily and the MARS Net at 6 p.m. on 40 meters. WP4AQA soon will be WP4AQA/3 from Pennsylvania. CA is having drive trouble in the TBS-50. HZ is replacing the steel tower with an aluminum tower so he can lower it quickly during the hurricane season. AT sticks to 40-meter c.w. MP is building an s.s.b. generator and a kw. final. WP4AOD has 37 states confirmed on 15 meters from the new QTH in Rio Piedras. WP4AQK is getting out fine on 15 meters from Baldrich. DJ applied regulated voltage to plate/screens of the H.F. oscillator and mixer tubes in the HRO receiver and changed the wiring so that voltage remains on these tubes even during transmitting periods, reducing the drift on 28 Mc. to zero. Traffic: KP4WT 46.

**CANAL ZONE**—SCM, Ralph E. Harvey, KZ5RV—At the meeting of the Canal Zone Amateur Radio Association Mar. 5 the SCM gave a short talk on the ARRL and what it has done for the advancement of amateur radio since it was organized in 1914. The SEC explained the duties of the various appointive offices in the AREC and invited all amateurs present not already members to join the AREC. K9DMG and his XYL, were the guests of UJ and hi XYL, CJ. The Cross Roads Amateur Radio Club now has a new location and is moving to Coco Solo. HG has been transferred to the Gold Coast and soon will be back on the air from Coco Solo. VR took part in the recent XYL-OM Contest and worked WAS, including Alaska. She hopes that she gets QSLs for confirmation for the WAS certificate. LC was heard in the recent ARRL DX Contest, and Len says that he made over 700 contacts, mostly on c.w. HG has returned from a well-earned vacation in the States. Traffic: KZ5JJ 93, OB 89, HQ 52, RJ 41, RR 40, WF 37, VR 36, UR 15, JN 11, LC 11, RM 7, RV 7, DE 6, BS 2, RD 1.

## SOUTHEASTERN DIVISION

**LOS ANGELES**—SCM, Albert F. Hill, jr., W6JQB—SEC; W6LIP, RMs; W6BHG and K6HLR. PAMs; K6BWD and W6ORS. The following stations made BPL in February: K6HLR, K6LVR, W6GYH, W6CG and K6OWQ. K6GEX reports that the Intra-County Net is sponsoring a V.H.F. QSO Party on 220 Mc. For details, contact Ralph, K6EOK and W6OYM report several good 6-meter openings. The Westchester Amateur Radio Association's new officers are W6K LZ, pres.; K6KED, vice-pres.; K6RAD, secy. K6OQD is sporting a new Panoramic receiver. W6USY enjoyed a nice trip to Death Valley. W6BES is keeping a sked with W4DTL. W6AKY is celebrating his 83rd birthday. Congrats, "Uncle Fred!" W6SRE is sporting a new NC-303. K6COP and K6PLW report some fine DX on 20 and 10 meters. New officers of the Associated Radio Amateurs of Long Beach are W6KQI, pres.; K6KXQ, vice-pres.; W6IMT, secy.; and K6KNP, treas. K6TPL is working some fine DX on 40 meters. W6AM now has 292 countries confirmed. K6VGH is on 10 and 2 meters with Commu-

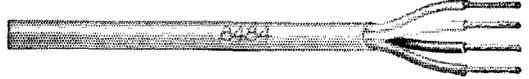
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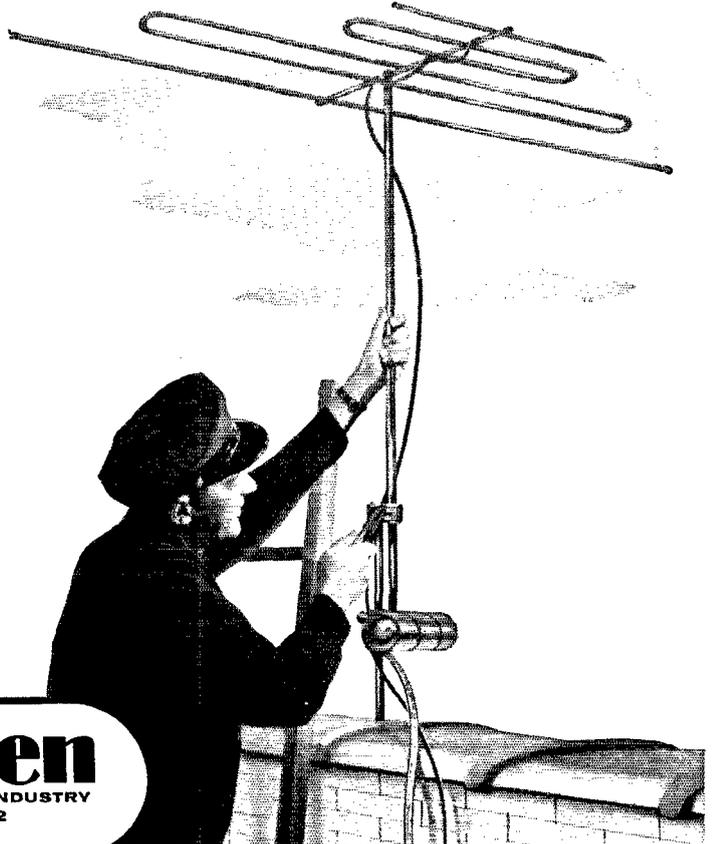
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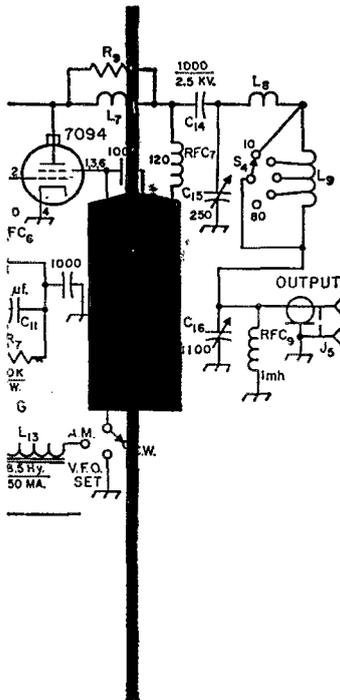


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nications. W6GTE will furnish applications for mobile operation in Mexico. K6JSD now is area control on ALN. K6LVR has the new Navigator working. W6GYH is carrying a nice sked with KG1EM. W6CG and K6OWQ did a bang-up job handling traffic out of Alaska for the Fur Rendezvous. New officers of the Radio 50 Club are W6PZL, pres.; W6ORS, secy.; W6GYH, treas.; W6KOS and W6MLZ, directors. Support your section nets: C.w., Southern California Net at 1900 PST daily on 3600 kc.; Phone SoCal 6 Net at 1900 daily on 50.4 Mc. Traffic: (Feb.) K6HLR 1091, W6GYH 977, W6CG 690, K6LVR 639, K6OWQ 618, K6OZJ 417, W6QR 214, W6BHG 203, K6JSD 157, K6GKX 96, K6GCC 87, K6JQB 83, K6OQD 81, K6TPL 59, K6PZM 43, K6GGS 42, W6NTN 26, W6CAH 24, W6USY 22, W6SRE 20, K6PLW 14, K6EOK 12, K6EA 7, K6VGH 5, W6ORS 4, K2HNW/6 3, W6BUK 2, W6BRO 1. (Jan.) W6ZJB 1257, K6OQD 94, K6JSD 90, W6NKR 38.

**ARIZONA**—SCM, Cameron A. Allen, W7OIF—SEC: YWF, PAM-75: FMZ, TPG is on a Caribbean cruise aboard the *New Amsterdam* and is operating maritime mobile with a KW1-1. Remember the Northern Arizona Hamfest May 30 and 31. It will be at Whitehorse Lake about 25 miles from Williams in the cool pines. There are very good camping places and cabins are available. For any additional information contact BFA, in Prescott. Traffic: (Feb.) W7YAT 142, ZNS 114, OIF 21.

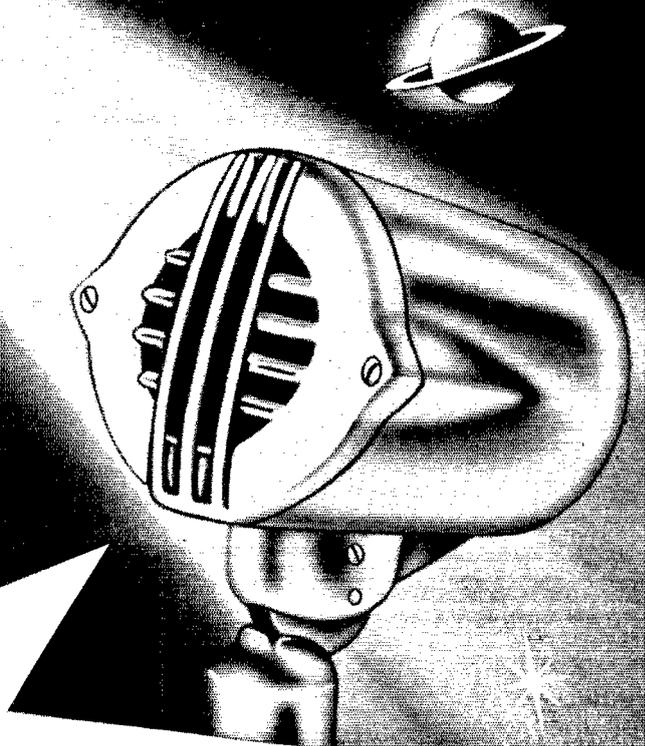
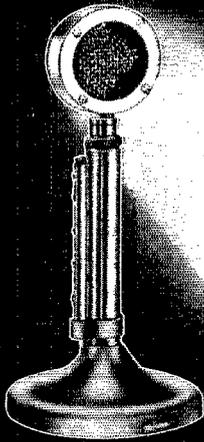
**SAN DIEGO**—SCM, Don Stansifer, W6LRU—Your SCM enjoyed the March meeting with the South Bay Amateur Radio Society in Chula Vista. The clubs help with Novices and code and theory classes is excellent. The club members already have made extensive Field Day plans. The Fullerton Club had MYC of Gonsett as speaker at its March meeting. W6PLK, an ardent DXer, now has 210 confirmed and was active during the DX Contest on c.w. W6ELQ, ORS in San Diego, has a GPR-90 receiver. W6SK, with aid from W6YXK/MM, handled press releases and information to the families when a San Diego fishing boat sank off the coast of Peru. K6ZCR, in Fullerton, turns in a nice traffic count of 203. The San Diego DX Club met at the home of W6RCD in March. He recently made DXCC on phone. W6ZVQ is up to 245 countries. The March meeting of the Helix Club featured pictures of the Clipperton Island Expedition, FO8AT, sponsored by the San Diego DX Club. The recent National Engineer's Week Exhibit featured an excellent amateur radio booth. Local c.d. and RACES nets were called during the exhibit and many visitors talked via amateur radio for the first time. The project was spearheaded by K6LFH, with help from K6JPI, K6HQJ and others. WA6BUX has a new electronic keyer for his DX-40. K6KGS, a high school student, is now on s.s.b. with an SB-10 and 6146s. K6IPV continues to work good DX with his DSB rig at 150 watts. Two members of the Dana Junior High Amateur Radio Club are awaiting their Novice calls. With summer around the corner, your SCM reminds all clubs and amateurs to send or call in information for this column. Traffic: W6EOT 858, K6ZCR 203, W6ELQ 118, W6SK 82.

**SANTA BARBARA**—SCM, Robert A. Hemke, K6CVR. The Santa Barbara Radio Club had W6FDO as guest speaker. The subject was "Another Look at Transistors." He demonstrated and explained how a transistor works and made no reference to vacuum tubes as most hams do. It was a very interesting talk to Novices and oldtimers alike. The Ventura County Radio Club, K6KCT, is maintaining a regular watch 6 days a week handling servicemen's phone traffic from overseas to their wives and families here in the states. WV6EBH, a new licensee, plans to work 80-40-meter c.w. with an AT-1 transmitter and an RAO receiver. The Channel Cities Net now has 30 nightly check-ins covering from Santa Maria to San Diego. New members of the net are K6SDE, WV6DNW, and K6HBH. Traffic: (Feb.) K6BVA 32, W6YCF 12, K6CVR 3, W6OUL 2, W6MSG 1.

## WEST GULF DIVISION

**NORTHERN TEXAS**—SCM, L. L. Harbin, W5-BNG—Asst. SCM: E. C. Pool, 5NFO, SEC: K5AEX, PAMs: BOO and IWQ, RM: ACK. K5HWN is the new EC for Tarrant County. Bob has just been appointed RACES Officer for the county. DKT is EC and C.D. Communications Officer for Archer County. K5QGF, a new Archer City ham, is having trouble finding the 6-meter band with his home-built converter. K5LCU is city firemarshal, city judge, ambulance driver and the only sideband station in Archer City. K5MIU has been a first-aid instructor for years and has made sure that all Archer City hams hold a first-aid card. IGV is an instructor at Sheppard Field. Thanks to K5GKH for information on Archer City hams. PCN has moved to San Antonio. The Dallas ARC's new officers are RQB.  
(Continued on page 168)

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\*Complete with G-stand

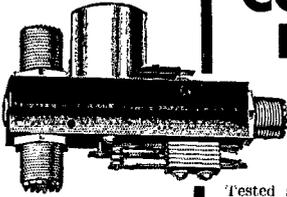
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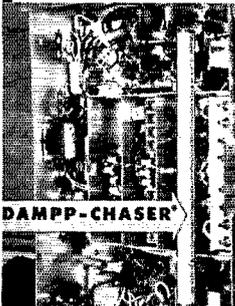
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pres.; I.L.K. vice-pres.; L.R. secy.-treas.; ZYA, program dir.; HCS, tech. dir. K5AEX spoke on civil defense at the club's Mar. 3 meeting. K51MC is the proud owner of a new 101 receiver. The Tarrant County 8-Meter Emergency Net held a practice evacuation drill Feb. 28. All the personnel and cars at the U.S. Public Health Service Hospital were moved to a rendezvous area. Mobiles were stationed along the route and kept hospital officials informed of the progress of the convoy. The efficiency with which the operation was carried out drew high praise from the hospital staff. This net has a trailer completely equipped with radio for all-hand operation and room for two to sleep. GY reports some progress is being made in the formation of a c.d. unit in Naples. LR wants to hear from old-timers interested in joining the Quarter Century Wireless Association. Traffic: W5SMK 384. BKH 206. W5GY 182. K51DZ 83. JSN 83. W5ROO 82. K5PNV 65. W5BTH 64. K5HGL 34. LLL 43. W5OCV 40. LR 30. K51JN 27. W5PTL 18. K5KBH 14. IBB 13. ACD 12. W5RV1 2.

OKLAHOMA—SCM, Richard L. Hawkins, W5FEC—SEC: K5KFS. RMs: JXM and K5JGZ. PAMs: DRZ, MFV and VCJ. The Lawton-Ft. Sill Hamfest was a huge success with hams from all over Oklahoma present. VCJ has been appointed as V.H.F. PAM. Contact him for all information on v.h.f. activities in the section. MMD has a new 32S-1. Dyed-in-the-wool c.w. man JKS has discovered a.m. and 15 meters. K5CBA, K5DUJ, UCT and K5MYF met the requirements and were issued OLZ/SSZ certificates. KN5OXF and KN5SHF are planning a Dallas trip for that General Class ticket. New EC appointees are KUC, UYQ, PHP and K5JOH. The State C.D. is trying to get RACES started on a state-wide basis. PAA has a new beam up. A new ORS appointee is K5JGZ. EHC renewed his OPS appointment. PML is due back from D14-Land. Do not forget to attend the ARRL National Convention at Galveston, Tex., June 19, 20 and 21. Please report your station activities by the 5th of each month. Oklahoma Ham of the Month: PNG for his years of faithful attendance and support of the c.w. traffic nets. Traffic: W5DXI 538. K5MBK 375. USA 350. W5DRZ 341. K5JGZ 130. W5KUC 103. VVQ 47. MGK 43. K5JTW 33. W5CCK 28. FEC 28. K5OCZ 28. INC 27. W5MFX 23. K5CBA 16. W5WAF 15. PNG 14. YZB 11. UCT 9. ESB 8. K5EZM 8. KFS 8. W5HIM 7. K5BAT 4. ELG 4.

SOUTHERN TEXAS—SCM, Roy K. Eggleston, W5QEM—SEC: QKF. PAM: ZIN. RM: K5BSZ. EGD is the new president of the Gaylarks. New officers of the Corpus Christi Radio Club are QEM, pres.; APT, vice-pres.; GPV, secy.; K5KRZ, treas.; HJM, act. mgr.; K5ONX, pub. mgr. In addition to the officers the following directors were elected: AQK and SIL for two-year terms, CRO and KNSTFO for one year. The 7290 Traffic Net had 39 sessions, 465 messages and 1363 station check-ins. LOW and PMT are moving to Oklahoma City. K5EYL to College Station, Tex., and QPA to Pensacola, Fla. South Texas certainly will miss these work horses, but our loss is some other section's gain. KN5MMY is anxiously awaiting the nice piece of paper that will allow him to drop the "N" with his call. K5HYS is punching a hole in the ether with a new vertical. Congratulations to K5RYS and K5OEA on making BPL, RYS for the first time and OEA for the third. Chuck, the BPL Medallion will be nice to hang over your bunk in the Submarine. Welcome to 41TV out El Paso way. Also welcome back to DE. AQK is the new EC for Corpus Christi and Nueces County. K5GTO and K5RYS are new OOs covering West Texas. Traffic: (Feb.) K5FGF 972. OEA 509. RYS 196. W5EGD 105. LVC 90. ZIN 64. K5MWH 30. W5QLT 28. K5KBD 9. (Jan.) K5RYS 103.

**CANADIAN DIVISION**

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM's: A. D. Solomon, VE1OC, and H. C. Hillyard, VO1CZ. SEC: 1BL, XY and AAZ have been maintaining daily schedules on 10 meters with VE3EGD/SU in the Gaza Strip while ADU has been working him on 20 meters and handling traffic for the Saint John Area. Newly-elected officers of the Keith Rogers Memorial Club are BZ, hon. pres.; ADR, pres.; BF, vice-pres.; ZM, secy.-treas. Maritime correspondents for the new *Canadian Amateur* magazine are RJ (Nova Scotia) and VE (Prince Edward Island). The Newfoundland AREC was active during a severe storm in February. Those participating included VO1s AO, FB, BU, BJ, AK, PD, BY, DN, AI, BD, DT, DP, ER, EZ, CY, DG/1, CG/1, AB, CZ, K3JQO/VOL, W2ZRX/VO, K6THB/VO, VE1s WL, CZ and OM are trying out new beams. LZ has a new KWM-1 installed in his car. About 150 Nova Scotia amateurs are sporting their call letter license plates. DX stations, working for their WAY or WA CAN certificates on 10 meters, are complaining that the province of New Brunswick is rare DX to them! Don't

(Continued on page 168)

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**The American Radio Relay League**  
West Hartford 7, Conn.

forget the Convention, Labor Day week end, at Halifax, Traffic: (Feb.) VE1VN 84, ABJ 64, OM 17, ADH 13, ES

**ONTARIO**—SCM, Richard W. Roberts, VE3NG—Latest news has it that Ontario Hams are forming an organization known as the Ontario Amateur Radio Assn. BIF is promoting the II Meter Net. This is a coast-to-coast net, CAB broke his ankle, NZ was snowbound. OQN is looking for new recruits, RW is a new OBS on 75 meters, KM is in W4-Land mobile, UY also is in W4-Land mobile, PN has a 600-watt PA, NM is back after a lengthy absence, PY has a new beam, CDX is s.s.b., BXJ runs the Windsor round table Sun, on 3757 kc. at 1400. A new EC in Kingston is EIJ, The Westside RC held its Annual Dinner Apr. 4. The Nortown ARC held its Annual Dinner in March and a very successful one it was, DWN is tech. editor for the new *Canadian Amateur Magazine*. Your SCM and SEC paid a visit to the London ARC and a better meeting would be hard to find. The boys in the Windsor Area decided to forgo the holding of the ARRL Convention for at least a year but latest word is that London will take it for 1959. VD reports that he is working DX with the antenna in his shack, BUR had loads of traffic from the Tampa, Fla., Fair, TM is rebuilding, CFI is working on WAG with the addition of his new NC-300, ASA is vacationing in Bermuda, DTB has a new transmitter, RH has a new receiver, ELC visited in VE2-Land, HE has a new Harvey Wells receiver, Bruce West, of Toronto newspaper fame, has been bitten by the ham bug and expects to get his ticket soon via the Nortown classes, RVT really was snowbound this winter with Five feet of snow, MF has a new Mohawk receiver, Prince Edward Island VEIs are active on 20-meter phone, WAVE applicants, please note, Traffic: VE3BUR 349, NG 104, BZB 90, AUS 87, DPO 81, EII 75, NO 70, AUU 63, TM 60, CFR 44, BJV 41, ANL 40, EIH 26, DMI 23, DUU 21, DH 18, DWW 17, CLF 15, ADN 14, BXJ 14, CDX 11, DLC 9.

**QUEBEC**—SCM, C. W. Skarstedt, VE2DR—Traffic nets: C.w.—OQN, 5535 kc. at 1900, Quebec Phone Net, 3780 kc. at 1845. With deepest regret we learned of the passing of GH, of Lachute. A well-known and beloved OT, he was active until the very end. The sad news of the death of the NYL of LO reached us in February. To both families our sincerest sympathy, WT is a fine c.w. operator at Joliette, AIHW is passing around the cigars; occasion—a junior operator arrived, AKF moved to Abbotsford and is active with a Challenger transmitter, ADR gives code practice and expects new hams in Sherbrooke, WW and YU appear to be leading the local brigade in the ARRL DX Test, CA worked c.w. on all bands, JE is joining the mobile clan, AWK received Phone/C.W. WAC, VOIDQ will sign IN, ARB is ex-3AXS and operates from UN, BAO is successful by DXing with a quad antenna, ASW is back from W-Land, where he signed /W1-5, JI was VO2AT, The Royal Montreal Regiment ham station is BAR, IP worked K7 in Idaho on 80 meters, DZ is back on the air with n.f.m. and an HQ-129X, ACD built a rig using 813s, ASA is the station of the Air Cadet Wing, PY operates VE6NA on a Navy ship, ABE's WAC was confirmed, PG skeds on 80 meters, Club station JC was operated by AWW, AWR, ABE and ATL during the DX Test, ATL is proud of the first club bulletin of JC, ABE will operate FPRC during July, the first Quebec DX expedition to this island, Traffic: VE2DR 78, CP 66, EC 34, ABE 14, JC/2 8, APR 7.

**ALBERTA**—SCM, Gordon W. Hollingshead, VE6VM—PAM: OD, TF and UK recently added s.s.b. adapters and may be heard regularly on 20 meters, SE, in Coultis, reports a 2-meter mobile net is being organized for Southern Alberta and Northern Montana, MO is building a bigger voice on 2 meters with the new antenna he is constructing and hopes to work Calgary with a Viking, AM can be heard regularly on 10 meters, RF, in Grande Prairie, reports difficulty working VE7s with a dead power supply, It seems a mouse and a 868A got together during a QSO, WG can be heard daily on 40- and 15-meter c.w. The Lethbridge Club elected the following officers: IU, pres.; QV, vice-pres.; LC, treas. Traffic: VE6YE 40, OD 16, YM 7, PV 6, TG 5, SS 4, SF 2, TT 2, UK 2, BL 1, OM 1.

**MANITOBA**—SCM, James A. Elliott, VE4IF, Four members of the Beausejour Radio Club are taking the radio monitor course with the civil defense, The ARLM members were guests of a local 807 factory recently, Another code class has been started with 35 members, This class was organized by the ARLM and the Winnipeg School Board, with SR as instructor, Renewed activity is being shown re our license plates, There still is hope! ER still is under the doctor's guidance and is progressing slowly, QX is building s.s.b. Peg, PE, has joined the Advanced class and will be heard on 75- and 20 meter phone, VK3AMH, Bob, has been maintaining skeds with home over Blairs, CP station, Con-

(Continued on page 170)

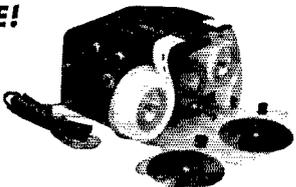
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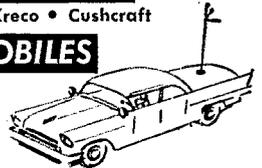
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20	6 Foot	HW-20	
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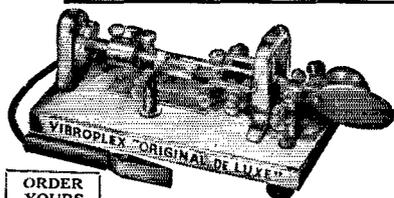
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ALL THE WAY - IT'S EZ WAY

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grats to KP, EG and QX, who passed the Advanced Class exams. XP is rebuilding. EO and LEN did nice traffic-handling jobs during the St. Louis tornado disaster. Traffic: (Feb.) VE4KN 23, GE 9, IF 8, JY 8, QD 8, AN 4, RF 4, EG 3, MW 3, MH 2, TE 2, WV 2, IW 1.  
**SASKATCHEWAN**—SCM. Lionel O'Byrne, VE5LU—At the annual meeting of the Regina Amateur Radio Club the following officers were elected for 1959: DG, pres.; W5GTW/VE5, vice-pres.; HV, secy.; VP, treas. An excellent talk on Wave Propagation was given at the meeting by R.G. JK has been appointed OBS. FA has a new Ranger. LE and JO are heard on s.s.b. 3EDK, ex-5EO, is back home on QSOing the old gang on mobile. Traffic: VE5RE 8, IG 6, QL 4, KV 2, WR 2.

