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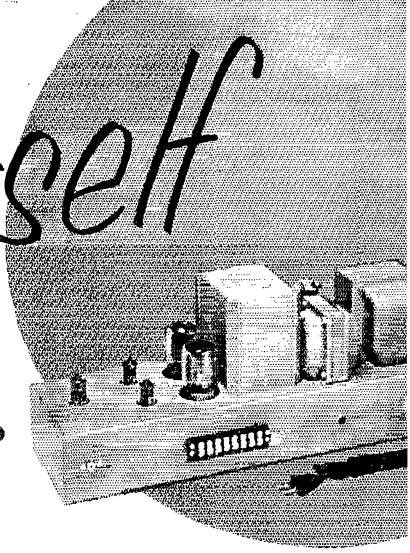

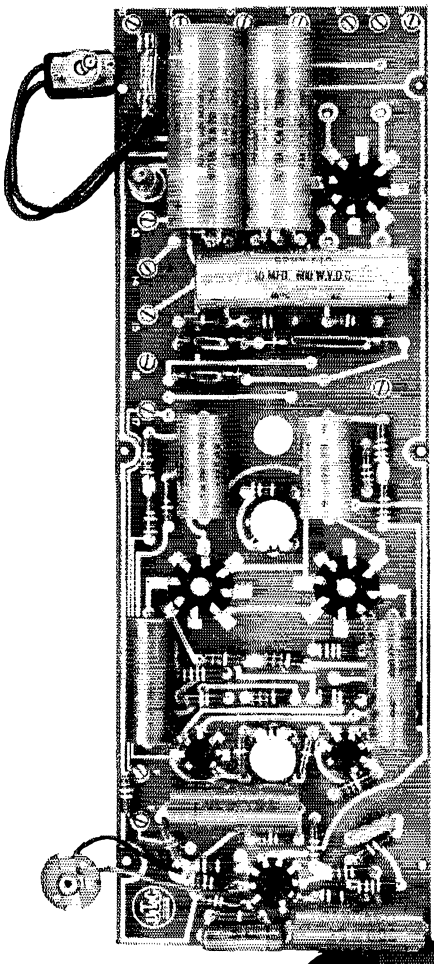

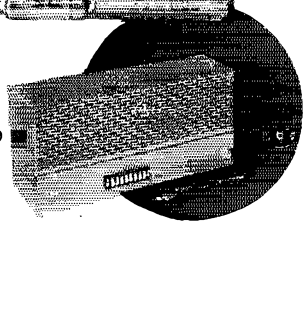

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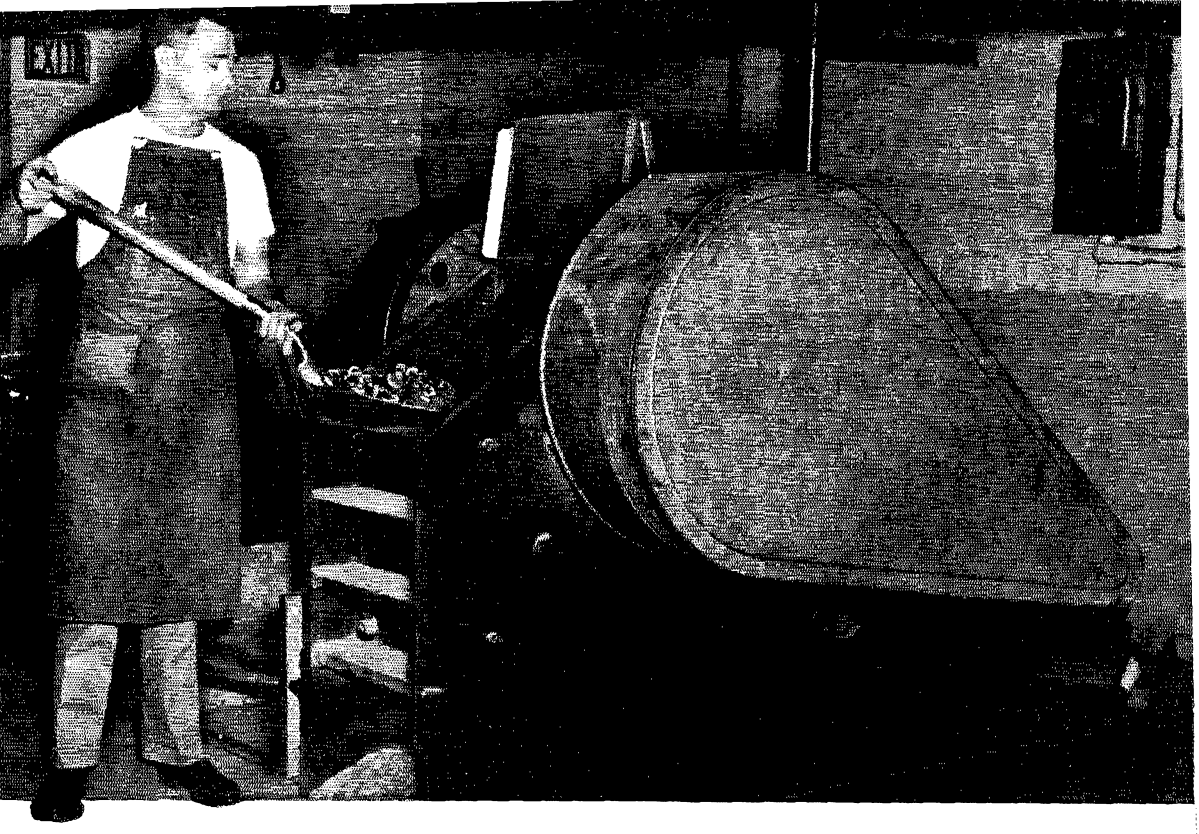

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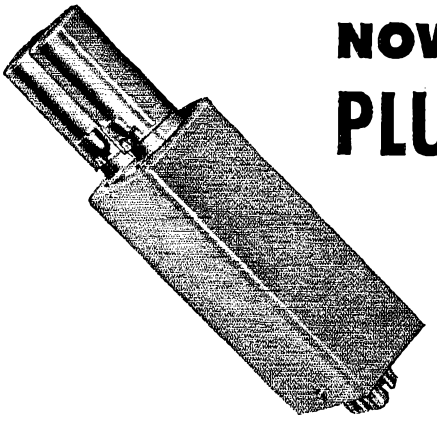
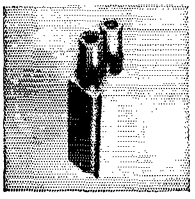


Popularity of Collins Mechanical Filters and Mechanical Filter Adapters in the 75A Amateur Receivers has resulted in many requests for Mechanical Filter Adapters designed for use in other popular receivers.

The advantages of the mechanical filter approach to receiver selectivity may be immediately recognized. For instance, Filter Adapters eliminate problems normally associated with improving receiver selectivity. Installation requires only that an IF tube be removed and the Filter Adapter plugged into its socket. No modification or disfiguration is necessary. The Collins Mechanical Filter Adapter is self-contained, permanently tuned, and power and signal circuits are obtained from the tube socket. Gain of the Filter Adapter matches that of the IF tube replaced.

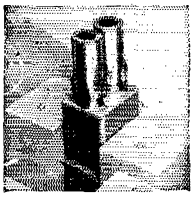
The convenient plug-in feature of the Filter Adapter provides a means for selecting a choice of bandwidth for reception of CW, AM, SSB or FSK. For example, the 800 cycle bandpass Adapter may be plugged in for CW reception; the 1.2 kc Adapter for either CW or FSK; the 3.1 kc Adapter for AM or SSB; and the 6.0 kc Adapter for AM.



Adapter Type	Bandwidth At -6 DB	Bandwidth At -60 DB
353A-08	0.8 kc	2.5 kc
353A-12	1.2 kc	3.0 kc
353A-31	3.1 kc	7.0 kc
353A-60	6.0 kc	12.6 kc

Net Each____$65.00

The 353A-series Adapter is shown in a Hammerlund SP-400. The 353A-series Adapter also fits the National HRO-60.



Adapter Type	Bandwidth At -6 DB	Bandwidth At -60 DB
353B-08	0.8 kc	2.5 kc
353B-12	1.2 kc	3.0 kc
353B-31	3.1 kc	7.0 kc
353B-60	6.0 kc	12.6 kc

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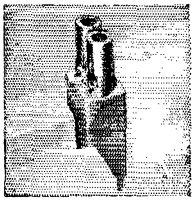
The 353B-series Adapter between the IF cans in the SP-600-JX receiver.



Adapter Type	Bandwidth At -6 DB	Bandwidth At -60 DB
353D-08	0.8 kc	2.5 kc
353D-12	1.2 kc	3.0 kc
353D-31	3.1 kc	7.0 kc
353D-60	6.0 kc	12.6 kc

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F500-series __$35.00 F250A-67 (6.7 kc)___$45.00

FREE LITERATURE AT YOUR REQUEST

Booklets describing Mechanical Filters and Mechanical Filter Plug-In Adapters are available. Included are response curves, detailed theory of operation, circuit applications, and other informative data. See your local distributor or contact a Collins Sales Office.

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JANUARY 1955

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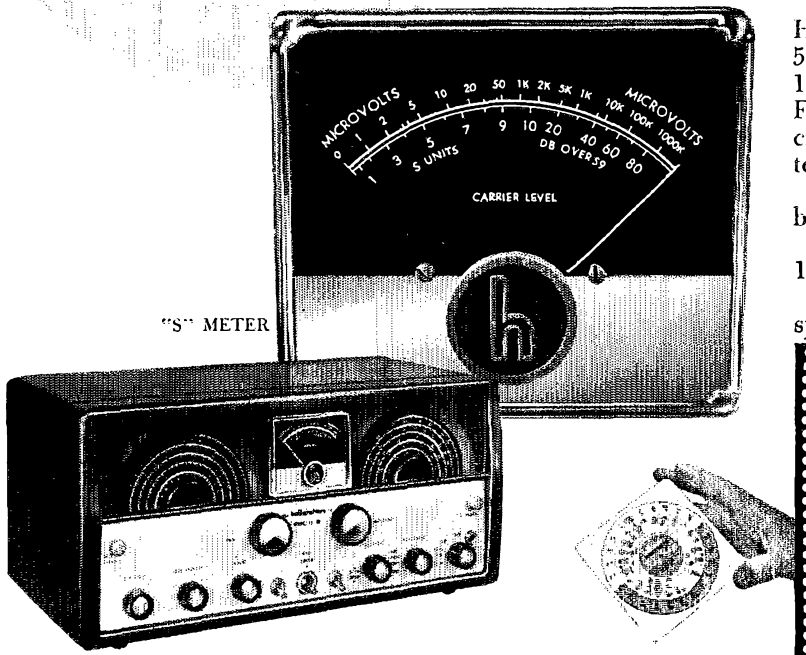

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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the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

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

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

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

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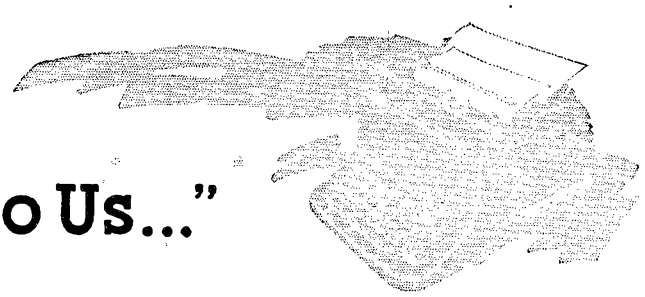
ROBERT E. COWAN W5C
3840 Encanto Drive, Fort Worth 9, Texas
Vice-Director: John F. Skelton W5M
1901 Standish Dr., Irving, Texas



"It Seems to Us..."

THE YEAR IN REVIEW

In 1954 the American Radio Relay League marked the 40th year of its founding as a non-profit membership association "of, by and for the radio amateur." It was a banner year in most respects. Full membership reached the highest figure in our history, and the proportion voting in the autumn director elections showed this to be an active, participating interest on the part of members in their national association. *QST* continued to grow in size and scope, perhaps soon to present another problem of enlarging the yearly binders so that twelve issues can be fitted into them!

At yearend a new publication, *Single Sideband for the Radio Amateur*, appeared in order to cater to and encourage amateur use of this growing field. Considerable publicity on the attractiveness of amateur radio as a hobby appeared in various magazines, resulting in thousands of inquiries to Headquarters on how to get into the hobby, and also resulting in a heavy demand this year for "beginner" publications. The 1954 financial statement will again show new highs in gross income and outgo.

While it is only late November as we write, it appears unquestioned that amateur radio itself is reaching a peak of growth, totaling perhaps 125,000 licensees. During the early part of the year a license fee seemed imminent, but it has since been pigeonholed. A major change occurred in June with the placing of Novice and Technician Class examinations on a mail-only basis, so that with the reduced distance for Conditional Class eligibility, amateurs themselves are conducting more than half of FCC exams for newcomers. New questions were added to the General Class exam to expand its scope and bring it up to date. The requests to increase the size of the voice allocation at 14 and 28 Mc. were turned down by FCC. Duplex operation on 50 Mc. was authorized, as was maritime mobile use of 21 Mc. General approval was given to the security control program, "Conelrad," for amateurs, with specific proposed regulations to follow. The League was signally honored with the visit, in January, of five members of the Federal Communications Commission and two staff Bureau heads.

Despite generally poor conditions for DX, more than 2600 amateurs have now qualified for the DX Century Club roster. They, with DXCC aspirants, are encouraged by the knowledge that as the sunspot cycle swings to a more favorable point, propagation conditions are rapidly improving and the now-occasional openings of 21 Mc., for example, will soon become everyday occurrences. With more than 8000 individual participants reported, manning more than 2000 transmitter-receiver installations, the ARRL Field Day was again the biggest ever. From the roars of "CQ SS" that covered the bands those November week ends, we'll predict the same for that popular activity. "Above 50 Mc." activity has a banner year also: more than 600 amateurs took part in the January V.H.F. Sweepstakes; a coast-to-coast relay on 144-Mc. was completed in June; and the 10,000-Mc. DX record was set and broken three times during the year — it now stands at 109 miles! "Burst" reception from meteor reflections was the means of several long-distance QSOs, and experimentation with this form of communication attracted considerable attention, not only among amateurs but also in professional fields.

At midyear a nationwide test of civil defense organization and facilities showed amateurs fully ready to perform their auxiliary communications functions. The Simulated Emergency Test in October continued to be another means of keeping amateur emergency skills at peak efficiency. RACES licensing continued to grow, with one-half of the States already having approved plans. Both civil defense and normal amateur emergency-preparedness organizations performed admirably in the East Coast hurricanes. The TVI specter was reduced to a skeleton, as more and more amateurs find the best way to lick the problem is to tackle it. The League's demonstration was given at a number of western cities, completing coverage of the country where low-band channels are in use.

Once again as we come to the close of a year we find that amateur radio can take pride in an outstanding performance, through the organized activities of its national association, and a meritorious record of performance "in the public interest, convenience and necessity."

OUR COVER

This month's cover shows the interior of W3SMQ, Lansdowne, Pa. Equipment is completely homebuilt, following designs presented in *The Radio Amateur's Handbook*. In the rack at the left are the modulator and power supplies. On the desk is a push-pull 807 rig running 150 watts. To the right are the VFO and an 8-tube superhet. A Monitone is to the right of the receiver, and a *Handbook*-design antenna tuner on the window sill, upper left. Operator and constructor of W3SMQ is W. P. Hampton.

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. (Bold-face type indicates change since last *QST* listing.)

W1, K1 — J. R. Baker, jr., W1JOJ, Box 232, Ipswich, Mass.

W2, K2 — H. W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.

W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia 5, Penna.

W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.

W5, K5 — Oren B. Gambill, W5WI, 2514 N. Garrison, Tulsa 6, Okla.

W6, K6 — Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.

W7, K7 — Mary Ann Tatro, W7FWR, 513 N. Central, Olympia, Wash.

W8, K8 — Walter E. Musgrave, W8NGW, 1294 E. 188th St., Cleveland 10, Ohio.

W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wis.

WØ, KØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn.

VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.

VE2 — Austin A. W. Smith, VE2UW, 6164 Jeanne Mance, Montreal 8, Que.

VE3 — W. Bert Knowles, VE3QB, Lanark, 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, 329 15th St., North Lethbridge, Alta.

VE7 — H. R. Hough, VE7HR, 2316 Trent St., Victoria, B. C.

VE8 — W. L. Geary, VE8AW, Box 534, Whitehorse, Y. T.

VO — Ernest Ash, VO1A, P. O. Box 8, St. John's, Newfoundland.

KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.

KH6 — Andy H. Fuchikami, KH6BA, 2543 Namauu Dr., Honolulu, T. H.

KL7 — Box 73, Douglas, Alaska.

KZ5 — Gilbert C. Foster, KZ5GF, Box 407, Balboa, C. Z.

A Happy New Year

To Hams Everywhere

— The ARRL Hq. Gang

25 Years Ago this month

January, 1930

The editorial discusses the new 14,000-kc. 'phone band, pointing out its advantages as well as potential difficulties which can result from bad judgment and poor equipment.

A poor man's power transformer using hand-wound primary and filament coils and junk-box honeycomb coils for secondaries is described by E. H. Harrington, jr., W9CRR. Almost 900 volts each side of center tap can be furnished by the unit, which costs about four dollars.

Station of the month is W9BAG, owned by Frank Smolek of Chicago. The transmitter is a 50-watt crystal rig using Heising modulation on 'phone and buffer-filament keying on c.w. The receiver is a superhet, with a regenerative first detector, two i.f. stages, regenerative second detector, and audio. A two-inch cage suspended 45 feet in the air between two steel towers, with 70-foot aerial and counterpoise, serves as the radiator.

Results of the Board of Directors elections are made known. Alex Reid is the new Canadian General Manager; Prof. E. C. Woodruff returns as Atlantic Division Director; Dakota Division elects Cy. L. Barker; M. M. Hill represents the Delta Division; Louis R. Huber is Midwest Division Director; the Pacific Division chooses Allen H. Babcock; and Harry F. Dobbs becomes the Southeastern representative.

Trophies for the first Sweepstakes contest, a two-week period, are announced. Sweep brooms, three feet long, decorated in the League's black-and-gold, with radio tube handle-grips will be given to the top three men in the new contest.

This month's humorous story by "Felix," W5LS, entitled "Hams Are Born — Not Made," involves W. M. "Soupy" Groves, W5NW, and his "Brother-in-law."

A.c. receivers are discussed by Beverly Dudley, assistant technical editor. The author describes several circuits which were tried, and gives details of the final result, a completely-shielded receiver using a UV-224 r.f. stage, UV-224 regenerative detector, and a UV-227 audio amplifier.

More About V.H.F. Auroral Propagation

Recent Findings and Suggestions for Improved Results

BY ROLF DYCE,* W2TTU

THE characteristics of propagation associated with the northern lights have been described in the pages of *QST* by Moore.[1] As v.h.f. communication equipment has improved, amateur use of auroral propagation has multiplied over the past few years, especially above 144 Mc. A program of amateur auroral reporting was initiated in 1951, some of the information gathered thereby appearing in "The World Above 50 Mc." These reports were then sent on to Cornell, where a statistical study has been attempted. Some results are presented here. Research in England,[2] Scandanavia,[3,4] Canada,[5] and Alaska[6,7] has progressed rapidly since 1950, yielding new ideas about auroral v.h.f. reflections which may be useful to the amateur for understanding the behavior of such propagation.

Description of Auroral Signals

An aurorally-propagated signal has a characteristic growl or hiss due to a fast QSB that is at an audio rate up to several hundred cycles per second.[8] As the carrier frequency is increased from 50 to 144 Mc., the growl increases in pitch. 'Phone is badly garbled although relatively slow c.w. telegraphy can get through without difficulty. The b.f.o. will usually not give a clean note, so this is a sensitive test for signals propagated by aurora.

Unlike *E*- or *F*-layer propagation, strongest signals are usually obtained when both stations point their antennas northward, regardless of the actual great-circle bearing between stations. Often all stations will appear to come from the same direction in the north, as if a small portion of the aurora is responsible for all the propagation. During especially strong aurora, often accompanied by active overhead displays, the signals may appear to come from a variety of directions spread about north. However, in general, stations located to the east of the receiving station will have preferable directions eastward of magnetic north and likewise for westerly stations.

Amateur Reports

Amateur reports of auroral propagation, collected with the help of ARRL and dating back to 1951, have been assembled at the Cornell Ionosphere Project. The individual stations were located on a map, and the direct airline distance was measured between pairs of stations reporting communication. This does not imply that the radio path was along this measuring line, but merely tells one at what distance communication was possible. Histograms showing the likelihood of occurrence of certain distances are given in Fig. 1. A similar graph for sporadic-*E* signals on 50 Mc. shows a prominent maximum at about 800 miles, with a "skip" region for shorter distances. However, notice in Fig. 1 how the probability of communication by auroral propagation falls off with distance. The graph below 100 miles is too low due to (1) blanketing strength of direct or tropospheric signal, (2) failure of amateurs to log familiar and nearby stations, (3) fewer amateurs because the inner ring contains less land area and hence fewer amateurs.

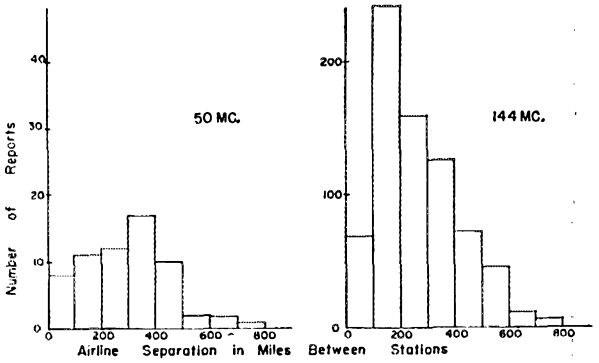


Fig. 1 — Useful working distances obtainable by auroral communication. Data taken from amateur reports.

*Cornell University Ionosphere Project, Franklin Hall, Ithaca, New York.

[1] Moore, "Aurora and Magnetic Storms," *QST*, *35*, No. 6, June, p. 14 (1951). See also Journal of Geophysical Research, *56*, March, pp. 97–106 (1951).

[2] Aspinall and Hawkins, *Journal British Astronomical Association*, *60*, April, p. 130 (1950).

[3] Harang and Landmark, *Journal of Atmospheric and Terrestrial Physics*, *4*, January, p. 322 (1954).

[4] Hellgren and Meos, *Rept. No. 26*, Chalmers University of Technology, 1952. See also Tellus *4*, p. 249 (1952).

[5] Currie, Forsyth, and Vawter, *Journal of Geophysical Research*, *58*, June, p. 179 (1953).

[6] Bowles, presented at URSI-IRE Meeting at Washington, D. C., April, 1954.

[7] Dyce, presented at URSI-IRE Meeting at Washington, D. C., April, 1954.

[8] Bowles, *Journal of Geophysical Research*, *57*, June, p. 191 (1952).

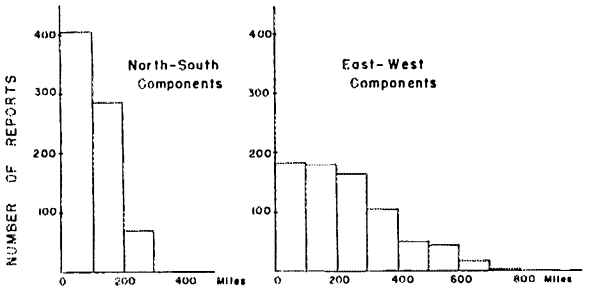


Fig. 2 — Communication is better along east-west directions. The airline distance between 144-Mc. stations working via aurora, expressed in two components, shows east-west distances far greater.

The 50-Mc. data suffer from the same errors, in addition to the fact that only one-tenth as many reports were sent in.

The information contained in Fig. 1 gives a measure of the distance over which auroral communication is to be expected. Such information would be difficult to obtain without the use of amateur reports. This graph also supports the view that auroral propagation is not a skip phenomenon, as was recently suggested in Norway.[3]

The 144-Mc. data were reëxamined and the distance between each pair of stations expressed in two components — a north-south and an east-west distance. The results appear in Fig. 2. A difference in the two components is clearly seen, showing that east-west paths are generally longer than north-south paths. This effect may be due to the oblong shape of the population distribution, since most reports came from a narrow region extending from Ohio to Massachusetts. However, the preference for east-west station-to-station direction is also explained by a theory later to be discussed.

An Auroral Signal Recorder

A scheme for automatically recording auroral signals has been assembled at the Cornell Ionosphere Project and has been operating almost continuously now for two years. Many amateurs are already familiar with the high-power transmissions continuously, day and night, from Cedar Rapids, Iowa, on 49.6 and 49.8 Mc. Cornell University at Ithaca, New York, is located so that these transmissions come in strongly by auroral propagation, when it is present. It is possible to obtain a continuous record of auroral openings merely by attaching a recording milliammeter to the d.c. output from the detector. The QSB on an auroral signal is too fast for the recording pen to follow, so an average value is painted on the recording chart when auroral signals are present — see Fig. 3. Strong and frequent bursts of signal due to meteors can be obtained over the Cedar Rapids-to-Ithaca path. They provide an easy means of verifying that the transmitter is operating and for setting the receiver tuning. The occurrence of auroral signals as recorded in this manner correlates very well with such openings as reported by amateurs. Amateurs in general, and Michigan amateurs in particular, seem to have sharp ears because even brief occurrences of auroral propagation are caught at least by some. Of course, there are short periods when amateurs report auroral signals when Cedar Rapids has faded out. The reverse is also true. The recorder scheme provides a continuous check on the auroral signals throughout the entire night and is therefore useful for studying daily and seasonal variation in the frequency of occurrence of the auroral propagation. Records of auroral signals are a help in early warning of openings and in predicting subsequent openings.

A graph showing expectation of auroral propa-

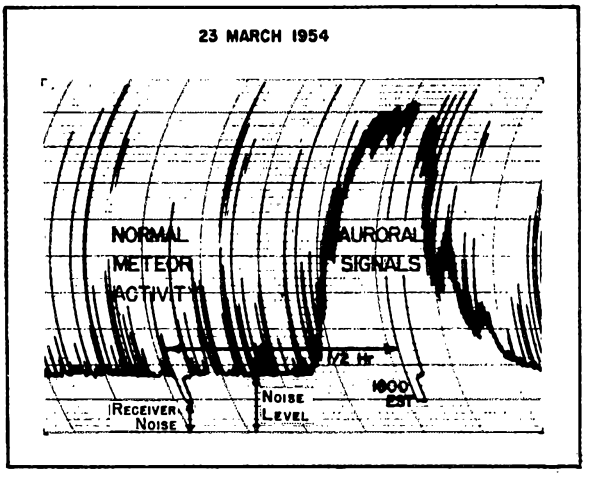


Fig. 3 — Example of a short auroral opening beginning about 5:50 P.M. Esterline-Augus record of the 49.8-Mc. signal from Cedar Rapids shows need for checking v.h.f. bands in early evening hours. Blank spots on hour and half hour are 2-minute periods when transmitter is turned off automatically.

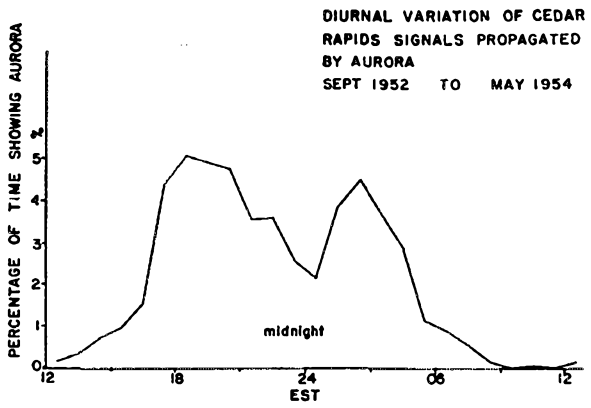


Fig. 4 — Good times for auroral propagation are 6:00 P.M. and 2:00 A.M.

gation at any time of day appears in Fig. 4. Isolated cases of auroral signals have been observed at almost every hour, but the phenomenon is chiefly a nighttime one. This curve emphasizes the importance of observation just before suppertime. An interesting dip near midnight shows up, for which no explanation is here offered. It shows that openings frequently continue into the early morning hours, although they may die out temporarily around midnight. There are also cases of auroral openings after midnight not accompanied by auroral signals earlier.

The seasonal variation was plotted in Fig. 5 by determining for each month the percentage of time that auroral propagation was present. Maxima of auroral propagation can be seen to occur in March and October, with important minima in December and June. A decrease can be seen from 1952 to 1954 that is believed to be authentic. This is attributed to the decrease in the sunspot activity over the past few years, expected to reach a minimum some time in 1954. With this information, one can better predict when auroral signals can be expected, or putting it another way — when no auroral propagation should be observed.

Position in Space of the Ionization Involved

Most of the organized research concerning auroral propagation has been done using radar. That is, by transmitting only for a brief instant (about 1/10,000 of a second) and measuring the time for this pulse to return to the receiver, one can determine the distance to the auroral ionization. Accompanied by a sharply directional antenna, the range and azimuth of auroral echoes can therefore be determined by a single station.

Some radar experiments were done at Cornell on 103 Mc., using a high-powered war-surplus search radar.[9] This used a large antenna 8 dipoles vertically and 4 dipoles in width, the whole affair being rotatable. Echoes were obtained about 400 to 600 miles to the north. There was fairly good correspondence between the echoes obtained and ray activity (vertical streaks) seen by eye. There never had been enough auroral activity to determine whether one could obtain echoes when aurora was overhead.

[9] Thayer, Master's thesis, Cornell University, 1952.

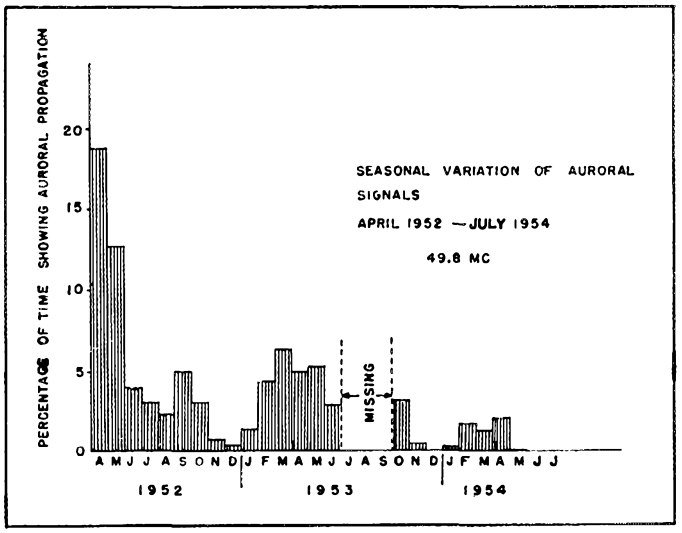


Fig. 5 — September and March are good months for auroral propagation. The decrease from year to year shown here should reverse after the 1954 sunspot minimum.

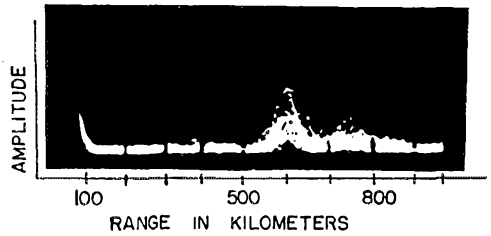


Fig. 6 — Typical 50-Mc. auroral echo. The trailing edge of the 51.7-Mc. transmitter pulse is seen at the far left. Two auroral echoes can be seen delayed in time corresponding to 600-km. and 720-km. range.

During the summer of 1953, Ken Bowles (W2MTU, ex-ZGP) and the author had an opportunity to work at the Geophysical Institute at the University of Alaska. The Institute is located at College, Alaska, a few miles from Fairbanks. It is, therefore, only 100 miles to the south of the maximum auroral-activity zone which forms a ring around the earth's magnetic pole. Some observations will now be described that were performed by the author during 1953, and which are illustrative of recent research now under way at several locations. Aurora is seen frequently, is strong and occurs frequently over the entire sky including south of overhead. Hence, this northern latitude affords an excellent place to observe the effects of visible aurora on v.h.f. propagation.

Arrangements were made to operate a c.w. beacon transmitter on 51.9 Mc. about 100 miles to the east. The signal could usually be heard weakly by troposphere propagation, but was heard when aurora was present coming from the north with the characteristic growling auroral QSB. On a different frequency assignment of 51.7 Mc., permission was obtained to install a transmitter five miles away sending pulses 150 times per second, each being about 100 microseconds in duration. The transmitting antenna was originally a horizontal dipole to send radiation in all directions in the meridian plane. A rotary 4-element Yagi was then used for receiving, using a low-noise crystal-controlled converter and a Super-Pro receiver. The d.c. detector output was fed into an oscilloscope, the strong direct signal coming from the transmitter being used to initiate each sweep. With the antenna pointing north during aurora and with the 51.9-Mc. station coming in by auroral propagation, weak echo pulses could be obtained, and the range easily estimated. (See Fig. 6.)

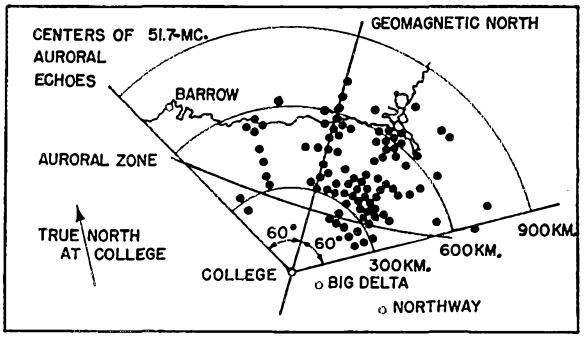


Fig. 7 — Each point represents maximum auroral activity at a different time. Azimuth determinations were usually made using a c.w. transmitter equipped with a turnstile omnidirectional antenna, with a directive array on the receiver. A hill impeded observations to the northwest.

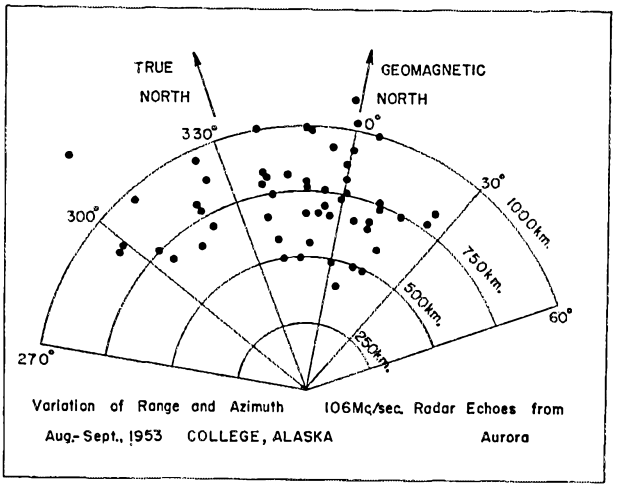


Fig. 8 — Results using high-powered search radar on 106 Mc. (*Courtesy of K. Bowles*)

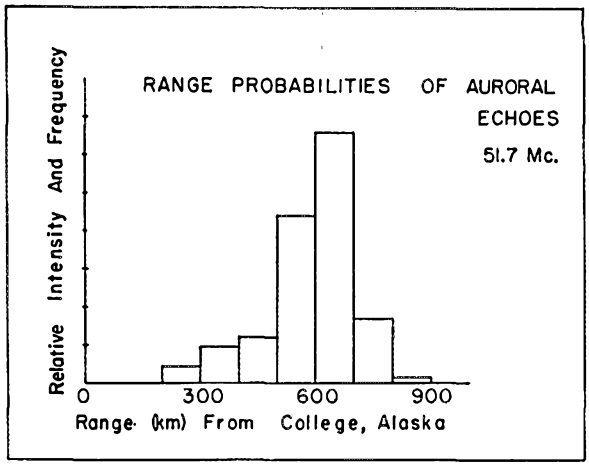


Fig. 9 — Auroral radar echoes do not occur at short distances.

It has been shown by parallactic photography that most visible auroral light comes from about the *E* region at a height of about 60 miles, or 100 kilometers.[10] One would, therefore, expect to encounter echoes as close — but no closer — than about 100 km., and also to find echoes from the south when visible auroral forms could be seen there. This was quickly seen to be not the true state of affairs. Echoes were obtained mainly from distances greater than about 400 kilometers and were never obtained from the south. Contrary to expectations, most echoes came from places far to the north of the auroral zone as shown in Figs. 7 and 8. The echoes clearly came mainly from the northern quadrant. Some continuous film records of echo range were made at 51.7 Mc. They gave the statistical result shown in Fig. 9, showing a pronounced tendency for the echoes to have ranges of 500 km. or greater.

To rule out the possibility that these echoes might be coming from overhead ionization at a height of 500 km., an antenna with a vertical main lobe was constructed for comparison purposes. Six half-wave elements in a broadside array were suspended above the flat metallic roof of the Geophysical building. A separate converter, receiver, and oscilloscope were connected, so that the observer could watch both antenna presentations simultaneously. Echoes from meteors were seen with both antennas, indicating that both sets of receivers were working properly. Next, observations of auroral echo range were made when overhead arcs, bands, rays, and corona were present. These occur frequently at College. All auroral echoes were definitely much stronger on the rotary Yagi antenna which was looking at low angles. Similar results were found with the 106-Mc. radar equipment by tilting the regular antenna to point overhead during overhead aurora. These experiments show that auroral echoes are (1) from targets at great distances, probably at a height of about 100 kilometers, and (2) from low angles of elevation, no matter where in the sky the visible auroral forms occur.

At College, one frequently sees streaks of auroral light rising from the western horizon, extending overhead and down to the eastern horizon. It has already been shown that the v.h.f. echoes were not coming from the overhead

(*Continued on page 116*)

[10] Stormer, *Terrestrial Magnetism and Atmospheric Electricity, 51*, December, pp. 501–504 (1946).

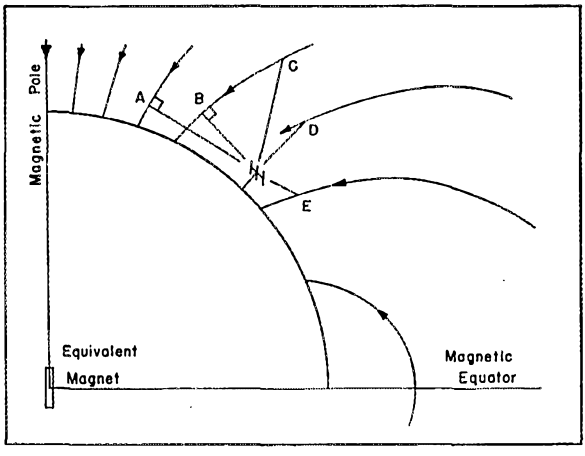


Fig. 10 — For v.h.f. propagation, the bounce-point needs to be roughly perpendicular to the field of the earth's magnetic force, even if auroral ionization existed over the entire sky. In this exaggerated picture, beams *A* and *B* give echoes, but *C*, *D*, and *E* do not.

Bandswitching a Crystal-Controlled Mobile Converter

Using the B.C. Receiver as a Tunable I.F. for 3.5–30-Mc. Reception

BY C. VERNON CHAMBERS, W1JEQ

ALTHOUGH the converter shown in the photographs was designed primarily for mobile use, this relatively simple unit will add gain and stability to almost any of the less-expensive communications receivers that include the broadcast range. While one might conclude from its compactness that it is rather difficult to construct, carefully planned subassemblies make the job comparatively easy. In a mobile installation, the unit can be suspended directly under the car broadcast receiver, where it is hardly noticeable and detracts nothing from the appearance of the instrument panel, nor from the comfort of front-seat passengers.

The high-frequency oscillator in a crystal-controlled converter is fixed in frequency, of course. Therefore, this system departs from the more conventional in that the b.c. receiver, rather than the converter, is used to tune over the ham bands. The frequency stability gained by the use of crystal control is hard to appreciate until you have tried it. Over rough roads, at any speed, even 10-meter signals stay put. Only a jolt hard enough to detune the broadcast receiver will change the frequency.

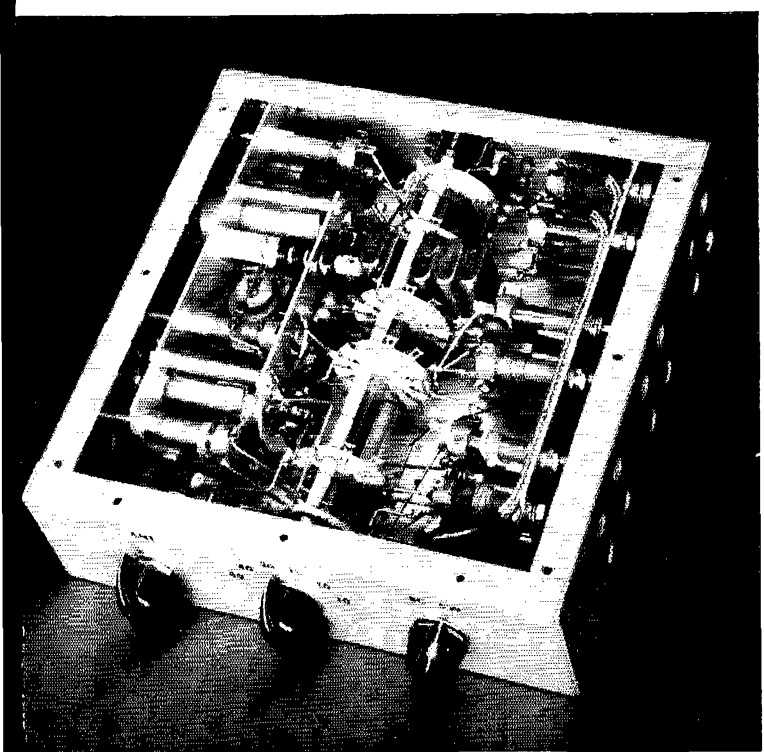
Another advantage that is sometimes overlooked is the fact that most car receivers (and all communications receivers) have good dials that are easy to handle and conveniently located. This is in contrast to the miniature controls found on most tunable mobile converters as a result of the effort to keep within minimum dimensions. Even the smallest tunable unit requires space that is difficult to find in a convenient spot without interfering with panel instruments or leg room.

While the converter draws 20 ma. at 150 volts, tests have shown that the performance is essentially unchanged with the plate input reduced to 5 ma. at 45 volts. This means, of course, that the unit can be supplied from the car-receiver power pack with no danger whatever of overloading it. Or, if you are reluctant to dig into the receiver to bring a B+ lead out, you can operate the converter from a small B battery.

The Circuit

The circuit diagram is shown in Fig. 1. A 6AK5 is used as an r.f. amplifier, and a 6J6 dual triode as the frequency converter. Since the tuning of the converter is fixed, the circuits of the r.f. amplifier must be broadbanded to pass all frequencies in any ham band. These circuits consist of slug-cored coils tuned by the tube capacitances. However, a trimmer capacitor, C_3 in Fig. 1, is included so that the amplifier grid circuit can be peaked up for the particular antenna in use, or in going from one end of the band to the other.

A common trouble experienced when a broad-



The input tuning capacitor (C_3), the bandswitch, and S_1 are in line from left to right on the front wall of the chassis. The tuning slugs for the coils may be adjusted through holes drilled in the sides of the chassis. Inside the unit, switch sections S_{2A} through S_{2F} are in line in that order from front to rear. Crystals for the oscillator are grouped between switch sections S_{2D} and S_{2E}.

cast receiver is used as a tunable i.f., is that strong local broadcast signals may feed in through the converter to reach the b.c. receiver input and cause interference. This effect has been minimized in this design by providing a pair of wavetraps, C_1L_1 and C_2L_2, at the input. With C_1L_1 tuned to the strongest signal at the low-frequency end of the b.c. band, and C_2L_2 tuned to the strongest local signal at the high end of the band, the feed-through of b.c. signals will seldom be bothersome.

For frequencies above 7 Mc., the oscillator section of the converter works at harmonics of the crystal frequency. At these frequencies a circuit is used which limits the oscillator output essentially to the desired harmonic frequency. On 3.5 and 7 Mc., the crystals work at the fundamental, and the circuit is a simple Pierce, L_6 being eliminated on these bands.

For the sake of simplicity in the diagram, only a single set of coils (the 14-Mc. set) is shown. Other coils and crystals are wired similarly to their respective switch points. Switch section S_{2E} is not used as an active switch, its point terminals merely serving as a most convenient tie-point strip for supporting the junction of the crystals and L_6 coils. In the case of the 7- and 3.5-Mc. positions, where no L_6 coils are used, the corresponding switch points are simply wired together, as indicated.

S_1 performs the switching necessary in shifting from ham-band to broadcast input. S_{1A} and S_{1B} shift the antenna from the converter to the b.c. receiver, while S_{1C} turns off the converter filaments.

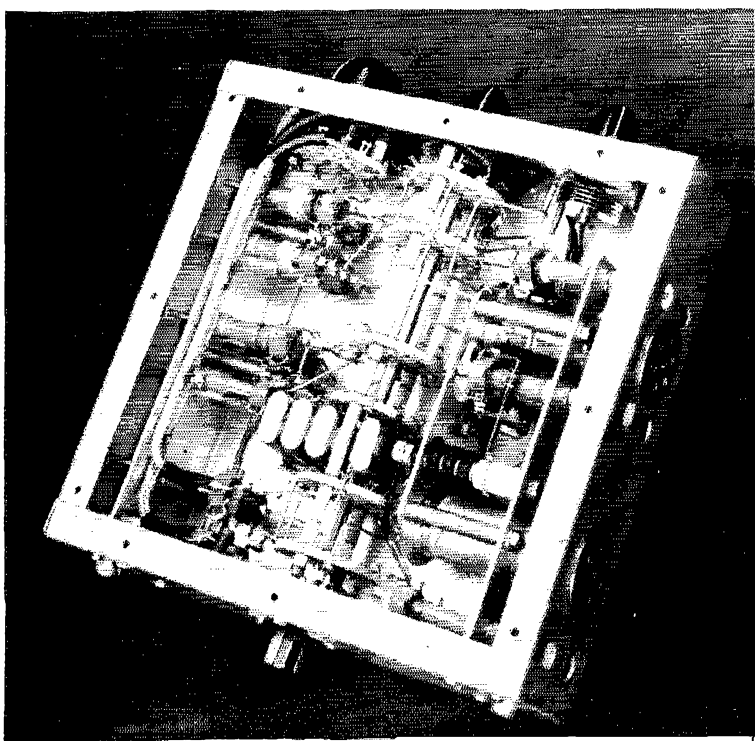
As with a conventional superhet, the frequency of the crystal-controlled oscillator must differ from the frequency of the incoming signal by the frequency of the i.f. amplifier. In this case, the i.f. will vary from about 550 to 1550 kc. — the usual tuning range of the b.c. receiver. An accompanying table shows the crystal frequency, the h.f. oscillator frequency, and the range over which the b.c. receiver must be tuned to cover each of the ham bands. The oscillator works on the low-frequency side of the signal frequency in this instance.

• Here is a mobile converter that includes bandswitching and crystal control — features that add much to the operating convenience and received-signal stability. The standard car b.c. receiver is used as a tunable i.f., eliminating the problem of providing suitable controls and space often involved with tunable converters. Form factor has also received careful consideration. Plate power requirements are easily handled by the car-receiver supply, or even a small B battery, if the operator wants to avoid tampering with the b.c. receiver.

Since the range of the b.c. receiver is approximately 1000 kc. (1550–550 kc.), the tuning range with any single crystal is limited to 1 Mc. However, this is more than adequate for all except the 10-meter band. For full coverage of this band, two crystals are used, as indicated in the table. The two frequency ranges are from 28 to 28.9 Mc., and from 28.75 to 29.7 Mc. The 11-meter band is not normally included, but values are given so that this band may be substituted for one of the 10-meter ranges if desired

Construction

The converter is built into a $2 \times 7 \times 7$-inch aluminum chassis. The top cover (actually a bottom plate for the chassis, and not shown in the photographs) is a flat piece of aluminum measuring 7 by 9 inches. The extra inch of overlap on each side provides lips for fastening the



Connectors J_1, J_3 and J_2 are mounted in that order, from right to left, on the rear wall of the converter. One-inch holes in the side wall permit the removal of tubes. The 9/16-inch holes are for adjustment of the 28-Mc. coils.

converter to the bottom cover of the b.c. receiver by means of machine screws and metal spacers.

The aluminum bracket for the large subassembly should be made first. This subassembly is shown to the left of the bandswitch in the front view of the converter, and in the two detail photographs. The bracket is 5½ inches long and 1⅞ inches high, with ⅜-inch lips bent along the bottom and the rear end. The detail photographs identify the components in this subassembly, indicating the holes that must be drilled for the tubes, coils and r.f. chokes.

When the bracket has been drilled, place it against the rear wall of the chassis, and ¾ inch in from the left side, and mark the mounting holes in the chassis. Then slide the bracket against the left-hand side of the chassis and spot the slug-adjusting holes, and the 1-inch holes that permit removal of the tubes. The latter are the ones covered with snap-in buttons in the rear view.

The tube sockets are mounted on a piece of aluminum 3¾ inches long overall, and 1⅞ inches wide. This piece is spaced 1⅜ inches from the bracket and is supported from it at the four corners by long 6-32 screws with metal spacers. It has ¾-inch holes opposite the two inside coil forms, and ⅝-inch holes to clear the two r.f. chokes.