## Monitrol

(Continued from page 19)

are available on the top end of the chassis. The 6C4 and the two relays project horizontally from the right face of the chassis. All connections are to a terminal strip on the back.

Under-chassis arrangement is not critical. The transistors and related circuitry are on a resistor mounting strip raised from the chassis on  $\frac{3}{4}$ -inch separators.

It might be possible to calculate resistor values which would give desired time constants on the speed control. However, values will vary with the transistors used and with the relay adjustment. It is easier to select the resistors empirically (that's a five-dollar way of saying "cut and try"). Our method was as follows: The complete unit was assembled, and wired except for the speed-control resistor network on  $S_1$ . Using test leads, a 5000-ohm variable resistor was connected between point A and  $S_{1A}$  in the position of  $R_1$ . Using the monitor to listen to the signal, the key was closed with  $S_1$  in position 4. The variable resistor was adjusted to give the length of dash desired at the maximum speed setting, removed from the circuit, measured, and a  $\frac{1}{2}$ -watt fixed resistor of equal value wired in at  $R_1$ .

The variable resistor was then clipped across the position to be occupied by  $R_2$ , between point A and  $S_{1B}$ , and adjusted to give twice as many dots as dashes in a given time. The measured value determined  $R_2$ .

Similar procedure determined the values of  $R_3$  and  $R_4$ ,  $R_5$  and  $R_6$ , and  $R_7$  and  $R_8$ , moving the SPEED CONTROL down one notch for each pair. A couple of times, the measured resistance was a value we did not have on hand. When this happened, a new measurement was taken between point A and the appropriate switch contact, and the fixed resistor was installed bypassing those already in place.

### Operation

The key is a Vibroplex, modified by removing the jumper which connected the dot and dash contacts under the base. It is connected to the unit with a piece of four-wire rotator cable from which one wire was stripped and shielding added. The 0.01- $\mu$ f. ceramic capacitor was required to eliminate r.f. pick up. For use with the automatic keyer, a rubber band anchors the weights to the damper mechanism on the back

(Continued on page 172)

# IN STOCK AT RADIO SHACK

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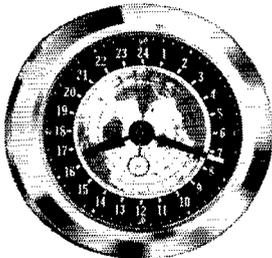
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CA-1252-10	12.6 V.D.C.	500/250 V.D.C.	200/400 M.A.
CA-126D3-12	12.6 V.D.C.	600/300 V.D.C.	200/400 M.A.
IA-1260-10	12.6 V.D.C.	117 V.A.C.	100W—60 CYC.

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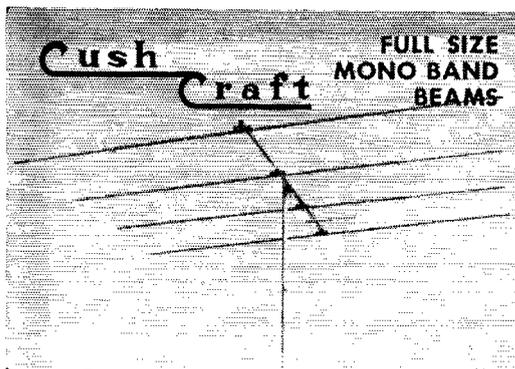
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# TOWERS

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See Page 144  
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of the key. When a visitor to the shack wants to use the bug without automatic keying, the rubber band is removed,  $S_1$  is set to MANUAL, the contacts adjusted using the monitor, and the unit operates as a straight break-in keyer with  $S_2$  in the OFF position.

We use the monitor as a code practice oscillator, and to warm up our fists before going on the air. As for on-the-air operating, we wonder why we waited so long to get the convenience of break in, or put up with the monitoring system we used to have, which had to be retuned every time the transmitting frequency was changed. And it drifted during QSOs besides!

Do we like the automatic key? Well, we never thought our sending was so terrible before we got it, but have since concluded that "even your best friends won't tell you." Requests for repeats are fewer since we have it, and there are more good solid ragchews and fewer QRUs following an exchange of signal reports and QTHs. And that, along with building something new and making it work, is where we get our fun out of ham radio. **QST**

## Armed Forces Day

(Continued from page 67)

allow Armed Forces Day c.w. and RTTY broadcast competitions. Military stations will operate on spot frequencies outside the amateur bands as follows:

Station	Military Frequencies (kc.)	Appropriate Amateur band (Mc.)	
WAR (Army radio, Washington, D. C.)	4020 (a.m.)	3.8 to 4.0	
	4025 (s.s.b.)	3.8 to 4.0	
	6997.5 (c.w.)	7.0 to 7.2	
	20,994 (c.w.)	21.1 to 21.25	
	4010 (c.w.)	3.5 to 3.8	
NSS (Navy radio, Washington, D. C.)	*4012.5 (s.s.b.)	7.2 to 7.3 & 3.8 to 4.0	
	3319 (RTTY)	3.5 to 3.8	
	6970 (c.w.)	7.0 to 7.2	
	7375 (RTTY)	7.0 to 7.2	
	14,385 (s.s.b.)	14.2 to 14.3	
	14,480 (c.w.)	14.0 to 14.2	
	20,075 (c.w.)	21.0 to 21.25	
	**14,927.5 (RTTY)	see note	
	AIR (Air Force radio, Washington, D. C.)	3347 (c.w.)	3.5 to 3.8
		7635 (a.m.)	7.2 to 7.3
14,405 (s.s.b.)		14.2 to 14.3	
15,715 (c.w.)		14.0 to 14.2	

\* Operator transmitting on 4012.5 (s.s.b.) will listen in the a.m. and s.s.b., sections of the 40- and 75-meter bands for a.m. or s.s.b. stations.

\*\* NSS will key 14,927.5 kc. simultaneously with one of the RTTY frequencies listed above. This frequency will be utilized as frequency propagation conditions dictate.

Military stations will listen for calls from amateurs within the appropriate amateur bands. Contacts will consist of a brief exchange of location and signal report. This is a test of military-to-amateur communications and no traffic handling or message exchange will be permitted. A QSL will be sent to each amateur station worked. Each of the military stations will acknowledge separately. **QST**

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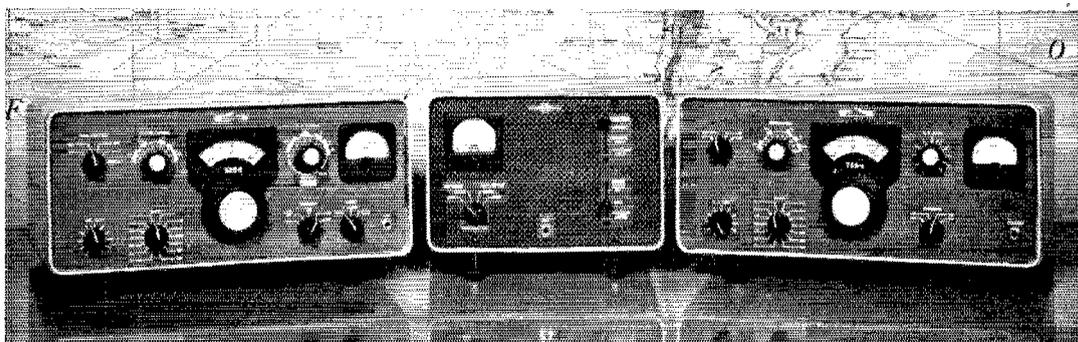
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# TOWERS

ALL THE WAY - IT'S EZ WAY

See Page 144

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## Exit Ignition Noise

(Continued from page 33)

Remove the high-voltage coil and connect the primary wires to the capacitor terminals. Install the spark plugs and set the completed harness in place. The shielded distributor cap should be placed carefully over the distributor and seated properly with the small shim positioned under the cap. Then connect the high-voltage leads to the coil and spark plugs. Dress the cables around high-temperature engine components and tie them down. This completes the installation job.

### Results and Evaluation

The finished version performs perfectly, with all trace of ignition noise gone. The test mobile equipment consisted of a KWM-1 transceiver and a 2-meter Communicator. Since the KWM-1 doesn't have a noise clipper or limiter, reception was practically impossible before changing to the shielded system; with the engine running, the KWM-1 S meter had averaged around 20 over S-9 and only the strongest of signals could break through the noise. This condition was true on all three bands—20, 15 and 10 meters. After shielding there was no noise detectable, either on the S meter or to the ear.<sup>3</sup> The Communicator, with its broad-band i.f., was not so susceptible to the noise as the KWM-1, but again only fairly strong local signals came through. The noise clipper helped a little but the receiver was overloaded with noise. With the shield on, the noise disappeared. The only sound discernible with the clipper off was a bit of vibrator hash from the Communicator's own power supply!

One thing this system doesn't do is cure the other fellow's noise, although this isn't as big a problem as was anticipated at first. In heavy slow traffic, when other cars are near the receiving antenna, noise will disrupt reception. However, we have found that even in normal city driving the average amount of noise from outside sources is small. When it does become excessively strong, the stand-by clipper or limiter in the receiver will usually make the noise more tolerable. One encouraging factor in this situation is that over 20 per cent of the cars manufactured today include resistor plugs as standard equipment. Perhaps some day the figure will be 100 per cent and the noise generated by other automobiles will decrease.

Several untreated cars were tested for noise by driving them up to the mobile receiving antenna. On the whole, normal communication could be carried on with the KWM-1 when the noise-generating car was 25 feet or farther away. On 144 Mc., the separation required was somewhat greater—in a few cases, as far as a few hundred yards. Tests also were made on 2 meters while driving to and from work. The squelch control on the Communicator receiver was ad-

(Continued on page 176)

<sup>3</sup> A Collins representative advised that with normal suppression techniques an S3 meter reading on the KWM-1 was just about the lowest that could be hoped for.

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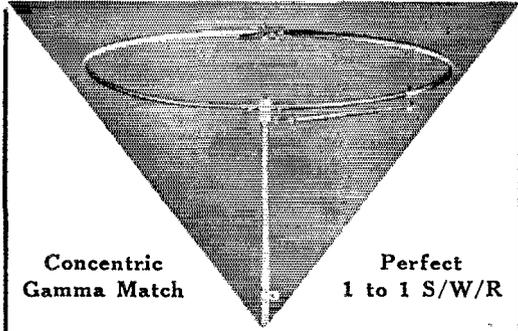


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justed so that the slightest noise would trigger the receiver. When noise from an approaching car actuated the squelch, the other car's relative distance was estimated and recorded. Eventually, a list of cars which should always be given a wide berth when an important contact is in progress was compiled. Naturally, avoiding such cars is not always practical, but it is important when choosing mobile partners for transmitter hunts!

The author wishes to thank W1CJX, W1JZG, W1VON and W3JOR — the latter of the Auto-Lite Company — for their ideas and help in this project.

QST

## Sweepstakes

(Continued from page 68)

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K51QA...10,064-99-41-A-22	KN5QWH...5720-80-32-A-28	KN5QJN...8040-71-32-A-23
W5LMI...3713-56-30-A-6	KN5QCP...1235-27-19-A-11	

<i>Wyoming</i>		W7ABO...72,562-511-71-B-34
W7HRM...45,480-379-60-B-22	W7BHH...35,650-234-62-A-26	W7SQT...458-14-13-A-2
KN7CRL (K7L DLN KN7CRL)	13,590-166-52-A-40	

(Continued on page 178)



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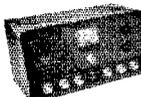
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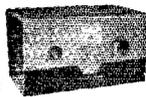
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Bandswitching 6 & 2M Xmitter. Power input 60w CW; 55w AM on both 6 & 2M. Regulated screen supply, 4-stage RF section. Provision for mobile use. 52-72 coax output. New duo-band final tank circuit eliminates switching.

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Complete Xmitter, 80-10M, 100w PEP DSB input, suppressed carrier 40w AM, 50w CW. Min. 35db carrier suppression. 3-stage RF section, pi-net; speech clipping. Inverse neg. feedback.

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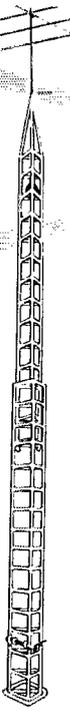


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K4LWI... 27,913-193-58-A-23  
K4LNA... 19,916-208-52-B-27  
W4WOG... 16,231-125-53-A-10  
W4PBR... 9928-105-38-A-10  
KN4ZX... 1928-37-18-A-21  
W4CIU... 176-8-B-3  
K4MMO K46 AMO (SSB)  
N1,765-474-69-A-35  
K4UEE (K4UEF, KN4YKL)  
32,873-250-52-A-29

*Eastern Florida*  
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K4DAS... 138,006-798-71-A-40  
W81DJN/4120-420-670-72-A-40  
K4QEP... 116,100-645-72-A-40  
W4BTO... 68,258-535-64-B-37  
K4QED... 66,83-490-67-A-26  
K4JLD... 55,360-350-64-A-39  
K4KDN... 47,600-340-56-A-18  
K4MZN... 18,988-155-49-A-19  
K4EHH... 14,263-149-38-A-39  
K4QPT... 13,683-144-38-A-4  
K4RJJ... 11,788-115-14-A-10  
W4MW... 10,725-116-39-A-13  
W4EIV... 6,795-76-36-A-10  
K4HOK... 5,160-67-32-A-4  
K4FORU... 5,119-62-35-A-27  
KN4ZRT... 4,600-55-28-A-15  
K4DRO... 2,600-40-26-A-11  
W4SAS... 2,400-49-20-A-11  
KN4ZDW... 900-24-15-A-17  
W4JO... 63-5-5-A-1  
K4TGY... 3-1-A-1  
K4NCN (W4KNY, W4CHX)  
97,808-629-63-A-40  
W4DFU (8 oprs.)  
54,150-365-60-A-35  
K4VRW (K4s PVH VRW)  
2970-52-24-A-10

*Western Florida*  
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W4JLW11... 98,140-717-70-B-40  
K4MFL... 21,895-181-58-A-18  
W4AXP... 66-6-6-B-2

*Georgia*  
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W4HBO... 116,375-665-70-A-35  
K4MOF... 97,625-550-71-A-31  
W4BXY... 90,304-525-69-A-24  
W4ZKU... 90,000-625-72-B-40  
K4EWW... 82,626-503-71-A-27  
K4ATM... 79,950-492-62-A-40  
K4PEG... 42,415-250-68-A-34  
W4LQ... 38,088-281-69-B-32  
W4LDD... 32,603-207-63-A-21  
K4EEK... 30,674-248-58-A-16  
K4KZF... 19,736-140-57-A-16  
K4HIG... 17,438-155-45-A-18  
W4BFE... 16,730-120-56-A-11  
W4GGD... 13,228-143-37-A-15  
W4GSD... 11,858-140-34-A-14  
K4PIC... 10,120-95-44-A-20  
K4LAX... 10,120-95-44-A-20  
K4OLQ... 853-34-11-A-7  
K4QYW... 701-26-11-A-9  
KN4SV... 20-4-2-A-1  
K4SVT (W4WKP, K4s JBY SVT UWL VGO)  
84,056-532-68-B-40  
W4BKJ (W4BKJ, W4P, KN4-ZMR)  
7,725-108-30-A-17  
K4UJB (K4UJB, KN4YAU)  
490-15-12-A-13

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WP4API... 210-13-8-A-6

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KZ5LC... 7613-88-35-A-12

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W6SRB... 145,965-865-68-A-37  
K6GLC... 117,540-663-72-A-39  
K6IBP... 112,778-690-66-A-40  
K6YD... 100,618-572-70-A-37  
K6JOV... 92,300-520-71-A-40  
W6NKE... 91,501-517-71-A-36  
W6HAL... 86,310-619-70-B-40  
W6PZH... 85,520-536-64-A-40  
W6PXX... 82,564-529-69-B-  
K6JED... 69,550-428-65-A-36  
K6ELQ... 65-410-456-62-A-30  
K6TVL... 62,744-520-62-B-37  
W6SRT/6 57,333-323-71-A-32  
K6JBY... 53,925-366-60-A-17  
K6MSG... 49,613-329-63-A-28  
W6OTV... 42,701-291-55-A-53  
K6GSL... 41,118-312-66-B-28  
K6UYK... 40,413-265-61-A-25  
K6SELJ... 40,350-270-60-A-20

K6REP... 32,373-283-46-A-35  
K6PANQ... 31,070-241-52-A-29  
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K6KYH... 26,000-202-64-A-20  
W6UQC... 24,360-233-42-A-32  
K6VDK... 19,020-161-48-A-10  
K6CQF... 18,595-131-57-A-8  
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K6HSQ... 11,320-143-32-A-35  
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W6CIS... 10,368-72-72-B-  
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K6YNB... 9258-92-46-A-7  
K6NJB\*... 8740-94-38-A-17  
W6WDD... 3400-105-32-A-  
W6ACL... 7553-105-38-A-11  
W6UEJ... 6219-100-25-A-31  
K6CDW... 6160-77-32-A-7  
K6VVD... 5981-73-33-A-11  
K6AQB... 4169-64-29-A-24  
K6PVS... 3648-55-24-A-11  
K6MKG... 3648-55-24-A-11  
W6UGU... 3120-64-16-A-8  
K6QIP... 2560-33-24-A-5  
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K6RTE... 1978-44-23-B-13  
W6BRDQ... 643-31-7-A-4  
W6RFX... 643-31-7-A-4  
KN6SJI... 525-15-14-A-12  
K6PNG... 523-19-11-A-4  
K6TZY... 481-18-11-A-6  
K6EPE... 310-8-9-A-8  
K6PUS... 30-4-3-A-1  
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KN6SWL... 8-3-1-A-12  
K6LGT... 5-2-1-A-5  
K6QEH (3 oprs.)  
64,268-392-66-A-34  
K6KIV (K6s KIV QIP)  
5100-68-30-A-9  
W66AFA (W6UGU, W66AFA)  
3-1-1-A-1

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K7AII... 97,020-596-66-A-40  
W7ZMD... 93,365-526-71-A-36  
W7AAT/7 36,304-231-63-A-18  
W7GANL... 13,178-127-42-A-18

*San Diego*  
W8ZVQ... 158,330-892-71-A-30  
W6JTA... 138,883-765-73-A-40  
W6WYN... 79,170-609-67-B-35  
K6VZA... 427-7-A-36  
W6ACE... 55,263-322-70-A-36  
K6BCG... 44,688-275-65-A-35  
K6OLS... 21,890-199-55-B-16  
K6EQ... 18,143-123-59-A-9  
K6LLE... 16,645-114-1-A-15  
K6LLI... 6425-130-20-A-16  
W6AJB... 5458-64-37-A-19  
K6CEK... 4530-76-24-A-  
K6EJK... 3173-83-15-A-16  
W6YZD... 128-8-8-B-1

*Santa Barbara*  
W6UJS... 114,245-785-73-B-33  
W6JTA... 51,480-315-66-A-33  
W6DVT... 41,669-283-59-A-26  
K6POF... 10,801-96-45-A-21  
W6OUL... 4,000-50-32-A-6  
KN6TTS... 140-8-7-A-1

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W5GNE... 76,456-475-65-A-37  
W5HGN... 75,311-537-57-A-25  
W5TPZ... 62,134-401-63-A-40  
W5DLM... 45,744-293-65-A-29  
K5IDZ... 41,250-250-66-A-40  
W5RVL... 38,640-278-56-A-22  
K5GHP... 31,590-235-64-A-24  
K5PVC... 27,560-209-53-A-37  
K5RQ... 12,556-116-45-A-  
K5GPM... 10,593-112-38-A-12  
W5LR... 5931-73-33-A-  
KN5QJH... 1350-33-18-A-11  
K5LSY... 525-18-12-A-4  
K5DRC (K5s A2D DRC)  
91,375-540-68-A-40

*Oklahoma*  
W5YJS... 114,835-683-68-A-34  
K5IZM... 112,158-844-67-B-39  
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W5LW... 76,680-428-70-A-30  
K5ETM... 27,030-215-51-B-  
W5YKB... 13,892-151-46-B-12  
KN5OKY... 5005-80-28-A-21  
W5LQ... 2013-35-23-A-8  
KN5OJD... 875-32-14-A-22

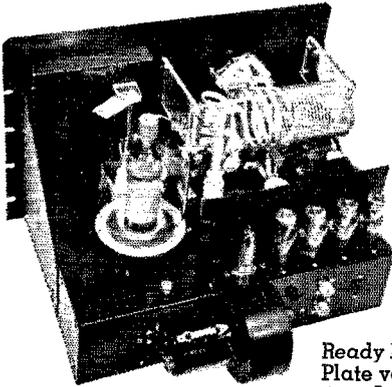
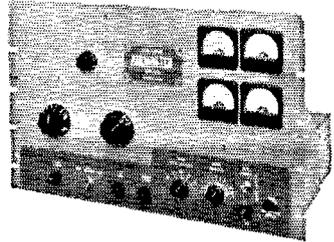
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W5WZQ... 146,340-819-72-A-40  
K5BSZ... 93,600-520-72-A-26  
W5JY... 75,633-43-71-A-19  
K5JZY... 75,663-43-71-A-19  
W5JHE... 71,190-452-63-A-31  
K5JEH... 63,315-404-63-A-30  
W1PVF/5 37,520-269-56-A-30  
KN5PEL\* 31,608-270-47-A-40  
K5LW... 2792-191-59-A-29  
W5DB... 9068-117-31-A-12

(Continued on page 180)

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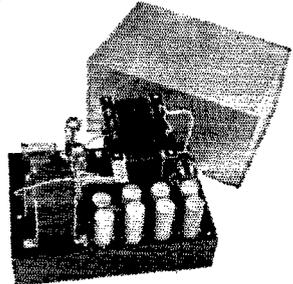
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 VE1EP...1088- 34-16-B-5

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 VE2AZN...44,530- 293-61-A-35  
 VE2OL...42,750- 285-80-A-20  
 VE2AWR...14,513- 219-27-A-27  
 VE2AHW...3,115- 46-28-A-7  
 VE2AJD...2970- 51-24-A-12  
 VE2ARA...2050- 42-20-A-6  
 VE2PZ...1575- 35-18-A- -  
 VE2AZI...120- 3- 6-A- 5

*Ontario*  
 VE3UOT<sup>12</sup> 130,889- 899-73-B-40  
 VE3DSU...115,575- 670-69-A-35  
 VE3AGX...85,994- 699-62-B-40  
 VE3EAM...76,600- 500-63-A-21  
 VE3EU...70,875- 406-70-A-28  
 VE3DH...49,519- 416-65-A-34  
 VE3ACB...61,880- 364-68-A-34  
 VE3DBP...53,760- 454-48-A-35  
 W0A1H/VE3 48,320- 303-64-A-17  
 VE3AVS...38,800- 290-67-B-28  
 VE3AM...29,510- 214-36-A-31  
 VE3AWR...28,767- 335-43-B-18  
 VE3DDU...20,329- 209-39-A-13

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 W3MCG/VE4 72,720- 610-60-B-24  
 VE4BK...20,719- 166-51-A-27  
 VE4WT...1760- 32-22-A- 6

*Saskatchewan*  
 VE5VP...48,454- 330-59-A-19  
 VE5DZ...28,520- 242-62-B-29

*Alberta*  
 W7PSO/VE6 42,210- 272-63 A 24  
 VE6QV...30,495- 216-57-A-27  
 VE6CX...26,036- 204-53-A-30  
 VE6UW...15,060- 126-48-A-15  
 VE6TY...7438- 85-35-A-11

*British Columbia*  
 VE7JO...87,678- 501-70-A-36  
 VE7CQ...81,578- 448-73-A-30  
 VE7LB...32,900- 236-56-A-14

*Yukon/N.W.T.*  
 VE8JW...108,186- 613-71-A-35

<sup>1</sup> WA2AAX, opr. <sup>2</sup> W7UHK, opr. <sup>3</sup> W3AFD, opr. <sup>4</sup> K2JVB, opr. <sup>5</sup> W7YAG, opr. <sup>6</sup> W1WPR, opr. <sup>7</sup> Hq. staff, not eligible for award. <sup>8</sup> W1F8J, opr. <sup>9</sup> W4YZC, opr. <sup>10</sup> W0FVD, opr. <sup>11</sup> W4HBK, opr. <sup>12</sup> VE2NL opr. *Non-competing* W3CDQ, W4ISS, W7PUV, W8s KJK TZO, W9QGR, W0KTR, KL7PI, VE1AR.

## Happenings

(Continued from page 85)

not because it is preferred to phone as such. Every technical means possible must be adopted if a useful signal-to-noise ratio is to be achieved, including particularly the use of high-gain rotatable directive antennas.

It is a well-established characteristic of antennas of this type that high gain is secured by sacrificing bandwidth. In the larger antenna arrays such as are used for this work the optimum performance is secured, at 50 Mc. for example, over a band of only 200 to 300 kilocycles each side of the design frequency. The antenna may be usable, although with a reduction in gain and other desirable characteristics, 400 to 500 kc. from the center frequency, but is essentially useless at frequency departures of as much as one megacycle.

Because of the nature of ionospheric propagation at 50 Mc., previously discussed, amateurs using such arrays have designed and built them for frequencies very close to 50.0 Mc. These antennas represent a very considerable investment in time as well as money, and there would be a natural reluctance to modify them for 50.9-51.0 Mc. since that frequency offers only the prospect of much-reduced opportunity for interesting work in the field of ionospheric propagation. Aside from this, it should be appreciated that this type of work is by no means the only activity in which these operators are engaged. They, too, participate in ordinary domestic communication, and since the various types of ionospheric communication discussed above are the exception rather than the rule, it follows that such domestic communication occupied a large proportion of their available operating time. As the Commission observed in its findings, this type of operating tends to concentrate near the low-frequency edge of the 50-54 Mc. band, where antennas designed for ionospheric work are principally useful.

*Concerning the 144-148 Mc. band:* So far as current knowledge indicates, there are no significant differences in propagation attributable to frequency within this range.

The argument for an exclusive c.w. assignment at the low-frequency end of the 144 Mc. band is essentially that this is the part of the band in which weak-signal long-distance work has in the past been concentrated; that existing equipment and especially antennas have been developed and constructed for the low-frequency edge; and that in view of the greater electrical and constructional complexity

(Continued on page 138)

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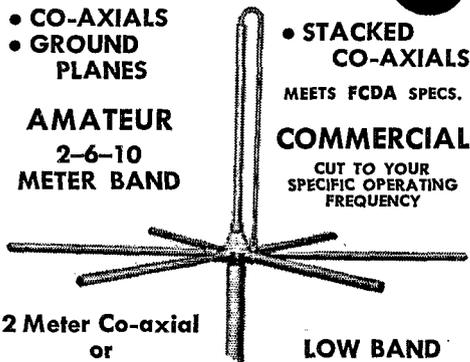
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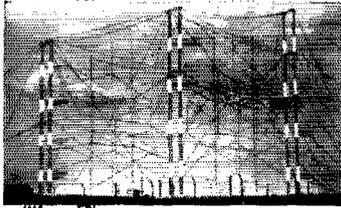
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of high-gain rotatable antenna arrays in this frequency range, real hardship would result if the arrays had to be redesigned and rebuilt for the 148 Mc. edge of the band. In many cases, perhaps most, no such changeover would be undertaken.

The exact location of the proposed exclusive c.w. segment within the 144-148 Mc. band does not appear to be a paramount issue with those voicing objections to the original proposal, as judged by inspection of the sample comments dealing with the report and order.

*Concerning the Value of Scientific Contributions by Amateurs in the VHF Field:* The amateurs have a deserved reputation for discovering new methods of radio propagation. Because of their number and geographical distribution, as well as the enthusiasm with which they devote long hours to being "on the air" and the avidity with which they strive to extend the distance range over which they can carry on communication, discovery comes naturally to them. Everything that the amateur has discovered in this field has, sooner or later, drawn scientific attention and study, frequently leading to new theories of propagation and to new and useful approaches to frequency allocation and utilization. The League believes that this penchant for discovery should be fostered to the fullest extent by the regulatory authority as being manifestly in the public interest. The proposals for exclusive c.w. assignments as originally fostered by the League and as proposed by the Commission in its notice of proposed rule-making of June 11, 1958, are in our opinion a useful and necessary step in this direction. It is also our opinion — and that of many amateurs concerned, as expressed to us since the issuance of the report and order of December 11, 1958 — that for the reasons outlined above the effect of the Commission's action is for all practical purposes equivalent to complete denial of the original proposal.

The League therefore asks that the Commission reconsider its order, with a view to restoring the frequencies assigned exclusively to A1 operation to 50.0-50.1 Mc. and 144.0-144.1 Mc, as set forth in the notice of proposed rule-making dated June 11, 1958.

The American Radio Relay League, Inc.  
BY PAUL M. SEGAL  
Its General Counsel

A. L. BUDLONG General Manager  
March 3, 1959

## Correspondence

(Continued from page 95)

ships have been formed between American, Canadian and British amateurs. This is obviously a very good thing and one which should be encouraged.

I have noticed, however, that there is still a surprising lack of knowledge on either side of the Atlantic about the other fellow's technical developments and equipment position. This must be attributable to the lack of interchange of technical publications.

During the past few years I have advised a number of British amateurs to subscribe to *QST* in order to learn about the latest developments in the U. S. A. and have also been instrumental in several hundred W/K/VF amateurs subscribing to the *RSGB Bulletin*. This interchange of information must surely add considerably to the pleasure we derive from our hobby.

With this in mind I have approached the Radio Society of Great Britain who have agreed to supply me with a sufficient number of copies of the *Bulletin* to send specimens to any American or Canadian amateurs who are genuinely interested in subscribing on an annual basis. The subscription is \$4.00 a year, and carries with it membership in the RSGB.

If *QST* readers who are interested will write to me I shall be pleased to send a specimen copy to them, and give them whatever assistance I can.

— J. Douglas Kay, G3AAE/GC3AAE

## NO DEDUCTIONS

4932 Marie Tobin Drive  
El Paso, Texas

Editor, *QST*:

I was recently informed by one of the locals that there is a tax ruling to the effect that money spent for procurement of

(Continued on page 184)

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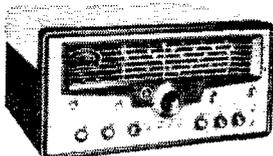
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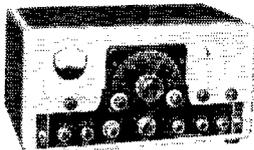


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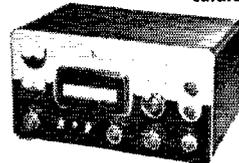
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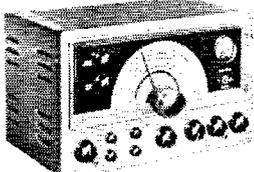
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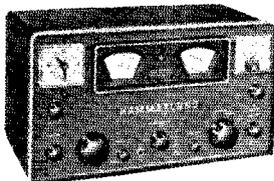
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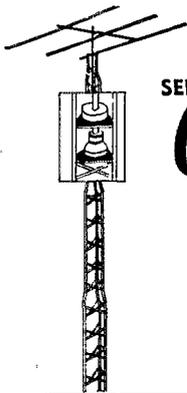
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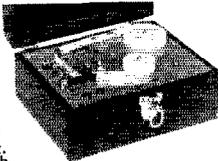
# TOWERS

ALL THE WAY - IT'S EZ WAY

See Page 144  
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## What Is This Thing Called the "Hump" in CODE?

THE hump (around 8 words) is the thing that tells you you have wasted your time by starting out wrong. Thirty years ago when we started teaching Code our students too ran head-on into the hump. We went to work to find out why. TWO-PHASE, STEP BY STEP instruction is the perfect answer. In this method dotdash is not A. The SOUND resulting from dotdash is A. There is also the important factor of correct timing. If the signals are not timed correctly the resulting sound will not be correct. There are many, many things connected with proper Code instruction, many of them so small they seem inconsequential. Others are so technical that many so-called experts fail to understand them. It's a long story but I have it all written up and will be glad to send it to you. A postcard will bring you the full story.



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equipments utilized in participating in Civil Defense organizations such as MARS can be deducted for income tax purposes. This local claims to have seen this ruling in one of the issues of *QST*, but he does not remember which one.

— Michael Geller

[EDITOR'S NOTE: Your friend has the wrong magazine, OM; and besides, the item was incorrect! Under certain conditions expenditures *exclusively* for civil defense activities may be deductible for income tax purposes, but this most certainly does not apply to an individual amateur's expenditures for gear which is used occasionally and incidentally for RACES drills, etc.]

### CODES?

2616 Lyndhurst  
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Editor, *QST*:

There has been much discussion recently in the St. Louis area regarding the use of the much-popularized "Ten" signals commonly in use by law enforcement agencies. Some amateurs contend that they are strictly illegal. We have not yet been able to have the term "illegal" completely defined. Some contend that the "Ten" signals, of which there are about 100, are top secret and should not be known by persons other than law enforcement officers, while others believe that their use is in violation of FCC regulations.

I should appreciate your comments on this matter and your interpretation of FCC regulations relative to the use of these so-called secret codes.

— Stephen B. Godwin, KØPXI

[EDITOR'S NOTE: The amateur rules prohibit the use of codes and ciphers when the intent is to conceal the true meaning. Inasmuch as the "ten" code is not secret, its use by amateurs is permissible.]

### TIME

c/o Federal Electric Corp.  
Box 2330, Edmonton,  
Alberta, Canada

Editor, *QST*:

It's high time *QST* got on the ball and quit this silly business of quoting times (contest and the like), in PST, PDST, MST, EST, CST and all the other ST's. Soon we are going to have NYST (New York Standard Time) and NYCDST (New York Central Daylight Saving Time) and TMWNYST (Twenty Miles West of New York Standard Time.)

There's only one time in world-wide radio communications and that is GMT. Why can't all hams use this? Our logs would then be in time phase — very useful when checking QSL cards — and there would be none of this agonizing mental arithmetic while rattling along on the bug. We have enough confusion on our bands as it is without this added confusion of times. So, let 1959 be observed as a "Use GMT Year."

— Jack Campbell, VE8MX

All DX contests announced in *QST* show GMT. However, experience has proved there is no point in showing a local QSO party — such as the Wisconsin QSO Party only to Wisconsin hams — in anything but CST. New amateurs are sometimes confused by conversion to the 24-hour clock (i.e., where 9:30 P.M. equals 2130), and even more so by conversion from local standard or daylight to GMT where the date can be affected. Moreover, for reasons involving the contest concerned, the ARRL Novice Roundup, Field Day and V.h.f. Parties start on a *local* time basis. This cannot be expressed in GMT because the beginning time varies with the time zone of the participant.

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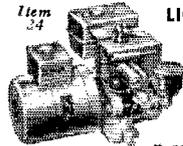
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## How's DX

(Continued from page 76)

has been pushing phone on 15 and 10. . . . FK8AS takes a dimming view of possible ZM7 outings on his part. . . . ZL3DX & Co. aspire to a multiband VR5AC-ZK2AC-ZM6AC onslaught later this month, mainly on 20 sideband. . . . VR2DA is considering year-end VR5 and/or ZM7 possibilities. . . . A full-fledged CR10 probe appears imminent, probably KWM-1 style. . . . Ex-VR3A now seeks to carve another DX niche as VK2ANB. . . . VK9s XM and XN keep Christmas Island intermittently available, 20 preferred.

**Europe** — ON4QX intends to concentrate this month's 3A2CZ activity on the low c.w. edge of 20, according to a dispatch from K4DKX. . . . K1QJL and F7CV (W4ZJY) report on Americans in Paris and vicinity; KN0SDY is QRX for his Technician ticket and F7 label. . . . W5WNF, newly licensed as F7FO, works the world on 15- and 20-meter sideband. . . . F7DI is QRT and homebound. . . . F7DJ likewise in mid-March. . . . F7BX moves toward s.s.b. activation. . . . Yanks in France now are authorized mobile operation and inputs up to 400 watts. . . . F7CV has a fresh WAC tapestry but finds WAS elusive. "In almost eight months of operation here on 20 c.w. I've heard only two W's." . . . K1BVI brings us up to date on MARS action in Spain, currently the nearest thing to hamming there so far as Yanks are concerned. "At present there are six authorized and operational MARS unit stations here. The oldest and NCS, AJ2GA, has been in operation more than three years. Several more are expected to be authorized in the near future." . . . OY7ML's late single-sideband splurge netted some 700 QSOs in 54 countries, about 75 per cent of all activity involving W/Ks. Martin and the many who captured their first Faeroes s.s.b. contacts have K6AXS to thank for the loan of that KWM-1 transceptor. . . . W6VLH goes to Rome for the rest of this year and inquires as to HV operational opportunities. . . . 11DFC and friends fired up 1IEZZ/M1 for much 28-Mc. s.s.b. fun this spring, W8GKB being one of the early birds. . . . Continental snippets shipped by W6KG; W4KAC goes to Greece this month with hopes of Crete operations. . . . Czech globe-girdling expedition (OK7IIZ) plans should be bearing fruit by now, possibly putting Albania on the air at the first stop. . . . From K4SCW/mm: "I'm working on getting a Greek license and may be able to visit Rhodes occasionally." SV0WP (W3JTC) interests Dick in the autonomous republic of Mount Athos, the smallest of Greece's departments and a religious community purportedly off limits for all females. . . . You *neer* can tell, anymore. G3CQE and buddies drew the tag (G3GD) for their planned Isle of Man swoop last month. K9ELT states that a KWM-1 and 3-el. Mosley spinner set the boys up strong for the throng. . . . Russia's world-wide phone contest in mid-March was announced much too late for QST coverage but W1AW carried the ball. *You're* missing the boat if you don't audit the Maxm Memorial Station's bulletin transmissions at least twice weekly. Lads s.s.b. W2VZY and colleagues welcomed Poland's first s.s.b. ham station, SP3PL, also operated by XXL SP3SQ, to the DX scene. Julian pegs 150 watts on 10 through 80 meters. Ws 2MA 3SX and 2VZY were SP3PL's first U. S. sideband contacts in that order. . . . WYDXC understands that HA5AM discounts any early HA5AM/ZA possibilities. . . . WGDXC observes that 8M5WN/LA/p ticked off some 400 QSOs in the opening '59 ARRL DX Test period and still pursues Ark., Idaho, Me., the Dakotas and Utah.

**Hereabouts** — W1TS brings up a suggestion we've heard before but he gives it a hard logical sell: Why not designate a *testing segment* to be voluntarily employed when loading up antennas, checking TVI, etc., on our busiest band, 20 c.w.? Each kilocycle on 14 Mc. is a precious commodity, as any pre-hunter will agree, and there's far too much AB emission messing up QSOs day after day. Most of this key-down stuff is superfluous, to be sure, but the remaining necessary testing is still too heavy to be ignored. Don recommends the 14-100-14,110-ke. slot as a starter, a specification that should make neither phone nor c.w. factions very unhappy. Now how do we roll the ball? It's up to you, of course. . . . Eva and Alex of old CN8MM now reside in Sao Paulo. PY1CK (PY9NA) says the prominent DX duo hope to become PY2 DXers directly. K2UYG notes that an 11-year-old neighbor is a nephew of contest-conqueror W9IOP. The lad has become an ardent s.w.l. but can't see how anyone can possibly enjoy c.w. work. Time for an avuncular explanation of the birds, bees and bug. Larry? . . . W8WDZ, now KA2DZ, brushes us up on our Fletcher Ice Island ham history: "Yours truly was the first amateur on, and to operate from, T-3. Cull signs used were KL7AGP/mm and NARS AK1BD; the period of operation extended from April through June of 1952. There were only 36 king-size QSL cards with T-3 postmarks on them forwarded for this activity. I can't recall for sure, but either W7LTK or W6NCP scored the first

(Continued on page 188)

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60w CW, 55w AM **\$129.95**

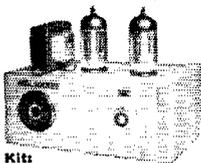
52-72 ohm coaxial output matches all beams and most dipoles. Variable antenna loading control. Regulated screen supply. Four stage RF section, all metered, allows straight through operation. Harmonic and TVI-Suppression. Reserve power for accessory operation from chassis rear socket (VFO, speech clipper, relay, etc.). Provisions for antenna changeover relay. Suitable for mobile use; provisions for plug-in power supply. New duo-band final tank circuit eliminates switching and increases efficiency.



Wired: **\$59.95** In Kit Form: **\$49.95**

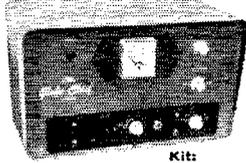
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**Screen Modulator SM-90    Globe Chief 90A    Universal Modulator UM-1**



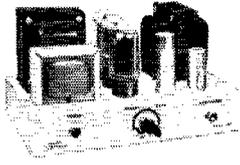
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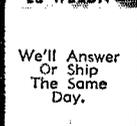


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QSO with Fletcher's Ice Island." . . . . K4IGD claims the world's DX and miles-per-watt records for his outfit, the Army Ballistic Missile Agency, as a result of the performance of *Pioneer IV*. Come to think of it, 400,000 miles on 180 milliwatts is quite a stretch. This was v.h.f. monkey business but K4IGD of Redstone Arsenal is an avid 15- and 20-meter c.w. DX man . . . . Don't forget the concluding session of Radio Society of Bermuda's W/K/VE contest on the 8th-10th of this month, men . . . . W9UBI managed to squeeze in a DXCC between atomic physics homework sessions, a neat trick in these days of complex scholarship . . . . W6TT, Ks 2IQJ and 3EFR recently dropped in on KP4KD and, with about 800 contest QSOs in February, Ev wonders where that month went. KP4KD nears phone DXCC membership status now; CE0ZA made it 241 worked, all told . . . . "San Diego DX Club's DXpedition to Mexico's Socorro Island is canceled on word from XE1YF that only Mexican citizens will be permitted to go there. All-Mexican XE4B may be heard before June." This heartbuster from W6CAE . . . . W9IHN was visited by VK3AZW for three days in February. Chuck writes, "Strangely enough, on the first night he was here we raised VK3CX right off the bat, an old buddy and only three miles from VK3AZW's home — no sked!" . . . . Niagara Frontier DX Association offers a "DX Signal of the Month" award to bombshell-type DX stations. W2GBC tells us that CE0ZA won it handily for January . . . . K2QXG points out that Serrana Bank has been added to the list of areas to be counted toward his "20-K" certification . . . . W8UMR and T2HP verge on the "DXCC" brink . . . . Cute ARRL Test approach by W2HJJ: "Worked one station in each country heard and came out with 110 countries in about 16 hours of the first c.w. week end. From checking with other participants I gather there were at least 130 countries worked, so I guess I'm not such a good snooper." ARRL HQ, Wis ICP and WPO multipopped for 97 countries in the Test's opening session. (Boss, did it really take you twelve years to make DXCC? — Jeeves) (True, Jeeves, but we really didn't try hard till we got to No. 17 confirmed.) . . . . Miscellany provided by DXCSL, OYARA, VERON and WGDXX: The green light is a-glimmering for the Ohio Valley group's projected Guadalupe gallop. . . . W4JRD/KS4 is due back home after a low-pressure 14-Mc. San Island solo. . . . ZL1AV, visiting K9ECC, would like to wend his way homeward in the company of VP2VB/mm aboard *Yasme III*. Danny now takes a breather as VP2GDW after salvaging some twenty crates of paraphernalia from the battered hull of *Yasme II*, abandoned after becoming rockbound in the Grenadines early this year . . . . The KS4BB party's voyage toward Serrana Bank was so interesting and so well radiated around 14,050 kc. in mid-March that the land-based activity itself came almost as an anticlimax. KV4AA served as u.c.s. for YN4DLS/mm Stateside liaison. W3WV, who arranged invaluable radio bearings for the lads from time to time through Navy facilities, is W3PZW's OM, in case you didn't know; which fact added a family flavor to the whole affair. Well done!

Ten Years Ago in "How's DX?" — A dire need for innovations in the DX field is stressed by the prologue of your May 1949 column, including allocation of auto-ignition frequencies other than 10 and 20 meters . . . . W4JQ's postwar 75-meter phone WAC is said to have been clinched by JA2AT. W9AND and VE7IC added 80-c.w. all-continent claims, and W4BRB reached the 3.5-Mc. sixty-country mark. Goodies on 80: FA8BG, HA5B, HP1BR, JA3AA, KG6DI, KW6AP, OX3BC, TG9JK, VP2LX, YV4AW, ZB1AR and ZS6DW . . . . Forty's favorites appear to be FA8AD, FT4BA, GD3UB, HA4SA, HR1AT, SU1CR, UA0FB, Ws 1LBW/C1 8SIR/KG6, ZCs 6UNJ and 8PM . . . . Twenty-meter code reports dwell upon Cs 1JH 4RK, FT4AJ, MI3ZZ, VK1VU, VR5s IP PL, roving Ws 6YNK/HS 6ZNT/KW6 0HWI/KS6 0MCF/C3, YK1AF and ZC1CL. Fancied on 14-Mc. phone are AC4RF, AR8BC, FQ8SN, FT4AT, MD4BPC, MI3SC, PK4DA, VR3C, VS7NX, Nepal's VU7AF, YK1s AA AB and ZC1AZ . . . . Ten eases pace but produces MB9BN, MF2AA, MT2E and VR3A on voice. LX1AC and TA3GVU on c.w. . . . . There's a note on the formation of the Ohio Valley Amateur Radio Association with a flock of crack DXers involved . . . . Well-worked VK3MC appears photographically, and Jeeves finds himself somewhat up a tree. QST

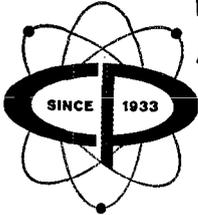
## World Above 50Mc.

(Continued from page 79)

reached. The cycle is then repeated. Tone modulation is used to facilitate copying the signal on receivers not equipped with beat oscillators. A frequency in the 2-meter band will be added later, if interest warrants. This info is from W3LDA, trustee of the station.

After several years of informal meetings of the v.h.f. men of the Portland area, the group have organized the Columbia River V.H.F. Society. Members come from Vancouver, Hillsboro, Gresham, Clackamas and St. Helens, (Continued on page 130)

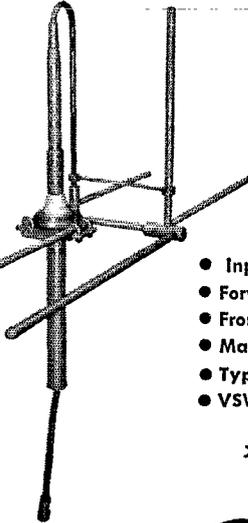
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# TOWERS

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See Page 144

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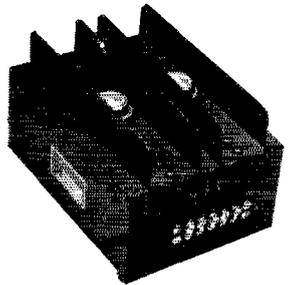
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SEE PAGE 181

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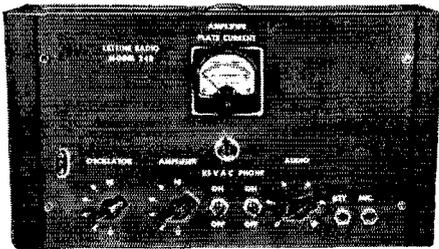
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See Page 144

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as well as Portland. Meetings are held the third Friday of each month at the Oregon Museum of Science and Industry. An AREC Net operates each Thursday at 2000, and is followed by a RACES Net at 2100; both on 50.55 Mc. The club will be operating a station in the June V.H.F. Party, and all interested parties are welcome, says W7HIO.

We left out a few details in the report of the Royal Order of Hootowls, March *QST*, p. 70, according to W7YJE. Lee points out that anyone can become a Hootowl by working another member of this outfit on 50 Mc. - but the QSO must take place at midnight Saturday, and last one hour. You must then apply to W7YJE, enclosing 25 cents to cover the cost of the certificate and mailing. Nominations must be confirmed by the member station worked. The date of the ROHO Picnic has been changed to June 21, instead of the 14th as originally reported. Place: Gaffney's Resort, Lake Wilderness, near Renton, Wash., 0900 to 1300.

The Badger V.H.F. Club of the Milwaukee, Wis., area was formed to handle the production of a paper, the *V.H.F. News*, formerly put out by K9IQO, but abandoned when it became too much for George to handle alone. Officers are K9IQO, president, W9NMA, vice-president, K9LMIW, secretary, W9ZDI, treasurer, and W9JCI, program director. Meetings are to be held monthly at the Old Heidelberg Inn on a day not set at the time of this report.

The Ontario V.H.F. Association (appropriate club call - VE3VHF) announces sponsorship of two v.h.f. awards, the WVE for 50 Mc. and the Century Award for 144 Mc. For the WVE, 50-Mc. two-way contacts must be made with Prince Edward Island, New Brunswick, Nova Scotia, Quebec, Ontario, Yukon and Newfoundland or Labrador. They aren't likely to be issuing this one on a production-line basis! As if this were not enough, the OVHFA states that contacts made during contests will not count!

For the 2-meter award a certificate will be issued for 50 VE3 contacts. Endorsements will be offered for 75 and 100 contacts. The no-contest provision applies to this one also. All contacts must be confirmed by QSLs. Address of the OVHFA: P.O. Box 112, Station F, Toronto 5, Ontario. Thanks to Canada's one holder of 50-Mc. WAS, VE3AET, for the above information.

As reported briefly last month, a 220-Mc. contest will be held in Southern California coincidentally with the ARRL June V.H.F. Party. Sponsored by the Inter County Net, it will run from 1 P.M. local time June 13 to 4 P.M. June 14. Suggested operating frequencies are between 221.2 and 221.6 Mc. A maximum of 24 hours operating time is permitted. Prizes will be given to member stations.

The Inter County Net is believed to be the only 220-Mc. traffic net in the country. It was organized last fall, its first session being held Sept. 29. More information from Net Manager, K1GKX, 110 Argonne Ave., Long Beach 3, Cal. Ralph reports that the changeover to horizontal polarization on 220 in Southern California is going well, with 15 stations changed over by the end of February, and more coming. With W7LEE, Parker, Ariz., using horizontal, the boys have a DX incentive.

One way to promote activity on 220 or a higher band is to set up some regular schedules. K2ITQ/3 works his brother, K2ITQ, nightly on 220, on a schedule that was formerly kept on 50 Mc., which helps. On Monday nights, the Mt. Airy V.H.F. Club 220-Mc. net gets about everyone in the Philadelphia area who has 220 gear on the air.

The 1000-mile Club certificate (December, 1958, *QST*, page 90) offered by the Raritan Bay Radio Amateurs has been applied for by some 25 operators, all the way from New England to California, and from Texas to Canada. It is more than just wallpaper; the 1000-mile club is intended to foster the advancement of the art of long-distance communication on all bands from 144 Mc. up. Detailed records of each member's equipment and objectives are kept. Application forms may be had from W2TMM, 90 Luke Ave., South Amboy, N. J.

## OES Notes

In the reports from which these notes are compiled we know that there will be at least one or two complaints that, though the writers have reported faithfully for months, they have never seen their calls in print. No news from their area either, they say. How come? What do we have OES for?