Before assembling the unit, the antenna coils (L_3) should be wound on each of the two L_4 forms. Each of the North Hills coil forms has an extra set of terminals that may be used as tie points for the switch ends of the L_3 windings. (By judicial use of these extra terminals, it is possible to complete the wiring of the converter without employing any additional tie points.)

Small components should be kept close to the tube-socket supporting strip so that they will not project and make contact with the bandswitch terminals later. At the conclusion of the wiring of the subassembly, connect power leads that will run to S_{1C} and J_3, and attach a 2-inch length of wire to Pin 5 of the 6J6. The free end of the latter will later be connected to S_{2D}.

The remaining slug-tuned coils are mounted as a second subassembly on a bracket the same in size as the first, although the mounting lips must be bent in the opposite direction. The coils are arranged in three groups of four coils. The coils are centered at the corners of a ¾-inch square. The first *square* is centered on the strip and at ⅝ inch from the front edge of the strip. The second square is centered 2½ inches from the front edge, and the last square is centered 3⅝ inches back. At the center of each of the two squares toward the front a hole is drilled for a 1-inch 6-32 screw. A soldering lug and a ¾-inch metal spacer are slid over the screw before it is fastened to the bracket. The lugs are convenient grounding terminals.

Before the coils are mounted, this bracket should be placed against the rear wall of the chassis and ¾ inch from the right-hand side and its mounting holes marked in the chassis. Then, as before, it should be slid against the right-hand side of the chassis while the slug-adjusting holes are spotted in the wall of the chassis.

The first group of coils toward the front are the r.f. grid coils, L_3L_4, and the plate coils, L_5, are in the second group. With the slug screws facing you, the 80-meter coils are at the upper left, the 40-meter coils are at the upper right, the 20-meter coils at the lower left, and the 15-meter coils at the lower right. The third group of coils at the rear include the trap coils, L_2 at the upper left, and L_1 at the upper right. Below are the 20-meter oscillator coil (L_6) to the left, and the 15-

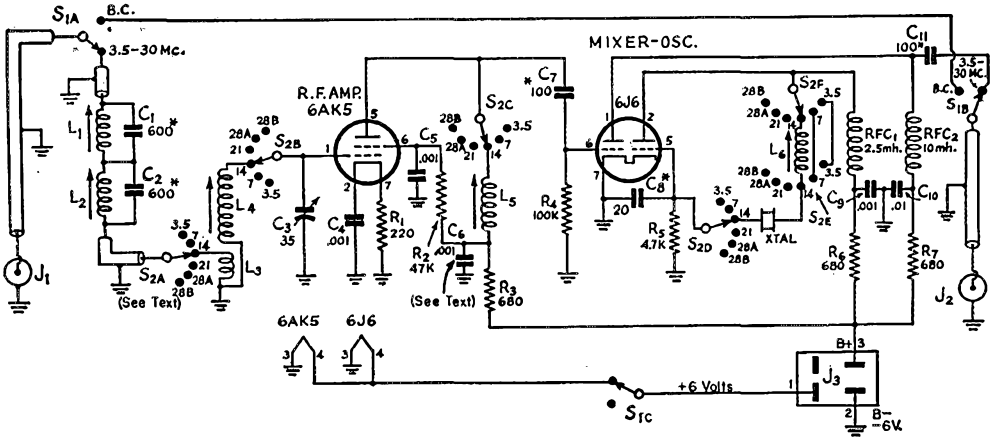


Fig. 1 — Circuit diagram of the crystal-controlled mobile converter. All resistors ½ watt. *Indicates a tubular ceramic capacitor; all other fixed capacitors disk ceramic.

C_3 — 35-$\mu\mu$f. variable (Hammarlund HF-35).
L_1 through L_6 — See coil chart.
J_1, J_2 — RCA-type phono jack.
J_3 — 4-prong male chassis connector (Cinch-Jones P-304AB).
RFC_1 — 2.5-mh. r.f. choke (National R-100S).
RFC_2 — 10-mh. r.f. choke (National R-100S).
S_1 — 3-pole 5-position (used as 3-p.d.t.) selector switch (Centralab PA-2007 or PA-5 wafer mounted on PA-300 index).
S_2 — 6-pole 6-position selector switch (6 Centralab PA-18 wafers mounted on PA-302 index; see text).
XTAL — See frequency chart (James Knight type H-17).

Frequency Chart for the Mobile Converter

Band, Mc.	*Crystal Freq., Kc.*	*Oscillator Freq., Mc.*	*I.F. Range, Kc.*
3.5–4	2900	2.9	600–1100
7–7.3	6400	6.4	600–900
14–14.35	6700	13.4	600–950
21–21.45	6800	20.4	600–1050
26.96–27.23	6575	26.3	660–930
28–28.9	6850	27.4	600–1500
28.75–29.7	7050	28.2	550–1500

NOTE: I.f. range indicates broadcast receiver tuning range necessary for covering the associated amateur frequencies.

meter oscillator coil to the right. The antenna coils, L_3, should be wound on their corresponding grid-coil forms (L_4) before assembling.

Only a single by-pass condenser is shown in the diagram at C_6. Actually, there are three of them. One is at the junction of the cold ends of the two 10-meter coils, one for the 3.5- and 7-Mc. coils, and one for the 14- and 21-Mc. coils.

The Bandswitch

The bandswitch is made up from Centralab Switchkit parts as indicated under Fig. 1. The wafers are spaced as follows: index head to wafer S_{2A} — 5/16 inch, S_{2A} to S_{2B} — 11/16 inch, S_{2B} to S_{2C} — 1 7/16 inches, S_{2C} to S_{2D} — 11/16 inch, S_{2D} to S_{2E} — 1 inch, S_{2E} to S_{2F} — 13/16 inch. The tail of the bandswitch shaft should be cut off close to the last wafer, to leave space for J_3, but the two assembly screws should be allowed to extend through the rear wall of the chassis to strengthen the support. In assembling the switch, be sure to use the small fiber washers between each ceramic spacer and between the wafers and the spacers to prevent cracking of the ceramic. All wafers should be placed on the assembly rods so that the rotor or "arm" terminal is the second terminal to the left of the upper assembly rod, as viewed from the front.

The crystals can be soldered to the switch contacts after the switch is mounted in the chassis. They are placed between S_{2D} and S_{2E}. In the rear-view photograph, the crystals, left to right, are for 3.5 Mc., 7 Mc., 21 Mc., and the high end of the 28-Mc. band. The crystals for the 14-Mc. band and the low end of the 10-meter band are placed horizontally, one above the other, against the bottom of the chassis. They are hidden by the group of three lower-frequency crystals. Prongs taken from an octal socket and slid over the crystal-holder pins are a good means of connecting the crystals to the switch wafers.

The three controls are lined up along the center line of the front edge of the chassis, with the antenna trimmer, C_3, to the left, the bandswitch at the center, and S_1 at the right. The two outer controls are centered 2 inches from the bandswitch shaft. In the final assembly these should be mounted first.

Shielded phono jacks (RCA type) are used for J_1 and J_2, and are placed near the two rear corners of the chassis. In the rear view, the antenna jack is at the right and the output jack at the left. The fiber mountings of these jacks will need to be clipped off so that they will fit between the chassis and the subassembly brackets. These should be mounted next, and the coax leads run to S_{1A} and S_{1B}, keeping the leads along the bottom corners of the chassis.

Next the two subassemblies can be mounted and connections made to the bandswitch. Most of these connections can be made most easily with bare No. 16 wire. In addition to the connections shown in the diagram, the bandswitch terminals immediately to the left of the upper tie rod (as viewed from the front) on S_{2A} and S_{2B} should be connected together, and then to the ground terminal at the socket of the 6AK5. This grounds the inactive L_3 and L_4 coils.

As a last operation, the power leads are brought to the power supply connector, J_3, and soldered to the terminals.

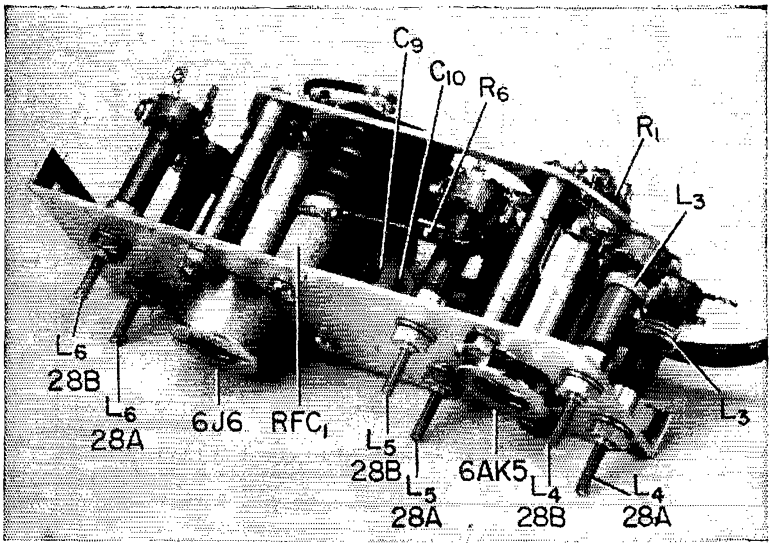
Power Supply

The converter requires 0.625 ampere at 6 volts for the heaters, and anything between 5 ma. at 45 volts to 20 ma. at 150 volts for the plate supply. This can be taken most conveniently from the car b.c. receiver by connecting two leads to an audio-output-stage socket. It is preferable to take the filament voltage from this point, rather than from the car wiring, so that advantage may be taken of any battery-line filtering that may be built into the b.c. receiver. Plate voltage should be taken from the screen terminal. This voltage will usually be about 200, and can be dropped down to the desired value with a series resistor. A 12,000-ohm 2-watt resistor will usually be about right. This resistor should drop the voltage from 200 to approximately 75 at about 10 ma. The hot filament and plate-supply leads, plus a

Coil Chart for the Mobile Converter

Band	*Turns*	*Ind. Range, μh.*		*Type No.*	
	L_3	L_4 L_5	L_6	L_4 L_5	L_6
3.5–4	30	64–105	——	120-G	——
7–7.3	8	18–36	——	120-E	——
14–14.35	4	5–9	18–36	120-C	120-E
21–21.45	3	3–5	5–9	120-B	120-C
26.93–27.23	3	2–3	3–5	120-A	120-B
28–28.9	3	2–3	3–5	120-A	120-B
28.75–29.7	3	2–3	3–5	120-A	120-B

NOTE: L_1 and L_2, Fig. 1, are Types 120-F (36–64 μh.) and 120-E, respectively. Series 120 coils are obtainable from North Hills Electric Co., Inc., 203–18 35th Ave., Bayside 61, New York. L_3 is wound with fine magnet wire at grounded end of L_4.



This view of the subassembly shows the 1-inch holes which permit removal of the tubes. The mounting bracket measures 1⅞ by 5⅜ inches and has ⅜-inch mounting lips at the bottom and the left ends, as seen from this angle.

ground lead, can be brought to a connector mounted on the b.c. receiver, or run in the form of a cable terminated with a female plug that fits the connector at the rear of the converter. Shielded wire should be used for the cable.

Antenna Coupling

With a small antenna, such as a mobile whip, tight coupling to the antenna is essential for best signal response. It is also important in avoiding regeneration in the r.f.-amplifier stage. Therefore, especially when the antenna is a small one, it should be resonant. This is usually the case in a mobile installation where the antenna must be made resonant for transmitting. If a signal generator is used for preliminary adjustment, it should be one having low-impedance (about 50-ohm) output. Here at the ARRL lab, initial tests were made with a signal generator. Final tests were made with a standard 10-meter whip loaded with a Johnson "Whipload-6," preadjusted to each band. The bandswitching feature of this loading unit was most convenient in changing back and forth between bands along with the converter.

Adjustment

The high-frequency oscillator should be checked first, listening on a communications receiver at the oscillator frequencies listed in the table. No adjustment of the oscillator is necessary at 3.5 and 7 Mc., but at the higher frequencies the slugs of the L_6 coils must be adjusted for most stable output at the proper harmonic frequencies. Set the receiver to the desired frequency and adjust the slug until the oscillator signal is heard. To make sure that the oscillator is crystal-controlled, jar the converter. If the signal is crystal-controlled, no amount of jarring should change the frequency. If it is not crystal-controlled, the slug should be adjusted carefully until the oscillator locks in with the crystal.

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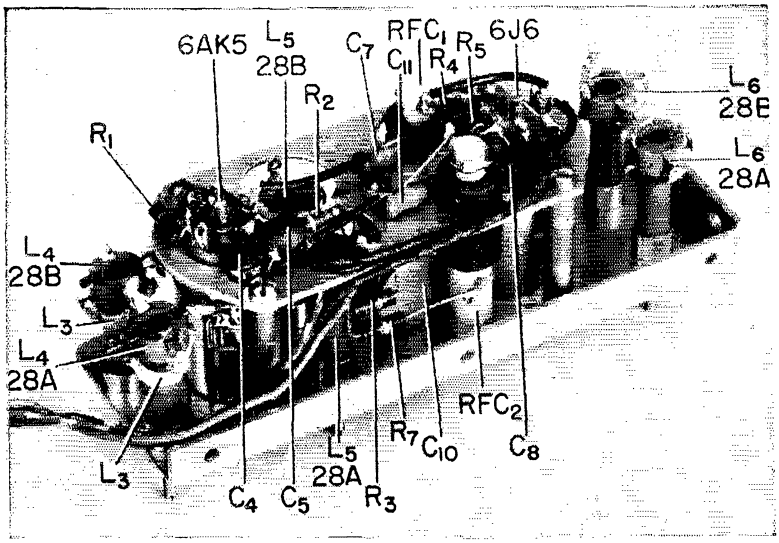


This assembly supports the tubes, the 28-Mc. coils, and most of the small components of the crystal-controlled converter. The support plate for the tube sockets has rounded ends to clear coils L_4 and L_6, and a pair of ¾-inch holes to provide access to the terminals of the amplifier plate coils. The wire leads leaving the unit at the left connect to S_{1B}, S_{1C}, and Pin 3 of J_3, as shown by Fig. 1.

A Cubical Quad for 20 Meters

Reviving a Neglected Type of Beam

BY S. B. LESLIE, JR.,* W5DQV

• The cubical quad enjoyed brief popularity when "10" was in its glory, but has practically disappeared along with sunspots and ten-meter activity. The author finds it highly satisfactory on 14 Mc. and offers reasons why it is worth serious consideration if you're thinking of putting up a beam.

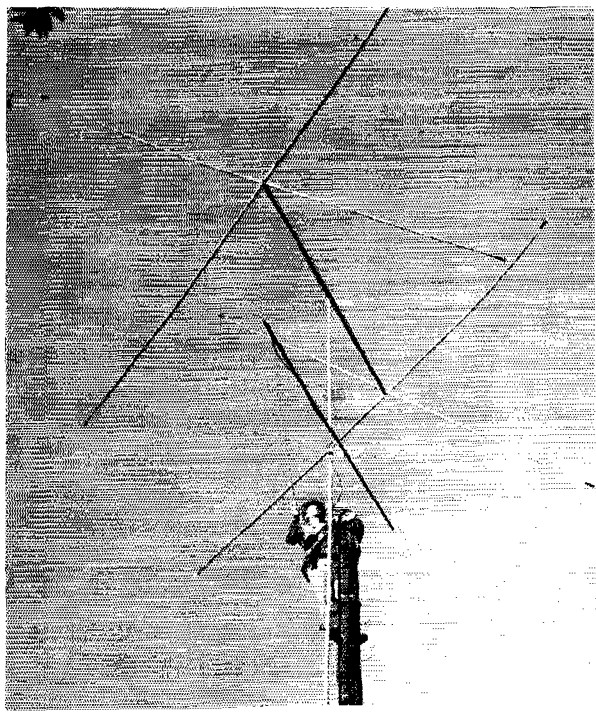
IN pursuit of our hobby we occasionally run across a piece of equipment that performs in a satisfactory manner, is easy to build, simple to adjust and low in cost, yet for some unknown reason is neglected and forgotten by the majority of amateurs. Such is the case of the cubical quad antenna. A few years ago, when 10 meters was open, the quad enjoyed considerable popularity. Many amateurs reported that it gave them results equal to, and in many cases superior to, the conventional 3-element Yagi, some claiming gains as high as 10 to 11 db.[1, 2] Measurements at ARRL headquarters gave the quad a gain of 7 to 8 db. over a reference dipole antenna, a gain equal to that of a good three-element beam.[3]

As 10 meters faded out so did the quad; the fellows who had been so enthusiastic about it failed to carry through and use it on the lower frequencies. Comments received over the air now indicate that many hams do not know what the quad is or what it is capable of doing. Those who are familiar with it seem surprised that a practical one for 20 meters could be built and all assume it would be a monstrous affair. Actually, the quad occupies less space and appears smaller than a three-element beam.

The cubical quad consists of a radiating element and a parasitic reflector, usually spaced 0.15 or 0.20 wavelength, both radiator and reflector consisting of square loops one quarter wavelength on a side, making a total of one wavelength around the loop. This configuration can be arranged either as shown in Fig. 1A or Fig. 1B, that shown at 1B giving slightly higher gain.[3] In some installations the reflector is made a little longer than the radiator as in Yagi beam construction, in others it is made the same length as the radiator. In either case, provision is made for tuning the reflector by means of a shorted stub or variable condenser in order to obtain optimum phasing. These square loops may be thought of as two half-wave elements stacked one quarter wavelength apart with their ends bent to connect them together, hence a lower angle of radiation is obtained than would be expected from a simple two-element beam. Many of the early versions used two-turn loops for radiator and reflector but this served no purpose except to raise the feed-point impedance.[3]

Performance Data

The amateur literature has very little to say regarding the mode of action of the quad and anyone interested is urged to read the articles mentioned above. Since this antenna seemed to have several advantages over the Yagi and as very little experimental work had been reported on it, a scale model for the 50-Mc. band was built to try to determine some of its characteristics. All measurements were made with the center of the array one wavelength above ground and the instruments used were a Heathkit AM-1 antenna impedance meter, a Millen grid-dip oscillator and a homemade field-strength meter. The test signal was furnished by a transmitter feeding into a dipole elevated one wavelength above the ground and located three wavelengths from the antenna being tested. All measurements were



W5DQV adjusting the phasing stub on his 20-meter quad. The main supports are bamboo fishing poles.

* % Leslie-McCauley Clinic, 122 East 3rd St., Okmulgee, Okla.

[1] The *CQ* Staff, "Cubical Quad, Topic Number One," *CQ*, December, 1948, p. 37.

[2] Hoffman & Middelton, "Constructing the Cubical Quad," *CQ*, June, 1949, p. 11.

[3] "The Quad Antenna," *QST*, November, 1948, p. 40.

♦

double-checked on two different occasions to make them as accurate as the instruments would permit.[4] The results are tabulated below:

Radiator alone	Imp.	110 ohms
	Gain over dipole	2 db.
Reflector spaced 0.20	Imp. of radiator	75 ohms
	Gain over dipole	10 db.
Reflector spaced 0.15	Imp. of radiator	65 ohms
	Gain over dipole	8 db.
Reflector spaced 0.10	Imp. of radiator	45 ohms
	Gain over dipole	8 db.
Director spaced 0.20	Imp. of radiator	50 ohms
	Gain over dipole	5 db.

The gain figures seem high but they are the actual readings obtained. The radiating element alone, without reflector or director, gave a consistent gain of 2 db. over a well-matched and trimmed dipole. This does not agree with the published figures for a square loop; nevertheless, this 2-db. gain was obtained on two different occasions, using different loops and different dipoles, all grid-dipped to the correct length. Disregarding this 2-db. gain of the square loop, the 0.20 spaced quad still gives a gain of 8 db., a very respectable gain indeed.

A field pattern taken with the reflector at 0.15 is shown in Fig. 2. A pattern taken at 0.20 showed a similar outline but with somewhat greater attenuation of the back lobe.

The radiation from the sides of these test beams and the one used on 20 meters was remarkably low, the field-strength meter indicating almost zero off the sides. On-the-air tests with the 20-meter quad showed a 45-db. front-to-side ratio and 25-db. front-to-back ratio. A square element tuned as a director and spaced 0.20 wavelength gave a gain of 5 db. over the dipole, which brings up the interesting possibility of a three-element quad using 0.15 or 0.20 spacing for both director and reflector. Such a beam might prove considerably better than a three- or four-element Yagi. Time limitations prevented investigating these possibilities, but it is hoped that the above experimental work will stimulate more work on the quad by other amateurs. This beam is worth much more attention than it has received in the past.

The 20-meter quad here at W5DQV has created considerable interest, nearly half the stations contacted asking for more information about its operation and construction. After fourteen months' operation on 20 c.w., this antenna has proven its worth as it has given results equal to and often superior to the three-element wide-spaced beam it replaced. It is definitely smaller than the usual three-element beam, having a "wing span" of only 16 feet 9 inches as compared to 33 feet, a boom length of only 12 feet as compared to 20 or 24 feet, and as described here, a weight of about 20 pounds. Yet this is a full-sized beam capable of giving full-sized performance; there are no shortened elements and there are no loading coils to absorb power. It is easily turned by a TV rotator, is constructed of readily obtained materials, and can be built, put in place and tuned in one or two week ends.

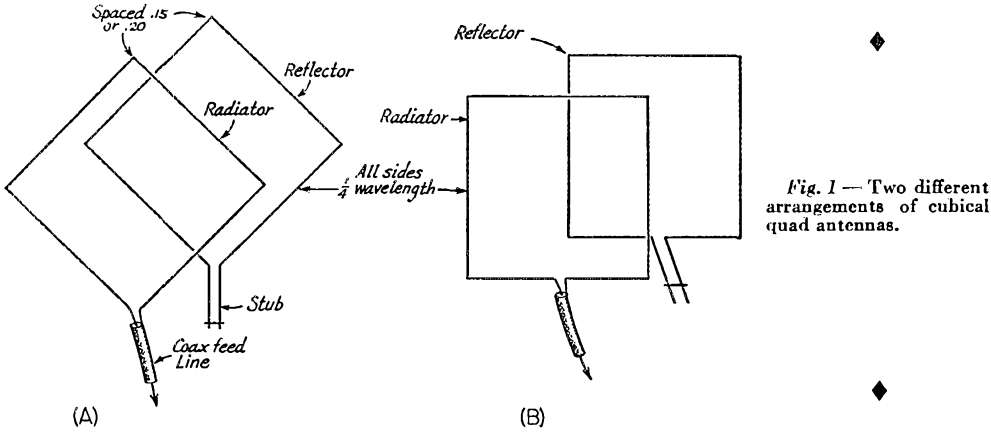


Fig. 1 — Two different arrangements of cubical quad antennas.

Construction

Most of the details of construction can be seen in the photo and drawings. It was built to be as light as possible and while it does whip some in the wind, this does not seem to cause any notice-

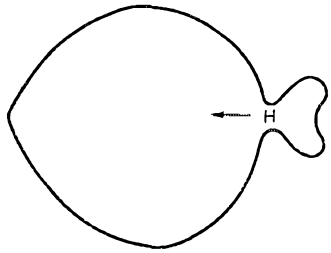


Fig. 2 — Field-strength pattern of 50-Mc. cubical quad with 0.15 spacing. The broad nose and sharp dips off the sides are also very noticeable in on-the-air tests with the 20-meter quad.

[4] Antenna measurements of any type tend to be tricky, even with elaborate and accurately-calibrated equipment, because of the difficulty of detecting and eliminating stray effects which sometimes are of the same order of magnitude as the quantities under investigation. Results such as those tabulated here (and other similar tabulations of antenna performance figures) are of considerable value, practically, if it is kept in mind that they are necessarily approximations, useful as a guide but not to be taken as literally as, say, the reading of a good quality d.c. voltmeter. — Ed.