Some OES appointees make our column regularly; others seldom or not at all. Reason: the boys who make it turn in newsworthy and useful reports month after month. Others

(Continued on page 192)

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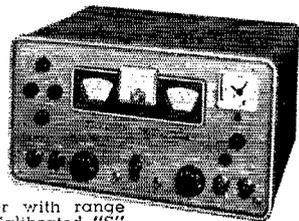
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All models except HQ-160 are available with clock at \$10.00 extra.

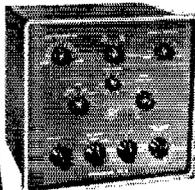
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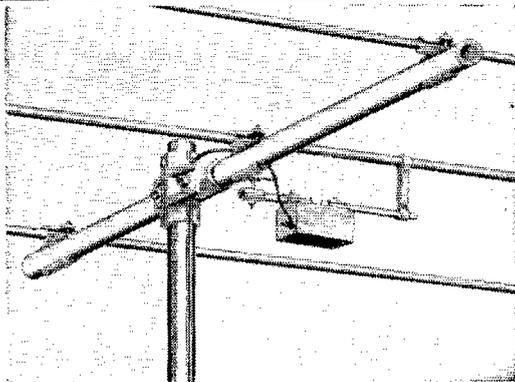
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**TOWERS**

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See Page 144

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report facts that are of interest to nobody but themselves. "Nothing to report" written on an OES form time and again is merely a waste of time and postage. "Moved shack from attic to basement" is little better. That "K1XYZ has new Communicator" will keep few QST readers awake nights. And no matter how hot your news is, if it relates to frequencies below 50 Mc. your report lands in the wastebasket.

OES stands for Official Experimental Station. The E can be stretched quite a bit, and it often is, to include operating news that will be of interest to others, but this is not a gossip column. Look over the Notes in several past issues of QST and you'll see what it takes to make the column. The supreme test is whether the item will be read with interest by most v.h.f. enthusiasts. Getting anyone's call into print counts for very little. A geographically balanced presentation is more important, but it is news value that decides the issue.

Almost every ham does things that interest others. Listen to the ragchewing after any radio club meeting, and you'll hear what we mean. Anything you'd talk to others about is potential QST meat — report it promptly and in useful detail. But don't expect to see it in the next issue of QST after you mail the letter. OES reports are made to your Section Communications Manager. He in turn forwards them to ARRL. The news that follows appeared in your March 1 reports. If something of really hot-news nature happens, report it to ARRL directly, with a copy to your SCM. It may make QST one issue earlier that way.

**KIAOX, Hartford, Conn.** — New 144-Mc. preamp with 416B grounded-grid marked improvement over 416A previously used. Building high-level 144-Mc. s.s.b. mixer.

**KIBOX, Southboro, Mass.** — Local fire station getting QRM from Venezuela on 46.2 Mc.

**WIEUJ, Tynsboro, Mass.** — Building crystal-controlled gear for 2300 Mc.

**WIPOM, Southington, Conn.** — Testing 50-watt 220-Mc. rig; worked W1QVF 20 miles away, using only dipole in beamend. Beam soon to go up.

**WILGE, Windsor Locks, Conn.** — Last European reception on 50 Mc. was CT1CO, Feb. 12. Numerous openings to South America (PZ1AE and HC1FS) through Feb. and March.

**KZSQ, Rahway, N. J.** — Many s.s.b. signals heard regularly on 6. S.s.b. frequency is 50.3 Mc. (W1BOM reports that Sunday at 1100 is a rallying time, with W3HFY W2SZE K2KTH K2VIX K2TSG W1ZGO and W1BOM among the participants.)

**K4EUS, Chester, Va.** — Local frequency, 145.35 Mc., busy almost nightly.

**W4FNR, Ft. Lauderdale, Fla.** — First TE of 1959 worked Feb. 15, 16 and 17, including OA4C and LUS. W1HDQ XE1GE W4RMU W4IKK and W5VY heard simultaneously via back-scatter from south, Feb. 22, 1000 EST.

**W4FWH, Doraville, Ga.** — Net activity on 220 Mc. getting under way in Atlanta area. Test period beginning 0800 EST Sundays. Mondays, 2000 EST, for 2-meter net, 144.35 Mc.

**K4KYL, Knoxville, Tenn.** — YN1JZ, worked Feb. 15 by K4PES, first 50-Mc. sig from YN heard in this area.

**K4PKK, Decatur, Ga.** — Activity on 6 rising steadily. Worked 25 different locals during February.

**W4RMU, Oceanway, Fla.** — Called CQ nightly, each half hour, 1830 to 2200, beam south, during March and April. Objective: TE work with South America or tropo contacts with Southern Florida. Frequency 50.005.

**W6OHQ, Piedmont, Cal.** — Work with 432-Mc. mobile shows signals comparable to 144 Mc. in most instances, but with greater freedom from ignition noise. Maintained contact with W6OJB for 46 miles, Vacaville to Orangevale, 18 miles east of Sacramento. Mobile setup has 6524 tripler driven by Communicator. Receiver has 416B r.f., crystal mixer, and Communicator as tunable i.f. Antenna is 2-meter whip, working as 3/4 wave.

**W8WRN, Columbus, Ohio** — Tri-Country 6-Meter Net operates Mondays, 2000, on 51.15 Mc. March meeting of v.h.f. section of CARA was televised by W8RRJ and W8DMR, whose stations were pictured in March QST.

**K9DTB, Villa Park, Ill.** — Enjoying 50-Mc. s.s.b. operation. Activity on 220 Mc. improving in Chicago area.

**W0ETX, McPherson, Kan.** — Local net on 145.5 Mc. being readied for storm season. W0ETX transmits ARRL Bulletins on Sunday, Tuesday and Thursday, 1945. V.h.f. OBS work bringing good response.

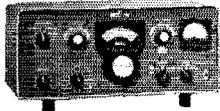
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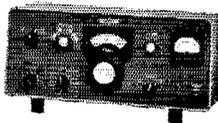
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# TOWERS

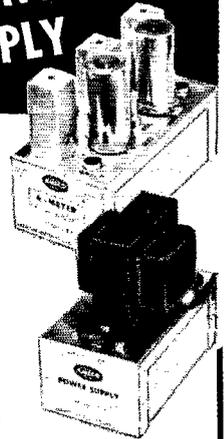
ALL THE WAY - IT'S EZ WAY

See Page 144  
AMATEUR RADIO CENTER  
BALTIMORE, MD.

# NEW AMECO 6-METER CONVERTER & POWER SUPPLY

### FEATURES INCLUDE:

- Crystal controlled.
- 6BZ7 cascode RF amplifier & 6U8A mixer-oscillator.
- Special Pi-net shielded output coil with taps allows converter to have any output frequency for hookup to any receiver.
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Complete Kit as Low as **19.95**

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- 6-meter converter complete with tubes and crystal for 7-11 Mc. or 14-18 Mc. in kit form with instructions. **\$19.95**
- Model CB-6K..... **27.50**
- WIRED AND TESTED (with tubes and crystal) Model CB-6W for above frequencies..... **10.50**
- Kit or wired models for any other output frequency—\$1 extra
- Power Supply complete in kit form. Model PS-1..... **11.50**
- WIRED AND TESTED, PS-1W..... **11.50**

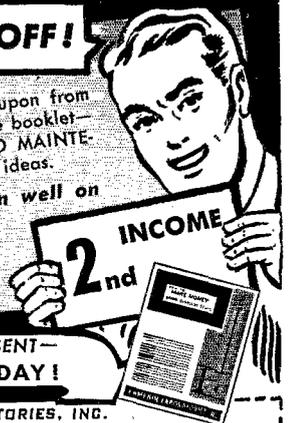
## AMERICAN ELECTRONICS CO.

1203 Bryant Ave. (Dept. Q5) New York 59, N. Y.

# EAVESDROPPING ON THIS QSO SURE PAID OFF!

The other night I was "reading the mail" — during a QSO between a W4 and a W1. The W1 said his earnings from part-time commercial mobile-radio maintenance had paid for his KW rig!

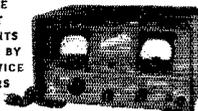
So — I made a decision — and mailed the coupon from the Lampkin Laboratories' ad in QST. The free booklet — "HOW TO MAKE MONEY IN MOBILE-RADIO MAINTENANCE" — gave me facts... figures... and ideas. NOW — evenings and weekends — I am well on the way toward a substantial second income.



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FREQUENCY METER  
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## Russia's Iron Curtain

(Continued from page 90)

goes from north to south. Since continental Russia does not extend very far towards the equator, it is possible, in principle, to lay transmissions down in Moscow which would be very difficult to jam from any other point in Russia, by using just the right frequency and a transmitter situated somewhere in Africa.

Let no one get his hopes up too high, however. In the first place, there are still the ground-wave jammers. In the second place, the majority of the short-wave receivers presently being manufactured in Russia will not tune higher than about 12 megacycles. (This permits Russian listeners to receive domestic broadcasts, but makes it impossible for them to receive anything above 12 megacycles, unless they use older receivers. Thus the full benefit of a southerly transmitting location can only be reaped at night, and during times of sunspot minimum.

### Effect on Amateur Radio

It comes as a shock to a U. S. ham to learn that in Europe the 3950-4000-kilocycle band is used for short-wave broadcasting, and that transmissions from services other than amateur also occupy the frequencies from 3500 to 4000 kc. and from 7100 to 7300 kc. During the next sunspot minimum, the world's short-wave transmitters will spend most of their time nudging each other in the bands below 12 megacycles, and the pandemonium is likely to exceed anything known in the past. For it is clear that neither side will give an inch in the cold war of the radio waves. The "barrage" will surely increase in both numbers and power, no doubt to be matched by a cacophony of equal intensity from the other side. The increase in short-wave broadcasting by many of the smaller countries also will add to the congestion of the radio spectrum.

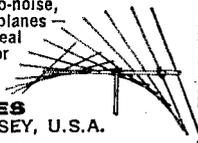
### Acknowledgment

The writer wishes to thank Mr. G. H. Chapman, Manager of the Munich Relay Base of the VOA, for his many kindnesses, and Mr. Edgar T. Martin, Engineering Manager of the VOA system, for permission to publish this article. Mr. J. C. Miller has provided useful information. **QST**

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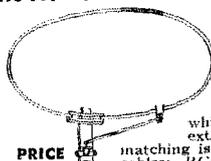
# TOWERS

ALL THE WAY - IT'S EZ WAY

See Page 144

AMATEUR ELECTRONIC SUPPLY  
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Fills the need for improved omni-directional antenna for fixed or base station. Electrically, it consists of a half-wave-length radiator (without end loading) and incorporates the improved "Gamma-Match" feed system pioneered by Hi-Par

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PRICE  
\$16.95  
NET

### MODEL 6-R SPECIFICATIONS

Design Center.....	50.5 MC or as specified
Polarization.....	Horizontal
Radiation Pattern.....	Essentially Circular
Gain (compared to a straight half wave dipole).....	9
Impedance.....	52 ohms
V.S.W.R.....	1:1 at design center
Diameter.....	Approx. 39"
Net Weight.....	2 3/4 lbs.
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Strong and practical. Solid aluminum split ball adjusts to any angle. Heavy phenolic insulator disc has moisture-proof gaskets. Coax fitting and grounding backplate included.



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New Super Stable VFO. Provisions for two crystals. Complete handswitching 10 thru 80 meters. Efficient wide range pi-network output. Panels are bright chrome, with contrasting grey knobs. Push-to-talk phone. Power requirements: either 6 or 12 volt AC or DC filament supply, 450-500V DC at 250 Ma. Tubes: 6BH6 VFO, 6BH6 buffer, 5763 buff-dblr, 6146 ampl., OA2 reg., 6AQ5 clamper, 12AX7 audio amp-driver, two 1614 mods. Makes an ideal Novice xmtr when operated at 75 watts input.

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Frankfort, Ind.

## World Above 20,000 Mc.

(Continued from page 16)

considered, the resulting expression<sup>5</sup> becomes

$$F'_{rec} = L(t + F'_{i,t} - 1).$$

$F'_{i,t}$  is the effective noise figure of the i.f. amplifier, and it is the noise temperature ratio of the crystal.  $t_{i,t}$  is equal to the ratio of the available noise power output from the crystal to that of a resistor at room temperature.  $F'_{i,t} = 10$  db. or  $10\times$  for a television set tuned to Channel 2,  $t = 2.5\times$ , and  $L = 8.5$  db. or  $7\times$  for 1N26 crystals at 21,000 Mc. Hence, substitution in the above equation yields  $F'_{rec} = 80\times$ , the ratio of receiver noise power to that generated by a resistor equal to the input impedance  $R$  of the receiver (300 ohms). The r.m.s. noise voltage  $V_{noise}$  of such a resistor over a band width  $B = 4$  Mc. is  $V_{noise} = \sqrt{4kTB R} = 5 \times 10^{-6}$  r.m.s. volts.  $k =$  Boltzman constant, and  $T =$  absolute room temp. The noise

power is  $\frac{V_{noise}^2}{R} = 8 \times 10^{-14}$  watts. Hence, the

absolute magnitude of the minimum detectable power  $W_R$  is  $(80)(8 \times 10^{-14}) = 6 \times 10^{-12}$  watts.

The amount of power received  $W_R$  at a distance  $d$  is related to the amount of power transmitted  $W_T$  as follows:

$$W_R = W_T G f e^{-\alpha d}$$

$G$  is the antenna gain,  $f$  is the fraction of power intercepted by the receiving antenna at a distance  $d$  with inverse square law scattering, and  $\alpha$  is the attenuation due to water vapor. For parabolic antennas of diameter  $D$  operated at a wavelength  $\lambda$ , we may express the above equation in decibels as

$$10 \log_{10} \frac{W_R}{W_T} = 10 \log \frac{4D^2}{\lambda^2} + 10 \log \frac{D^2}{4d^2} - \frac{1}{2} \alpha d \text{ (db)}.$$

Using  $W_T = 10^{-2}$  watts,  $W_R = 10^{-9}$  watts,  $\alpha = 1/2$  db./mile, corresponding to 50% relative humidity,  $D = 15'$ , and  $\lambda = 1/2'$ , we compute  $d$  to be about 150 miles. QST

<sup>5</sup> Torrey and Whitmer, *Crystal Rectifiers*, 15, Radiation Laboratory Series, McGraw-Hill, New York, N. Y. (1948), page 25.

## Amateur and Public Relations

(Continued from page 82)

under existing rules the amateur is obliged to investigate each case of BCI or TVI to determine whether or not the fault lies within the transmitter, even though it has been pronounced "clean" by WTVIC standards.

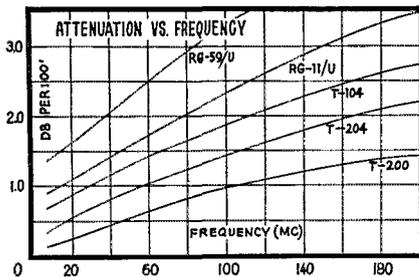
Transmitter and transmission line troubles do develop, and changes in equipment and circuitry, synonymous with true hobbyism, may cause interference to your neighbor's television reception, but not to your own monitor television receiver.

What can you do during the waiting period — until the manufacturer provides a filter or other needed remedy for TVI?

Many amateurs limit their operations to other than the more desirable TV program hours.

(Continued on page 198)

## the paths of least resistance

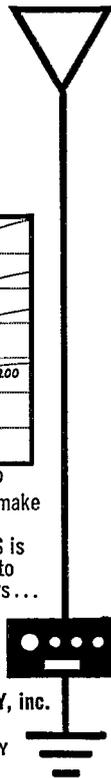


Choice of the right transmission line can make a world of difference (See QST, April, 1959) — whatever your choice of antenna or rig. TIMES is the coaxial expert, an organization dedicated to the design and production of better conductors . . .



Write for details on low-loss coaxial cable types . . .

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 each 2¢ plain, 5¢ stamped

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 West Hartford 7, Connecticut

# TOWERS

ALL THE WAY - IT'S EZ WAY

See Page 144  
 ALLIED RADIO CORPORATION  
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## TELETYPEWRITER EQUIPMENT

Model #14, 15, 19, 26 & 28 Teletype machines. Telewriter Receiving Converter and others. For general information & equipment list write:

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- HUSKY CAST ALUMINUM END SPIDERS
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The CUBEX MK III gives you 3 FULL SIZE, FULL EFFICIENCY, beam antennas with separate FULL WAVE driven elements on each band. All this in half the horizontal space required by a 3 el, 20 mtr. beam.

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 Other Models from \$24.50

WRITE FOR FREE BROCHURE "MK"

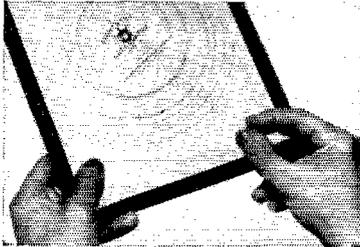
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# How Many Turns?



**B** ESET with a knotty technical problem? Why not let an ARRL Lightning Calculator provide the solution and save hours of operating time, or time you might better spend in constructing that new rig.

**I** F YOU'RE trying to figure out how many turns to wind on a coil for a particular band, you'll find the answer more quickly by using the Type A Calculator, designed especially for problems involving frequency, inductance and capacity. Direct-reading answers to Ohm's Law problems involving resistance, voltage, current and power may be obtained rapidly on the Type B Calculator. Be sure — and be accurate — with one of these dandy time savers.

## ARRL LIGHTNING CALCULATOR

Type A or Type B

\$1.25 postpaid

## THE AMERICAN RADIO RELAY LEAGUE

West Hartford 7, Conn.

Others maintain the good-will of their neighbors by "keeping in touch." Let your neighbor know that you are still vitally concerned in reaching a mutually agreeable solution to your common problem. *You* understand their predicament, for you too, and your family, own television receivers. Some amateurs lend their neighbor a high-pass filter, or install a suitable home-made trap on a temporary basis. These installations — on the outside of the affected television receivers — work remarkably well, but many cases can be cited where set owners are so pleased with the effectiveness of the trial installation that they are reluctant to permit removal of the filter for further use by the committee. If one particular frequency band or section of a band causes interference, it is wise to refrain from operating there until remedial measures have been taken. A temporary reduction in operating power may help in some cases.

Since you never know when your neighbor may be unwillingly "listening in," it is wise to limit "on the air" discussion concerning local TVI problems. Your neighbor may misinterpret the most innocent remarks.

Imagine the chagrin of the amateur when informed of this occurrence. Recently one particularly incensed television set owner advised our office that at the time she reported interference directly to an amateur he continued his radio contact during telephone conversation with her. She could hear his voice through the television receiver as well as through the telephone. Later, through the television receiver, she heard the amateur refer to her as "that character down the street."

Believe me, your committee coordinator and I know that these situations develop to the point where a satisfactory solution consumes time and patience all out of proportion to that normally required, for it may breed an epidemic of unreasoning resentment throughout an entire neighborhood.

Never, but *never* "knock" the complainant's receiver, even though it *is* a time-worn relic. Remember, you won't be able to explain away the obvious fact that the receiver works fine when you are off the air. Again, your technical reasoning may not be understood nor appreciated, and what you do *not* say cannot be misinterpreted.

*Carefully avoid putting him on the defensive.* Above all, be a good listener, as long as needs be. Try to place yourself in your neighbor's situation, and, again, employ in effect, the Golden Rule. After you have gained his confidence you might sound out a factual note.

It is an honored privilege to operate an amateur radio station. Whether or not you are at fault, and whatever the cause, be on your guard for opportunities to serve your neighbors in BCI and TVI matters. Only in this manner can you assure for those who follow, the same privileges you now enjoy.

In the process you will also affirm the right of the amateur to the frequencies he now holds. **QST**



*We Invite You To Compare*  
 AS WE HAVE, SAYS LEO I. MEYERSON, WØGFQ  
 THEN ORDER THE WORLD'S TOP 3-BAND BEAM



FROM THE WORLD'S TOP DISTRIBUTOR  
 WORLD RADIO LABORATORIES



*Compare Size*

Compare the Hy-Gain Full Size Trap Tribander with any other trap tribander in the industry. You will find it is the only one that has both full element spacing (.25 wave length boom on 20 meters) and full sized elements (longest element 32'). This amounts to almost a third more metal than smaller tribanders selling for the same price. If you have a space problem buy the Hy-Gain Miniature Tribander at a savings of \$30.



*Compare Construction*

Hot dipped galvanized steel boom 1 1/2" in diameter for maximum strength with lowest possible wind loading. Boom braces form rigid angular boom to mast assembly. Heavily plated 10 gauge steel channels attach all elements to boom and boom to mast with positive grip. Elements are 6061T6 high strength aluminum alloy; - 1 1/4", 1", 7/8" and 3/4" in diameter. All hardware is galvanized and irridita treated offering superior weather resistance. Hy-Gain's streamlined traps (only 2x3") together with steel boom construction result in the smallest wind loading area possible in a full sized tribander.



*Compare Matching*

Exclusive Hy-Gain Triaxial Gamma Match System with coaxially formed reactance cancelling capacitor built in makes possible for the first time a perfect 1:1 SWR on a three band antenna. Although factory precalibrated, it is also adjustable to compensate for variations which may be encountered at each installation site. Exceptional bandwidth maintains low SWR over the entire band. The use of this matching system permits tuning the array for maximum gain with no compromise to facilitate matching.



*Compare Traps*

The Streamline Hy-Gain Traps are small (3" in diameter) and light weight. They actually have less wind surface area than any other trap manufactured. Capacitor, dielectric and coil form moulded high impact styron. They are designed to take 1 KW AM, 2000 watts PEP. Individually factory resonated for maximum frequency energy and completely factory weather sealed, water proof and air tight (do not breathe) for years of stable operation. Carbon activated polyethylene covers. High Q coils well removed from any metal mean highest efficiency of isolated action.



*Compare Performance*

Hy-Gain's High Q Traps result in minimum element loading and true full sized performance. The longest element of approx. 32' together with full size 18' boom spacing results in a triband beam with full 8 db gain and 25 db front-to-back ratio. No smaller 3-band beams can develop this gain. In addition, Hy-Gain does not compromise by detuning parasitic reflector and director to raise feed point impedance of array so that it can be fed split dipole with a 52 ohm line. Instead, the Hy-Gain Tribander is tuned for maximum forward gain and the matching is accomplished by the Tri-axial Gamma Match System.



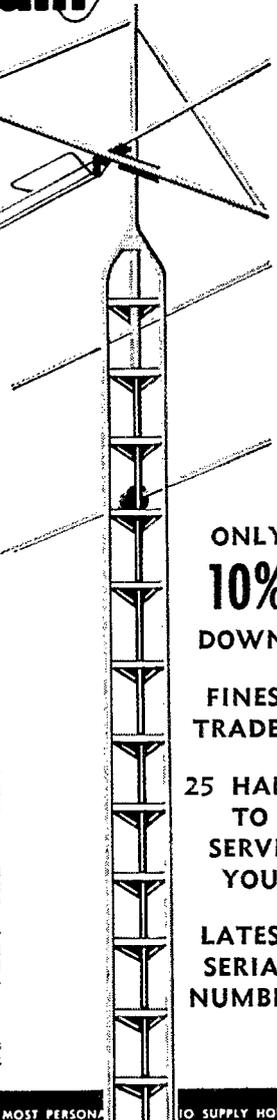
*Compare Price*

Hy-Gain's tremendous Ham Acceptance and large volume production makes possible the lowest price in the industry for a full-sized three element tribander; - \$99.75.



*Compare Distributors*

Only World Radio can offer the host of services guaranteeing your satisfaction. Fast turnover insures late serial numbers. Our reconditioning department and established ham market allows us to offer the biggest trades. We finance our own paper, for the easiest payment terms. Fast shipment from the Center of the U.S. cuts your waiting to a minimum. And 25 hams in our organization pride themselves on Personalized Service to You. Try us.



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# HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(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.

(3) The Ham-Ad rate is 30¢ 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 7¢ per word will apply to advertising which in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 7¢ 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 30¢ 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.

(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.*

**QUARTZ**—Direct Importers from Brazil of best quality pure quartz suitable for use in electronic or crystal. Diamond Drill Carbon Co., 248 Madison Ave., New York City 16.

**MOTOBOLA** used FM communications equipment bought and sold W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

**WANTED:** Cash or trade, fixed frequency receivers 28/42 Mc. W9Y1Y, Troy, Ill.

**WANTED:** Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GHH, 1010 Monte Dr., Santa Barbara, Calif.

**KWM-1** wanted. Also few high plate dissipation tubes, radios BC348, ARN14, ARN30, ARCC3, 51 Series Gear 51J, 51R, communication receivers, transmitters, Dames, W2KUW, 308 Hickory, Arlington, N. J.

**ATTENTION** Mobiles! Leace-Neville 6 volt 100 amp. system alternator, regulator & rectifier, \$45.00. Also Leace-Neville 12-volt 100 amp. system, alternator, regulator, rectifier, \$85.00. Good condition. H. A. Zimmerman Jr., K2PAT, 115 Willow St., Brooklyn 1, N. Y. Ulster 2-3472.

**CASH** for your gear. We buy as well as sell. Write for cash offer or trade. We stock Elmas, Gonset, Hallcrafters, Hammarlund, Johnson, Lyseo Master Mobile Morrow, National and other ham gear. H & H Electronic Supply, Inc., 506 Kishwaukee St., Rockford, Ill.

**RECEIVERS:** Repaired and aligned by competent engineers, using factory standard instruments. Authorized Factory Service Station for Collins, Halcrafters, Hammarlund, National. Our twenty-second year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

**SAN FRANCISCO** and vicinity. Communication receivers repaired and realigned. Guaranteed work. Factory methods. Special problem, invited, any equipment. Associated Electronics, 58 South P St., Livermore, Calif. W6KFF, Skipper.