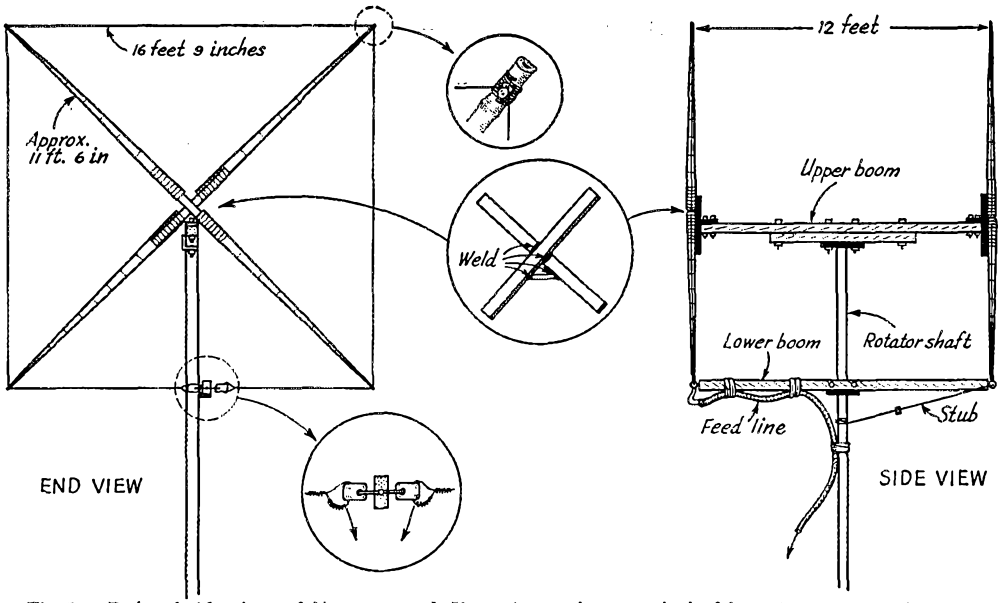


Fig. 3 — End and side views of 20-meter quad. Upper insert shows method of fastening antenna wire to support arms. Center insert shows construction of support-arm mounting bracket. Lower insert shows method of attaching feed line and stub to the center insulators. Two small egg insulators are used, fastened to end of lower boom as shown with a small nail.

able change in loading or on received signals. There is nothing critical in the construction except the length of the wire elements, and no doubt many will devise better ways to build and support this antenna. One of the quads built by a local ham used 1 × 2-inch pine for the support arms but this beam was much too heavy and blew down in the first light wind. The support arms shown in the drawing are ordinary bamboo fishing poles about 16 feet long, with the butt ends wrapped with friction tape to prevent the metal mounting bracket and wire from biting into the bamboo. These arms are fastened to the mounting brackets as shown in Fig. 3 with several turns of No. 14 galvanized wire, and the far ends are not trimmed until the antenna wire has been fastened in place. Two mounting brackets and eight bamboo support arms are required. The mounting brackets serve to hold the arms in place and to fasten them to the end of the boom. These brackets are made by welding two 24-inch lengths of 1-inch angle iron together back to back to form a large "X" 90 degrees between legs, and welding a 5-inch length of 1½-inch strap iron between two of the legs to fasten the "X" to the boom end. The arms are assembled and the antenna wire is fastened in place before attaching the brackets to the boom.

Many amateurs will raise their eyebrows at the idea of using fishing poles in construction of an antenna, but if the poles are well treated with a weatherproofing compound they will last several years. Weatherproofing compounds are available at all lumber dealers. This antenna has been up for over a year in all sorts of weather and as yet shows no signs of wear. Be sure to get straight poles with no splits in them. No insulators are necessary, the poles themselves acting as long insulators. The antenna shown in the photo uses plastic insulators but subsequent beams have shown these to be unnecessary. The easiest way to mount the antenna wire on the arms is to lay a long length of wire on the ground and mark it at quarter-wave intervals, in this case 16 feet 9 inches, and use these marks to indicate where the wire fastens to the pole. Fasten loosely at first as it will be necessary to slide these joints up and down the poles a little until all four sides of the

(*Continued on page 122*)

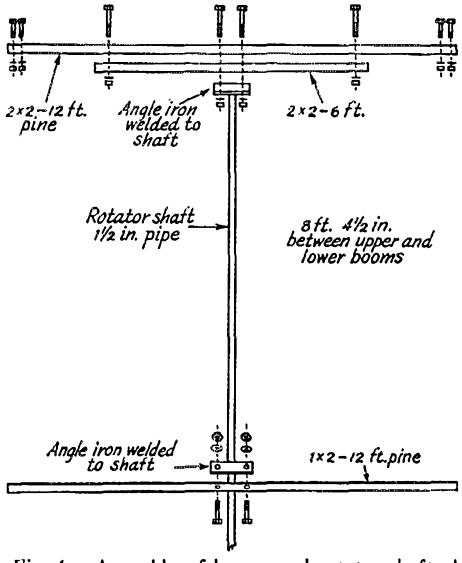


Fig. 4 — Assembly of booms and rotator shaft. All bolts are ¼ inch.

A Discussion of Receiver Performance

Some Fine Points and Unsolved Problems of Receiver Design

BY E. W. PAPPENFUS,* WØSYF

• Here is an article on receivers that anyone with the slightest interest in "why" should not pass up. It won't tell you how to build anything, unless you read carefully between the lines, but it will certainly help you to understand some effects that may have been a mystery up to now.

SINCE good communication superheterodyne receivers have been available for about twenty years, it is surprising that there is anything left to discuss about this line of equipment. However, the large number of letters that are written to the manufacturers questioning receiver performance points to the need for a discussion of the action of a receiver under certain conditions. These include weak-signal reception as well as performance in the presence of a very good signal. Many hams feel that there is no need to miss a QSO because a signal is weak. They feel that if a signal can't be read, it is strictly the fault of the set design. At the same time, it is hard for many radio operators to understand why a receiver cross-modulates and blocks when the kilowatt station next door comes on the air. As you may guess, this is a discussion of the reasons why a receiver is not all the amateur expects and perhaps also a defense of receiver design.

The subjects to be discussed include receiver sensitivity, signal-to-noise ratio, noise figure, cross-modulation and blocking. It is self-evident that a receiver for amateur use, and particularly for DX, must have a great deal of inherent amplification. The ability of a receiver to make a lot of sound in the loudspeaker with a very weak signal is called "sensitivity." High sensitivity in a receiver is a necessary, but not sufficient, definition of weak-signal receiver performance. "Signal-to-noise ratio" is also very important.

It is not quite as apparent that a good communications receiver must be free from overloading or cross-modulation when strong signals are present. These undesirable effects are generally overlooked in the general confusion and congestion of the present-day amateur bands. It must be admitted that the modulation splatter blamed on the local amateur at the other end of the band is sometimes generated in the receiver. It is unfortunate that a receiver designed for very good weak-signal performance should have difficulty with extremely strong signals. This, however, is the case, and it is an area in which an engineering compromise must be reached. Like most compromises, it is open to argument, and there is no completely clinching evidence to prove that the receiver design was right. The compromise involves r.f. stage gain, a.v.c. characteristics, r.f. selectivity, type of r.f. tubes, type of mixer tube, and mixer noise. With all of these balancing factors it may be seen that it is not an easy decision for the set designer.

* % Collins Radio Company, Cedar Rapids, Iowa.

The signal-level chart for a 75A-3, shown in Fig. 1, will help to explain some of the items discussed previously. In developing this chart, a signal generator was set for a convenient level at the antenna and then moved back, stage by stage, toward the diode detector. The signal generator output was adjusted to hold constant diode-load voltage at each point in the circuit and, of course, the frequency was changed appropriately at the i.f. amplifier. The signal generator was then returned to the antenna terminals and increased to simulate a stronger signal. Again the signal generator was moved toward the second detector holding diode-load voltage constant. Moving the signal generator along, stage by stage, is equivalent to a voltage measurement at that point. A family of curves was generated, as shown, that gives a complete picture of receiver performance with various r.f. input levels. A change in gain is represented by a change in slope of the curve. Note the constant gain of antenna link to first r.f. grid, and the reduction in gain due to a.v.c. in the first r.f. stage and the i.f. amplifiers. It is clear how the gain of the five controlled stages changes to hold the diode-load voltage almost constant.

A.V.C.

The basic function of automatic volume control in a receiver is to keep the diode-load voltage constant and thus hold constant audio output for changing signal levels. This is apparent from Fig. 1, because the diode-load voltage does not rise appreciably above 8 volts as the signal level is changed from 1.5 to 100,000 microvolts. This constancy of receiver output voltage does not tell the whole story, however. It is important to "delay" the application of a.v.c. voltage until a suitable signal-to-noise ratio is reached. This allows the receiver output to increase in a linear manner with input signal level so that receiver noise is rapidly overcome. In the 75A-3 the a.v.c. does not become effective until the input signal is about 1.5 microvolts. In addition, some sets delay the application of a.v.c. voltage to the r.f. stage until even higher signal levels are reached. This also contributes to a linear improvement in signal-to-noise ratio as the input signal is

increased above the a.v.c. threshold. As an example of delayed a.v.c. action, if a 2-microvolt signal gives a 10-db. signal-to-noise ratio, then a 20-db. increase to 20 microvolts will give a 30-db. signal-to-noise ratio. A 10-db. signal-to-noise ratio provides a good readable signal, but a signal with less noise is more enjoyable and less tiring to the operator.

By dividing the a.v.c. voltage applied to the r.f. stage in the 75A-3, suitable action is obtained without separately delaying the r.f. stage a.v.c. voltage. Since a sharp-cut-off tube is used in the 75A-3 r.f. stage, there is a secondary reason to limit a.v.c. voltage to this tube. A 6BA6 is a better tube for a.v.c. action, but unfortunately it is a very noisy tube compared with the 6CB6 that is used.

Manual gain control in the 75A-3 operates on the a.v.c. line, just as the automatic volume control does. This means that the gain distribution is proper for any reasonable setting of the manual gain control. It is possible to degrade the signal-to-noise ratio with manual gain control if too much gain-adjusting action is applied to the r.f. stage, so that mixer noise is proportionally larger. Noise tests on a receiver should be made at various signal levels to insure that manual gain control is applied to the proper stages.

Weak Signals

It is possible to put a large amount of over-all amplification in a receiver because the amplification at a given frequency can be held to a manageable level through the use of the superheterodyne principle in single- or multiple-conversion (75A) schemes. The gain from antenna to loudspeaker in a typical communications receiver may be as great as 10 million, but all this gain does not permit the amateur to copy a weak DX station unless the noise contributed by the antenna-coupling circuit, the first r.f. tube shot noise, mixer noise, etc., is held to a low value. That is the reason receiver performance is specified by *signal-plus-noise*-to-noise ratio. A signal generator modulated 30 per cent at 400 c.p.s. (to simulate a speech signal) is fed into the receiver antenna terminal. The proper resistor is placed in series to match the receiver input impedance. The signal generator output is increased until there is a 10-db. increase in the reading of an output meter connected to the receiver audio over the level present when the modulation is switched off. This means that the signal (modulated portion) plus noise is 10 db. stronger than the noise. A signal 10 db. stronger than the noise level is acceptable for voice communications, hence the justification for this value. A good c.w. operator can copy signals with a lower signal-to-noise ratio, but the lower the signal-to-noise ratio, the more expert the operator must be.

It is dangerous to generalize, but it is possibly safe to say that any amateur receiver with a 10-db. signal-to-noise ratio at from 1 to 3 μv. is in the high quality class. Noise-figure tests [1] of receiver performance make use of a noise diode and are the only real means of comparison between receivers of different bandwidth, because receiver noise voltage varies proportionally to the square root of the bandwidth. A narrow-band receiver should not be compared directly with a wide-band set. Noise figure expresses the ratio in db. between the noise level of the receiver under test to a so-called perfect receiver in which all noise is assumed to be generated in the dummy antenna due to its thermal noise. (See Appendix.)

It can be shown that a perfect receiver with 6-kc. bandwidth and 100-ohm input would require 1.4 μv. to have a 10-db. signal-plus-noise-to-noise ratio. This receiver when operated with a dummy antenna matching the receiver input impedance has a 3-db. noise figure. It is theoretically possible to improve the noise figure by mismatching the antenna, but this is not important from a practical standpoint in the ham bands from 10 to 160 meters, because the antenna impedance cannot be predicted accurately. Again a compromise in design results, and a 100-ohm input impedance was selected for

[1] Goodman, "How Sensitive Is Your Receiver?" *QST*, Sept., 1947.

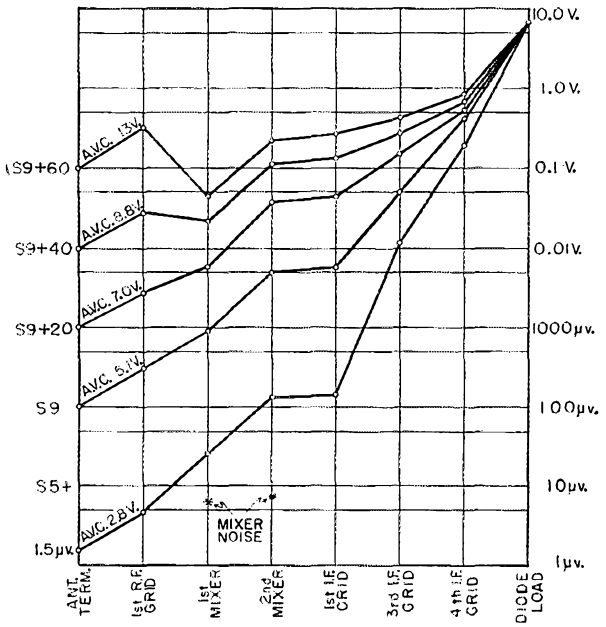


Fig. 1 — A signal-level chart of the 75A-3 receiver, showing the signal levels that exist through the receiver for various input signals and bias voltages.

the 75A-3. Since signal generators are generally available and noise diodes are not, it is customary to use the signal generator method with 10-db. signal-plus-noise-to-noise as the standard of comparison between receivers. Incidental frequency modulation in the signal generator can cause errors particularly at high frequencies and should be guarded against.

Noise in a receiver results from so-called thermal-agitation noise in the input circuit, shot noise, mixer noise and amplifier noise. Pentagrid mixers are particularly noisy tubes, but they are advantageous because of the ease with which the oscillator can be fed into the mixer and the freedom from coupling of oscillator voltage to the signal grid.

If enough gain-producing elements precede the mixers, then the mixer noise can be neglected. Since the greatest gain exists from the grid circuit of the first r.f. amplifier to the receiver output, it is logical to expect this noise to be louder than any other receiver noise. This is not always true, but in a properly designed receiver the input noise makes the greatest contribution to over-all receiver noise. This can be demonstrated by peaking the grid circuit, with

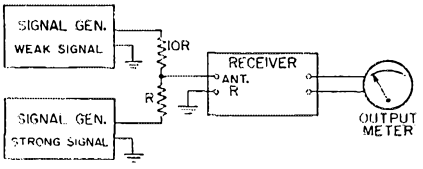


Fig. 2 — The cross-modulation effects in a receiver can be measured by using two signal generators connected as shown here.

a resistor of proper value across the antenna terminals. A rise in receiver noise output when the first r.f. tank circuit is tuned compared with the completely detuned condition indicates the proper gain distribution. A drop in noise level as the first r.f. tube is removed also shows that the mixer noise is not an important factor in over-all receiver signal-to-noise ratio. Two r.f. stages are generally not required to approach the ideal weak-signal receiver performance, because a single stage using a high-transconductance tube will amplify the signal sufficiently to override the mixer noise. The chart of Fig. 1 shows the equivalent noise present at the mixers. The gain here appears sufficient to override completely the mixer noise with 1.5-μv. input.

If this peaking effect of noise with antenna terminals properly loaded with a resistor is not found, then the antenna coil gain, antenna circuit Q or r.f. amplifier gain should be adjusted until the receiver noise is dominated by the receiver input noise. Only then can the operator say that his receiver is able to hear the weakest stations. This actually is a rather theoretical consideration because of the large amount of static and interference prevalent, except perhaps on the 10-meter band. When the weakest reading on the S-meter across the entire 20-meter 'phone band is S6 to S9, because of a solid array of strong signals, obviously receiver noise is not then the limiting factor. Receiver bandwidth is much more important. Atmospheric and manmade static on the antenna also limit the signals that can be copied. Only rarely can the full signal-to-noise capabilities of a receiver be used. This can be checked by tuning to an unused portion of the band (that's a joke, son) and then removing the antenna from the receiver and replacing it with the equivalent resistance. If the receiver noise output drops, then the antenna noise is the limiting factor and not the noise developed within the receiver.

Strong Signals

For the reception of strong signals, an additional receiver requirement is added. Radio-frequency voltages applied to any stage of the receiver must not exceed the bias for that stage with any signal ordinarily encountered. Fortunately, the receiver a.v.c. voltage increases the bias applied to each stage and at the same time reduces the gains through the receiver when strong signals are tuned in.

Five controlled stages are used in the 75A-3 a.v.c. circuit. By removing one controlled stage or by reducing the proportion of a.v.c. voltage fed to a stage, it is possible to change the receiver gain distribution. The set designer has this "handle" by which he can set the gain curve to the desired shape. The curves of Fig. 1 show sufficient r.f. gain adjustment so that the mixers are protected from large signal voltages for any signal within the range of the S-meter. Because mixers are somewhat critical in the application of bias, the first and second mixers are omitted from the controlled circuit and set at a suitable bias by voltage drop across a cathode resistor. The exact gain distribution within a receiver is not critical within the limitation that all stages must be held below the overload region with the highest signal level ordinarily encountered.

Strong signals outside the passband can reduce the set gain if rectified grid current flows in any stage which can charge up the a.v.c. line. A decoupling resistor and a low-resistance a.v.c. line minimize this effect.

Representative voltages for 0.5-volt input are 1.5 volts on the r.f. grid and 1.1 volts on the second mixer grid. At these voltage levels the mixer draws grid current and its conversion gain is reduced. The overload point for a receiver is defined as that input level at which a 6-db. drop in audio output occurs compared with the maximum audio output as the input signal is increased. Overload point for the 75A-3 is at 1.4 volts. A small amount of grid current in the mixer is not serious, as indicated by the fact that the overload point is well above the input at which the peak r.f. grid voltage applied to the second mixer exceeds its bias.

All s.s.b. operators will cry out loudly at the above statement. It is possible to tolerate grid current in a receiver mixer because the performance standards are so much lower than in linear amplifiers. In a s.s.b. transmitter it is desirable to keep intermodulation products down 30 db. Harmonic distortion of the signal in a receiver can be tolerated if it is 10 to 20 db. below the signal level. This explains the ability of the receiver mixers to operate satisfactorily with small positive grid voltages.

For the reception of weak signals described earlier, it is desirable to have as much gain as possible ahead of the mixers. This would insure that the signal level would be strong enough to override completely the noise from the pentagrid mixers. However, from the standpoint of strong signals, it is desirable to have low amplification until the selectivity of the receiver is effective. This would insure that only signals in the i.f. passband would tend to overload the set and these could be more readily accommodated by the high a.v.c. bias and gain control that is effective in the i.f. amplifier. These requirements for no amplification ahead of selectivity for strong signal reception and high gain in the antenna circuit and r.f. stage for weak signal reception are in direct conflict. It is fortunately possible to make an engineering compromise that will accommodate the majority of operating situations which confront the amateurs. Weak signals can be handled by using just enough r.f. stage gain to override the mixer noise by about 6 db. or slightly more.

Cross-Modulation

When the receiver is tuned to a weak signal, and a strong signal is present outside the i.f. passband, then a different condition prevails than in the strong-signal case outlined above. There is very low a.v.c. bias generated to protect the grids of r.f. and i.f. amplifiers from grid current and only moderate gain reduction to prevent strong signals from stage to stage in the receiver.

The only gain-reducing elements present are a small amount of a.v.c. bias generated by the desired signal, and the selectivity of the r.f. and variable-i.f. coils in double-conversion receivers. The selectivity of these coils determines the r.f. voltage applied to mixers and i.f. amplifiers. With very large signals applied to any stage of the receiver, nonlinear operation causes modulation components of the strong signal to appear on the weak signal. This, in effect, means that strong 'phone signals *outside* the selectivity curve of the i.f. amplifier can still be heard. The term "cross-modulation" has been applied to this effect. Cross-modulation in a receiver is measured by a laboratory set-up as shown in Fig. 2. Two signal generators are used to simulate the two signals. One signal generator feeds the receiver through a resistor equal to the input impedance while the other signal generator feeds through a resistor of ten times the input impedance. The resulting impedance is then very close to the matching value. The signal generator feeding through the large resistor is set for a value of r.f. that will produce an antenna terminal signal of, say, 10 μv. (approximately S6) at receiver center frequency. The audio output is measured and signal generator modulation is removed. The second signal generator is then turned on and adjusted for 30 per cent modulation. At various frequencies near the receiver center frequency the r.f. level from the second signal generator is increased until the receiver audio output is 10 db. less than that measured with the first signal generator. A plot of these values for the 75A-3 operating at 4.0 Mc. is shown in Fig. 3. Adjacent signals at S9 + 40 db. can interfere if they are closer than 15 to 20 kc. from the desired signal. Approximately 50-kc. separation is required for signals that are 60 db. above S9. The cross-modulation curve of Fig. 3 is an inverse composite of the receiver input selectivity. The lower part of the curve is determined by the selectivity of the receiver circuits to the second mixer grid and the upper part of the curve is shaped by the selectivity

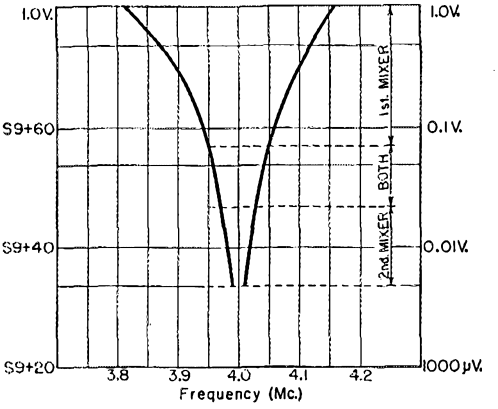


Fig. 3 — The cross-modulation characteristic of the 75A-3 receiver, with the receiver tuned to 4.0 Mc.

to the first mixer grid. The r.f. stage is never responsible for cross-modulation below 1 volt r.f. on the antenna for a 10-μv. desired signal level. The portions of the curve at which the first and second mixer respectively contribute to the cross-modulation are indicated. A portion of the curve entitled "both" is a transitional area in which both mixers contribute to cross-modulation.

The application of a.v.c. voltage to the r.f. stage reduces its gain and helps protect the subsequent stages from excessive voltages. The matter of cross-modulation characteristics of an r.f. tube is extremely complicated, so just taking a given tube and applying a.v.c. bias is not the whole answer. There is no substitute for a large number of cross-modulation tests to determine proper r.f. stage conditions. There does not seem to be a receiving tube available that possesses the

(*Continued on page 124*)

A Simple Rig for Six-Meter Mobile

A Compact Transmitter That Is Easy on Both Pocketbook and Battery

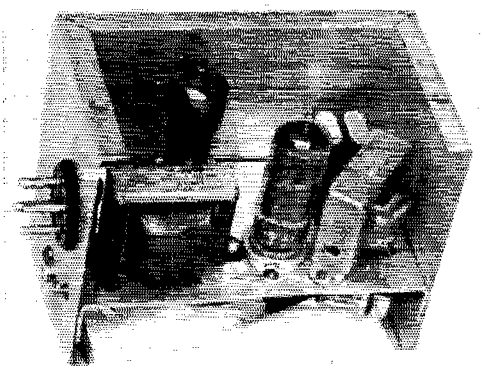
BY R. J. CARPENTER,* W3OTC

• In at least two respects the 50-Mc. band is ideal for mobile operation. The average car radio whip is the right length, and low power will do the job well enough so that nothing in the way of special batteries or generators is required. Here's a 6-meter rig compact enough for steering-post mounting. It uses only two tubes, and will work nicely on a small receiver-type vibrator supply. You can build it for as little as $21.00, complete; even less if you shop for bargains.

PERHAPS more people would go mobile if they didn't have to drill holes in their cars, bedeck them with special antennas, and install space-consuming boxes of gear that require something approaching Hoover Dam's power capacity. The 50-Mc. band is a big help in these problems. No special antenna mounts are needed, for the standard 54-inch broadcast whip is a respectable antenna system at 50 Mc. And the nature of 6-meter operation is such that a moderate amount of power works out surprisingly well.

A simple converter can be built that will give entirely satisfactory performance on 6. This article will describe a transmitter that should fill the bill on the counts of simplicity, small size, low total cost and low power drain. It is a complete 6-meter 'phone rig, running 7 watts input, built in a 3 × 4 × 5-inch box. Its total cost is about twenty-one dollars, including crystal and tubes.

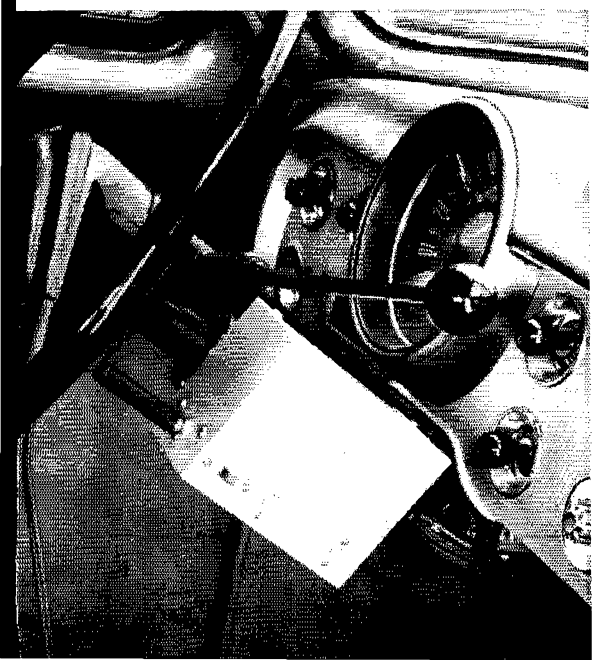
As may be seen from the diagram, Fig. 1, the circuit is extremely simple. The basis for this lies in the use of 50-Mc. third-overtone crystals. These high-frequency rocks are no harder to use than their lower-frequency brothers, and their relatively high price is offset by the simplification resulting from their use. (I bought mine at $1.50 each, but figured the crystal at $7.00 in the cost estimate above.) Suitable 50-Mc. crystals can now be obtained from most of the better manufacturers.



Interior of the W3OTC 50-Mc. mobile rig. Modulator tube and microphone transformer are at the right, modulation transformer and r.f. tube at the left.

* 1812 Arcola Ave., Silver Spring, Md.

[1] *The Radio Amateur's Handbook*, 1953 edition, p. 386.



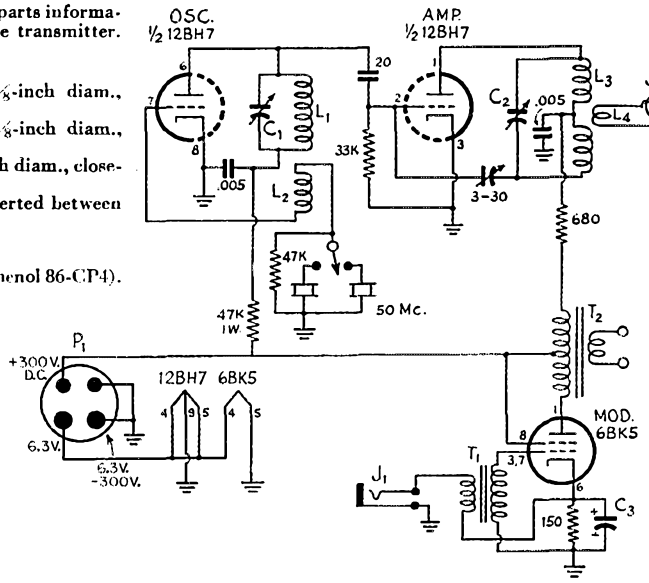
No, this isn't a converter — it's a complete 50-Mc. transmitter, audio and all. It runs 7 watts input, yet it is small enough for steering-post mounting.

Circuit Details

The first section of a 12BH7 is operated as an overtone oscillator at 50 Mc.[1] The plate voltage to this stage is held down by a large resistor, to help reduce the crystal current. Developing sufficient drive for the final does not seem to be a problem. Switching for two crystals is provided, though some retuning may be desirable if the frequency shift is more than about 100 kc. The

Fig. 1 — Schematic diagram and parts information for the W3OTC 50-Mc. mobile transmitter.

C_1, C_2 — 7-25-$\mu\mu$f. APC variable.
C_3 — 10-μf. 25-volt electrolytic.
L_1 — 5½ turns, No. 16 enam., ⅜-inch diam., close-wound.
L_2 — 2 turns, No. 20 insulated, ⅜-inch diam., 3/16 inch from L_1.
L_3 — 8 turns, No. 16 enamel, ½-inch diam., close-wound, center-tapped.
L_4 — 2 turns, No. 20 insulated, inserted between turns of L_3 at center.
J_1 — Single-circuit jack.
J_2 — Coaxial fitting, phono type.
P_1 — 4-pin male power fitting (Amphenol 86-CP4).
T_1 — Carbon-microphone-to-grid transformer (Stancor A4708).
T_2 — Plate to voice coil transformer (Merit A2900).



second section of the 12BH7 is connected as a neutralized power amplifier. With a plate-dissipation rating of 3.5 watts per section, an input of up to about 7 watts can be handled safely. Modulation is accomplished with a single 6BK5, using the tapped primary of a push-pull output transformer connected as an auto transformer. Microphone current is taken from across the cathode resistor of the 6BK5. Since the filtering of the current supply is not perfect, it may be necessary to reverse the leads to one side of the microphone transformer to eliminate audio oscillation or extreme bassiness. Arrangement of parts should be apparent from the photographs.

Tune-up

Adjustment is best begun at a reduced B+ voltage, 200 volts being reasonable. The equipment used includes a 50-ma. d.c. meter, a receiver for six meters with b.f.o., and a simple field-strength meter. A nonmetallic device should be used to tune the variable condensers. After the initial tune-up only the field-strength meter is needed to touch up the tuning.

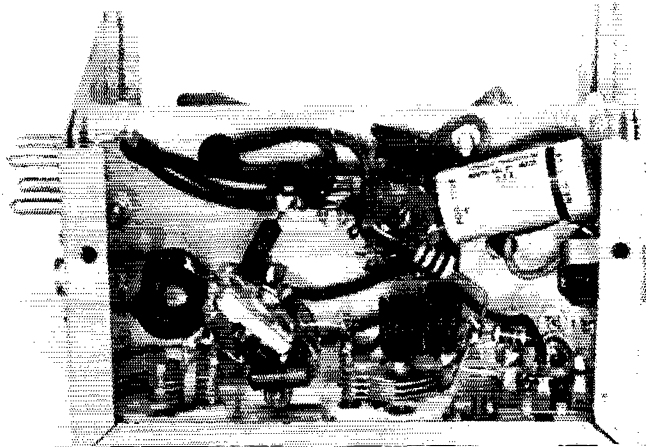
With the final disabled by removing its plate voltage, the oscillator is checked for operation by listening with the receiver. With the b.f.o. turned on, neutralization is next adjusted. Tune the final tank through resonance and vary the 3-30-$\mu\mu$f. neutralizing capacitor in small steps. Neutralization exists at the point where tuning the final through resonance has practically no effect on the oscillator frequency. Plate voltage can now be reconnected, through the milliammeter. The final plate current will be about 20 to 25 ma. when the plate voltage has been raised to the final value of about 300 volts and the antenna has been loaded up.

In my mobile installation plate power is obtained from a receiver-type vibrator supply which is hidden in the glove compartment. No visible holes have been drilled in the car.

Generally, I can work a 60-watt fixed station as far as it is readable over ignition noise from my own suppressed engine. Solid communication over a 10- to 15-mile range may be obtained in almost all locations, even with cross-polarization and the low power used.

The author wishes to thank John J. Nagle, W3JES, and George R. Sugar, ex-W3KQS, for their work on the photographic portion of this article.

Under the chassis of the 50-Mc. transmitter may be seen, right to left along the bottom of the picture, the crystal switch, the oscillator coils and tuning condenser, and the final tank circuit at the far left.



A One-Element Rotary for 21 Mc.

Utilizing Readily Available Materials in a Simple Antenna

BY LEWIS G. McCOY, W1ICP

LATELY, more and more amateurs are "discovering" the 15-meter band. Here is a band where it is possible to make long-distance contacts with low-power transmitters. Another feature of 15 meters is that antennas can be much smaller than those necessary for the lower frequency bands. The smaller antenna can be rotated to take advantage of the directional characteristics of an ordinary half-wave dipole.

Before discussing the actual construction of such an antenna, let's first clear up an erroneous impression about antennas that many newcomers seem to have. For some reason, many amateurs starting in the hobby get the idea that a horizontal half-wave antenna has no directional properties. In other words, they believe that when power is fed into such an antenna, the power will be radiated equally well in all directions. This is a completely mistaken concept. A horizontal half-wave antenna produces maximum radiation broadside to the radiating element. The least amount of radiation is from the ends of the antenna. Hence, a horizontal half-wave antenna is "bidirectional." If the ends of the antenna point north and south, maximum radiation will be east and west. To obtain the benefits of the directional properties of the antenna, it is only necessary to rotate it 180 degrees. Here are the constructional details for such an antenna that can be built for less than $15, complete with mast, wall mounting and 50 feet of feed line.

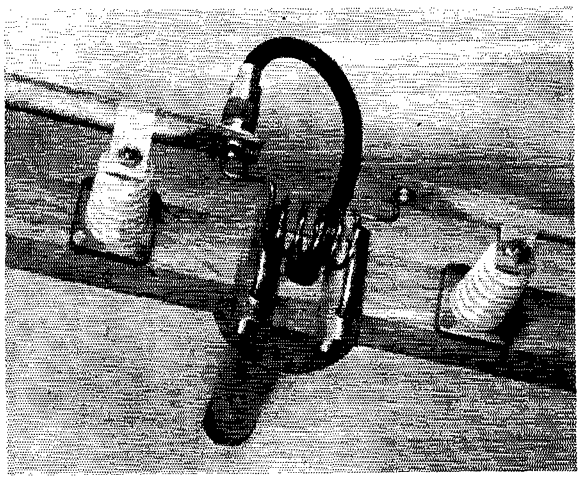
[1] A half-wavelength antenna would normally be fed with 72-ohm cable, since the antenna offers a good match for this impedance value. In this antenna system, the shorter elements, plus the small coil, offer a good match for 52-ohm cable.

• Here is an antenna that practically builds itself. Made from electrician's thin-wall tubing, a material sold in any electrical supply store, its main feature is that no cut-and-try methods are involved in its construction. Build it according to the directions in the article, and sit back and watch "solid" QSOs pile up.

Construction

The antenna is made from two pieces of ½-inch diameter electrical thin-wall steel tubing or conduit. This tubing is readily available at any electric supply shop and sells for approximately seven cents a foot. It comes in 10-foot lengths and, while 20 feet is short for a half-wave antenna on 21 Mc., with loading the length is just about right for 52-ohm feed line.[1] If aluminum tubing is available, it can be used in place of the conduit, and the antenna will be lighter in weight. However, it is sometimes difficult to obtain aluminum, while steel thin-wall conduit is available in any electrical supply house.

As can be seen in Fig. 1 and the photographs, the two pieces of tubing are supported by four stand-off insulators on a four foot long 2 by 2. The coax fitting for the feed line was mounted on the end of one of the lengths of tubing. A mounting point was made by flattening the end of the tubing for a length of about 1½ inches. The tubing can be flattened by squeezing it in a vise or



♦

This view shows a close-up of the coil and coax fitting mountings. Be sure that the coil doesn't short out to the outer conductor when soldering the coil end to the inner conductor pin on the coax fitting.

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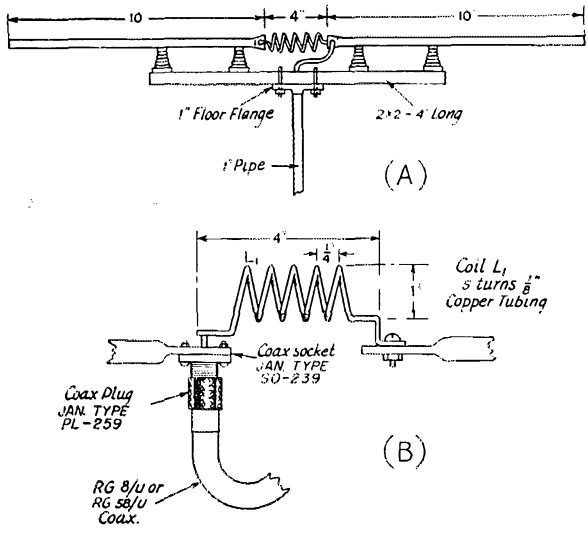


Fig. 1 — (A) Diagram of the antenna and mounting. The U bolts that hold the 2 by 2 to the floor flange are standard 2-inch TV mast type bolts. (B) A more detailed drawing of the coil and coax-fitting mountings. The ¼-inch spacing between turns is not critical, and they can vary as much as ⅛ inch without any apparent harm to the match.

by laying the end of the tubing on a hard surface and then hammering it flat. This will provide enough space to accommodate the coax fitting (Amphenol type 83-1R). A ⅝-inch hole will be needed in the flat section to clear the shell of the coax fitting.

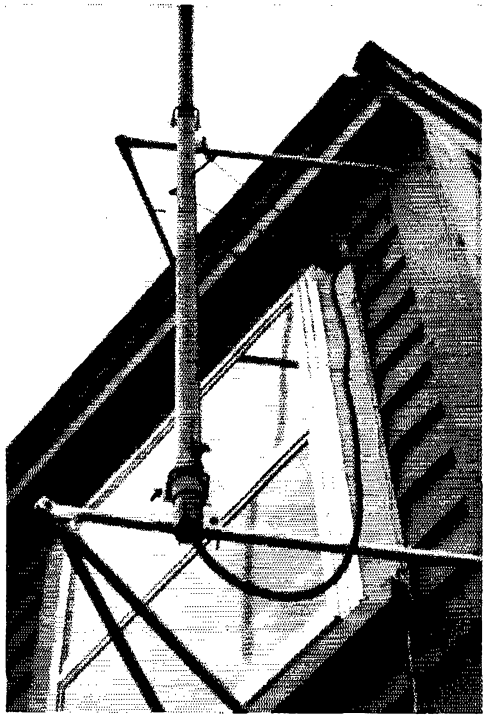
The coil, L_1, is made from ⅛-inch diameter copper tubing. It consists of 5 turns spaced ¼ inch apart and is 1 inch inside diameter. The coil is connected in series with the inner conductor pin on the coax fitting and the other half of the antenna. In order to secure a good connection at the coax fitting, the coil lead should be wound around the inner-conductor pin and soldered. The other end of the coil can be connected with a screw and nut.

Mounting

The antenna was mounted on a 1-inch floor flange and held in place by two 2-inch bolts, as shown in the photograph. The floor flange was connected to a 12-foot length of 1-inch pipe which served as a mast. Television antenna wall mounts were used to support the mast. In the installation shown, 19-inch wall mounts were used in order to clear the eaves of the house. A 2-inch long piece of 1¼-inch pipe was used as a sleeve, and it was clamped in the U bolt on the bottom wall mount. A ¼-inch hole was drilled through the mast pipe approximately 6 inches from the bottom. Then a 1½-inch bolt was slipped through the hole and the mast was then mounted in the sleeve on the bottom wall mount. The bolt acted as a bearing point against the top of the sleeve.

Another ¼-inch hole was drilled through the mast about three feet above the bottom wall mount. A piece of ¼-inch metal rod, six inches long, was forced through the hole so that the rod projected on each side of the mast. To turn the mast, a piece of rope was attached to each end of the rod and the rope was brought into the shack, so that the antenna could be rotated by the "arm-strong" method. Obviously, one could spend more money for a "de luxe" version and use a TV antenna rotator and mast.

RG-8/U 52-ohm coax cable was used to feed the antenna shown. For power inputs up to 100 watts, the smaller and less expensive RG-58/U can be used. However, when you buy RG-58/U, be sure that the line is made by a reputable manufacturer (such as Amphenol or Belden).



The antenna mounted against the side of the house, using TV wall mounts for holding the mast. The feed line comes out of the bottom of the mast and through the wall into the shack.

Some of the line made for TV installations is of inferior quality and is likely to have higher losses. The feed line was fed up through the mast pipe and through a ¾-inch hole in the 2 by 2. An Amphenol 83-1SP fitting on the end of the coax line connects to the female fitting on the antenna.

Coupling to the Transmitter

It may be found that, when the feed line is coupled to the transmitter, the antenna won't take power. Since the line is terminated at the antenna in its characteristic impedance of 52 ohms, the output of the final r.f. amplifier must be adjusted to couple into a 52-ohm load. Where the output coupling device is a variable link, all that may be needed is the correct setting of the link. If the link is fixed, one end of the link can be grounded to the transmitter chassis and the other end of the link connected in series with a small variable capacitor to the inner conductor of the feed line. The outer conductor of the coax is grounded to the transmitter chassis. The condenser is tuned to the point where the final amplifier is properly loaded. Such a system is shown in Fig. 2. Incidentally, this is the type of system that could be used with the Heathkit transmitter.

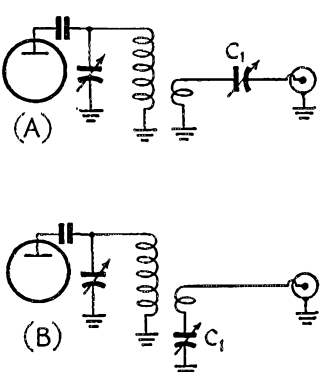


Fig. 2 — The variable coupling condenser, C_1, described in the text, can be connected as at (A) or (B), depending on which is more convenient for a particular transmitter. The condenser can be a receiving type of 50 to 100 $\mu\mu$f. capacity.

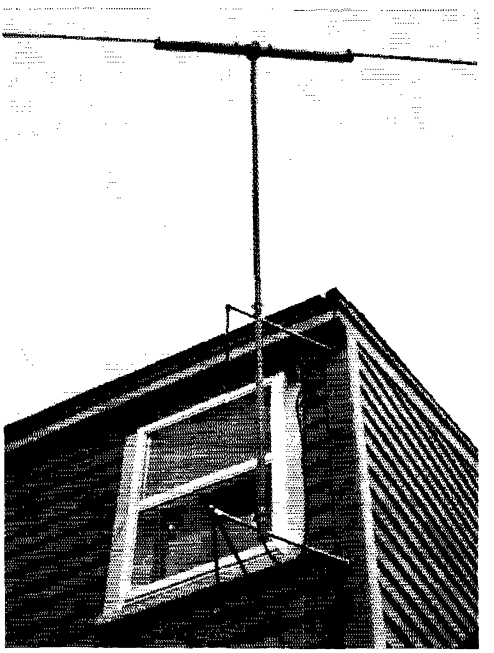
For transmitters having a pi-network output circuit, it is merely a matter of adjusting the network to the point where the amplifier is properly loaded.

In the event operation on 15 meters is in an area where one may have to contend with TVI, it may be necessary to use a low-pass filter to attenuate any harmonics likely to cause trouble. A simple filter was described in a recent issue of *QST*.[2] The filter is merely inserted in series with the coax feedline. This should take care of harmonic TVI problems.

Performance

Several different tests were made with the antenna including on-the-air checks with U. S. and foreign stations. The standing-wave ratio was carefully checked and at no point in the entire 21-Mc. band did the ratio exceed 1.3 to 1.

[2] McCoy, "The Tin Can Low-Pass," *QST*, Sept., 1954.



Over-all view of the antenna and mounting.

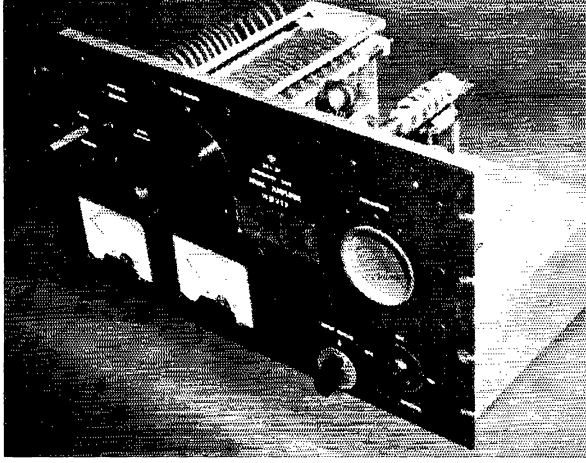
On the first CQ using the antenna, KP4WI answered and kindly consented to check the signal while the dipole was rotated. With the antenna broadside to him, his S-meter reading was 10 db. over S9. When the end of the antenna was pointed in his direction, the reading dropped to S1 to S3. Practically identical performance reports were received from W7SFK in Montana, from W5KC in Louisiana, and from DL2WW in Germany.

On reception, the variation from broadside to end was not as great as with transmitting reports. However, in many cases it was enough to make the difference between hearing a signal and not hearing one.

The simplicity of the antenna and the low cost, together with the improved performance over a fixed antenna, make it a worth-while project for an amateur interested in 15-meter operation. At the time of this writing, an OQ5 station in the Belgian Congo was heard on 15 meters working Novice stations. Who will be the first Novice DXCC?

MEMBERSHIP CHANGES OF ADDRESS

Four weeks' notice is required to effect change of address. When notifying, please give old as well as new address. Advise promptly so that you will receive every issue of *QST* without interruption.



Using a 304-TH as a grounded-grid amplifier, this unit can utilize to good advantage the full output of any of a number of popular commercially-built transmitters for driving power. The push-rod operated band-changing switch can be seen projecting through the panel at the left-hand end.

Grounded-Grid and the 304-TH

Utilizing "100-Watt" Rigs for Driving

BY THOMAS P. LEARY,* WØVTP

ONE thing that bothers most of us about designing and building a final amplifier is neutralization. This old dragon is with us in all conventional triode circuits, and a great many tetrodes also require it. But, with the right tube, the grounded-grid circuit will put the neutralizing condenser and split-stator tank back in the junk box.

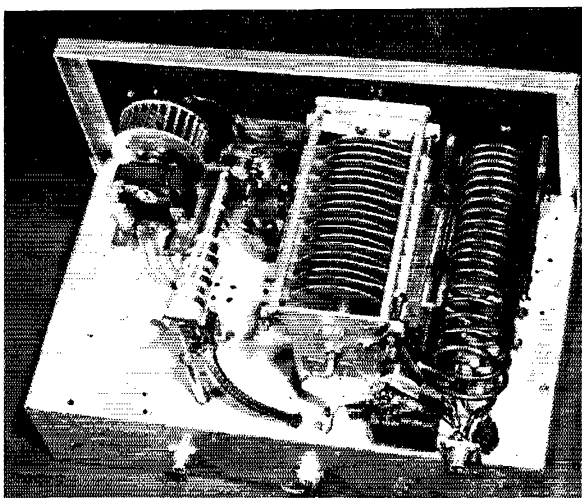
Still, we can't get something for nothing and grounded-grid operation requires four to six times the driving power. If we haven't already lost you, let's see what can be done with this arrangement.

Only the normal drive requirement of the tube is dissipated in the grid circuit: the remaining power passes through it and is added to the total power output. The filament, or input, circuit has a very low impedance, permitting the amplifier to operate as a Class B linear without swamping resistors.

Many amateurs own a Collins 32-V, a Johnson Viking or a homebrew rig with an output in the vicinity of 135 watts or more. When switching to higher power it seems a shame to dispose of this equipment, and somewhat ridiculous to use it to drive a final requiring only a few watts for the purpose. But such an exciter can be used without modification to drive a tube like the 304-TH to a kilowatt on c.w. or 750 watts on 'phone. With the same plate efficiency, the grounded-grid stage can put out more power than a conventional amplifier since additional r.f. is obtained from the driver. And, because we have no need for neutralizing, a pi-section output is a simple addition to the circuit. In Class B linear service only about 25 watts of drive is required which results in 200 watts of a.m. carrier. With high level, 100 per cent plate modulation cannot be obtained by modulating the final alone, since a fraction of the output originates in the driver, but the extra carrier is useful in getting through the QRM.

The main requirement for a tube to be operated in this manner is a low plate-to-filament capacity. The 304-TH has a capacity of about 0.7 $\mu\mu$f. plus the added advantage of an internal shield connected to the grid. The grid, which is grounded for r.f. through a by-pass condenser, shields the input and output circuits from each other in much the same manner as the screen grid in a tetrode. The driving power required depends to a great extent on bias and increases as the bias goes up. At cut-off (−135 volts with 2500 volts on the plate) the 304-TH can be loaded to draw 400 plate milliamperes with 135 watts of drive and 40 ma. of grid current. Under these

*8506 Broadmoor Dr., Omaha, Nebr.



The top-of-chassis layout, showing the blower (*left*) and copper-tubing tank coil (*right*). The fixed output condensers of the pi network are at the edge of the chassis in the right foreground.

conditions, using a bank of light bulbs and a light meter, 800 watts output was measured. Since at least twice cut-off bias is desirable for good linearity with plate modulation, about −250 volts should be used for 'phone operation. One hundred watts will then drive the tube to 750 watts input, still with 40 ma. of grid current. However, it was found possible with this circuit to modulate the final at a kilowatt input with cut-off bias without any splatter or serious deterioration of quality.

A 304-TL may also be used but drive requirements will be increased about 30 per cent. As an example, if a 200-watt exciter is available, the 304-TL, with −380 volts bias and 3000 volts on the plate, can produce more than a kilowatt output with input at the legal limit.[1] Both types can still be found in surplus stocks for less than $10.00.

[1] The power rating of a grounded-grid amplifier is not covered explicitly in the current amateur regulations, but FCC's interpretation is that the plate input to the "final stage" shall be considered to be the sum of the plate inputs to all stages contributing output power to the antenna. — Ed.

Circuit

As can be seen from Fig. 1, drive is injected into the filament-grid circuit and the power output is taken between grid and plate. Power sensitivity is very low and if plate-filament feedback can be kept to a minimum no neutralization is required. This means that the input circuit must carry the regular filament current in addition to r.f., and ordinary bandswitching of the input is not desirable. To conserve space, the amplifier to be described was designed for 40, 20, 15 and 10 meters only. The main filament coil (a dual winding) is used alone for 40 meters and the other coils are switched in parallel to cover the higher frequencies. The 52-ohm input link is coupled to the filament coil only, and need not be varied over the different bands; however, some system of changing the coupling between the driver tank and coax line should be provided. The internal antenna coupler in transmitters like the Collins, or a pi-section in the driver output, is entirely satisfactory.