**TRANSFORMERS** (3) W2EWL Special, \$3.00 postpaid. 88F, latest diagram, template, 3 xfmr's, disc ceramic Emica condensers, coils L1 thru L7 for W2EWL Special (Mar. 1956 QST), \$10.95 postpaid. Vitale, W2EWL, Denale, N. J.

**BARGAINS** Reconditioned & guaranteed. 32V-2, \$349. 32V-3, \$495. B & W \$109. Viking \$145. Ranger \$199. HQ-120 \$159. HQ-140XA \$199.95. HQ-100C \$159.50. HQ-110C \$215. 5X-96 \$199. NC-300, \$310.50. NC-126, \$139. NC-173, \$39.50. NC-109 w/calibrator, \$179.95. Write for complete list. We trade. Complete stock of new gear. Terms with only 10% down. Write Ken. W9ZCN or Glen. W9ZKD for deal. Ken-Els Radio Supply Co., 428 Central Ave., Fort Dodge, Iowa.

**COAXIAL** Cable. New surplus RG-54A/U, 58 ohms impedance—30 ft. prepaid, \$1.00. Radio magazines, buy, sell, trade, R. Farmer, 3009 N. Columbia, Plainview, Texas.

**KNOX** Electronic Supply, Inc. "Where your Trade-In is always worth more!" 67 N. Cherry St., Galesburg, Ill.

**ANTENNA** 80-40-20-15-10, \$21.95. Patented. Lattin, W4JRW, Box 44, Owensboro, Ky.

**HALLCRAFTERS**, Drake, Central Electronics, Gonset, Ham gear, Jerry W8EPI, Swartzlander Radio Limited, 1220 Stillwell Avenue, Fremont, Ohio.

**FIFTH** Annual Syracuse VHF Roundup, October 10, 1959.

**WANTED:** Battery receivers of 1920s, Irla, Acme, Radiola, Grebe, etc. Also UV199 thru UV206 tubes for electrical test. Buy or borrow. Grote Reber, Green Bank, West Virginia.

**WANTED:** Elicdo 1000F amplifier. CDR Ham-R rotor. Sell: 6 Kc 75A4 filter, \$25. W4CPQ, 1351 Bolling, Norfolk, Va.

**QSLs? SWLs?** Finest and largest variety samples, 25¢ (refunded). Callbooks (latest), \$5.00 postpaid. Religious QSLs, samples 10¢. Request free folder. "Rus" Sakers, W8DED, P.O. Box 218, Holland, Michigan.

**QSLs** of rare excellence. Samples 10¢. Dave, 601 East Maude, Sunnyvale, Calif.

**DELUXE QSLs**, Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢.

**QSLs** "Browine," W3CJI, 3110 Lehigh, Allentown, Penna. Samples, 10¢ with catalogue, 25¢.

**QSL** Samples, Dime refundable. W3K PJ Press, 1806 Water, Westleyville, Penna.

**QSL-SWLs**, Samples 10¢. Maigo Press, 1937 Glendale Ave., Toledo 14, Ohio.

**QSLs**, SWLs, Stationery, samples 5¢. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz.

**QSLs:** Twenty exclusive designs in 3 colors. Rush \$3.85 for 100 (ten different kinds) or \$6.25 for 200 (20 different kinds) and get surprise of your life. Satisfaction guaranteed. Five days service. Constantine Press, Bladensburg, Maryland.

**QSLs**, Sharp! 200 one color, glossy. \$4.75 Multi-color samples dime. K9DAS QSL Factory, Edward Green & Sons, 4422 Marquette Dr., Ft. Wayne, Ind.

**QSLs**, Samples, dime. Printer, Corwith, Iowa.

**COLORE** Glamor, scenic & nature. Custom sketch and photo. Samples 25¢ refunded. K4LPZ QSLs, Summerfield, Fla.

**QSLs:** 4 colors, glossy, 100, \$3.00. Samples 10¢. Dick, W8VXK, 1018 Arthur, Mt. Pleasant, Mich.

**QSL-SWLs**, Samples free. W4BKT Press, McKenzie, Tenn.

**QSLs**, Reasonable, 10 days delivery. Catalog dime (coin). Dick, K6GJM, Box 294, Temple City, Calif.

**SCENIC QSLs**, New, beautiful, samples 10¢. Camas Press, 3005-VC, North Hollywood, Calif.

**QSLs-SWLs** that are different! Colored embossed card stock, and "KroKote." Samples 10¢. Turner, K8AIA, Box 953, Hamilton, Ohio. 200 QSLs, \$3.00. Samples free. Bolles, 7701 Tisdale, Austin 5, Texas.

**QSLs**, SWLs, Samples 10¢. Ononadaga Press, Ononadaga, Mich.

**QSLs**, Outstanding, original, fast service. Reasonable prices. Samples 10¢. Super quality, quantity, 25¢. Refundable. VYS QSLs, 1704 Hale, Ft. Wayne, Ind.

**CREATIVE QSL and SWL Cards.** Are you proud of your card? If not let us print your next order. Write for free samples and booklet. Personal attention given to all requests. Bob Wilkins, Jr., KN5ZMT. Creative Printing, P.O. Box 1024-C, Atascadero, Calif.

**QSLs** Samples dime. Sims, 3227 Missouri Ave., St. Louis 18, Mo.

**QSLs-SWLs**, High quality, reasonable prices. Samples, Bob Teachout. W1FSV, 204 Adams St., Rutland, Vt.

**QSLs**, SWL's VHF'S SYL-OM's. (Sample assortment approximately 94¢). Covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fabulous DX-attracting, prototypal, snazzy, unparagoned, cards. Rogers, K8AAP, 737 Lincoln Ave., St. Paul 5, Minn. Also glamorous, puzzling (WOW)

**QSLs-SWLs**, 100 \$2.50, Samples 10¢. QSO File cards, \$1.00 per 100. Rusprint, Box 7507, Kansas City 16, Mo.

**QSLs**, Taprint, Union, Miss.

**QSLs**, rubber stamps, reasonable prices, nice designs, samples dime. Stan, W2DJH, 19 Elm, Warrensburg, N. Y.

**QSLs**, Glossy, samples 10¢. W1TB8 Press, 807 Main St., Winchester, Mass.

**QSL-SWL** samples free. Bartinoski W2CVE Press, Williamstown, New Jersey.

**QSLs:** Send 25¢ (refundable) for samples. W6CMN, Schuch, 6707 Beck Ave., No. Hollywood, Calif.

**QSLs**, Plain or fancy, samples dime. QSL printing, Box 12351, Houston 17, Texas.

**QSL-SWLs**, 100, \$2.85 up. Samples 10¢. Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

**QSLs** Atlas Missile, 100 Glossy 4-color, \$4.00. Paye, W4ZKK, 824 Avondale, Cocoa, Fla.

**QSLs? SWLs?** In '59 try mine! Samples 25¢ deductible. C. Fritz, 1213 Briarclark, Jolet, Ill.

**QSLs**, 3-color glossy, 100—\$4.50. Rutgers Vari-Typing Service, 7 Fairfield Rd., New Brunswick, N. J.

**QSLs** samples, quarter. Spicer, 4615 Rosedale, Austin 5, Texas.

**QSLs**, High gloss, 2 colors, samples 10¢. K2VOB Press, 62 Midland Blvd., Maplewood, N. J.

**QSL** Special. Free sample. Nat Silinette, W4AYV, Umatilla, Fla.

**QSLs:** Cartoons, colors, something different. Samples, 25¢. Chris, W9PPA, 365 Terra Cotta, Crystal Lake, Ill.

**QSLs**, SWLs. Citizen's band. Samples 10¢. Ononadaga Press, Ononadaga, Mich.

**QSLs**, Stamp brings samples, Eddie W. Scott, W3CSX, Fairplay, Md.

**QSLs**, 100 for \$3.00, glossy, samples free. R. A. Larson, 32 Midland Ave., Stamford, Conn.

**QSLs**, Samples free. Phillips, W7HERG, 1708 Bridge St., The Dalles, Oregon.

**QSL-SWLs**, 50 card bonus on order of 500. Samples 5¢. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz.

**QSLs**, Lapel pins, samples dime. Kephart W2SPV, 4309 Willis, Merchantville, N. J.

**QSLs** NEA. Attractive. Samples 10¢. Woody's, Box 164, Asher Sta., Little Rock, Ark.

**RUBBER** Stamps for hams, sample impressions, W9UNY, Hamm, 542 North 93, Milwaukee, Wis.

**RUBBER** Stamps: Why wait for cards? QSL with rubber stamps. Sample impressions, immediate delivery. Kay, K2UKQ, Blanchet Rubber Stamp Co., 21 Lincoln Ave., Orange, N. J.

DX-100, \$175, perfect; HQ-129X, \$135, new tubes, xfmr; DX-20, \$25, used only 4 months; AR-3, \$28, exc. condx; DB-23, like new, \$28. Bill Monk, 1804 Palma Plaza, Austin, Texas.

SELL: SX-101 Mark III and matching spkr, both less than six months old. Must sacrifice due to an emergency. Need cash badly. First \$260 gets it. Joan Silver, 155-11 89th St., Howard Beach 14, N. Y.

300 WATT transmitter; 813 final with VFO, \$250. Also 100 watt transmitter and Meissner signal shifter. \$95. No mikes. W0MBW.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8EJF, Purchase Radio supply, 327 E. Hoover St., Ann Arbor, Michigan, Tel. NORMANDY 8-8262.

4X150A tubes, \$6.00 each, postpaid. New, surplus, and guaranteed. H & C Sales, 343 Kenmont Ave., Pittsburgh 16 Penna. Phone LUcast 3-1602.

AUTHORIZED factory distributors for Adjustovolt, B&W, Elmac, Glosco, General Electronics, Glas-Line, Gonset, Hammarlund, Hexacon, Johnson, National, Penta, TMC, Tobé & Vocatine & Westinghouse. Wanted: xmtg. and special-purpose tubes and lab equipment. Trade-ins accepted. Open Monday through Saturday. Ham Radio Enterprises Corp., 512 Broadway, N. Y. 12, N. Y. Phone WALKER 7-7000.

EARLY issues QST with complete indices, bookram bindings, new condition, R. H. Winchester, ex-8BNY, 196 Rosemont Ave., Trenton, N. J.

TREASURY: Privateer Jean LaFite buried his treasure on Galveston Island south of the Republic of Texas. Treasure hunters will gather on June 19. Data and information available Box 73, Rte 1, Galveston.

NEW Boats, Mercury outboards. Will take ham gear on trade. Write: Boyd Reiter, K0LMO, Boyd's Marine Shop, Clinton, Iowa.

SAVE time. Save money! DX QSL's forwarded, 2c each after membership. Free flyer "DX QSL Co-op," Box 5938, Kansas City 11, Mo.

COMPLETE File QST's, 1915-1951 for sale. Landa, Clayton 2, Georgia.

HAMVENTION Day at Dayton, Ohio, May 9, 1959. Be there?

HAM TV Equipment bought, sold, traded. Al Denson, WIBYX, Rockville, Conn.

HIGH Fidelity components at rock-bottom prices. Brand new, fully guaranteed. All ma or makes. Amplifiers, tuners, speakers, etc. Our prices can't be beat! Write for quotations. The Ham's Exchange, 28 Stephen St., Levittown, N. Y.

WANTED: Amateur Radio Call Book for 1927. Write publication date, condition and price to W7UH, 419 W. 13th Ave., Spokane, Wash.

HAMFEST June 7th Southwest from Ottawa, Illinois on Illinois Route 71 at the LaSalle County 4-H Home and Picnic Area. Same place as last year. Advance registrations accepted if in our hands before May 28th. Advance registration \$1.00, at the gate, \$1.50. A nice all-day affair for Midwest hams and their families sponsored by the Starved Rock Radio Club. Contact W0MKS, G. E. Keith, Secretary, RFD #1, Box 171, Oglesby, Ill.

COLLINS KWI for sale, in exc. condx. \$2295. R. Gumm, 770 7th, West Bend, Wis.

SPECIAL: 813 Handbook xmttr, 350 watt A.M./C.W. Heath VFO in control panel with relays, etc. TVI-suppressed. All band. Must sacrifice! \$200. Bill Cate, 108 Stadium, Fayetteville, Ark.

Q! All Hams! Have any parts you don't need? I like to get on the air but can't afford to buy transmitter. Would like to build one, anything received, greatly appreciated. Tnx. VE2AWO, G. N. Muscat, 1038 Cr. Albanai, Duvernay Que. P., Canada.

MOBILE Hams! Battery troubles? Les Hay, W7JWD, Rt. 1, Winlock Washington, has the answer to your battery troubles. This is genuine. No gimmix!

S.S.B. xfmrs, exact set of 3 (hermetically sealed) for W2KWL Spenard brand new, exact set of 2. New compact G-E 100-watt modulation xmttr, multi-impedance (10 lbs.), \$6.25; new Elmac vacuum condenser, 12  $\mu$ fd at 32 kilovolts, \$5.50; G-E Pyranox, 20  $\mu$ fd at 1000 v.d.c. (330 vac) plus min. 4 for \$7.50; 6  $\mu$ fd at 2000 v.d.c. (660 vac) -min. 4 for \$5.50; 4  $\mu$ fd at 1000 v.d.c. (330 vac) -min. 4 for \$3.50. Please include postage, no o.e.d. S. Tucker, W2HET, 51-10 Little Neck Parkway, Little Neck 62, N. Y.

HARRIS Press QSL-SWLS. Free samples, 518 Milton St., Richmond, Va.

FOR Sale: Homebrew 40-80 meter, 32-watt xmttr, in exc. shape, used only 15 hours, \$25. KN9PWR, Byron Southern, 605 Washington, Kennebec, Mo.

SELL: 6 ft. sections Alprodec P-6W alum. tower, \$4.00 each. Base plates \$1.00 each. 40 many parts. W2LIE.

CLEANING Out Shack! Several rigs, beam, rotor, mike and accessories. Send stamp for listing and detailed descriptions. Brummitt, 1912 Holly St., Nashville 6, Tenn. W4WJG.

FOR Sale: Complete station including SX-100 receiver, DX-35 driving a 400-watt grounded grid linear amplifier, VFO, neatly cabled with single switch control, desk; extremely neat set-up; \$375. QST February 1955, present: \$10. Jonathan Wachtel, K2UDM, 36-42 206 Street, Bayside 61, L. I., N. Y. Tel. RA 4-8626.

SELL: Plate transformer G-E, type K-944 oil-filled 6250-0-6250 volts, 2.5 KVA, guaranteed irrevocably, \$75; Collins plug-in mechanism filter for 75A-1 Model 352-C14 1400 cycles, brand new, unused, \$45; Collins 32V2-3 TVI suppressed, in exc. condx. AM-CW phase modulation. This unit has been babied from time of its original purchase, \$335. F.o.b. W2BIB.

TWO Meter Communicator II for sale, in exc. condx, w/ \$20 worth of xtals, whip antenna, xtal mike and seven-element beam, \$150; S38E revr. like new condx. gud Novice revr, \$35; Hy-Gain 144V vertical, used only one month, \$18. Sorry, cannot ship beam or vertical. Pick-up deal. K2DVI, 48 Club Drive, Roslyn, L. I., N. Y.

SELL or trade: Gonset 2B 12-voit 2-meter, \$180 with extras, and T38-50D with VFO and power supply, \$90. Want: 20A or 10B with VFO. Must be local. W1OJL.

SWAP Good photographic equipment for ham gear or test equipment. What have you? What do you want? W2DQW, Stormville, N. Y.

SELL KWS-1, perfect, \$1275; 75A4, \$425; 32V3, \$400. W3CAV, William Henzy, Ontonotown, Penna.

FOR Sale: DX100, \$175; HQ-140X, \$185. F.o.b. Memphis, Tenn. A-1 condx. Wanted: Factory-wired Ranger and push-to-talk mike. W4GGG, 2671 Barron Road, Memphis, Tenn.

K2KJV. Yes, I belong to ARRL. K0RDP.

WANTED: Handspread dial for Hallcrafters SX25 receiver. W8QPH, George Toma, 835 Starkweather Ave., Cleveland 13, Ohio.

WANTED: Case for BC611 or BC721 Walkie-Talkie. Will pay cash. K2QZS, K. Wilkens, 37 Huntington Ave., Lynbrook, N. Y. Phone LY 9-0986.

SELL: Taptone 6-meter converter, GPR-90 matching speaker, both in perf. condx; \$400 or separately. Make offer. K2JNZ, Box 41, Beach Crest, N. J.

WANTED BC794-B revr, must be A-1 condx, complete with tubes. State price and items included. IE power supply, cabinet. All replies will be answered. Myrtle Hoekes, 903 Church St., Hannibal, Mo.

WANTED: Used Collins ground xmttr, type 32RA, 3-807's final, George Leininger, W8QZF, 16412 Marquis Ave., Cleveland 11, Ohio. ONE Owner 75A3. Three mechanical filters - 0.8 CW, 3.1 88H, 6.0 AM. Product detector, xtal controlled BFO injection, in FM socket. All recommended modifications, incorporated. First \$400 money-order. K0RIV, 1021 Norwood Drive, SE, Cedar Rapids, Iowa.

HT-18 VFO/NBFM exciter, in excellent condx, \$40; Bert Lenny, W7IBC, 343 Banrock, Malad City, Idaho.

WANTED: BC-342 RF oscillator bandswitch. James Mattea, Fullerton, Nebraska.

SALE: Collins 32V3 transmitter, spare 4D32 tube, one owner, in exc. condx; \$425. W1RKC, 271 North Ave., New Rochelle 3-7012.

VIKING II, VFO, mike, low-pass filter, antenna relay, 115V; \$265. Box 384, Paynesville, Minn.

COURIER for sale! Factory-wired E. F. Johnson Viking Courier about eight months old, \$215 cash, no trade-ins. L. A. Morrow, W1VG, 99 Bentwood Rd., W. Hartford 7, Conn. Tel. ADAMS 2-2073.

CANADIAN Amateur, \$3.00 per year. 10328 Trans Canada highway, North Surrey, B. C.

THUNDERBOLT: Want a factory-wired and tested job. State condition and price, and model number. Also want Telrex Triband. W. H. Maktejohn, K2EHS, 100 Van Buren Rd., Scotia 2, N. Y.

STILL Cleaning house! BC-375, \$35; BC-171, \$20; BC-645, \$15; SR 522, new, with tubes, \$25; National SW3, \$15; ASB5 revr, \$20; BC48Q, \$30; 10N1, \$15; JE103A, new, with base and cables, \$25. Hallcrafters 8-27 revr (28-145 Mc AM-FM), \$75; new SX-101 Mark III, \$300; Globe YHF-62 transmitter, new, \$125; WU type 2B tele type, \$60; Gonset Triband (as is), \$10; new polar relays, \$4; Elmac VC12-32 vacuum cond., \$10; many other items. Write me your needs. You pay shipping. R. D. Corbett, W1JLJ, 46 Prospect St., Torrington, Conn.

KWM-1, 12V and 110V supplies, mobile tray, matching speaker and Hell Whip 15 and 20 meter antennas, \$1000; will consider trade-in of 20A, HT-30, HT-32, Pacemaker or the equivalent. My gear new condition. W2EBO, 1367 Clover St., Rochester 10, N. Y.

NEED Ham equipment! Will trade Mercury outboards, cameras, appliances, TVs, Specials: NC-188, \$95; Viking Ranger, \$165; Factory-wired Viking II, \$180; Viking CDO, like new, \$300. Blough Mike, R.O., Al Blough, W9SP, 7511 Madison St., Forest Park, Ill., tel. FO 6-7500.

VIKING II, \$175; Viking VFO, \$25; Hammarlund HQ-140X, \$175. JIM Shupe, W8HCD, 11 Sparks St., Troutwood, Ohio.

RANGER, like new condx. Will swap for Gonset G-66 and 3-way pwr. supply, or will sell. Easily worth \$250. Make an offer! E. G. Campbell, K0GGE, 7th St. and 9th Ave., Waseca, Minn.

SALE: Elmac 67, mike, dynamotor, relays and cables, \$165; Gonset C46, 3-watt power supply, \$165. Super Pro B C1004, 540 Ke-20 Mc. excellent, complete, \$80. K9DVA E. Oman, 1103 East Ave., Hoscobet, Wis.

DX35, DX40 or similar rig wanted. Ted Dames, W2KUW, 64 Grand Place, Arlington, N. J.

WANTED: 6-meter Gonset Communicator, 6 volt. Local deal. W3AII, Stan Planka, 4539 Almond St., Phila. 37, Penna.

FOR Sale: Detroit area! Complete break-in station, in exc. condx, and operating. Valiant, SX-100 and all the trimmings. Ray J. McConnell, K8DAU, 853 Wordsworth, Ferndale 20, Mich., Lincoln 4-7046.

VIKING I, \$125; Viking VFO, \$22; Hallcrafters SX-28, \$98. For Sale. W8ENH, Clem Wolford, 630 Skyview, West Carrollton, Ohio.

SELL: Johnson Valiant factory-wired, \$345; HQ-110, \$219. Ditmer, W3KFA/2, 2233 Cypress St., Waukegan, N. Y.

SELLING Out: 70 lbs. tower, p.p. rotator, 3-band beam, 75S1, 32S1, 51F2, Par. 4-400As, CG linear, many miscellaneous components. Priced to sell, now! W0BBR.

FOR Sale: SX-99, purchased from Harrison, excellent condition, \$110, too busy to use. Floody, K2LKU, 30 Castles, Wayne, N. J. Tel. MO 8-3889.

PACE-MAKER, \$325; Hallcrafters 101-X Mark III with 447 speaker, \$325; 55 ft. telescoping tower, CDR rotor type M and Tri-bander Hy-Gain beam, \$225; Johnston TR switch, filter and 8-W. meter with coupler, \$50. W3CJP, 125 Girard Ave., Hyde Park, Reading, Penna.

NC-175 receiver; excellent condx, with Manual, Bargain at \$125. E. Mummy, 1032 Elmwood Ave., Buffalo 22, N. Y.

COLLINS 32V3, in superior condx, inc. spare 4D32, \$450 plus shipping. W7EQV, 37th Northeast, Seattle, Wash.

HAMS. Experimenters, surplus package, 25 different items, \$50 value, government surplus (unused). Send \$1.95. Kinningham, K9MFZ, 730 S. Sixth, Springfield, Ill.

LOCAL Sale only! SX-99, priced \$110, K2YQG, 343 Maple St., Brooklyn 25, N. Y.

GONSET Communicator II, 6 volt, sensitive mike, ear antenna, house antenna, dummy load, instruction book, used 175 hours. Need \$140. George Bonadio, Public Square, Watertown, N. Y.

SELL: SX-101, in exc. condx, \$300. W6CBV, Michael Milliron, 415 Concord St., Lodi, Calif.

WANTED: Transmitter (100 watts or under), revr, spkr, antenna relay, microphone, etc. Price must be low. Peter Boudreau, 41 Harriet Ave., Burlington, Mass. Tel. BR 2-9095 (Boston area).

WANTED: CD-618, FT-338 or female connectors from these items. VB-8, VB-9 Gonset 3011. Must be cheap but operating or repairable. W4N2Y, 119 North Birchwood, Louisville 6, Ky.

TRADE: Ruger 22 caliber, single-six revolver even for new or perfect WRL 755A VFO, Al Stevens, Granite Falls, Minn., K00GZ.

HQ-129X \$129, BC-794B 1.25-400K \$175, SP-600JX 26 540KC-54 MC \$325, SP-600JX 17 540KC-54MC \$395, 51J-3 500KC-30.5MC \$675, 75A-3 \$345, 32V \$275, NC-200 Sprk \$119, NC-183D Sprk \$40K-54M \$149, 44-54M \$249, HRC 3 Jr. \$50, C.L. 20A \$50, VFO \$245, Pacemaker \$345, Thunderbolt \$549. We make all types receivers, transmitters, test, Teletype eqpt in trade for NFW Johnson Hallcrafters, Hammarlund, National Fisher HI-FL, etc. Write Tom WIAFN, Altronics-Howard Co., Box 19, Boston 1, Mass. Richmond 2-0048.

FOR Sale: Gonset Super six, in exc. condx, \$30; Lear Dynaport wire recorder, in pert. condx, \$95; Millen R-9er, \$85; tubes; 1624s, \$2.50; 807s, \$1.75; 814s, \$4.25; 815s, \$1. All guaranteed. J. Warner, W6FCP, 1603 Lyon St., N.E., Grand Rapids 3, Michigan.

TWO new Natl. NPW-O precision calibrated dials, \$15 each; Billey factory-built, xtal controlled (6AG7) osc., output: 6-10 tones, \$6.50; \$6 buys two stereo organ tapes (1/2 hr x 1200 ft.), used once; FM tuner (needs only minor repairs), \$15; also TV converter (u.h.f.), tape recorder, CRT checker; priced F.o.b., W9WFT, 2029 Bradley Pl., Chicago 18, Ill.

CRYSTALS: Ammald, New crystals, Novice, Net, Converter, CD, Citizens, C.A.P. A1A1s, 1000's, FT-243 beam finished to 0.1%. Any klystron, 3500 to 8700 - 99¢, small hermetic holders, .050" or .095" pins \$1.95, June QNT "SSB Package" crystals, sets of five fundamental mixer crystals FT-243 \$8.95, small hermetic \$11.95. Accurately matched FT-241A filter sets, five channel 4.5 and two channel 4.6 - \$6.95. Unmatched test sets FT-241, 20A, 35¢. Arranging 9¢ per crystal. Californians add 4%. SSB crystals, all types including KWM-1 conversion. Let us know your crystal needs, we have them all. Crystals since 1933. C-W Crystals, Box 20652, El Monte, Calif.

FOR Sale: Hallcrafters SX-99, all 10: DX-40, \$60; Heath VFO, \$17; Hallcrafters R-46B spkr, \$16; all arc in excellent condx. Bill Puterbaugh, 6120 Waverly, La Jolla, Calif.

FOR Sale: Harvey-Wells TBS-50P xmtr, APS-50 pwr supply, National NC200 revr with spkr. Best offer. Ex/WN9JXQ, H. Stinespring, Rte. 1, Box 767, McHenry, Ill.

WANT: 75A-3 or 75A4. Have cash and Drake LA late model, new condx or telescope \$8, refractor with accessories to trade. Have 3 HX-2 supply tubes \$2.95 each. Glen Bowers, Box 105, Kearney, Neb. DX-30, J-38 key, xtals, relays and screen modulator; the whole works for only \$55 - all in exc. condx. W6NKC, 18902 Ervin Lane, Santa Ana, Calif.

SELL: 1 KW final, new RK85s, B&W coils condenser. \$45; 300-watt mod. MultiMatch out. 100 tps, \$40 on 19 in. panels. Heath ant. bridge, \$9; Collins revr loudspkr, \$3; G-E YRS slicer. \$25; 32V2 shielded filter against TVI for suppression. \$200; B&W 51B, \$155; Altec HI-FI tuner, \$45; Leete-Neville generator, 6 volt, \$42. Miscellaneous xmtr tubes \$2.95 each. Heath VFO, \$105. Kearney, Neb. Want: Late Drake SSB revr, 600L amplifier, D. B. Whittemore, W2CUZ, 36 Masterton Rd., Bronxville 8, N. Y.

FOR Sale: Panadator SP44, \$45; plate xfmr, 1500-0-1500 at 500 Ma. C&S 3000V DC, 400 Ma bridged ICAS, \$22.00; Altec 433A preamp., \$20; Bogen B50YL6 turntable 16 2/3 to 78 rpm with G-E diamond cartridge, \$22. Coyne radio textbooks, 5 vols. \$15. C. Jaray, 215 Main, Fort Washington, L. I., N. Y.

FOR Sale: Complete station of W6FAY Viking II and Viking VFO factory-wired, \$185; Hammarlund HQ-140X, 4-w spkr, \$175; BC-221M freq. meter, \$40; multiFilm complete mobile rig, \$225; (AP-67) (PE-125AX) (PMR-7) (PSR812), Mrs. Francis J. Hinz, 10 Cape Cod Lane, Beach Haven Crest, N. J.

DESK Call plates, plastic black or in colors, 1 1/2" x 8", only \$1.00 postpaid. Polished brass nameplate, 1" x 3 1/4", only \$1. postpaid. Bill Clinchard, 120 Ellis Ave., Jackson 9, Miss.

FOR Sale: 57 ft. Aeromotor tower, \$100; fact. wired Vallant, \$333; 4 separate 250THs PR KW finals, 10, 15, 20, 40 and 80 meters, TVI suppressed, \$60 each. American 350 V, 750 Ma pwr supp, \$75; Stator 250V V, \$60 Ma pwr supp, \$65; Craftsman 4 1/2" Dr. Press 6 mtr, \$60; Class B 500 w. mod. PP 810s, splatter choke, etc., \$50; 6 ft. Par-Metal rack, \$15; 23" Par-Metal cab., \$15; Heathkit 20W amp., \$20. Write for details. C. P. Ross, W9ABA, 2615 Blackhawk, Wilmette, Ill.

ARC-5 Receivers 190-550ke \$12, 3-6mc \$8, 6-9mc \$8, Receiver Tuning Knobs \$1, Dual Receiver Mounts \$2.75, ARC-5 Transmitters 3-6mc, 4-8.3, 6-9 mtr, \$6.50 each. Single Transmitter Rack \$2. Triple \$3, BC-456 Modulator \$3.75, MD-7 Modulator \$5.50, APN-1 420mc Transceiver \$9.50, SC-R-622 two meter Transceiver with AC Power Supply \$95, details upon request. PL-X Audio Filters \$2. Tubes, brand new 4D32 \$22.50, 4-400A \$39, 4-100A \$65, 4X150G \$35, 4X250B \$39, 757L \$12, 304TL \$16, 5894 \$10, 813 \$8.50, 8291 \$8.50, 832A \$4.75. Send your tube needs, all guaranteed, C.O.D.'s o.k. Bill Slep, W4FHY, Box 178, Ellenton, Florida.

SELL: Gonset Communicator II, 2-meters, new condition, four xtal position, \$165; SX99, new condx, \$115; wanted: 75A4, Ranger, Thunderbolt, will trade. Eugene Simring, K2TDD, 862 1/2 East 55th St., Brooklyn, N. Y.

WANTED: Sixteen MM camera and equipment for use on another rare DX Expedition this summer. Will trade my SSB gear as 20A, VFO 100 to 10, 600L, National revr, etc. W9OKM, 1207 Oneda St., Joliet, Ill.

SALE: GLOBE Champion 300, SX100 revr, both for \$500, and in like-new condx, with all instruction books. Will ship express collect in original cartons. James Miskelly, W4PIL, P.O. Box 180, Newberry, S. C.

NOTICE! Offering subject to prior sale: Barker & Williamson mod. L-1000-A grounded grid kilowatt linear amplifier, tubes, blower, factory-built power supply, no alterations; complete manual in pert. condx (manufacturers' not, \$495); original shipping carton, F.o.b., firm price, \$245; Lakeshore Industries transmit/receive switch, manual, \$12.50; Universal Service product detector for 75A-2, 75A-3, brand new, unused, manual, superb sideband, CW, \$27.50 postpaid. Compact, adjustable, accurate 100 kc standard wired for 75A-3 (ETC), manual, \$12.50 postpaid. Telephone Indianapolis, Ind. TRINITY 6-2005; write: Howard O. Steverid, W9DPL, Route 1, Box 12-B, New Augusta, Ind.

TWENTY-two years of QST, 1936 through 1957, plus eight earlier issues. Nov & Dec. 1945 missing. Best offer F.o.b. W2KWW, Burns, Grand St., New Milford, N. J.

SALE: Excellent NC-183D, speaker, \$300; like new NC-125, \$120; new Harvey-Wells R9A, \$115; Globe Scout 680A, \$85 and Globe Linear LA1, \$90, both one year and little used; new Heathkit VFO, \$18.50. P.o.b. John Yoder, K4M8N, 1200 1-ane Street, Kannapolis, N.C. Carolina.

WANT: Tri-band 3 El beam, 10-15-20. Please state condition and price, W9SER, 4221 E. 11th Ave., Gary, Indiana.

SELL: Ameco oscillator, \$11.50; headphones, \$1.50, plus postage. Albert Johnson, K1IKK, Newport, N. H.

CLIPPER Speech PCL-1, new, \$12.00; photoelectric relay, Knight, with source light, \$12.00, new, Mannie Teitch, K2VQU, 628 East 8th St., Brooklyn 18, N. Y.

SELL: NC-109, \$125.00; Knight 50 watt xmtr, \$30; Knight VFO, \$20, all in excellent condx. Fred Reckich, KSHAH, P.O. Box 641, Gobles, Mich.

ALUMINUM Tubing, 20¢ ft. piece-meal, 7/8 OD .065 wall 6061 T6, 12 ft., 1800 lbs. Sacrifice entire lot for a quick sale. Frank Metal Co., 3301 Gardner, Kansas City 20, Mo., Tel. BE 1-2896.

SELLING Out. K2RVY.

BARGAINS: CDR Model AR22 rotator and Indicator, \$19; Eldico Antennascope, \$9.00; Hy-Gain Model 14AV Tri-band vertical, \$19. Mohawk Midgetape pocket tape-recorder with all extras, \$95. Mailed free. W6KG, P.O. Box 30, Alameda, Calif.

SELL: B&W 5100 xmtr, in gud condx, \$325.00; HQ-129X with xtal cabl., \$130. Stan Rojek, W2MGM, 715 Windsor Terrace, Seheencree, N. Y.

K161PT is selling 813 xmtr, 872 and 866 power supplies. Twelve meter enclosed rack and panel. This would make a swell foundation for SSB final. Take \$350 or will swap for complete mobile rig. Stored at K6YNY, 196 Malcolm Dr., Pasadena, Calif.

SELL: VHF 152A, in exc. condx, \$35; KW final pi-net 4-250A, new parts, \$125.00. K6VFO, 612 Begler Ave., San Leandro, Calif. Tel. N Neptune 8-7546.

TRANSMITTER BC-191LF, brand nu condx, 100 watts output, 12V AC and 1000V DC, needed. Complete w/tubes and tuning unit. For 75-80 meters. Only \$50. F.o.b. Ironton, Ohio. Irving Craizer, K8GFI, RFD #1, Box 302.

SELL: Heath AR-3 receiver and QP-1, Q-Multiplier, both in gud condx, \$40.00. John N. Preston, 12 Robert Lane, Glen Acres, West Chester, Penna.

SELL: Homebrew 2E26 6-meter xmtr plus twenty watt modulator, \$23.00 and xtal controlled converter, \$7.00. Like new condx Gonset 6-Meter mobile converter, \$35. Saturday 610, John Stone, K6JZY, 2427 North Boston, Tulsa, Okla.

FOR Sale: Gonset Super Six and Supereceiver, new and unused. Stored in trunk of car \$125.00. Prepaid. Also have used Gonset Super Six, \$35.00. J. E. Greenbaum, W1LIG, 3823 Madison Ave., Bridgeport 6, Conn.

IATF Model HT-30 SSB Exciter, like new, \$300; Gonset Super Six and Supereceiver, 12V, \$30. Both prepaid to western states. KL7ANQ, 4207 Porrett Road, Spenard, Alaska.

FOR Sale: BC-454 75M transceiver with Vibropack, \$30; BC-614E meter, \$20; MAR U.H.F. transceiver; 7-day Chelsea ship clock. Ideal for shack. W6NHT, 824 San Miguel Rd., Concord, Calif.

GLOBE Chief (factory wired), Modulator, VFO, 209 Karr, Hoquiam, Wash. K7CNT.

NEW Bell 221 Pacemaker stereo amplifier, current model, \$90. Save plenty. Louis Blum, 396 E. Whittier St., Columbus 6, Ohio.

S-40 Receiver: In good condition. Best offer over \$50. You pay postage. Don Maddox, K5QWH, 838 S. Montclair, Dallas, Texas.

MERCURY Turnstile: A horizontally polarized omnidirectional mobile or fixed antenna. "The most for two meter mobile." \$3.95. Mercury Enterprises, Box 273Q, Granby, Conn.

FOR Sale: Complete Novice-General station, HQ-145, DX-35, VF-1, \$275. Wanted: Gonset 30-40 Mc. Tuner. W1ZUH, Southboro, Mass.

BASSETT Mobile antenna complete with 75 meter vacuum coil, \$16; Master Mobile bumper mount No. 445, \$5.00; Thoradson transformer 3700 CF 500 mils A.C., \$25; 2 1/2" Aerovox 2000V condensers \$1.00 each; stand \$1.40; \$3.50; Allen SWR bridge, \$5.00. Fred Norton, 1450 Winchester, Muskegon, Mich.

CLEANING House! Elmac AF-67, \$115; Morrow converter 5BR, \$45; Carter Dynamotor 6v inp., 375v. at 400 Ma. outp., \$12, whip ant. mount 75M and 20M I, coils, \$5.00; Millen Mod. 90881, 500 watt final, all coils \$12.25, and fil. xfmr, \$50; BC696A, \$10; Millen 750V at 250 Ma. pwr. supp., \$40; 75M, 40M, 20M, 15M, and 10M, HDYL coils and 3, 6 and 10 turn links, \$35; pr. #138, \$8. All F.o.b. K2BHF, 1405 Main St., Vestal, N. Y.

NC-300 and KW, transmitter for sale. \$300 for NC-300; KW rig 80-10 meters, A.M., C.W., S.S.B., \$1000. W8V8A, 6030 Wayside Ave., Cincinnati 30, Ohio.

3 Band Pre-selector, \$19. K6TWL, San Diego, Calif.

WANTED: Kilowatt parts, coils, condensers, chokes, etc. Kilowatt modulator or parts. Will take complete rig. Am building again. Not u got? All letters will be answered. W8SBN, P.O. Box 45, Aberdeen, Ohio.

MOBILE Station complete: AF-67 with mounting case, Super-Six with mounting bracket, Gonset squelch-limiter, C-1050 supply, complete center-loaded all-band antenna, coax relay with PDDT contacts, all manuals, excellent condition, no modifications on any equipment. Only \$220. K6ULL, Box 2187, Stanford, Calif.

SELL: DX-40 and Knight VFO, First \$69 takes both. Good condx. Has worked 35 states. Kit books for both. K1LXC, W. Willey, 95 N. Main, Penacook, N. H.

SELL: Globe Scout 65B factory-wired, \$65. Ameco 12-record code code, \$5.00. K2VEH, Jac Holzman, 115 W. 16th N. Y. C., OR 5-7137. Nautical hams: deal on a Ball recording sextant?

CANADIANS: Collins KWM-1, complete with 516F-1 AC power supply, 516F-1 DC power supply, 351D-1 mobile installation kit, Mosley Tri-band mobile antenna and dynamic mobile microphone. All items are in new condx, only a few months old. \$1000 F.o.b. Winnipeg, Manitoba, Canada. Will be willing to ship if required. VE4AT, 128 Lenore St., Winnipeg 10, Canada.

WANTED: Receiver in good condition. Prefer HQ-129X. Give full description and lowest cash price. W3FHT, 122 Hampshire Road, Baltimore 21, Md.

FOR Sale: NC-88 and 6J6 6-meter converter, \$80. Also Globe Scout 680, \$50. Bill Meyer, K9DGC, 211 North Third Ave., Cedarburg, Wis.

SELL: DX-35 and Heathkit UFO. Both in perfect condition. Both for \$60. K4KJF, 703 W. 12th St., Titton, Georgia.

MUST Sell: Transcon 10-meter 12 volt mobile xmt-r-conv. See p. 30 in December 1957 QST. Best offer over \$50. K3CTX, 1772 Killobourne Pl., Washington 10, D. C.

FOR Sale: Heath TE-4A TV alignment generator, \$35. Three months old. FH; Heath AM-2 S.W.R. bridge, new and OK, \$12. (Resent tape recorder. Needs minor work. \$25.00. J. G. David, K4HQB, Box 205, Bishopville, S. C.

WANTED: Early radio gear: Atwater Kent, Grebe (R. Radiolas, Kennedy, Loose Couplers, etc. Paul Giganti, WGVV, 2429 San Carlos, San Carlos, Calif.

WANTED: Collins 51J late model, good condition. (quote lowest cash price. Karl Hassel, Tower Lakes, Barrington, Illinois.

KW-1, Serial Number 337 with AC power supply, \$720 F.o.b. Shreveport, Louisiana by Louis M. Gregory, W5FLZ, 3025 Old Mooringsport Road.

DX-100, in excellent condition, with manual. High level negative clipping, rear apron plug for TR switch power. Local pickup preferred but will ship if prepaid. First \$150. Jack Lambert, K2ESZ, 89 Thayer St., Lorraine 7-3449, New York 40, N. Y.

FOR Sale: SX-71, in working condition, but needs alignment, \$90; Meissner signal shifter with coils for 20 and 40 M., \$15. Darryle Kranstuber, 6713 Brookside Road, Cleveland 31, Ohio.

CLEARANCE: All new equipment: 2-X-150A, \$30; 250TH, new, \$25; Heath VOX, \$18. K5TQD, Oma Radio Club, Claremore, Okla.

LAMPKIN Frequency meter, used in maintenance in municipal departmental work. Good bargain. Contact Ecker, 26 Trumbull Ave., Plainville, Conn. Phone SHerwood 7-9363.

FOR Sale: Globe Champion 300-A. Looks new, 7 months old \$395. Larry McCrory, 308 Washington, Franklin, Ky.

IMMEDIATE Sale desired: Excellent Elicio 75W transmitter, complete, \$20. Signal Shifter, fair, \$10. Write to K4SA4, 3753 1/2 Lentz, Louisville, Ky.

WANTED: NC-300. Will pay \$250. Others considered. Will be willing to pick up in Philly area. Bon, K2DUK, 565 North Coles, Maple Shade, N. J.

HAMMARLUND 150, like new condx, \$200. Stan Gonet, 211 Sylvan Knoll Road, Stamford, Conn.

SELL: QST 1928 through 1945 in QST binders for best cash offer. Purchaser must remove same. No shipping. Write W2AEB.

SELL: Complete mobile rig, Elmac A167, PMR61 revr, James 1050 supply, cables, control box, excellent condx, with manuals, \$240. W3LWN, Box 103, Sigel, Penna.

SELL: Four unused RCA 838 200W. triodes, \$5.00 each. W3Y1K.

SELL: QST the 1933 through 1952, complete run, intact. Make an offer. P.o.b. K. Sandstrom, WIBNO, 590 Mount Elm, Fitchburg, Mass.

KEYS: For electronic keys, attractive, precision made, 3 x 4 inch black cast base, 3 1/2 lbs., satin finish solid brass construction, dual wick paddles for minimum ambidextrous motion, silver contacts. First ever offered, \$15.50 prepaid in U. S. A. Card for details, Ponce Electronics, Box 181, Babylon, L. I., N. Y.

SWAP Collins equipped station, am giving up hamming: 8 line 32s4 xmt, 516 P2 power supply, 7581 revr, 312B3 spkr; 503 Torex 3-el. 20-Meter beam. Want foreign or American new or used sports or standard car. All letters answered sixty days after publication date of this ad. Ed Ceries, W6GCF, 1035 Westglen Drive, St. Louis 19, Mo., USA.

SRL: Heathkit 12 watt W5M amplifier, \$45. Richard Bedard, 12613 Werry, Ft. Campbell, Kentucky.

"CY X1" - Only book about X1L, 500 photos. Now only \$3.00. Luisa Sando, W5RZJ, 212 Sombrio, Santa Fe, New Mexico.

SALE: HQ-100, new, \$150; VF-1, \$15; DX-40, \$60. W5OPU, Sam Wardio, 4943 Arthur Dr., New Orleans, La.

FOR Sale: DX-100, \$170; Pierson KE-93 with 6/12 volt Vtroc power supply, \$125. Both little used. George Buck, W7BSD, 119 West 6th St., Port Angeles, Wash.

SELL Hallcrafters HT-32, \$550; SX-101, \$300. K2CVP, 39 Canterbury Rd., Woodbury, L. I., N. Y.

CANADIANS: Sell Globe Scout 66, VFO 755 factory-wired for \$180; SX-100 for \$300. Will pay shipping. Equipment in A-1 condition. W. Sieke, Decca Stn., Port aux Basques, Newfoundland, Cana.

ALUMINUM for every ham need. Write to Dick's, 62 Cherry Avenue, Tiffin, Ohio, for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

COLLINS 75A3 with reduction knob, xtal calibrator and 6-meter converter. Beautiful! \$375. W2FPF, 7 Joan Terrace, Montvale, N. J.

SELL: 500/450 watt CW/Tone "Orion 5 section transmitter" \$135; DX-100 like-new condx, 1 year old, \$189. Harold Treloar, 1751 West Genesee St., Syracuse, N. Y.

HAMARAMA - Sunday, May 17th, Lake Shawnee, Topeka, Kansas. Mobile hunts, XYL-YL activities, covered dish luncheon. Hams, guests, 150 mile radius invited. Charlie Martin, W0MXG, Chairman, Kaw Valley Radio Club, Inc., 1959 Hamarama Committee.

ADVANCED Modulation equipped Viking Ranger for sale. Factory wired job. Operates with push-to-talk. In excellent condx, \$225 F.o.b. Topeka, Kansas. Charles Martin, Jr., W0MXG, 1268 College, Topeka, Kansas.

COMMUNICATOR III, 6 meters, \$185. K2LKI, 412 Summer St., Schenectady, N. Y.

WANTED: SX-101 Mark III or HQ-100. State lowest price and condx. W4EFB, 3614 Steele St., Memphis, Tenn.

CELEBRATING our 14th ham shack! Power xfmtrs, condensers, miscellaneous parts. Send stamp for list. Bill Overdort, W3POZ/4, 5350 Kingsbury Ave., Jacksonville, Fla.

FOR Sale: Viking 1, \$125; Millen 90711 VFO, \$40; Teracraft PA, \$25; Teracraft 6M, \$25; Millen 90810 trans, \$40; 1 K4W 2-meter PA w/pwr supp. and 300 watt plate modulator. Write for details. Robert G. Klausner, 4437 Sibley Road, University Heights, Ohio.

PERIODS: Uncased 88 whv., like new. Dollar each. Five for \$4.00. P.P. DaPaul Co., 101 Starview Way, San Francisco 27, Calif.

SWAP Or Sell: 15 ft. 1956 Trojan Custom Queen with 30 horse Evinrude electric starter, big-twin motor for KWM-1 with AC pwr supp. Alfred Krumh, 70-18 171st St., Flushing 65, N. Y.

RIG For sale: Like new HQ129X with xtal calibrator, \$150; Globe Scout 680, in excellent condx, \$35. Both for \$225. K2SJC, 9012 New York Ave., North Bergen, N. J.

HQ-129X, built-in 100 Kc marker, Heath Q-multiplier, clean, \$130. K2EHR.

CRYSTALS: For 2, 6 and 40 meters and other frequencies, 25 cents each. Send for frequency list. Set of 120 crystals covering 5075 Kc to 3550 Kc. Complete set, unused, \$11.95. E. W. White, W6WMC, 210 Alden Rd., Hayward, Calif.

BARGAINS: Reconditioned and guaranteed. Shipped on trial. National SW54 \$35.00, NC800 \$279.00, HR-5, NC183D; Hallcrafters S38 \$29.00, S85 \$59.00, SX99 \$119.00, SX71, SX96, SX100, SX101; Hammarlund HQ100 \$139.00, HQ129X \$159.00, HQ110 \$149.00, HQ140, HQ150, HQ160, HQ170; Johnson Ranger \$179.00, Viking 11, Valiant, Thunderbolt, Pacemaker; Collins 75A1, 75A2, 75A3, 75A4, 32Vs, KW1M, KW51; Globe; Gonset; Heath; Elmac; complete stock of reconditioned and new gear. Write to: Lt. Henry Radio, Butler, Missouri.

ELEMENT Gonset 3-Bander, converted late model, excellent condition, complete instructions F.o.b. El Paso, Texas, \$75 or your best offer. 2 new RCA 6146, \$6.00. W5LBC, Box 1645, El Paso.

COLLINS 32V3 for sale, like new condx. Also have beautiful homebuilt PP813 KW rig, completely enclosed. Variac controlled pwr supplies, illuminated meters, etc. Must be seen, real buy. Local deal only, this area. Al Grober, WINUZ, 164 Deerfield Rd., Cranston, R. I.

BRAND New Gonset Super Six, \$39.50; Master Mobile 132JC mount, \$3.00; 89-60 whip, \$5.00; 1-17 mike, \$4.00; 50 ft. R4R/J1, \$5.00; DM-33 dynamo, 12V, 625V @ 225 Ma, \$5.00; J4-01 dynamo, 12V, 400V @ 185 Ma, \$5.00; deal on University MII-8 trumpet, (worth \$5.00) + Heath PM-2, \$7.50; Bench grinder, less motor, \$3.00; grid for ur lab hole saw, \$1.50; Black & Decker rulo-hole attachment, \$3.00; Vibroator jigaw, \$5.00; Drill index, \$1.00; American Beauty 100w iron, \$2.00, F. S. Eggert, W9FLL, 11833 Wisconsin, Detroit 4, Mich.

FOR Sale: Johnson Matchstick vertical antenna. In excellent condx, \$80. Dr. M. F. Hash, W7YHS, 319 No. 26th St., Billings, Montana.

SELL: Line to push-pull grid transformer 15 watts audio), \$2.00 postpaid. Wanted: 51J receiver, trade RTTY gear, W7K V.

DX40, \$50; Heath Q Multiplier, new, \$9.00; Heath Balun coil, new, \$8. Erwin Sapiro, K1JMH, 9 Dell Drive, East Haven, Conn.

WANTED: Transmitter, 50 to 90 watts, VFO or xtals. Receiver, such as SX-99, HQ-100 or HQ-110. Give exact condx and price in first letter. K4KJK, Box 6080, Charlotte 7, N. C.

SWAP: 1942 Hammond Novachord organ as is for 6 meter Communicator III late model receiver, or make offer. W6OOB, 4254 Niagara Avenue, San Diego 7, Calif.

LYSCO Mod. 600, \$45.00; W5W Balun, Mod. 725, \$15.00; Johnson T-R switch, \$22.50. W. Groh, 115 E. Liberty, Columbia, Ill.

WANTED: Ham radio instructor, with or without gear, for children's camp. Please send replies to Camp Sequoia, 703 Bach Court, Westbury, L. I., N. Y.

FOR Sale: Elmac 4-125's, new, sealed cartons, \$16 each; 241's, new, \$2.00 each; 30471's, unused, \$10; PH-103 dynamo, cables, sorry, can't ship it, \$14.00; Gonset 100% R modulation indicator, unused, \$8.00; Johnson SWR indicator, \$6.00; pair of Stancor #1415 chokes, 500 Ma., \$10.00 each; 1000 Kc frequency standard xtals 093" pins, \$1.50 each. W. T. Curtis, W21VS, Box 125, RFD #1, Utica, N. Y.

HAMSI Learn Mathematics! Practical, Select Calculus, Algebra, Trigonometry, Geometry, Easy Lessons. First Four, \$1.00. Mathco, 4256-2 Minzor, Cincinnati 17, Ohio.

SWAP KW5-1 for late Volkswagens, Volvo, Simca, Dauphine, W5YRY, Tom Hopkins, 6223 McCommas, Dallas, Texas.