The amplifier output circuit will match a 52-ohm line. A 9000-volt tank condenser was found

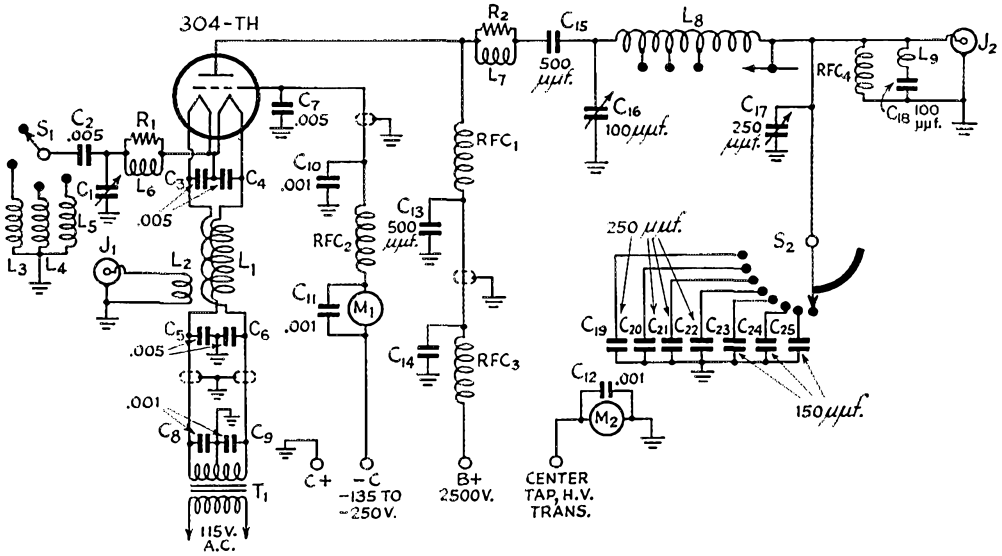


Fig. 1 — Circuit of the 304-TH grounded-grid amplifier. Capacitances are in μf. except where specified otherwise.

C_1 — 150-μμf. variable condenser (Johnson 150F20).
C_2 to C_7 — 0.005-μf. mica, 1000 v.
C_8 to C_{12} — 0.001 disk ceramic, 600 v.
C_{13} to C_{15} — 500-μμf. ceramic, 20 kv. (Sprague 20DK-T5).
C_{16} — 100-μμf. variable, 9000 v. (Johnson 100D90).
C_{17} — 250μμf. variable, 0.026-inch spacing.
C_{18} to C_{25} — 2500-volt mica.
L_1 — Two parallel windings No. 12 enam. on National XR-10A form, 10 turns of the two wires in parallel. Advance winding a notch with each turn.
L_2 — 4½ turns No. 18 stranded, polyethylene insul., wound directly on cold end of L_1 (TV "anode lead").
L_3 — 13 turns No. 12 enam., 1¼-inch diam., 3 inches long, air-wound.
L_4 — 6 turns 3/16-inch copper tubing, 1¼-inch diam., 2½ inches long, air-wound.
L_5 — 4 turns 3/16-inch copper tubing, 1¼-inch diam., 2¼ inches long, air-wound.
L_6, R_1 — Filament parasitic choke and resistor; see text.
L_7, R_2 — Plate parasitic choke and resistor; see text.
L_8 — See text.
L_9 — Resonate to desired TV channel with C_{18}.
J_1, J_2 — Coax connectors, chassis-mounting type.
M_1 — 0–500 d.c. milliammeter.
M_2 — 0–150 d.c. milliammeter.
RFC_1 — National R-175A r.f. choke.
RFC_2, RFC_3 — 2-μh. r.f. choke, 500 ma. (National R-60).
RFC_4 — 2.5-mh. r.f. choke.
S_1 — Single-pole 4-pos. steatite rotary (Centralab 2512).
S_2 — Single-pole 9-pos. progressive shorting steatite rotary (Centralab PA 2012). Two in parallel will be more satisfactory.
T_1 — 10-11-volt 12-amp. filament transformer (Thordarson 21F19).

necessary in the pi-section to prevent arcing with plate modulation. The input leads for power are completely shielded and filtered for TVI.

An electronically-regulated bias supply was found to be desirable for c.w. operation when keying an earlier stage. If the amplifier grid leak is used as the bleeder on a bias supply delivering cut-off voltage, as is common practice, the bias supply must be unusually husky because of the low value of grid-leak resistance required. The bias supply circuit used is shown in Fig. 2. The control provides a means for varying the key-up bias between about 90 and 250 volts. Additional

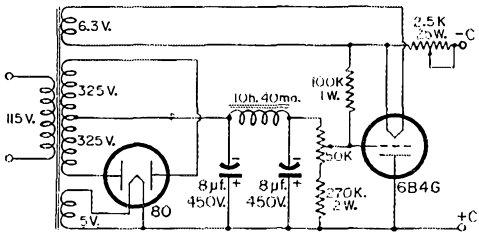


Fig. 2 — Bias supply circuit using a 6B4G as a regulator.

operating bias is obtained from the voltage drop in the 2500-ohm adjustable resistor when grid current flows.

Mechanical

This amplifier is the result of considerable sweat and experimentation and the builder may depart from the illustrated component layout at his own risk. Contrary to some published information, grounded-grid does not eliminate parasitics with these tubes and great care must be taken to keep plate-to-tank-condenser and filament-to-input-condenser leads short. The parasitic chokes and resistors should make up most of these leads. Complete shielding, without any inductive coupling, must be maintained between input and output circuits to prevent oscillation on the operating frequency.

The amplifier is mounted on a 10 × 17 × 4-inch aluminum chassis. The filament components are located on the under side at the right. A dividing shield and ventilated bottom cover are placed over this half, while the left under side is used to mount the filament transformer and meters. A 2 9/16-inch hole is cut near the front of the chassis, with its center 7 inches from the right-hand edge, and the 304-TH is submounted so that the internal shield is level with the top of

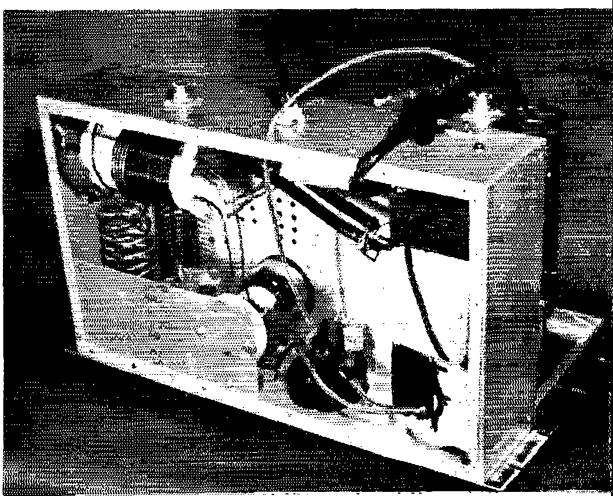
• A practical grounded-grid circuit using a high-power tube popular because of its low price in surplus. The amplifier incorporates the lessons learned in earlier attempts to make the 304 behave in a bandswitching grounded-grid arrangement covering 7 to 30 Mc.

the chassis. The tank condenser is placed just to the left of the tube and mounted upside down to obtain a short lead from the plate cap to the center of the stator. The R175A choke is placed horizontally with its top near the tube cap. The tank coil is mounted to the left of the condenser with the "cold" end toward the front. The coax socket, loading condensers and switch are located to the rear between the coil and condenser.

Some kind of blower is a necessity with such compact design since the 304TH dissipates 130 watts continuously from the filament and a couple of hundred watts more when in operation. Plenty of space is available on the right side above chassis for the blower, and air can be drawn in through the front panel. The panel is aluminum, 10½ by 18 5/16 inches, and the whole thing will fit in the top section of a Bud Junior Cabinet Rack (RC-1947A) which is 21¼ by 19⅞ by 10½ inches. The lower section needs no chassis and all power supply equipment, except the plate transformer, can be fitted in if the arrangement is carefully worked out. The plate-transformer terminals may be covered with a steel chassis of the proper size and high voltage led to the rectifiers through RG-8/U cable, with the shield grounded as a safety measure. The transformer can then be set on the floor under the operating desk. The center tap of the high-voltage winding can be connected to the plate milliammeter through ordinary shielded wire.

A small shield was found necessary above chassis between the 304-TH and the tank condenser, to eliminate capacitive coupling with the filament.

The main filament coil is mounted horizontally, lengthwise with the chassis, with the "hot" end just behind the base of the tube. To the right of the tube, under chassis, is the filament variable condenser. The 20-, 15-, and 10-meter coils are grouped compactly around the coil switch and



The cathode tuned circuit occupies the left-hand end of the chassis in this view. The bifilar coil at the top is used on all bands, additional inductances being connected in parallel to shift the tuning to the band in use.

the ends soldered directly to the tabs on the switch. The opposite ends of all three are soldered together and connected by a short lead to ground.

The filament by-pass condensers are connected directly across the socket terminals. The parasitic choke and resistor are fastened between the right-hand forward socket terminal and the front stator connection of the filament variable condenser.

The filament transformer is located under the chassis in the left rear corner. The transformer specified is somewhat overloaded for this use and runs hot but it will deliver the voltage if the 11-volt primary tap is used.

We have the old-fashioned notion that nothing can beat air-wound copper tubing for a low-loss coil. There was no room in this set-up for a conventional high-power switch, so we hit on the idea of using fuse clips fastened directly to the tank coil. The coil itself is 19½ turns of $\frac{3}{16}$-inch copper tubing, 2 inches in dimeter and 7½ inches long. First, close-wind the coil and spread it to 6 inches. Then spread the rear 5½ turns until the whole thing is 7½ inches long. The coil is supported on ¾ by 2½-inch stand-offs and soldered to screws in the tops of the three insulators at the 3rd, 8th and 18th turns (approximately) counting from the rear of the chassis. The fuse clips are soldered or fastened to holes in the tubing with small screws, in line at 3½, 5½ and 8½ turns, also counting from the rear. A piece of ¼-inch brass rod, with the point rounded, acts as a shorting bar between the clips and is connected to a piece of ¼-inch fiber rod with a shaft coupling so that it can be slid in and out from the front panel. A $\frac{3}{16}$-inch copper tubing lead runs from the front of the coil to the rear coax connector, and another fuse clip is fastened to this lead with a short piece of tubing so that it always grips the shorting bar to complete the connection. The whole assembly can be made quite rigid and the fuse clips make a positive, self-cleaning connection. Different points can be scribed on the fiber rod to indicate the correct setting for each band.

Heat-radiating connectors should be used on the grid and plate leads of the 304-TH. The grid by-pass condenser to ground should have practically no leads.

The parasitic resistors are of the Globar type, available from General Electric TV parts dealers. They are about $1\frac{1}{16}$ inch long, $\frac{9}{16}$ inch in diameter and come two to a package. The plate circuit parasitic choke is 2½ turns, ½-inch diameter with the resistor paralleled across it with very short leads. The filament circuit parasitic choke consists of two turns wound directly on the resistor. Both are wound with No. 12 wire.

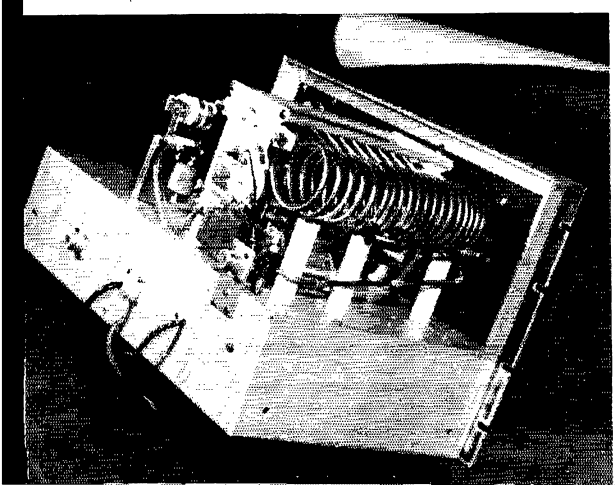
Tuning and Operation

Since the filament and plate circuits are essentially in series, some differences may be expected in tuning as compared with an ordinary amplifier. Full excitation should not be applied without plate voltage on, since the rated grid dissipation will be exceeded and tube damage can result. Some way of reducing driving power, such as switching resistance in series with the plate supply primary of the exciter, should be provided.

First apply *reduced* excitation with plate voltage off. Do not exceed about 60 ma. of grid current; it will peak at the resonance point of the input condenser. Then resonate the plate condenser, which will be indicated by an increase in grid current. It will be noticed that some plate current will flow even without plate voltage, and a dip will be found at resonance. Now apply reduced plate voltage through a series resistance, like a 500-watt photo-flood bulb, in the primary of the plate transformer. With bias reduced below cut-off, make the usual checks for parasitics with different settings of the tuning condensers. Then apply full voltage. Grid current will probably disappear, so increase excitation and make additional adjustments for maximum grid and minimum plate current. Loading can be controlled with the variable loading condensers. Keep an eye on the plate current drawn by the driver stage while making adjustments in the final, as coupling may have to be reduced to keep the driver tube from exceeding its ratings. Bias may be reduced to near cut-off for c.w. in order to obtain at least 40 grid milliamperes at a kilowatt input; however, the more bias the better the plate efficiency. With practice, the stage may be moved around the band very quickly; the filament circuit tuning is fairly broad and requires only occasional adjustment.

For Class B linear amplification of an a.m. signal, maximum input is 500 watts. Reduce the drive to about 25 watts or until no grid current flows without modulation. With modulation it should rise to about 20 ma. in peaks with bias

(Continued on page 126)



The shorting rod for band changing runs along the side of the tank coil, making contact with fuse clips fastened to the proper turns on the coil.

General Techniques of 10-Meter Mobile Noise Reduction

Wavetraps as Ignition Suppressors

BY TALMADGE R. ENGLAND,* W4MJJ

• **In this article, W4MJJ discusses the use of tuned wavetraps in suppressing electrical noise in 10-meter mobile installations.**

MOBILE OPERATION of amateur stations is ever becoming more popular, and especially will this be true if ten meters finally does open wide next year (it's always next year!). What follows is intended to give the would-be mobileer a fundamental insight into the cause of the biggest headache of mobile operation — noise. Compared to the elimination of noise, especially in the ten-meter band, the actual installation of the equipment is comparatively easy.

Now every ham knows that whenever a spark occurs some r.f. noise is generated. In fact, it is not at all necessary that there be a spark — merely a surge of current. The current surge induces transients in the associated wiring or, what amounts to the same thing, it "shock"-excites the inductance and capacitance of the wiring into a damped oscillation. Due to the random distribution of these two parameters, the oscillations occur at many frequencies. It is probably unnecessary to point out that the car's ignition system is the biggest noise producer, with the generator and regulator trailing. Indeed, if ten-meter operation is contemplated, you had best decide that complete elimination is impossible, and purchase or build a good noise limiter at the outset. However, the limiter, used in conjunction with standard methods of suppressing noise in its various and sundry spots, and traps in the ignition system (to be described), will reduce the interference to a most tolerable level.

While standard methods of noise suppression are aptly detailed in late editions of *The Radio Amateur's Handbook* and will not be repeated here, it will be interesting to enumerate the basic methods in a general manner. By keeping in mind the simple idea of what transients are and how they arise, the following seven methods of reducing or eliminating them are evidently fundamental: (1) elimination of L and/or C; evidently, no oscillatory transients would then be possible — but neither is the method. (2) Elimination of the spark. This is not so impossible as it sounds, for that is precisely what we do when graphite grease is used in the wheel bearings to eliminate wheel static. (3) Damping the oscillation. This is the usual method of reducing ignition interference; i.e., by installing resistors in the wiring. Unfortunately, this method is not applicable to other parts of the electrical system. (It is interesting that from a theoretical viewpoint there is a critical value of damping resistance beyond which no oscillatory transients are produced, but the value is too large to be of practical use.) (4) Shielding of wiring. (5) Grounding of such possible radiating elements as the tail pipe. (6) By-passing of the various electrical components of the car, such as dome light, gas gauge, etc. It should be kept in mind that a car's electrical system, being of low voltage, is a low-impedance system. By-passing is, therefore, not so effective as might be expected. (7) Rejection by the use of tuned traps or chokes.

A trap installed at a spark plug in W4MJJ's car.

The last method has been too much neglected. Although some amateurs do use tuned traps in the generator lead, no one seems to have tried them in the ignition wiring. The author installed traps on each plug, and inserted similar traps in the main tower of the distributor, and at the generator and the regulator. The generator and regulator traps practically eliminate noise from these two sources, whereas by-passing will not. Noise rejection in the ignition system is at least as good as that obtained with resistor suppressors. But where ignition interference is concerned, the

(*Continued on page 128*)

* % WMIK, P. O. Box 698, Middlesboro, Ky.

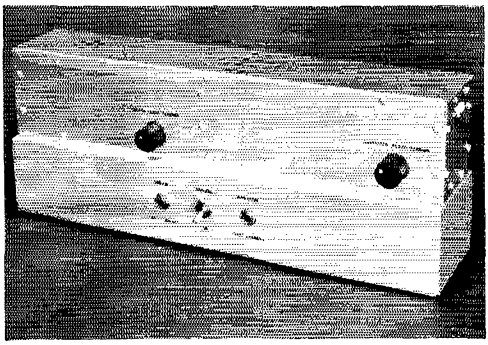
Using the 6524 Dual Tetrode on 432 Mc.

A Tripler-Amplifier To Follow Your Present 2-Meter Rig

BY EDWARD P. TILTON, W1HDQ

THE fellow who wanted to put more than a couple of watts on 420 Mc. had little in the way of tube choice until recently. There were only a few transmitting tubes on the market that would do the job, and prices for these began at around $25.00 each. Introduction of the Type 6524 dual tetrode recently[1] by RCA should help to promote more use of the 420-Mc. band, as this new tube can be bought for considerably less than anything we've had available previously.

Designed especially for u.h.f. mobile service, the 6524 is a natural for use in 420-Mc. amateur work. Operating from a plate supply of 300 to 375 volts, one 6524 as a tripler will drive another as a straight-through amplifier. Output from the tripler stage can be as much as 8.5 watts, and the amplifier will deliver up to 20 watts. These ratings are for 470 Mc., so some leeway is left for the amateur in getting efficient operation at the third multiple of his 2-meter frequency.



Tripler-amplifier for 432 Mc. Note that complete shielding and forced-air cooling are employed.

The transmitter shown here is a modernized version of the dual tetrode rig that has appeared in the *Handbook* for some years. It can be driven with a 2E26 amplifier on 144 Mc. readily, as the driver power output need be no more than 4 to 6 watts at 144 Mc. Output on 432 Mc., under plate-modulation conditions, is a good 12 watts; enough to make quite a respectable signal. On f.m. or c.w., it can be boosted to the 20-watt ICAS operating conditions.

Construction

It will be noted that provision is made for enclosing the tubes and tank circuits completely. The enclosure serves two purposes: it provides a path for circulation of cooling air, and holds down radiation from the tank circuits. The latter consideration is important in getting power into the transmission line, and of course the shielding is an aid to TVI prevention.

The main chassis is fitted with a bottom cover. Air from the fan mounted on the rear wall is circulated up around the tripler tube, at the left, and through ¼-inch holes below the amplifier tube. Holes in the top cover are the only means for this air to escape, and thus the cooling flow is concentrated where it will do the most good. The number of holes in the top cover, and in the chassis under the amplifier tube, can be varied until an equal flow of air appears to be coming through the two top sets of holes. This can be checked readily by noting how briskly a sheet of paper rises from either set of holes when the fan is started. This check should, of course, be made with the bottom plate in place.

The fan shown provides a flow of 17 cubic feet per minute, more than adequate for the job, so no great care was taken to stop small air leaks. Where a smaller fan is used, all air holes should be plugged. Small holes and cracks can be sealed with household cement, and the meter jacks should be plugged in this case.

The tripler tube is mounted vertically, at the left, with its socket 1½ inches below the chassis. There is just room under the socket for the self-resonant input circuit, L_2. The amplifier tube is horizontal, with its socket mounted in back of a plate that is 8 inches from the left edge of the 3 × 4 × 17-inch aluminum chassis. The shielding enclosure is 3¼ inches wide by 3½ inches high

Half-wave lines are used in all 432-Mc. circuits. The grid circuit of the amplifier is capacitively coupled to the tripler plate line, the two overlapping about 1¼ inches. The spacing between them must be adjusted carefully for maximum grid drive. Plate voltage is fed to the lines through small resistors. These should

[1] "World Above 50 Mc.," *QST*, October, 1951, p. 136.

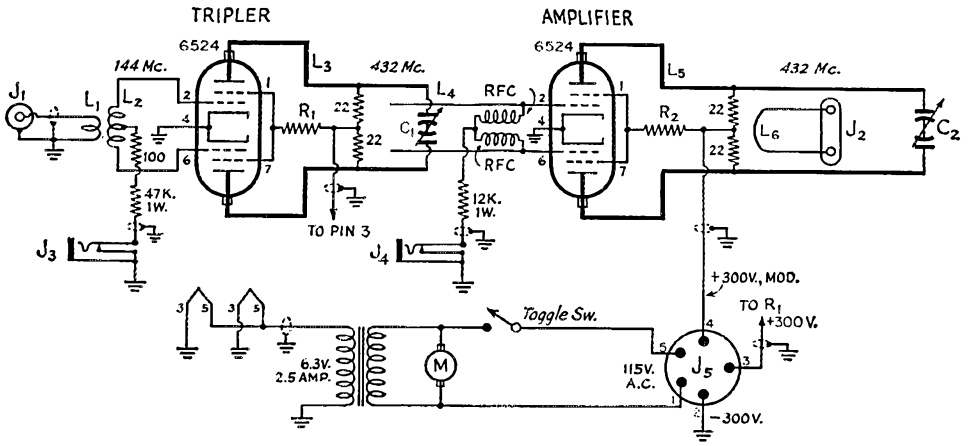


Fig. 1 — Schematic diagram and parts information for the 432-Mc. tripler-amplifier.

C_1, C_2 — 10-$\mu\mu$f.-per-section split stator, double spaced (Bud LC-1664). Do not use metal end-plate or grounded-rotor types.

R_1, R_2 — 23,500 ohms, 2 watts (two 47,000-ohm 1-watt resistors in parallel).

L_1 — 2 turns No. 20 enam., ½-inch diam. Insert between turns of L_2.

L_2 — 4 turns No. 16 enam., ½-inch diam., ½ inch long, center-tapped.

L_3 — Copper strap on heat-dissipating connectors, 3½ inches long. Twist 90 degrees ½ inch from plate end. Space ¾ inch.

L_4 — Copper strap 2⅞ inches long, soldered to grid terminals. Space about ½ inch.

L_5 — Copper strap 3⅞ inches long, fastened to heat-dissipating connectors. Space ¾ inch. All tank circuits of flashing copper ½ inch wide.

L_6 — Coupling loop, No. 20 enam., U-shaped portion is 1 inch long and ⅝ inch wide. Mount on 3-inch ceramic stand-offs.

J_1 — Coaxial input fitting (Amphenol 83-1R).

J_2 — Crystal socket used for antenna terminal.

J_3, J_4 — Closed-circuit jack.

J_5 — 5-pin male chassis connector (Amphenol 86-RCP5).

M — Motor-blower assembly, 17 c.f.m. (Ripley Inc., Middletown, Conn., Type 8433).

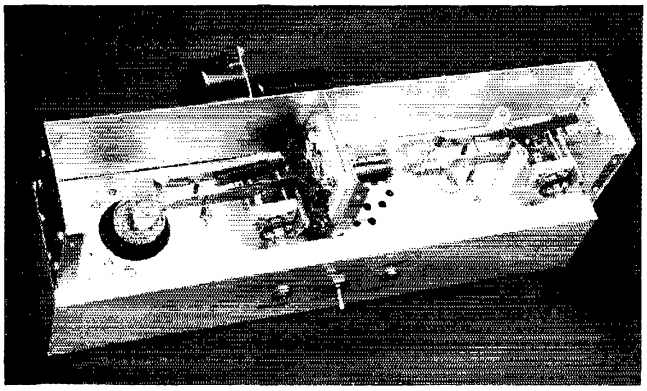
be connected at the point of lowest r.f. voltage on the lines. The amplifier grid r.f. chokes are connected at the tube socket.

Some interesting "bugs" were encountered in the development of this layout. A haywire test set-up was made to check the operation of the new tubes. They worked fine, so a "final" form was evolved as shown, except for the variable capacitors used for tuning the plate lines. At first we used a split-stator unit equipped with metal end-plates that grounded the rotors. With these the tripler gave more output on the second harmonic than on the third. When the rotor was ungrounded there was a considerable improvement. As this particular capacitor could not be mounted conveniently without grounding the rotor, we next tried the capacitors specified. These have metal mounting brackets, but they are not connected electrically to the rotor shaft. Even with these units, using the metal brackets grounded to the chassis threw the tank circuits out of balance, so it was necessary to mount the capacitors up on edge, on polystyrene plates. With this arrangement there was practically no second harmonic in evidence in the tripler tank circuit, and both it and the amplifier circuit tuned normally and showed good efficiency.

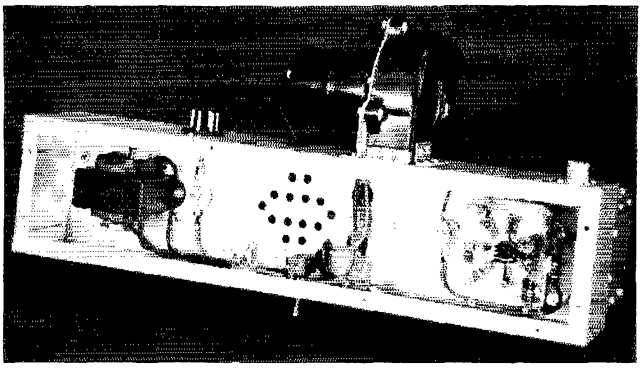
[2] Tilton and Southworth, "A Step-by-Step Station for the V.H.F. Man," *QST*, October, 1954, p. 16.

Testing

The tripler-amplifier is designed to operate in conjunction with a 144-Mc. transmitter such as the 2E26 rig shown in October *QST*.[2] A plate supply of 300 volts at 200 ma. is needed. Apply power to the 144-Mc. driver stage and adjust the spacing of the turns in L_2 and the degree of



Interior view, showing the 6524 dual tetrodes and their half-wave line tank circuits.



Bottom view of the tripler-amplifier, with plate removed. The tripler tube socket is at the right.

coupling between L_1 and L_2 for maximum tripler grid current. This should be about 3 ma.

Next apply plate and screen voltage to the tripler and tune C_1 for maximum grid current in the amplifier, with no plate or screen voltage to the latter. Adjust the position of the grid lines with respect to the plate circuit, readjusting C_1 whenever a change is made, until at least 4 ma. grid current is obtained.

Now connect a lamp load across the output terminal, J_2. Ordinary house lamps are not suitable. A fair load can be made by connecting 6 or more blue-bead pilot lamps in parallel. This can be done by wrapping a ¼-inch copper strap around the brass bases and soldering them all together. Then another strap should be soldered to the lead terminals. Apply plate and screen voltage and tune C_2 for maximum lamp brilliance. It should be possible to develop a very bright glow in the 6-lamp load with a plate current of about 100 ma. at 300 volts.

Cut drive very briefly to check for oscillation in the final stage. Grid current should drop to zero. The rig is then ready for use. The screen and grid resistors shown are for operation with plate modulation. Somewhat more output and input can be run if the screen or grid resistance is decreased slightly, but this should be done only when the rig is to be used for f.m. or c.w. service.

Operating conditions are about as follows: tripler grid current — 2 to 3 ma.; amplifier grid current — 3 to 4 ma.; tripler plate and screen current — 90 ma.; amplifier plate and screen current — 110 ma.; output — 12 watts.

In choosing the operating frequency it is well to bear in mind that nearly all work being done in the 420-Mc. band involves tripling from commonly-used frequencies in the 2-meter band. By mutual agreement, to make it a relatively simple matter for stations using narrow-band techniques to find one another, stabilized transmitters are kept between 432 and 436 Mc.

This tripler-amplifier was built around the 6524 tetrodes, but the same general construction can be used with other dual tetrodes such as the 6252 and 5894A by Amperex and the 832A. With the 6252, operating conditions will be quite similar to those given above. With the 5894A (9903), up to 40 watts output can be obtained on c.w. or f.m., and 25 to 30 watts with plate modulation. The 832A will deliver only about 5 watts. The pin connections given in the schematic diagram are for the 6524.

WWV-WWVH SCHEDULES

FOR the benefit of amateurs and other interested groups, the National Bureau of Standards maintains a service of technical radio broadcasts over WWV, Beltsville, Md., and WWVH, Maui, Territory of Hawaii.

The services from WWV include (1) standard radio frequencies of 2.5, 5, 10, 15, 20 and 25 Mc., (2) time announcements at 5-minute intervals by voice and International Morse code, (3) standard time intervals of 1 second, and 1, 4 and 5 minutes, (4) standard audio frequencies of 440 cycles (the standard musical pitch A above middle C) and 600 cycles, (5) radio propagation disturbance warnings by International Morse code consisting of the letters W, U or N, together with digits from 1 through 9, indicating present North Atlantic path conditions and conditions to be anticipated. (See Measurements chapter of recent *Handbooks* for details on forecast symbols.)

The audio frequencies are interrupted at precisely one minute before the hour and are resumed precisely on the hour and each five minutes therefater. Code announcements are in GMT using the 24-hour system beginning with 0000 at midnight; voice announcements are in EST. The audio frequencies are transmitted alternately: The 600-cycle tone starts precisely on the hour and every 10 minutes thereafter, continuing for 4 minutes; the 440-cycle tone starts precisely five minutes after the hour and every 10 minutes thereafter, continuing for 4 minutes. Each carrier is modulated by a seconds pulse, heard as a faint clock-like tick; the pulse at the beginning of the last second of each minute is omitted.

Strays

VE2QQ should be ready for the Commandos after his recent experience in "hitting the beaches." Within an hour, he raised K2EP, Long *Beach*, N. Y., W4BTO, Palm *Beach*, Fla., and W6MPY, Long *Beach*, Cal., all on 40-meter c.w.

Results – 1954 W/VE Contest

Gordy Webster, VE2BB, contest chairman of the Montreal Amateur Radio Club, sponsors of the W/VE Contest of last September 25th and 26th, announces final results of the activity. Leading Canadian score was that of Russ Wilson, VE6VK, who posted 37,725 points by working 252 stations in 50 sections. Across the border, W9PZT led all U.S.A. entrants with 17,853 points. In the tabulation below, the first-listed station in each ARRL section is a certificate winner. The figure following each call indicates the final score.

N.Y.C.-L.I.
W2BVN....5375
W2LGG....4977
K2GHS....448
K2CMV....448

N. New Jersey
W2EQS....14,974
W2LYO....13,822
W2AQT....5802
K2EUN....3185
K2AFQ....2304
W2CVW....2176
K2EGZ....1962
K2GAS....1706
W2MPP....1493
W2BBK....768
K2EPP....320

Iowa
WØNPF....8684
WØVFM....6314

Kansas
WØGAX....3839

Missouri
WØGBJ....7295
WØPXX....576

Connecticut
W1ODW....9726
W1JTD....5460
W1NLM....213

Maine
W1VEH....1344

E. Massachusetts
W1LQQ....2730
W5TPZ/1....1194

W. Massachusetts
W1YXV....3882
W1ZUU....3271
W1SYH....2616

New Hampshire
W1ARR....3982
W1QGU....2474

Idaho
WN7VWS....1024

Montana
W7FUB....768

Oregon
W7UGQ....2730

Washington
W7SRX....299

Santa Clara Valley
K6CLM....1642

San Francisco
W6DWJ....768

San Joaquin Valley
W6EUH....21

North Carolina
W4RXI....22

Virginia
W4BZE....8447
W4APM....8361
W4IA....6655
W4TFX....5887
W4JUJ....2986

Utah
W7QDJ....4095
W7SOJ....554

Wyoming
W7UFB....2688

Alabama
W4WOG....2816

E. Florida
W4VRS....5972

Georgia
W4BEY....1546
W4ZSC....43

Los Angeles
W6AM....577

Arizona
W7RZQ....1920

San Diego
W6WSS....1067

N. Texas
W5BJA....10,369
W5CAY....1408
W5VNW....896
W5ZWR....725

Oklahoma
W5CFC....2560

New Mexico
W5VRP....9471
W5KF....21

Maritime
VE1VB....18,690
VE1AEE....15,252
VO6N*....14,766
VE1ZZ....14,706
VE1EK....11,672
VO6U....11,571
VE1DB....7087
W4KVM/VO6....3770
VE1CU....3380
VE1OM....2640
VE1WL....2436

Quebec
W2SVF/VE2....18,950
VE2ATD....15,698
VE2PZ....4623
VE2BB....2736
VE2AM....1140
VE3DPG/3....464
VE2RL....315

Ontario
VE3DRD....26,492
VE3BBM....23,868
VE3ACB....15,162
VE3DSQ....14,580
VE3AJR....14,184
VE3BHS....13,720
VE3ATR....12,768
VE3BXF....11,400
VE3AXL....9272
VE3BUR....8581
VE3DTN....6028
VE3TM....4004
VE3BHW....4000
VE3DU....3762
VE3BNQ....3402
VE3YV....2000
VE3AVS....1900

Manitoba
VE4HS....966
VE4MT....693

Saskatchewan
VE5DA....4356
VE5DZ....3472
VE5AJ....1232
VE5RU....1173

Alberta
VE6VK....37,725
VE6ZR....6783
VE6OS....2190

British Columbia
VE7ALE....21,836
VE7QQ....5887

Yukon/N.W.T.
VE8YT....9180

E. Pennsylvania
W3ADE....1564
W3EAN....1024

Md.-Del.-D. C.
W3AYS....16,381
W3HTK....8543
W3HVM....7242
W3KLA....5077
W3VD....2389
W3FY....1216

S. New Jersey
K2CPR....9599
W2ILN....6196
W2GND....5631

W. New York
W2SCC....12,478
W2RJJ....2645
K2DXV....1600
K2BRF....1408
W2QBB....512

W. Pennsylvania
W3KQD....3733
W3VKD....2304

Illinois
W9PZT....17,853
W9WJV....3285
W9WIO....2958
W9ASK....2176
W9UXN....1742
W9CNF....363

Indiana
W9UWU....8020
W9UKG....7103
W9SWR....5119
W9FGX....2816
W9POB....2752
W9FYM....2503
W9UTL....1877

Wisconsin
W9GWK....15,741
W9RKP....12,542
W9UDK....10,174
W9AEM....8063
W9VBZ....4778
W9DIK....4255
W9HDH....1344
W9YOS....270

Tennessee
W4VNE....8191

Kentucky
W4KVX....12,115
W4YOL....1365

Michigan
W8KPL....6371
W8MSK....2688

Ohio
W8AJW....16,509
W8AQ....7679
W8CPQ....6826
W8MQQ....5247
W8QHW....4607
W8RO....4191
W8PCS....1194
W8OWZ....1280
W8KMF....398

* Labrador certificate winner.

NEW BOOKS

Obtaining and Interpreting Test Scope Traces, by John F. Rider. Published by John F. Rider Publisher, Inc., New York. 186 pages, 5½ by 8½, paper cover. Price, $2.40.

Covers composition of waveforms of various types frequently encountered in practical work, how to adjust the oscilloscope for proper operation, and how to interpret what the 'scope shows. Particular attention is paid to pattern faults such as are caused by hum, distortion, and similar spurious effects. Chapters on Lissajous figures and various kinds of test set-ups are included.

How To Use Test Probes, by Alfred A. Ghirardi and Robert G. Middleton. Published by John F. Rider Publisher, Inc., New York. 172 pages, 5½ by 8½, paper cover. Price, $2.90.

Operating characteristics, design considerations, and use of probes designed to work in conjunction with vacuum-tube voltmeters and oscilloscopes. The probes covered range from high-voltage d.c. and a.c. types through rectifying and demodulator types for low and high frequencies.

How To Service Tape Recorders, by C. A. Tuthill. Published by John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y. Pub. No. 167. 154 pages, including index, 5½ by 8½, paper cover. Price, $2.90.

Principles of recording on magnetic tape, with both general and specific operating and servicing data on current commercial equipment.

Technician's Guide to TV Picture Tubes, by Ira Remer. Published by John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y. 160 pages, including index, 5½ by 8½ inches, paper cover. Price, $2.40.

Describes the construction, operating principles and electrical characteristics of picture tubes, including projection and color. Accessories such as yokes, focus coils and ion traps are covered, with adjustment and repair data for the service technician.

Three Stormy Sisters

Part I — Carol and Edna

BY GEORGE HART, W1NJM

• So many reports were received on amateur emergency activities during the three hurricanes that it became impossible to tell a complete story in allowable *QST* space for a single issue. We'll tell you about Hazel in a future *QST*.

TROPICAL HURRICANES are fickle and unpredictable things. Perhaps that's why they are given women's names. Not since 1944 has the Northeast received a visitation from a tropical storm, but this year, one decade later, as if to make up for past omissions, three screaming hurricanes, spawned in the Caribbean, made their destructive way up the Atlantic Coast. First Carol curved in out of the Atlantic, brushed Hatteras, howled up the Western Atlantic to hit the end of Long Island and deliver a smashing blow to Connecticut, Rhode Island and Eastern Massachusetts as she failed to curve out to sea as expected. Two weeks later Edna started north, maintaining a more easterly course and wreaking most of her havoc on Nantucket, Cape Cod, the Maine coast and the Canadian Maritime Provinces.

But Old Dame Nature was not yet through with her shenanigans. Early in October she whomped up a hurricane to end all hurricanes, and this one she named Hazel. Again coming up out of the Caribbean, Hazel struck inland as far south as Myrtle Beach, S.C. Through North Carolina, Virginia and Maryland she screamed in full fury. In the mountains of Central Pennsylvania she lost some of her force, only to gather herself for one last blow at the Toronto area before she dispersed.

Each of these stormy sisters wept millions of gallons of rain, tore down telephone and electric lines in witch-like fury, washed out roads, tore off roofs and smashed houses as though they were made of paper, and sent high tides with enormous waves smashing against beach resorts. In all areas, radio amateurs were called upon to provide emergency communication. Many of them have written Headquarters to tell us about it, and we intend to chronicle them here. Many more have never let us know what they did. This account is written on the basis of reports received.

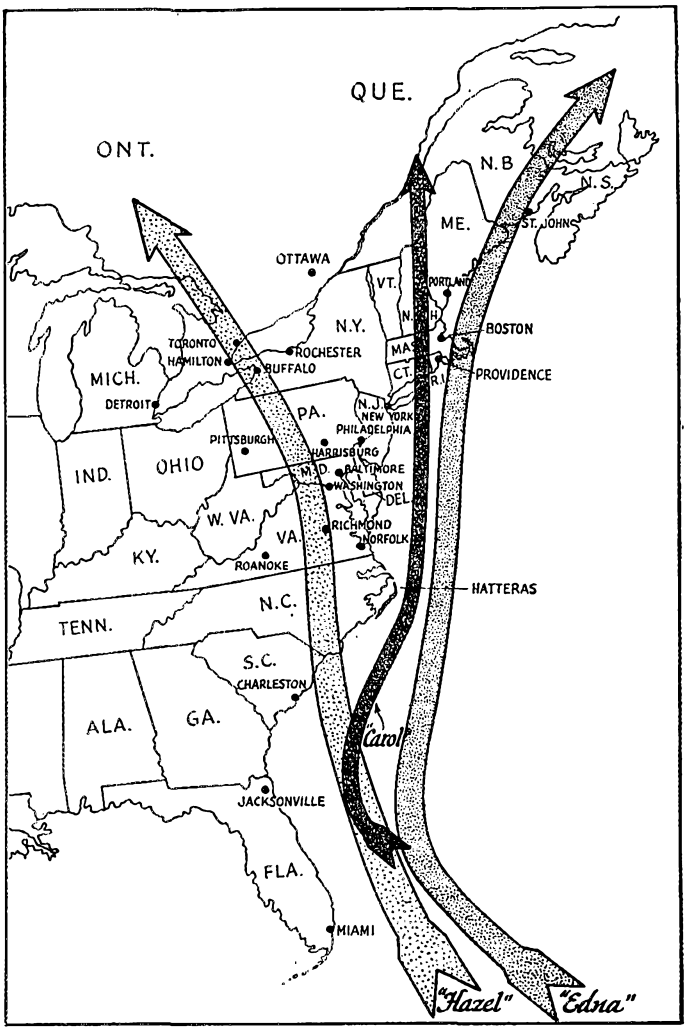
Carol

The Nassau County, L. I., AREC was alerted by the Red Cross at 1210 on August 31st, and W2KFV was put into operation on 10 and 2 meters. Mobiles were dispatched to East Rockaway, Long Beach, Atlantic Beach, Point Lookout, Island Park, Oceanside, Freeport, Baldwin, Jones Beach, Gilgo Beach, Bellmore, Wantagh and Seaford on the south shore, and Manor Haven, Port Washington, Sea Cliff and Bayville on the north shore. A portable 2-meter station was set up at Red Cross headquarters in Mineola. The County c.d. station was activated on 10 and 2 meters with a link to Red Cross headquarters, from which contact with mobiles was maintained. W2KFV operated from Red Cross headquarters, with W2QBR relieving, and at c.d. headquarters W2JKX operated on 10 and W2KEB on 2, assisted by K2EQH.

Contents of messages were such as reports of bridges out, trees down across highways, electric wires down, roads washed out and fire reports. The two-meter station at Red Cross was secured at 2135 after a message of commendation had been read from the disaster chairman. Mobiles in operation were *W2s* GCK GPQ KCW LLR VQI YIL and K2EWB. Mobiles standing by were *W2s* DBI DUS KRP OME, *K2s* AXF and CCM. W2LBJ was in use as a fixed station. Other stations checked in and standing by were *W2s* ANN AZA KNA NRL QFH TUK UGF ZAI, *K2s* BGO BJG CNN and EAF. K2DHC was the call used at Nassau County c.d. headquarters.

At 1000 EDST on the morning of August 31st, W1VXL, the station of the Cranston Radio Association located at the Red Cross building, was put on the air by W1OGY as winds reached hurricane velocity in that area. Mobiles W1BTV, W1LZY and W1YKQ called in shortly afterward, en route to the club. When power failed, W1OGY assumed NCS duties from his mobile until W1VXL switched over to emergency power. By 1230 the Cranston Civil Emergency Net was in full operation with W1POP operating W1VXL and six mobile units out patroling or standing by. A link on both 10 and 2 meters was established with W1AFO/1 at Cranston Police Headquarters. Other mobiles were *W1s* ZBZ and YRY. Others standing by were *W1s* JYF OOX RUS WUH ZPG and *WN1s* BQB and YVW.

In the late afternoon, W1WSY, at state civil defense headquarters in Scituate and other RACES stations were activated on 2 meters with W1WKO coördinating information for this net from the governor's office. W1VXL and W1AFO/1 also established links with W1WSY and W1WKO. Operation was terminated about midnight. Accomplishments: many messages handled for the mayor and Cranston police; several trips to accompany Red Cross vehicles; handled Red Cross and other emergency traffic; picked up blood plasma, delivered it as



This chart shows the approximate paths taken by the three hurricanes. In terms of damage, Carol exceeded Edna, but Edna was the larger in size. Hazel was the largest of all in both categories, and we'll tell you more about her in the next installment.

directed. After the NCS had secured, *W1s* YKQ, LZY and YRY traveled in convoy headed by the state c.d. director to the southern part of the state to attempt a survey of damage and leave a portable generator at the Narragansett fire station to aid in setting up radio communication.

Amateurs in Hingham, Mass., under direction of EC W1MD, conducted fire patrol, since most of the city's telephones and fire-alarm circuits were out. The following amateurs participated in this activity: *W1s* AYG BIY DMS MD NMK SXN and W5HNW.

In the New Bedford area, W1AVY/1 was activated on 75 meters and W1WKM on ten. The following operators were on watch at these stations: *W1s* AEN* AGG* AVY* AWH* BMQ* CTZ* HPH* LAZ* MHN OH* TZU* UID WU* WGN* and ZPE*. Those marked with an asterisk also operated mobile rigs when not on duty from one of the control stations. A total of 538 messages was handled to and from the area. New Bedford nets also tied into Fairhaven on ten meters, where about 15 mobiles were coöperating with local police and military.

The Cape Cod-Islands Emergency Net on 3912 did a very fine job restricting traffic for Cape and Islands. Other nets active were the Deep Sea Dragnet on 3970, Transcontinental 'Phone Net on 3970 and the Early Bird Net on 3845.

In Worcester, the RACES net was activated within a matter of minutes by Radio Officer and EC W1SPF. Most of the damage suffered was from rain, although power was off over most of the city. Emergency power was supplied for c.d. headquarters by the ROTC at Worcester Tech. W1SPF reports 28 amateur radio operators on duty, plus four girls with restricted operator permits and 14 more waiting in reserve. The following are particularly to be commended for their work: W1NZD/m, who was the first to report; W1AET, who took net control; W1SPG for his fine work in relaying; and W1QCQ, who took over at W1YEW net control. Other amateurs participating in the order in which they made their appearance: *W1s* VDT LIB/m TJO ONA/m SDU NZD/m UQL/m VLN/m AJV NNI/m UQW/m ZJW/m CS YPG RIL ZTL VPE/m SPG/m VGH CLU/m AAP/m JWM/m and VYK.

In Norfolk (Mass., that is), emergency operation was complicated by a prison break from the Norfolk Prison Colony. The hurricane hit its peak here at about 1500, August 31st, and took out all

means of communication other than radio. A gasoline-driven generating plant was set up at the fire station and the amateurs alerted. *W1s* WMN VQN BFV MJO and MGL responded, and MJO was dispatched to the state prison colony. *W1s* MNW, VQN and BFV were assigned to street patrol. At 2245 a report from the prison colony indicated two prisoners had escaped and were on the loose. This necessitated the setting up of road blocks and an even greater need for communications. The Norfolk gang were on duty for 48 hours without any sleep. EC W1CLF reports that the prison colony superintendent and the Norfolk police chief were high in their praise of the work done by the amateurs.

Carol's full force hit Haverhill about noon on August 31st, by which time telephone service was already partially disrupted. At 1245 W1SIX was set up at police headquarters and made contact with W1CCF/1 at c.d. headquarters, W1FW operating, and also with W1CCF/mobile in downtown Haverhill. By 1330 mobiles included *W1s* SNZ QYR QZS QQD NAG UHH and WN1ZUB, all cruising the city to report fallen trees and wires down. *W1s* WXE RYV WTK and WN1AFM came on later, all on a spot frequency of 147 Mc. With almost every road out of the city blocked by fallen trees and live wires, all mobiles had plenty to do. Fire-alarm and police signal systems were also out. The stations went off the air 0800 September 1st. Later, a fire patrol was set up tying various fire stations together and tying West Newbury, Mass., in with the Haverhill system. This set-up was in operation until September 15th.

The hams in Braintree became active starting at 1100 on August 31st, when W1VTH decided to activate W1TYN, the civil defense station. Thirty-three stations reported in, of which 22 were mobiles. At W1TYN, W1VTH was joined by W1VMU. As damage reports poured in, mobiles were dispatched to various locations, often accompanied by a policeman, to try to keep everything under control. Emergency power was necessary at 1206, and W1TYN was off the air until 1225. W1JOB relieved W1VTH and W1VMU at 1845, but VTH was back on the air from his mobile after a short rest and some chow. Also operating at W1TYN were W1QPH and W1OSX (Braintree c.d. Comms. Officer), and the station was on the air until 2250. Other amateurs participating in this area: *W1s* IA AUU EKG FQK JQA KJD KPX MPT OFO OKE RES RGS ROB SMC TQQ UYK VBB VPR WFQ WNT WSN YMV YYZ YZG YZP ZPI ZWQ.

In Framingham, W1MEG reports six mobile units in action: *W1s* WMT LPM RVA MEG WPW and QQW. In Lynn, EC W1JLN reports some of their mobiles went to Saugus and were received heartily. They helped patrol the town.

The situation was such in Arlington by 1030 that the town manager ordered the c.d. hams, the auxiliary police and the auxiliary firemen alerted. W1LXR and W1THO were the first alerted, and moved to activate the control station at the civil-defense director's office. W1WBX acted as net control operator while W1LXR and W1THO began a mobile patrol of the town. W1LLY and W1CTW entered the mobile net during the afternoon. Meanwhile, the six-meter net went into operation jointly with the auxiliary police, looking for live wires on the ground. Mobiles were *W1s* BAQ CTW FWQ LLY LXR NBI THO VCZ and WYC. W1WBX and W1WYC alternated as control-station operators, and W1WBZ helped maintain equipment.

At the peak of the storm in Dedham, EC W1SH requested W1LYL to report to the police station to assist in getting the town's police transmitter back on the air, since power was off. W1LYL ran 200 feet of power cable from the basement to the transmitter on the top floor. The c.d. units were then able to operate on 10 and 2 meters. Returning to his home, LYL had to restore his own equipment to operating condition, to go into operation on 75 meters for ten consecutive hours. A big day's work for LYL.