BARGAINS: New Close Out Demonstrators: Carter VSR627 dynamo, \$39.00; Telrex R100 rotor \$39.50; Telrex R200s, \$179.00; \$495.00; Gonset 500W linear \$249.00; Gonset 2 linear \$119.00; S85 \$104.50; S102 \$49.95; Hickok 610A \$159.00; Phasemaster II \$249.00; Mosley VPA-1015-3 \$39.50; Precision III B semitripler \$399.00; Precision "Snooper" geiger \$25.46; RCA geiger \$99.50; Sonar 120 VFO \$14.94; Telrex R100 rotor \$34.75; Telrex R200s, \$179.00; Triplet 345, \$169.00; YAM1225A \$29.95; Globe 11M-1 \$39.95; HQ-110C \$224.00; Hylite 3F15 beam \$39.95; Lyseo 650 \$49.00; Sonar 120P \$179.00; Wein ConeRad \$14.95; Morrow MAH Armchair station \$399.00. \*Also many reconditioned items, write Leo, W9GFQ, Rox 811, Council Bluffs, Iowa, World Radio Labs.

75A Y perfect with 2.1, 3.1 Kc and 800 cycle filters, \$575; Central Electronics MM2 with L.F. adaptor for AY, \$100; KW Matchbox, \$85; Drake 1A, \$825; pair #138 grounded grid with AC var. cap and 2" square bore, 100% power, \$120; 1000 Kc 1913" spkr, \$225; Triplet 650A, \$45; Sico 770A, \$10; Millen 90651 grid dip meter, \$45. Sorry, no trades! And I cannot ship. Pick-up deal. John F. Babcock, W2ZTZ, 1 Ann St., Spring Valley, N. Y.

ORIGINAL Owner, Factory-wired Viking II and VFO, \$225; Signal Sentry, \$10; Hallcrafters SX-42, \$150. F.o.b. Cos Cob, Conn. John S. Ward, 7 Salem St.

SELL: Six Meter Gonset mobile converter, with noise clipper, vt grid condx, \$30; Six Meter, 20 watt, Teracraft Transmitter, brand new, never used, \$45.95. F.o.b. Milwaukee, Wis. K9COP, 2845 South 52nd St., Milwaukee 19, Wis.

FOR Sale: New, Elmac AF-67, PMR-7, 1050 P/S. Deluxe all bandmaster mobile antenna mounting racks, relay, etc. New, unused. Factory price. Company car and XYL for \$100 problem. Good discount. W. Barnes, K4MZC, 934 Ross, Wausau, Wis.

HARVEY-WELLS Z Match, \$68; NC109 revr, \$134; Hallcrafters SR75 transceiver, \$66; Central 10A-SB7; Heath DX-20, \$32; Motorola Police cruiser receiver, \$28; Elmac A64H transmitter, \$69; Heath 0-10 scope, \$44; Teracraft 220 Mc. conv., \$22; Regency 10 Meter booster, \$17; B&W V5 ohm L0-pass, \$11; Elicio antenna scope, \$20; Dow 10 W. AC relay, \$7; Johnson SWR bridge, \$7; Bur 100 Kc "starburst" \$12; Heath \$40 S.W. Meter, \$25; Speakers for 75A4, SX100, NC183, \$10 each. All guaranteed like new condx. F.o.b. Chicago 35, Tregger, W91VJ, 2023 N. Harlem Ave., Tel. Tuxedo 9-6430. We pay cash for receivers and transmitters.

813 amplifier for sale, \$75; 2400V/500wts. Has a bug. Have no time to fix. Pse write Tom Evans, Jelliff Mill Rd., New Canaan, Conn.

SELL: Shure dynamic mike, Mod. 65, collapsible stand and w/20 ft. cord. All in excellent shape, for \$55. WD3SG, 518 Gordon Ave., Nantberth, Penna.

WANTED: HQ129X or HQ-140. State price. Wendell Caruthers, Jasperson Dr., Madison, Tenn.

FOR Sale or trade: Rollei-cord IV camera with case. Want Globe Chief or Globe Scout with SM-90 modulator. Ralph Roper, P.O. Box 71, Waterloo, Iowa.

FOR Sale or trade: Panda PR-120V, \$150; NCZ-40D, \$125; Federal type 804 signal generator, 8-330 Mc., \$125; Measurements Corp. Mod. 75 signal generator, \$35; General Radio heterodyne freq. meter mod. 616D, \$35; VR-V-1 Wire recorder, \$50; miscellaneous parts and equipment. Write for list. Want 75A2 receiver, preffer trade. W6FRS, 1139 Bullock St., Encino, Calif.

6 Meter converter, w/tubes and xtal, \$17.50 postpaid. Nat Stinnette, W4AYV, Umatilla, Fla.

CLEAN HQ140X, unaltered, \$175; DX-100, top condx, gud assembly job, \$185. Reason for sale: bought 8SB rig. 2-Motorola 100 watt 30-50 Mc. FM xmtrs, complete w/ant, relays and 6V. dynamotors, \$25 each; 25-50 Mc. dual head end assembly for G-E Progress line mobile equipment; 565 Motorola 15 watt transistor powervoice spkr, \$30. Need: 349L1, & G-1 linear amp, parts and small gen. coverage revr. W6DSB, Box 261, Webster, Wis.

FOR Sale: HQ-140X, \$175; Heath DX-20, \$32; Q Multiplier, \$9.00; ant. coupler, \$13.00. Brand new. R.D. #3, Box 179, Medina, Ohio.

ROTATOR: Wanted CDR HAM-M or Roto Brake, W9YRV, 202 E. Thompson, Urbana, Ill.

SALE: Brand new NC-300 with matching speaker, in orig. carton, never used. Best offer over \$300. Tom Prothro, W5HBP, 847 Lee Hall, San Antonio 12, Texas.

WANTED: Mims rotator and indicator. R. Divis, 1613 S. Ruble St., Chicago 16, Ill.

JOHNSON 6N2, \$95; Johnson 2 mtr. VFO, \$25; Comm. I, \$90; Comm. II, \$110; Gonset 2 mtr. VFO and preamp, \$35; linear, \$80; TBS50D and AP850 supp, \$75; VHF 162A, \$35; Tecart 2 mtr; xmtr, \$35. H. Palmer, 228 N.E. 172 St., North Miami Beach, Fla.

SX-42/AM-FM, mult, \$125; DX-100/Baluns, \$175; Rollei-cord with 35 mm Rolleiflex flash, access. debl, 8SB coil \$7.00, \$25; all band trap, 11-A, FM pilot, 88-108 Mc. Miller SWR bridge complt., TB-4 rotor, hard aluminum 1 1/2" tubing, superselective IF amplifier (QST March '53) not completed, \$200, on parts alone. With complete diagrams and manuals, all inquiries and offers will be answered. Local hams invited to inspect. Everything must go! Waasdrop, K2GXA, 87 Ridge Road, Rumson, N. J.

HEATH Kits assembled, fifty percent of the cost of kit plus postage-send kit or money for kit. I'll bill assembly charge. Robert Sisson-Routé 2, Hartford, Mich.

COLLINS 75A-4, perfect, like new. Late serial number, 3.1 Kc and 2.1 Kc filters and matching speaker. First money-order for \$650.00 takes it. J. H. White, Box 521, Greeley, Colorado.

SELL: NC125 with QF-1 and speaker, \$125; 10 meter, 4-element beam, \$15. Plek up deal only. Ed Miller, K2SLG, 436 Ocean Ave., Lakewood, N. J.

MOVING: 32V2 Collins, NC300, No. 19 Mark II, all in exe, condx; SX28 vgr gud condx, 50 ft. steel tower, 20M Telrex Supermin beam, 11.8 Navy intercom 11-A, FM pilot, 88-108 Mc. Miller SWR bridge complt., TB-4 rotor, hard aluminum 1 1/2" tubing, superselective IF amplifier (QST March '53) not completed, \$200, on parts alone. With complete diagrams and manuals, all inquiries and offers will be answered. Local hams invited to inspect. Everything must go! Waasdrop, K2GXA, 87 Ridge Road, Rumson, N. J.

SELL: Collins 32V3 perfect condx, \$450.00. Reason for selling: Transferring to mainland. Local sale preferred. Bob Stimpson, 37 Kaupuni Dr., Kailua, Hawaii.

DRAKE-1A receiver, new, serial 613, with factory guarantee and in original carton. Used 4 hours. Going mobile. \$220. W4ALR/2, 723 Maple Court, Moorestown, N. J.

SELL: Collins 75A-3, serial N1652, like new, with speaker, calibrator, NBFM and manual, \$375; DX-100 with improved keying (QST August 1956); improved loading (CQ Oct. 1956). Collins-type knobs, delivers 800 volts, exc. condx, \$175; SX-62 with speaker, in perf. condx, \$150; Telrex meter element beam, \$30; CDR rotator with cable, \$25; Johnson Matchbox, \$25; Electro-Tape tape recorder, \$30. Rev. Leon Borman, C.S.C., 400 Eblon Ave., Akron 6, Ohio.

FOR Sale: Collins 310B1 exciter with 6146 final and allband tuner, 2 kW, 75A1 receiver, \$225. Both A-1 condx. Also 220 volt, 2 kW Variac, \$28. Will ship F.o.b. W6SRF, Russ Davis, 1204 North Alamo St., Anaheim, California. Phone PR 4-3710.

GONE Sideband and hi-power. Have for sale: Globe-King 500A, \$450.00; Central Electronics 20-A with VFO and QTI, \$200; Johnson VFA, Mod. 1, \$40.00; (2) Elmac A54s, \$75; Elmac PMR-6 w/pwr supp., \$80; RM100 speech clipper, \$25; Edson L. Hart, Jr., W8AZP, Box 183, Salineville, Ohio.

MULTIMETER For sale. I would like to sell this superior instrument in excellent condition, for only \$20.00. Ron Alspaugh, W6NKS, 18802 Ervin Lane, Santa Ana, Calif.

75A3 with 3 and 6 mechanical filter, 6DC6 RF amp, by Collins and product detector in FM socket, Collins schematic, Spottess, \$375; commercial appearing tabletop linear in 11-A. Bud cab, with power supply, grounded grid 81cs similar to L1000A P.E.P. 1500 watts input, \$200; stamped envelope for picture; xfmr 2500 volts each side of CT. 500 miles cased. Sorry, won't ship, \$200. One box of assorted parts (mostly Collins surplus), tubes, coils, xtals, etc. \$5.00. Will ship, KW, coils, variables, capacitors, etc. W9NEP, 1237-73rd, Des Moines, Iowa.

I PAIR (2) Vacuine transceivers, Mod. JRC-400, for \$50. W. Jackson, W4AVR, P.O. Box 285, Chatsworth, Ga.

COMMUNICATOR Owners: Modernize, more B plus, less wasted power. Seven pin plug-in silicon diode assembly replaces rectifier tubes. No wiring changes. \$8.50 postpaid. John W. Tenzza, W1EC1, 926 Yale Ave., Wallingford, Conn.

FOR Sale: National MB-150 Tuner. \$10; Biley CCO-2A oscillator for 2/6/10 meters, \$7.00. Vibroplex bug, \$8.00. W2EWS, R. L. Frie.

SWAP: HRO-60 in brand new condition including A, B, C, D, coils, xtal calibrator, product detector inside receiver cabinet, and matching speaker. I will swap my 75A-4 with speaker in similar condx to match my KWS-1. Wallace Printz, W2KAN, 1177 East 14th St., Brooklyn 30, N. Y. Tel. DE 8-3343.

KWM-1 with AC power supply, \$675. L. Wecker, W2FZR, 69 Anshumunika Rd., Babylon, L. I., N. Y.

SWAP 12 ft. aluminum car top boat with Buccancer deluxe 5 h.p. outboard, both in new condx, for late model commercial ham gear. Make an offer. W2UPY, A. Ostrochovsky, 70 Rea Ave. Ext., Hawthorne, N. J.

FOR Sale or Trade: XC-50 Tapetone 6 M converter 14-18 Mc out-put, \$50 for trade for small Allband xmtr such as TBS-50, DX-40, K2OYJ/1, 11 Fountain St., N. Kingstown, R. I.

VHF Men: 6J4 tubes guaranteed, \$1.00 each. Four: \$3.00. P.P. W9ZQG, J. W. Fordham, 4621 Sheridan, Chl., Ill.

SELL: B-85, Vv gud condx, QF-1, Both for \$85; Globe 65-A used 2 hrs., \$75. All three for \$150. Going mobile. Dick Axelrod, 125 Edgehill Rd., Balta, Penna. Phone MO 4-4694.

KWS-1 with automatic A.I.C. perfect, \$1250; 75A-4, \$475; 75A-3 with Universal Service Product Detector, \$365; HQ140-X with xtal cab, \$169. W5WCA, Barnes, 8451 Ridge Ave., Dayton 14, Ohio. Phone: CRestview 7-0409.

FOR Sale: Johnson Pacemaker, latest circuitry, like new, \$325. Also new transistorized two-tone test oscillator, \$20. K2VGM, 13 Accord Rd., E. Rockaway, L. I., N. Y.

MOBILE Whips: Webster Bandspanners; 80-10 meters. Best made. For information write to Ed's Radio & TV, Box 83, Oxford, Nehr.

RC779A "souped up" per CQ Dec. '57; vj fd, quiet and hot, with pwr supply, cables and book, \$90; vj gud NC-88, \$75; Heath QF-1, \$7.50; BC-654 3.8 to 5.8 Mc. xmtr and revr, new. Make offer. PE-105, w/vw, with cables, \$17.50, 4 unused 2C43 tubes, \$5.00 each. K1CRB, 85 Liberty St., Braintree, 83, Mass.

VIKING Navigator, six months old and perfect, \$135; Knight Communications Co. 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 40 mtr xtal, pwr supp., \$20. W. J. Tancig, K9MYZ, Beecher, Ill.

FOR Sale: Apache transmitter, four months old, Works PB. No bus \$210.00. 8H-10 Sideband adapter, also PB, \$80. Have several pieces of test equipment and Crescent tape recorder. Send stamp or postcard for list. J. G. David, K4HQB, Box 205, Bishopville, S. C.

HQ-110C, like new, \$200. Norman Michea, Phone PO 6-3510, K6PTZ, 11693 Picturesque Drive, Studio City, Calif.

SELL Hammarlund HQ120X, \$90; National 1-10A, all coils, \$25.00. Both in vj gud condx. Local deal only, please! H. I. Griffiths, W2QXK, 39-82 65th Place, Woodside 77, L. I., N. Y. Tel. LLincoln 54-49.

DX-100, in good working condx, carefully wired. First \$155 or highest offer. K4CO, 702 Lakeside, Williamsburg, Va.

NC101XA wanted. Please advise price, condx; 833A for sale. Strubank, 4417 Bedford, Detroit 24, Mich.

INSTRUCOGRAPH with 10 tapes: \$25.00. K7GFD, 225 Linden St., Reno, Nev.

GONSET II 6 meter, 6 volt; \$150 prepaid, \$140 collect. K7DFD/B, Box 148, Palmer Lake, Colo.

TRANSMITTER: 500W to 1 KW, 813 PP final; 2000 volt supply; \$175. Bob Snicer, 217 Osborn Rd., Albany, N. Y.

FOR Sale: QST, complete run from August 1939 to date. In perfect condition. W1MKM, 3 Eaton Place, Brattleboro, Vt.

SX-100 and speaker, \$185; NC-300 and speaker, \$245; CE-600L, \$300. J. D. Groves, K4BN, 1150 Magnolia, Daytona Beach, Fla.

NEW DX-40, crystals, perfect. \$57; National NC-125, immaculate, seldom used; \$125. New Amphenol 139-040 antenna, \$4.00; new RCA 50HP4 CRT, \$2. Gamret 28-D, Longfield Drive, Homestead, Penna.

FOR Sale: Hallcrafters SX-100, in good condition. Best offer over \$200. K2QDM, Norman Wise, 108-14 65th Rd., Forest Hills, L. I., N. Y.

SELLING Out: HQ-160, \$305; Heath Apache, \$240; Z-Match, \$50; rig case, \$20. All since new. Excellent. Don Goodrum, 2819 Plantation Dr., East Point, Ga. K4DHB.

FOR Sale: for the ham builder; a 25 lb. package of assorted electronic items, including toggle switches, rotary, switches, assorted capacitors, resistors, variable capacitors, controls rheostats, panel lights, hook-up wire, assorted screws with nuts, phone jacks, coax couplings, chokes, filament transformers, terminal strips, time-delay switches, etc. All tested, new and used equipment. A real buy for \$10 plus shipping charges. Shipping weight is 30 lbs. We have tons of other gear: transmitters, transceivers, power supplies, transformers, tubes, chassis, relays, filters. Send for descriptive lists. Al Meredith, KN2NQA, 35 Forest Avenue, Smithville, N. J.

NC-300, excellent. Completely checked and peaked at National Co. in April 1958. In the original carton with two manuals and receipt for above work, \$285. X(1)-300 xtal calibrator for same, \$15. BC-1206C receiver 200-400 Kc, depot re-pack, unused, \$7. Dave Bernays, K4UWX, Box 2056, Pine Castle, Fla.

MUST sell my like-new Collins 75A4 and KWS-1. Will deliver within 500 mile radius. Best offer. All inquiries will be answered. Paul J. Kehl, W9GFL, 1581 Kimball, Green Bay, Wis.

SELL: Ranger factory-wired, \$275; 8X-99 w/R-46B speaker and plug-in 8-9er, \$135; TR-2 rotator, \$20; GD-1B, \$15. F.o.b. K0IYO, Jay Tow, 1540 K. Minnehaha Pkwy, Minneapolis 17, Minn.

CANADIANS! Am moving to an apartment, no room for amateur radio. Have Pacemaker, single sideband, new 5667, Watt \$450. Also 20-A single sideband, \$250, and P & H linear 400 at \$150. All the above are factory-wired! VESGU, 130 Garfield Ave., Toronto, Canada.

NC-98 like new: xtal filter. Perfect. First revr cost \$149.95. Will sell for \$97.00. Will be willing to consider equip, or parts in trade. All inquiries inswred. KN4EJM, 2723 Almosa, Columbus, Ga.

CLEARANCE Sale: All must go - fixing to move! Send for picture and list of hundreds of items. Terrific discount. Brand new, never used: Gonset Tr-Band 3220 Beam, Lauda modulation monitor, tape recorder (\$5.00) used equipment: all-band kilowatt, two finals, 10 panel meters, Elmac P58-V, AC pwr supp. PCA-T-200 Panadaptor, Miller K9er, HF 10-20 converter, etc.; surplus equipment: BC-221 frequency meter, never touched, ARC5 receivers and transmitters, tubes 304T, 832s, 810s, etc. Send for complete list with prices and kilowatt picture. Make your bid - all must go! W4E, Box 48, Lewisburg, Tenn.

FOR Sale: DX-100 equipped with antenna relay, 1200  $\mu$ fd variable output, load, differential keying, W6GMC, 614 Bradbury Rd., Monrovia, Calif.

CLEANING Out all odds and ends: SCR522 complete, used, \$30; BC-645, new, \$30; General Electric YRS-1, new, \$50; Collins 32RA transmitter, used, \$75. Many other items. Transformers, National Parts, odds and ends. Send for list. W2FUZ, 721 Carroll, Teaneck, N. J.

FOR Sale: 3 new Elmac 4E27A/5-125B tubes, \$60 or \$25 each. Walter Madsen, W9YAE, Fontana, Wis.

WANTED: Collins 6 Kc mechanical filter for 75A3. J. A. Buzbee, K4QNX, 8021 Ola, Tampa 4, Fla.

WANTED: Viking Navigator transmitter, priced right. Sam Thompson, 602 Pacific Terrace, Klamath Falls, Ore.

FOR Sale: Mobile Installation: Gonset Commander and VFO, 3-30 Mc. converter with noise limiter, aut. spring mount, coax relay and dynamotor. Complete, \$130, prepaid. Will sell separately. 145 back issues of QST, 1940-1956 run, \$20. D. L. Robinson, W3SWV, 1609 Westview Dr., New Kensington, Penna.

ELMAC AF-67 transmitter and PMR-6, 12 volt receiver. James Vibrator supply handles both. All in gud cond, oprtng and appearance. Go mobile for \$200. W2KJQ, 3930 Anne Drive, Seaford, N. Y. Tel. SV 5-7555.

HAM Selling ten years accumulation of electronic equipment. Self addressed, stamped envelope appreciated. W3LXL, 8435 Cedarbrook Ave., Philadelphia 50, Penna.

SELLING: SX-100 with HQ speaker. In like new condition, \$215. Joseph Marshall, Jr., 22 Clare Drive, East Northport, L. I., N. Y.

TRANSFORMERS: Filament, dual secondary 2.5 volts @ 15 amp, 1 volt primary. Ideal for rectifiers, battery chargers, etc. Write for full information. Carl L. Morgan, K5SHE, R. R. #4, Harrison, Ohio.

250 WATT W.E. audio amplifier, complete with tubes, power supply and manual, \$60. F.O.B. Albany, N. Y. W2GPP, 14 Mountain View Ave., East Greenbush, N. Y.

GONSET 2 Meter Communicator III, brand new, in factory carton. Two hundred bucks. W0CVU, 1500 Center Point Rd., N.E., Cedar Rapids, Iowa.

SELL: Heath 0-8 scope, \$40. W2HFM, 60 Lindgren, Merrick, L. I., N. Y.

10B For sale. Very late model, \$99; Gonset 6 meter linear, \$99; P & H 600A, \$25. All F.O.B. Larry Housteau, W8LH, 139 Park Ave., Youngstown 4, Ohio.

SWAP: Remington Model 721 bolt action 270 calibre rifle, Weaver scope and mount, B&W powder measure, Lyman Tru-line, Jr., reloading press with 270 dies for Viking II or equivalent transmitter. Excellent condition. K5QQT, James C. Campbell, R.R. #1, Calera, Okla.

FOR Sale: Custom built 1 KW LA Pr RK65s in final, vax variable, B&W p-switch, 1 KW coil, 3 meters, tuned grid. Pwr supply, xfrmr 6000-0-6000 1/2 amp, CCO, UTC swinging choke 8-40 hv, 1 amp, 872a, variac 4000 volt condns. also AM 813 KW modulator speech amp., all for \$300. Also have tubes 6146s, two RK65s, 872-813, oil-filled condensers, xfrms, etc. others too numerous to mention or list. Prefer local sale. Come on down and pick up bargains. Cleaning house! Doc Bloomberg, K2CNG, Mayfair 1-5589.

SELL. Or swap: Dumont oscilloscope 208 perfect, \$35; Globe Scout 680 factory-wired xmttr, 80-6 meters, \$75; ART-13 and RAL schematics, 50c. W3HHD, 4905 Roanoke Dr., Washington 21, D. C.

BUYING Apache, selling excellent Knight xmttr, \$25; complete portable xmttr-revr portable, \$25 plus misc. gear. List available. Chas. Dutton, W9QLK, Rte. 2, Box 91-B, Elgin, Ill.

SELL: Simpson 303 VTVM, new condx, \$45; BC348Q, 110 VAC and 12 VDC plug-in, pwr supplies, \$55. F.O.B. Rochester, Mich. W8WBG, 501 Nawakwa, Ul 2-4668.

SELL: Factory-wired Globe Scout 65A with companion Heath VF-1; modified BA37 osc. for extra drive. Both for \$75. Perfect shape. Write to Lyle Mattes, 4555 Canal, Friley Hall, Ames, Iowa.

FOR Sale: Johnson Vallant, 200-275 watts; factory-wired; about 1 1/2 years old, used, \$125. Repeating with higher power. W2PME, 433 Abington Ave., Bloomfield, N. J.

VIKING II for sale, excellent condition, looks like new, with instruction manual and keying modification kit: \$180. Robert Sprung, W9CPK, 4847 W. 98th Place, Oaklawn, Ill.

SALE, Cheap, 20A, accessories, HQ-140X Hickok oscilloscope, Jim Tucker, 1303 West Louisiana, McKinney, Texas.

KWS-1, \$1375; Combo HT32, HT33A, \$1100. Forward stamp for cleaning house bargain list. W2ADD.

FOR Sale: RME 4300 plus QF-1 and Globe Chief, nice combination for the Novice. Both are in excellent condition. Am asking \$200 or best offer for both. Also new 2 meter H-pwr WCA transmitter, including 3 extra 4-125As and a converter; will trade for a 75A-2 or -3; must be in vry gud condx. Write K3AAF, Bryan Davis, 2010 Wallace Ave., Spring Spring, Md.

KWM-1 wanted. With without accessories. R. Yeager, 1455 Wilson Ave., Chicago 40, Ill.

100 QSTs, \$2.50; samples 15c. One Week Delivery! Arthur Greenberg, 3433 DeKalb Ave., Bronx, N. Y.

COLLINS 32V3 transmitter, Perf. condx, \$450. Chicago area deal is preferred. Richard Karl, 2836 Leland Ave., Chicago 25, Ill.

RG59/U, 5c ft. any length, minimum 50 ft. RG8/U, 30 ft. lengths with connectors, \$2.95 ea., 2 for \$5.00. H562/U with boom mike, 600 ohms, \$4.95; J-48 key, \$1.50 w/cord; 840VCT @ 500 Ma. plate transformers, 115 or 220 Pri., \$6.00 ea., announcing a great new parts kit of genuine govt. surplus parts. Value over \$30. No junk! \$3.95 ea. Complete satisfaction or your dough back on all sales. Lee Industrial Surplus, 25150 Van Born, Inkster, Mich.

RANGER For sale, Factory-wired in A-1 condition with PTT and keyer, \$195, SX-100, in exc. condx, \$220. K9GZF, 6114 N. Kimball, Chicago, Ill.

100 WATT phone/w. xmttr. Bandswitching 80-10 meters, power supply, rack cabinet, \$95. Meissner Signal Shifter, \$25, 80 watt, 2 meter xmttr, pwr supply, rack cabinet, \$95. HT-19 185 watt xmttr, \$95; 2 meter xtal controlled converter, power supply, \$20; prop pitch motor, \$25; 6 element 2-meter beam, 7; 3-cl. 10 meter, \$10; 3 element, 20 meter, \$18; UConn Radio Club, Box U-37, Storrs, Conn.

WANTED One used flying spot scanner, 525 lines 60 fields 30 frames with or without FM modulation tuneable one TV channels 2 to 6 C. Charles Engardt, 402 Claiborne St., Biloxi, Miss.

WANTED: 6 to 12 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

FOR Sale: Central 600L used less than 5 hours. \$350. W8PVC, 4619 W. 156th St., Cleveland, Ohio. Phone W1-8186.

COLLINS 310-B3, \$160; H RO JR. with coils and power supply, \$50; Teacraft 15 meter converter, \$20; BC453, \$10; local sales only. Will not ship. J. Porgacs, W2AAS, 4305 Furman Ave., Bronx 66, N. Y.

ATTENTION SSB, DSB and AM operators! Pre-emphasized narrow-band speech filter. Concentrates modulation intensity on audio-frequency range possessing greatest communications intelligibility. Wired and tested, \$18.95. Metek Labs, Box 222, Hastings, Nebraska.

ATTENTION Boat owners: Scot Marine radio, model 8LRM, 115 AC or DC. Has slight hum but otherwise in perf. condx. A really fine receiver for only \$175. Write your deal to K5MQK, 2000 McCullough Ave., San Antonio 12, Texas.

A MILLIAMMETER for less than the price of an NE2 neon lamp! Impossible? Not at all! "How to Make a Meter" gives plans, templates and instructions for making an Astatic oil-damped galvanometer with a few pennies worth of material. It tells how to adjust balance, linearity, damping and calibration of the meter. Originally designed to monitor transistor circuits, the meters have proved useful in simple plans. For your copy of "How to Make a Meter" send \$1.00 to L. Baker, 40 Schley Ave., New Rochelle, N. Y.

FOR Sale: Johnson Ranger, \$195; Viking II with VFO, \$195; Mobile with VFO, \$95 less VFO, \$75; Adventurer, \$45; Vallant professionally wired unused, \$375; Hammarlund HQ-100C, \$145; HQ-110C, \$175; National NC-303, \$295; HRO 5071, \$295; NC-125, \$119; Down Electronics, Inc. Art Brown, W9IHZ, 1032 Broadway, Ft. Wayne, Ind.

SELL: LM-138, meters, tubes, power supply components, etc. Stamp for extensive list. Will trade for mint, P-VF stamps. W4DWF, 911 26th Place, South, Arlington, Va.

VIKING II with Viking VFO, \$200; Stancor ST203A, \$25. F.O.B. Rochester, K2KBL/2, 25 Amherst St., Rochester 7, N. Y.

SALE: DX-100 in gud condx. Cheap for quick sale. Local sale, Philadelphia area preferred. K2QIL, John Kane, 27 School Lane, Haddonfield, N. J.

FOR Sale: Latest model Harvey-Wells R-9A double conversion receiver one month old, \$90; also professionally wired DX40 transmitter, never on the air, \$70. Both \$150. Donn Bacon, Box 117, St. Clair, Michigan.

JOHNSON Viking II with VFO, perfect, \$170; NC-300 with matchline 8pk, calibrator, like new, \$270; Heath VTVM, \$12; Heath ant. impedance meter, \$6.50; tubes, new 813, \$7.50; 872A, \$2.50 ea. Shure CR mikes, 7 standard, \$2.50, C. F. King, W8TVO, 22861 Edgewood, St. Clair Shores, Mich.

WRL Globe Scout, factory-modified, \$65; Heathkit VDO, \$15. W4VET, 8067 Lassalle, Baton Rouge, La.

RECEIVER for sale: NC-109 matching speaker, xtal calibrator, one year old, in perf. condx, \$165. Free delivery in some areas East coast. Clement, W4CHI, 4404 17th St. N., Arlington, Va.

SELLING DX-35, \$49.95; B&W Tr switch, \$15; Heath VFO, \$17. All in gud condx. W2QCL, 251 Preece St., Lockport, N. Y.

RECEIVERS: New! All Hallcrafters, Hammarlund. Used: NC-188, \$125; 8-94, \$39.95. Trades, Jim, W3VGG, J. V. Stout Co., 4640 York Rd., Baltimore 12, Md.

FREE "As Is" Heathkit VFO on purchase of my Globe Scout 680. K2VDS, D. Alberks, 166 F. 92nd St., N. Y. C.

WANTED: Vacuum variable condensers, 5-500  $\mu$ fd (Jennings UC8L 500 D KV), 20-2000  $\mu$ fd (Jennings UC81, 2000 D KV), quote lowest price. Joe Shank, Jr., W4KLT, Box 1486, Huntington, W. Va.

WANTED: 800 cycle filter, 455-C-08 for 75A-3. Have to trade 6 Kc filter for 75A-3 or WRL VFO Model 755, brand new, never used. W2PDB, 278 So. Ogden St., Buffalo, N. Y.

TELEVISION Camera with transmitter, RCA type, ATJ; excellent condition, unmodified. Make offer or trade for 6 meter Communicator. Dave Baxter, W5KPK, 4211 Concho, Dallas, Texas.

DX-20 for sale, in excellent condition, \$30. Ocean Hopper, 6 colls, 10. Doug Stevenson, 606 South Lynch, Flint 3, Mich.

COLLINS 310B exciter for sale. Excellent condx. No modifications. \$175.00. R. Yeager, 1455 Wilson Ave., Chicago 40, Ill.

HQ-129X, mint condx, \$129; VHF-152A, \$25. Pick up. Master bumper mount, \$4.00. W1PRT, 19 Bidwell, Bloomfield, Conn. CH 2-9355.

SELL: 32 V2 transmitter, two 4D82 tubes, \$275; new Person KE-93 revr, 6/12VDC Vibrapak, \$175; new Master Mobile Moon No. 666 coil, No. 444 bumper mount, antenna sections, \$30; BC-465, 465 Mc. trans-receiver, 12/21VDC dynamotor, antennas, LU-1 signal generator, \$30; MC-1, 8-8 Mc. trans-receiver, \$14; items F.O.B. Ogden. Following postpaid: new Johnson directional coupler and indicator; \$33; 12VDC dynamotor, 440VDC-200 Ma., \$11; B&W TVI filter, \$13; 2 6VDC Vibrapacks, 300 VDC-100 Ma. both for \$10; New Harrington GP-50 tank assembly, \$10; Lowell Maw, W7NHQ, 1419 Swan St., Ogden, Utah.

FOR Sale: NC-57, all-band and handbands receiver with QF-1 5.4 Kc. to 55 Mc., \$35; DX-35, \$45; 5-tube 2-meter converter with P.S. II, 14-18 Mc., \$45; 6-meter converter II, 27-29, \$50; 6- and 2-meter VFO with P.S. II, \$40; 6-meter xmttr 6146 final, \$25; with PS Turner 31D mike and stand, \$20; 25 watt modulator with P.S., \$45 (plus postage on all items). Richard Mehner, W2PQU, 408 West High St., Glassboro, N. J.

FOR Sale: Elmac AF-67, \$110; PE-103 w/cables, \$10; MM all-band mobile antenna, \$8; Dow 6v coax relay, \$5.00; Micro-Z Match, \$5.00; Hallcrafters R-86 AM-FM receiver (27 Mc.-146 Mc.) K2ALO, Hanson, 37 Lake Ave., Eatontown, N. J. Tel. LF 2-0720.

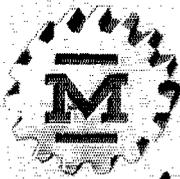
RME 4350A revr, brand new, \$195; will ship anywhere in U. S. A. Express prepaid, L. F. Lytle, 419 Stonegate Rd., Peoria, Ill.

SELL: 2 KVA Amertran xfrmr, 6200 volt CT 700 mills. \$50. B. F. Monteith, Douglas, Wyoming.

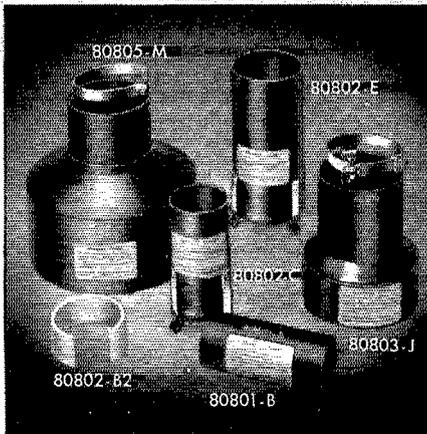
KRO50T1 in excellent condx, \$250 or will pay difference on a 75A4 in similar condx. BC221 with xtal and original calibration book, \$50; T47A/ART13, in excellent condition, latest "A" model, \$65. M. D. Haines, W5QCB, 1816 S. W. Military Drive, San Antonio 21, Texas.

SELL: B&W 51SB, Original owner. In mint condition: \$175. W4IEH, 941 Country Club Circle, Ft. Lauderdale, Fla.

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# Application



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Millen "Designed for Application" stock mu-metal magnetic shields include a complete line of shields for multiplier phototubes. Measurements prove that Millen carefully annealed mu-metal shields provide superior magnetic shielding.

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  - No. 80802-C for 6199, 6291, K1231/6467 and C-7151 1 1/4" diameter tubes
  - No. 80802-E for 6810A and 6903 2" diameter tubes
  - No. 80802-F— for 6372 2 1/2" diameter tubes
  - No. 80803-J for 6363 and K1197 3" diameter tubes
  - No. 80805-M for 6364 5" diameter tubes
- Custom made shields for special application can be provided.

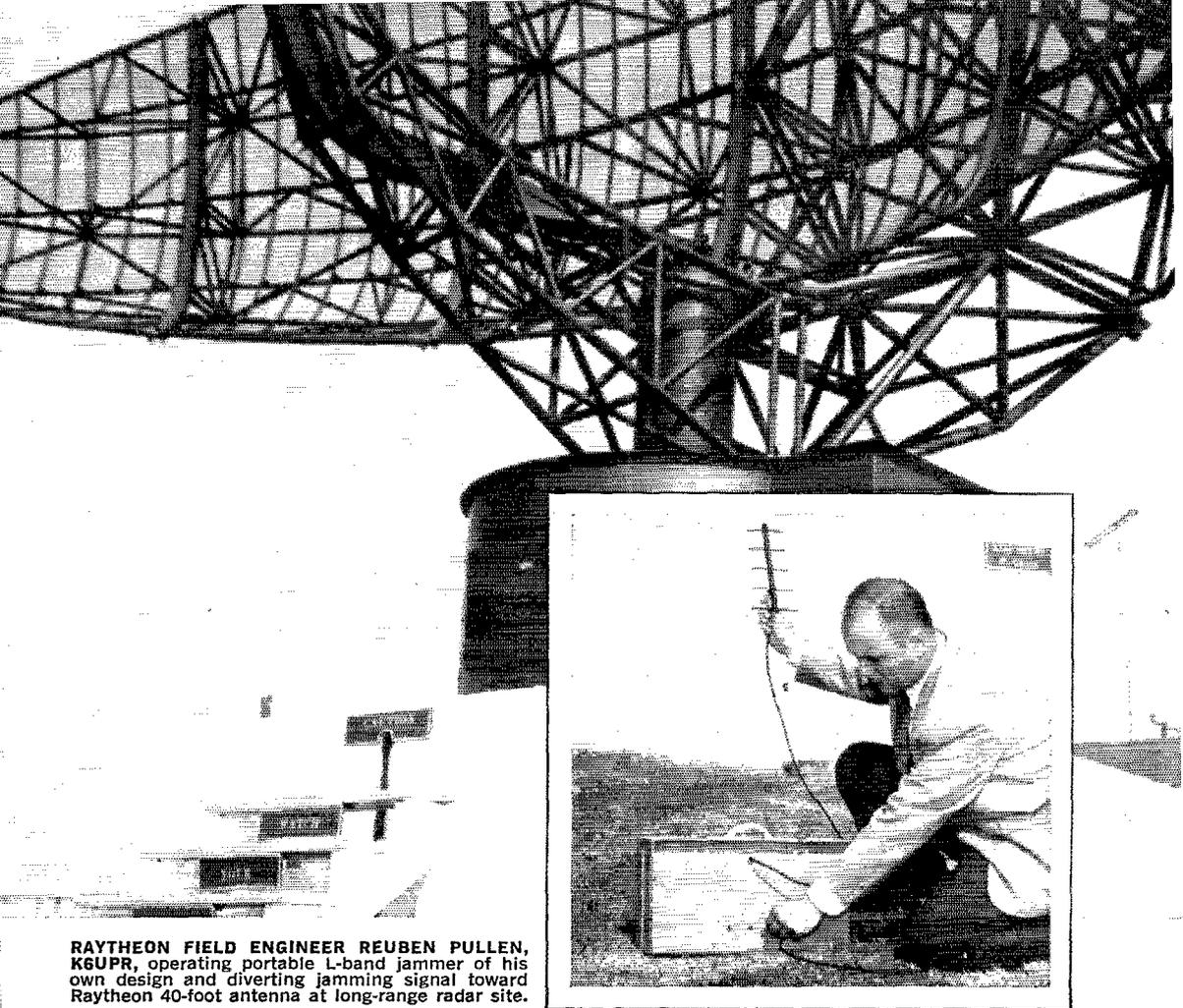
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**RAYTHEON FIELD ENGINEER REUBEN PULLEN, K6UPR, operating portable L-band jammer of his own design and diverting jamming signal toward Raytheon 40-foot antenna at long-range radar site.**

## **Field Engineering with a Future— in Raytheon's Army Signal Corps Programs**

To help train radarmen in interpreting scopes cluttered with jamming, Reuben Pullen, K6UPR, built this L-band jammer to create CW- or noise-modulated interference.

This kind of initiative is typical of the Raytheon field engineers who are on interesting assignments at 90 U.S. and overseas locations. Many Raytheon executives were once field engineers.

You may qualify as a Raytheon field engineer if you have an E. E. degree or the equivalent in practical experience with guided missiles, fire-control, ground and bombing radar, sonar or ECM.

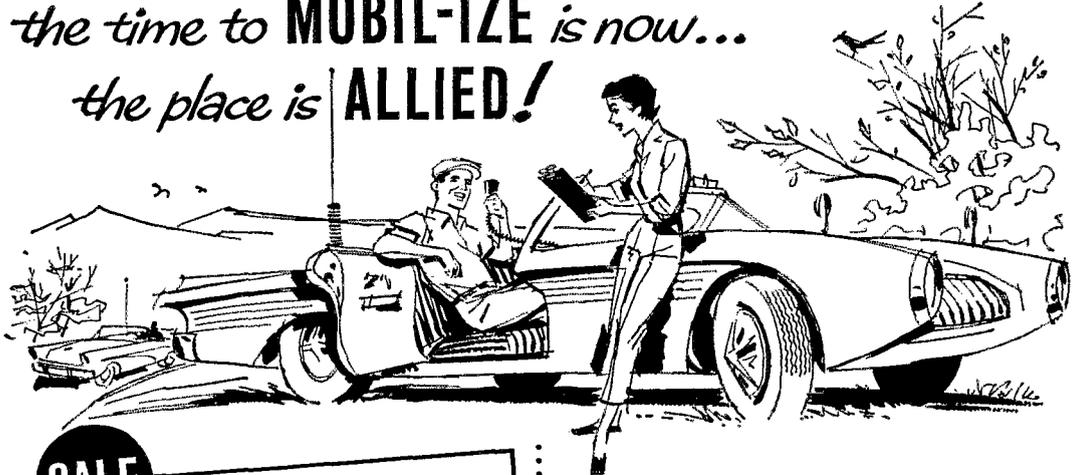
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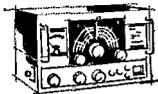
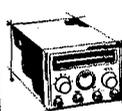
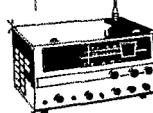
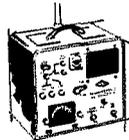
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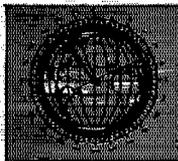
**ALLIED RADIO**

our 38th year



100 N. Western Ave., Chicago 80, Ill.

# National News Dial



Published periodically by the NATIONAL CO. INC., MALDEN 48, MASS.

## NEW NATIONAL NC-303 OVERNIGHT SUCCESS!



### Hams Throughout America Enthusiastic in Praise of New DeLuxe Receiver

Hams around-the-world have demonstrated their acceptance of the NC-303 since its recent introduction. Exceptional sales volume is being reported by National Company distributors. And as hams get on the air with their new NC-303's, interest continues to mount.

The NC-303 is a super-deluxe "ham band" receiver offering several exciting new features: Front panel SSB selector with exclusive, new "IF SHIFT" for instant choice of sideband . . . eliminates retuning or detuning. 5-position IF selector offers choice of sharp, SSB-1, SSB-2, medium and broad selectivity. New tone switch provides attenuation of highs, lows, or both for maximum readability.

New dual noise limiters . . . separate automatic noise limiter for AM, separate double-ended manual limiter for CW and SSB. New "Q" Multiplier with 60 db deep rejection notch, may be tuned continuously across the

entire passband, has separate notch frequency and notch depth controls. New 40-1 tuning dial with logging scale, plus new fine tuning vernier dial drive for super precision CW and SSB tuning.

Exclusive new WWV converter provision . . . no interference with dial calibration or frequency coverage . . . accessory calibrator provides one microvolt sensitivity on 10 mc WWV. New "fast attack—slow release" AGC. Crystal controlled 2nd converter oscillator provides excellent inherent stability from cold start. Sensitivity less than 1.0 microvolts. 10 dial scales cover all amateur bands . . . exclusive converter provision for 6, 2, and 1 1/4 meters.

These are only a few of the many features. See your National Co. Distributor, or write for full specifications. Suggested list price \$449.00.

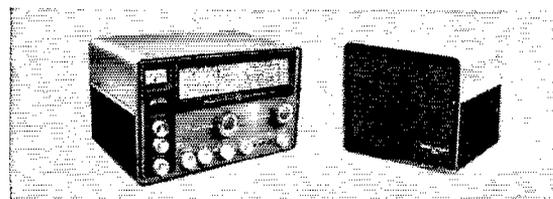
### NATIONAL CO. DISTRIBUTORS OFFER FREE \$17.50 SPEAKER WITH NC-109 OR NC-188 RECEIVER!

For a limited time only, most National Co. distributors offer an opportunity to buy now and save \$17.50 on the purchase of either the NC-109 or NC-188 receivers. You get the receiver PLUS speaker . . . BOTH FOR THE PRICE OF THE RECEIVER ALONE! See your National Co. distributor now and save.

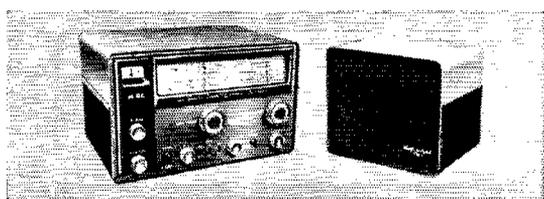
NC-109 covers 540 kc to 40 mc in 4 bands. Calibrated band-spread for 10-80 meter amateur bands. Exclusive "MICROTOME" filter provides 5 degrees of super-sharp selectivity. Sensitivity: 1-2 microvolts with 10 db signal/noise ratio. Separate high frequency oscillator

with temperature compensated ceramic coil forms reduces drift to .01% or less. Separate product detector for SSB makes the NC-109 America's lowest priced SSB receiver.

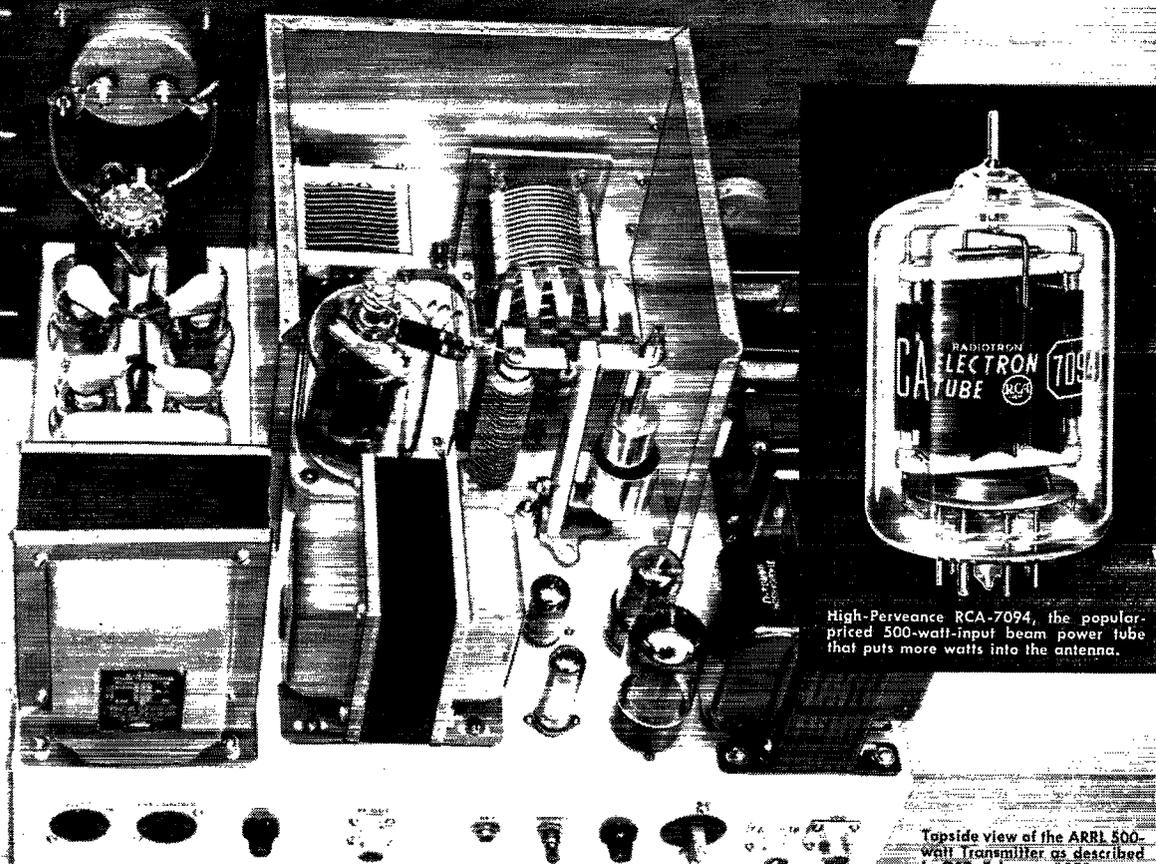
NC-188 covers 540 kc to 40 mc. Directly calibrated for 4 general coverage ranges and 5 band-spread ranges for 10-80 meter bands. Has RF amplifier stage, two IF stages and two audio stages. Has tone control, antenna trimmer, S-meter, separate RF and AF gain controls, automatic noise limiter. Has temperature compensated and ventilated high frequency oscillator for increased stability.



NC-109 PLUS NTS-1 SPEAKER Regularly \$217.45  
NOW ONLY \$19.95 DOWN full suggested cash price \$199.95



NC-188 PLUS NTS-1 SPEAKER Regularly \$177.45  
NOW ONLY \$15.95 DOWN full suggested cash price \$159.95



High-Perveance RCA-7094, the popular-priced 500-watt-input beam power tube that puts more watts into the antenna.

Topside view of the ARRL 500-watt Transmitter as described in QST, February 1959.

# Again **QST** DOES IT... ...with an RCA-7094



Pictured here is QST's recent 500-watt transmitter. Note the professional layout—ready to go on any band from 10 to 80. Then note the power tube in the final socket. It's an RCA-7094 Beam Power Tube—and RCA is proud to see it there.

Why is the RCA-7094 a growing favorite with transmitter men going QRO? This: RCA-7094 is a high-perveance, high-power type—takes 500 watts input on CW with only 1500 volts on the plate! RCA-7094 has high power gain—drives to full input up to 60 Mc with less than 5 watts driver output (from a single RCA-2E26 or even the RCA-5763). RCA-7094 will deliver more watts to your antenna than low-current, high-voltage types with the same input *because the plate-voltage swing is lower—and, consequently, plate-circuit loss is lower.*

So for a lot of output watts for your power tube dollar...for a half-gallon input with lower voltage-rated components...for better plate loading at higher frequencies, design around the RCA-7094. It's available through your RCA Industrial Tube Distributor. For a technical bulletin on RCA-7094, write RCA, Commercial Engineering, Section E-37-M, Harrison, N. J.

**RCA-7094**  
Typical Operating Conditions (ICAS)  
at 60 Mc

Type of Service	CW	AM	SSB AB <sub>1</sub>
DC Plate Volts	1500	1200	2000
DC Grid—No. 2 Volts	400	400	400
DC Grid—No. 1 Volts	-100	-130	-65
DC Plate Ma.	330	275	200*
DC Grid—No. 2 Ma. (approx.)	20	20	35*
Required Driver Power Output Watts (approx.)	4	5	4*
Useful Power Output Watts (approx.)**	340	240	250*

\* Maximum-Signal  
\*\* 90% Output Circuit efficiency



**RADIO CORPORATION OF AMERICA**  
Electron Tube Division  
Harrison, N. J.



For the name of your nearest distributor, call Western Union by number and ask for Operator 25.