In Winthrop, W1TTH and WN1BOX were first to recognize the seriousness of the situation and report to the control center. By 1030 the emergency generator was functioning. W1CMW also activated himself, and very shortly there were 10 stations on the air. Other self-activated stations were *W1s* VIS, UOC, and HFJ. Shortly after 1030 the power went off, and the emergency generator was put on the line to supply the entire building, including police radio control equipment, the state warning and emergency civil-defense equipment, lights, etc. W1TTH did most of the operating from the control center. The six-meter net was also activated and contact was maintained with Sector 4 headquarters in Newton throughout the emergency. The XYLs helped out as operators during the hurricane and deserve a lot of credit. Both in daylight and at night, mobile units were used extensively, moving from place to place with reports of conditions, coöperating with police and fire units. Operators in this work were *W1s* UOC TTH HFJ BB and WN1BOX, with W1BDU at the control station. W1DJ manned the Cottage Hill unit and W1GGP made himself available at the hospital unit.

In Bedford, W1RSY was on the air within minutes after Carol was reported, and was joined by W1BFV, who was assigned to the Veterans Hospital, and by W1ACE/m who went to Hascomb Air Force Base. W1VCX was on stand-by from Maynard until his own area was alerted. When W1RSY lost both his tower and power, he got on from his mobile rig. C.d. headquarters was activated by W1YFP, and later joined by mobiles *W1s* VGC EIQ WAE and WME. *W1s* NAD and NDI drove to Acton to assist W1TRD who was operating alone there. Activity continued from 0900 August 31st to 0600 September 1st. *W1s* TCG UHV YEP and ZSG were also active.

Edna

After the unorthodox behavior of Carol, Edna was tracked very carefully, both by the Weather Bureau and several amateur general-coverage

nets. But Edna, although larger and more ferocious than her predecessor, followed a more easterly course. Amateur networks were alerted and put to work all along the coast as Edna made her ponderous way northward, and indeed considerable damage was done in many coastal areas. This rampant female finally spent the last of her fury in the Canadian Maritime Provinces.

The Transcontinental Relay Net, operating on 7042 kc., and a special Hurricane Net set up on 3910 principally through the efforts of W1SS, followed the course of Edna very closely, relying principally on reports from amateurs in her way. TCRN was on the alert as soon as Edna was born, watching her closely as she moved northeastward at first slowly, then with gradually increasing speed, staying a hundred miles or so off the East Coast. W4ATA was the principal source of information at first, and he gave the net several advisories until September 9th, when Edna started moving toward the Carolina coast; then W4LM of Charleston reported in to help, and later W4PHJ helped supply weather information. As Edna moved northward, TCRN not only kept track of her closely, but got stations all over the nation into the network to handle possible hurricane traffic. At 1215 EST W2BO reported that the hurricane was expected to miss most of New England, brush the tip of Cape Cod and pass out to sea from that point. As the storm went past the New England coast, W1LHA and W1DTB gave frequent reports, the latter indicating that the worst was over at 1900 EST. The following were logged by W3CVE as having participated: *W1s* ARR FEQ DTB ONX PJF YEJ LHA, *W2s* BO IH JOA, *K2s* AEQ BJS, W3WV, *W4s* PL ATA TKR LM VHH UWE TYU PHJ WXL/4, *W5s* NRC GWT/4 RN ALZ CDP W6SWP W7CCL, *W8s* IZQ FUM DNC JWG, *W9s* SG GGG JUJ DUA UNJ SWM, *WØs* KA NAW, *KP4s* UH ZW, KL7ATO/W9 -- and W3CVE, of course.

W1SS organized a Hurricane Net on 3910 kc. during Edna. Constant reports of movement of the storm, wind velocity and barometric pressure readings all along the coast from New Jersey to Nova Scotia were made available to the Associated Press, the United Press and the International News Service, as well as to the general public and stations listening to the frequency. Due to experience in participating in emergency nets, the coördination and coöperation of all the 47 stations that comprised the net made for smooth and consistent operation. Actually, W1SS counted 131 stations reporting in at one time or another, including the following: *W1s* AFK AHX AWI AC AVY BNW BUD BLM CNX DKS ERG EKN EAB EHT FZT GGV GMH GIX HSC IAS JWV JOJ JNI LYJ LBH LHZ LYD LBP LYV LOS MFI MBQ MAE MJD MLT NBP NCT NRZ OQT OKH PNR PCY PZY PAZ PRK QLL QU QHC QPU RYJ RNA RYX RMZ RGR SBP SAN SGL SAI SLW TOP TID TAY TFE TZL URR UDF UV UMC ULY USS URA VDB VXR VRM VTX VYI VRM VRT WGP WKI WNM WNK WLM YQV YLG ZNE ZNF ZCH ZJM ZEL ZET K1WAB K1FCR, *W2s* ACO BKC BTB CRX DMK EEO GKQ GTE GMW HJR ILI IVI MQB NKD NXZ QHI TXI ZOL ZZG, *K2s* AX AAO ADV BFD BDW CBU EF EOF EON GMV W3BHK W4NI K4AF, *VE1s* AAO DW VE2DW. Special thanks are extended to the stations that monitored the frequency above and below the net frequency and assisted in keeping the band clear.

The First Regional Net of NTS was in operation during most of the hurricane. W1TVJ started monitoring at 0650 EST Sept. 11th and officially opened the net for business at 0750. Eighteen stations reported in: *W1s* CRW/m USM CPV HUM RRX BY VGX LV ARR, *W2s* IVU AEE VNJ LJM JVG LPJ JOA, *K2s* DKM and BJS. W1BY took NCS during part of the day, while TVJ worked for his local c.d. At 1800 he reassumed NCS and the following additional stations were in the net: *W1s* KYQ OAK OHT RRX VVA W3WV VE1XB and VE3BJV. The Net was greatly hampered by bad conditions in the evening and W3WV assisted in relaying. At 2300 the net was closed, but TVJ continued monitoring until 0100. At 0740 on Sunday he was on the job again, and the following additional stations were QNI: *W1s* WCC POK IMY COC YAO VRQ QJM, *W2s* KHQ IFP, *K2s* HTX CQP DSL GAS, *W3s* BFF ONB W4IF, *VE1s* AEE WL. The net

Here's the operating position from which W1SS controlled the Hurricane Net on 3910 kc. That's W1SS himself in the middle, while W1UPZ gets the Weather Bureau on the telephone and an INS reporter takes notes on the operation.

was continuous until 2142 that night. W1VVA, W1WCC and W1CRW spelled TVJ as NCS at times. Close liaison was maintained with TCPN and the Maritime Net, and much traffic was expedited as a result. Special mention should be made of the fine work done by W1BY, W2JOA, W3WV, W1CRW (who operated from his mobile rig much of the time), W1WCC and VE1XB.

Emergency power units were mighty valuable during the hurricanes, and many AREC units remained on the air simply because they had their own, like the Winthrop organization. That's EC W1BB on the right, and W1AGB standing in the rear.

The New York State 'Phone and Emergency Net was activated at 1800 Sept. 10th and continued through to 1800 Sept. 11th with W2ILI as net control. Approximately 175 net members checked in on the net frequency of 3925 kc. In addition, the New York State Civil Defense Amateur Radio Service was activated and standing by on 3993 kc. with 30 stations ready, and v.h.f. nets on 6 and 2 meters were activated with about 25 members. Links were maintained with Albany and National Red Cross in Washington, also with the Hurricane Net and the New England C.D. Nets.

Damage in Rhode Island was less from Edna than from Carol, but the Cranston Emergency Net was active from 1910 Friday evening until 2155 Saturday at the request of the Red Cross. Net control station W1VXL was activated on 29.52 Mc. and in the 144-Mc. band. Mobiles alerted included *W1s* BTV LZY YKQ OGY ZBZ OOX and YRY. *W1s* SGA QLD and VAY called in and stood by during the evening. Mobiles were dismissed but on Saturday morning were called back into action. A fixed station was set up at the Red Cross evacuation center at Edgewood. W1VXL was operated by *W1s* POP BTV ZPG and OOX, and on two meters by WN1BQB and W1ZGH. W1AFO was operated at police headquarters. W1EWT and W1QOF provided a link with Providence. W1TQW also furnished a fixed link in downtown Providence and monitored the band for other stations and traffic outside the Cranston net frequency. At the height of the storm all fixed stations operated on emergency power, and mobiles were on patrol duty. Official traffic was handled for the Cranston Police and the Red Cross. Other R. I. amateurs participating in the operation were *W1s* RUS RVO SGA BBN QLD MIJ JYF and OAV.

The amateurs in Lynn this time were able to do some collective good in their own city by setting up stations in the various firehouses. The frequency of 28,610 kc. was used. Mobile *W1s* WCB HRA QQL MHK OGK JZV were stationed at firehouses, SHV at Red Cross headquarters, VRK at the Medical Center and VHF at Lynn Hospital. At home rigs were *W1s* RLO LMJ VUH ZQL UKE YQF TBL DDI JKF VHE CTD and KLC. W1PBQ/m was in contact with Lynnfield civil defense, MCC/m with Salem civil defense and W1JLN/1 net control, operated by JLN and MTG.

In Dedham, W1LYL was again active. At 0820 on September 18th he was instrumental in dispatching mobile equipment from Brookline to New Bedford. Later, he followed the eye of Edna and relayed these reports to the Dedham c.d. office on 2 meters. Losing power at 1515, he operated mobile on 2 meters to report damage throughout Dedham as to road blocks, washouts and other damage.

The first station on the air in Winthrop was W1MQB, who kept an all night vigil on Edna's progress and estimated time of arrival. The net was alerted at 0700 Saturday morning and remained in operation until the danger from Edna was over. The following were also active: *W1s* DJ CMW OIR OUC HFJ/m BB BDU AGB/m TTH PBX and WN1BOX. Civil defense was prepared for evacuation, and a portable unit manned by W1TTH was ready for this purpose. Officials mobiling about town checking on conditions were kept in touch with the report center by means of WN1BOX/m on two meters. The Winthrop AREC was also able to provide an emergency generator for power for essential parts of the community hospital.

Hurricane Edna hit Haverhill on September 18th, and this time the gang was ready. W1CCF and W1FW were on stand-by at c.d. headquarters starting at 2200 on the 17th, other units coming on the air about 0800 on the 18th and staying in operation until midnight of that date. A unit was again set up at West Newbury, tying into Haverhill c.d. on 147 Mc. Merrimac was tied in on 28 Mc. with *W1s* HP REI and PIY on the air in that town. W1WTK restored an emergency generator which failed at the hospital. Haverhill operation during Edna was a continuation of its operation from Carol, and EC W1SIX sums up participants as follows: *W1s* SNZ RLT KBQ CCF SIX FW QYR WTK STA IWR MTS QQD QZS RYV QQG REI HP WXE NAG PIY, *WN1s* ZKB AFM and ZUB.

The Framingham Radio Club Net was alerted Friday morning by W1MHC. The club's generator was set up at W1RXH, who took over as NCS on 28,700 kc. Framingham being headquarters for Mass. Civil Defense Region 3,

liaison was made between Framingham and W1UQW in Worcester on 29,560 kc., contacts being made by W1RXH and W1MEG/m. The following club member stations were activated: *W1s* RXH WMT/m MHC/m QQW/m MEG/m SQY/m WLJ WPW/m SRG MQU/m and JUL. Operation was terminated Sunday afternoon.

In Hamilton there were three stations active — one mobile, one emergency-powered and one control station: *W1s* YLQ TIN and LQQ respectively. W1YLQ and W1TIN were active on the Hurricane Net on 3859.

The Braintree gang was again active during Edna. A total of 20 mobiles turned out to patrol the streets, reporting conditions almost as they occurred to the police, street, electric and fire departments. The mobiles assigned to assist the electric company's crews were especially active. W1VTH and W1ZSZ set up a fixed radio station inside the electric plant to act as net control for the repair crews. Many of these operators served around the clock. During the week end seven amateurs with a combined operating time of 41 hours served as net control operators: *W1s* SSA OSX CTR JOB EKG VTH and ZSZ. The following operated as mobiles: *W1s* JQA KJD KPX MPT OSX OFO QPH RRP ROB SSA TQQ UXN VMU VBB VTH YMV YYZ ZPI and ZSZ. Others serving in various capacities were *W1s* AUU IA ISU KWD LZB LJT MMH QVN QPT SAI VYI WNT YKS ZSU ZYG.

The Bedford gang turned out for Edna as they did for Carol, and again assisted the Bedford civil defense in maintaining communication. EC W1RSY showed up at c.d. headquarters at 0600 on Saturday and activated the control station, setting up communication with Brookline, Concord, Hingham and Lynnfield. Later, additional help showed up in the persons of *W1s* TCG ZSG NAD SAP YFP. Operating home stations were *W1s* ACE BFV VGC and RSY.

Up in Manchester, N. H., the Hillsborough County Emergency Net went into operation at 1200 on September 11th under net control W1YHI on 29 Mc. The net covered all locations throughout the city to provide communications with c.d. headquarters. The net remained in operation until 1820. Mobiles in action were *W1s* WUG RGC RYC URL YVX TXK and KYG. Others active were *W1s* EIQ KYX MSJ QJB QZV RSV TRD VCX WIZ WNB ZHN ALX KEK LEH MFY NCO PDQ PFX PIU QNC RAL RES RIL SLM SSA TYN UYK VBC VEL VIA WAE WME YKD YXN ZL ZPL. Fixed stations were *W1s* YHI ZIZ BRY RET QJY YJD WUR and WUU. ZIZ set up his station at c.d. headquarters in the northern sector of the city, and W1WUU set up at Moore General Hospital in Grasmere.

Edna only sideswiped these areas, but the Canadian Maritime Provinces felt her full force. Saturday afternoon, Sept. 11th, found New Brunswick net control VE1PF sending out storm warnings and weather reports. By 1900 the 3750 kc. channel was so congested that the New Brunswick and Nova Scotia groups divided, the former going to 3740 and the latter to 3770 kc. Yarmouth was the first to feel the brunt of the storm, and shortly after 2100 VE1DW and VE1ACE were the only amateurs being heard from that area, the latter mobile and the former on emergency power. Most of the power was off at Yarmouth, and VE1ACE patroled the town in his mobile reporting wires down, fallen trees, etc. VE1DW was in contact with VE1FQ at Halifax, which station was also on emergency power. VE1PT was patroling the Halifax suburbs and passing damage information to VE1FQ. Assisting at VE1FQ were VE1OM and VE1LZ. Skip washed out contact toward morning, despite efforts of W2SAI to help in relaying, but operation was resumed at 0700, by which time the storm had moved to the Gulf of St. Lawrence and other stations in that area were beginning to call in. Main bulk of traffic handled on Sunday consisted of telephone and power line

During Edna, EC W1JLN set up at Fire Alarm headquarters in Lynn, Mass., and acted as NCS for the net on 28,610 kc. Operating was done by W1JLN (seated, rear) and W1MTG. (*Photo by Lynn Daily Evening Item*)

damage, press releases, weather reports, movements of goods and military. Assisting at VE1FQ on Sunday were *VE1s* WL HC and LZ. VE3NG assisted in maintaining contact with Toronto. Other stations participating were *VE1s* NZ/m KK MY FG BW WB ABT ACW MX FM MT SI OC FN RF ED PB BB RL ABP WK PD NA TF VN DF PF ADU and UT.

EDITOR'S NOTE: The second part of this article, the story of amateur radio's participation in Hurricane Hazel, will appear in a future issue of *QST*.

Happenings of the Month

ELECTION RESULTS

Recent balloting in ARRL elections has resulted in the selection of four new directors and three new vice-directors to take office January 1st.

Harry M. Matthews, W9UQT, becomes the new director of the Central Division, with 999 votes, defeating Myron Hexter, W9FKC, with 552 votes, Edmond A. Metzger, W9PRN, with 505 votes, and Charles F. Reberg, W9MVZ, with 435 votes. A radio operator and technician with the Illinois State Police at Springfield, "Doc" Matthews has a long history of club work behind him. He has served in all the offices of the Central Illinois Radio Club, and also as president of the Sangamon Valley Radio Club. He organized the Illinois Emergency Net, and has been a director assistant and vice-director. He is an AREC member and PAM.

The new director of the New England Division, **Philip S. Rand, W1DBM,** won handily with a tally of 1636 votes to 490 for Frank L. Baker, W1ALP, and 259 for John L. Thompson, W1BIH. As ARRL Technical Consultant, "Phil" conducted the League's early TVI demonstrations and his work in the field gives him the second name of "Mr. TVI." He received a special citation under the first Edison Award, and was chosen for ARRL's first Merit Award plaque in 1953. He is radio officer for Connecticut Area One C.D., and EC for Fairfield County, and a member of IRE, AREC, and an OPS. Club work includes the founding and first presidency of the Amateur Radio Emergency Corps of Norwalk, Conn., and presidency of the Falmouth (Mass.) Radio Club. He is an electronic engineer at Remington Rand.

A former vice-director and SCM, **Clayton C. Gordon, W1HRC,** becomes the new vice-director of the New England Division with 1617 votes to 745 votes for Ira J. Hemingway, jr., W1HUM. "Clayt" has served as vice-president and treasurer of the Providence Radio Association and president and vice-president of the Pittsfield Radio Club. He is employed as a transmission tester in the long lines department of A. T. & T. in Pittsfield, Mass. He holds ORS, OPS and A-1 Operator Club certificates.

With 900 votes, **Walter R. Joos, W6EKM,** nosed out Raymond E. Meyers, W6MLZ, with 860 votes, to become director of the Southwestern Division. Director Joos, a salesman for Johnson, Carvel and Murphy, food products representatives, Los Angeles, just concluded four years as vice-director of his division. His club work includes the past offices of president, vice-president, and secretary of the Inglewood Amateur Radio Club.

For vice-director of the Southwestern Division, **Robert E. Hopper, W6YXU,** polled 1060 votes to the 694 votes of Roger D. Mace, W6RW. Vice-director Hopper is employed at the U. S. Navy Electronics Laboratory, San Diego, as a technician. For the past four years he has been a director assistant. He has served as president of the San Diego Amateur Radio Club, and as Chairman of the Southwestern Division Convention in 1949 and 1952.

Robert E. Cowan, W5CF, becomes the new director of the West Gulf Division with 732 votes, defeating incumbent A. David Middelton, W5CA, with 684 votes, and Charles Fermaglich, W5FJF, with 401 votes. W5CF is employed as manager of the Ralston Purina Company's Fort Worth plant, and is active in civic and city governmental work. He is a charter member of the Kilocycle Club of Fort Worth, a member of Air Force MARS, and AREC.

John F. Skelton, W5MA, becomes vice-director of the West Gulf Division with 1322 votes to 473 votes for Richard L. Hawkins, W5FEC. W5MA is division manager of the central division of Texas Power and Light Co., and has been a director of the Dallas Amateur Radio Club and chairman of the TVI Committee. He is well known as coauthor of "The Dallas Plan for TVI."

TECHNICIAN CLASS FILING

As explained in detail in last month's editorial, the Board of Directors of the League has heartily endorsed the FCC proposal to open the 50-Mc. band for the use of Technician Class amateur operators, but has been obliged to oppose the similar opening of 144 Mc. on the grounds it would defeat the original purpose in increasing 6-meter occupancy. The text of the League's filing with the Commission follows:

FEDERAL COMMUNICATIONS COMMISSION
Washington 25, D. C.

In the Matter of Petitions for amendment of Part 12, Rules Governing Amateur Radio Service, concerning Technician Class operator privileges.	DOCKET NO. 11157

COMMENTS OF THE
AMERICAN RADIO RELAY LEAGUE, INC.

Pursuant to Paragraph 6 of the Notice of Proposed Rule Making in Docket 11157, the American Radio Relay League files these comments on behalf of the more than 45,000 U. S.-licensed amateur radio operators who are members of the League.

These comments were formulated after extensive deliberation by the ARRL Executive Committee and subsequent vote by the elected Board of Directors of the League.

* * *

The League concurs in the proposal to open the 50-Mc. band to amateur licensees of the Technician Class, but opposes the proposal to open the 144-Mc. band for those licensees.

As to 50-Mc. Technician Use

Some time prior to the release of the present Notice by the Commission, the Executive Committee was in the process of examining an independent proposal received through League channels that the 50-Mc. band be opened to Technician Class licensees. The Committee rendered a report unanimously in favor of such a proposal, which was thereupon confirmed by the Board of Directors. Meanwhile, the Commission released its own proposal. Thus the League heartily endorses that portion of the present Docket which proposes to open the 50-Mc. band to Technician Class licensees.

In this respect the League concurs with the Commission's belief that "greater occupancy of, and experimentation in," the 50-Mc. band is desirable. We believe that the pattern of occupancy of an amateur band, particularly one above 30 Mc., depends to a considerable extent upon beginner interest in such band. Beginner interest above 30 Mc. has in recent years been concentrated in the 144-Mc. band, with little or none shown in 50 Mc. The League believes that it is necessary to take special steps to promote beginner interest in the 50-Mc. band, and urges the adoption by the Commission of this aspect of the proposal.

As to 144-Mc. Technician Use

With the issuance by the Commission of the present Notice, proposing that Technicians be permitted also on 144 Mc., the League again carefully examined the matter, particularly as to the overall effect of the combined proposals, and both the Executive Committee and the Board of Directors voted in opposition to the proposal. Thus the League is obliged to oppose the proposal to open the 144-Mc. band to Technician Class licensees.

The League's examination of the proposal fails to disclose any compelling reason for its adoption. Occupancy of the 144-Mc. band is not a problem. Since the war this band has had its proportionate share of amateur use. With the opening of a substantial segment of it for use by Novice Class licensees, in 1951, occupancy has increased to more than an adequate level. This band now has suitable beginner interest, which we have stated we believe is so necessary to continued occupancy. Thus we see no immediate need for regulatory action to promote usage of the band.

Nor does the League's examination of the proposal enable it to agree to the argument that its adoption would increase participation in the Radio Amateur Civil Emergency Service. Under RACES rules, station authorizations may not be issued to the holders of Technician Class licensees. Thus adoption of the proposal would not increase the number of stations available for civil defense communication under RACES. The value of the Technician Class licensee to civil defense communications lies, of course, in operator availability. In this respect the League notes it is already provided in RACES rules that Technician Class licensees may obtain authorizations to operate in that service, using designated segments not only to the 50-Mc. band but *any* RACES band segment. Thus the League does not see any specific advantage to civil defense communications by adopting the proposal under discussion.

The League believes that adoption of the proposal would certainly hinder, if not actually negate, the stated aim of obtaining more occupancy also in the 50-Mc. band. Should both bands be opened to Technician Class licensees, in the League's opinion such licensees would congregate on 144 Mc. almost to the exclusion of 50 Mc. This is for the reason that occupancy tends to promote occupancy, and such newcomers would be drawn to the band of greater occupancy. Further, obtaining equipment for the 144-Mc. band is a much simpler problem than for 50-Mc., both in respect to commercially-available units and surplus equipment. The only result would be greatly-increased occupancy of the already-populated 144-Mc. band and little — or, more likely, no — increase in 50-Mc. activity. This would obviously prevent the fulfillment of the objective, common to the Commission and the League, of encouraging greater occupancy of 50 Mc. It is primarily for this reason the League is obliged to oppose the 144-Mc. aspect of the proposal.

Though of lesser importance, the League also comments that adoption of the proposal would appear to make the Technician license rather too attractive. It is the League's view, and one which we believe is also shared by the Commission, that incentives should be provided for amateurs to progress to higher grades of license. In the case of the Novice, this is adequately handled by the one-year license term. In the case of the Technician, the primary incentive is frequency privileges. In areas where there is extensive v.h.f. activity there are hundreds of newcomers who will be perfectly satisfied with Technician status if they can work on all frequencies from 50 Mc. up. There is a considerable number of amateurs today of Conditional Class, or higher, already devoting their entire time to v.h.f., and perfectly content to do so. They very likely would never have bothered to obtain their present class of license had all the privileges above 50 Mc. been available to them with a Technician authorization.

Summing up, the League believes it to be not in the best interests of the amateur service to open the 144-Mc. band to Technician Class licensees, because there is no valid objective to be accomplished, because such action would negate the desirable objective of populating the 50-Mc. band, and because such action would also have the undesirable effect of removing, to a considerable extent, incentive to progress to a higher grade of license.

AMERICAN RADIO RELAY LEAGUE, INC.

By PAUL M. SEGAL
Its General Counsel

A. L. BUDLONG
Its General Manager

November 15, 1954

EXAMINATION SCHEDULE

The Federal Communications Commission will give Extra and General Class amateur examinations during the first half of 1955 on the following schedule. Remember this list when you need to know when and where examinations will occur. Where exact dates or places are not shown below, information may be obtained, as the date approaches, from the Engineer-in-Charge of the district. *Even stated dates are tentative and should be verified from the Engineer as the date approaches.* No examinations are given on legal holidays. All examinations begin promptly at 9 A.M. except as noted. (Novice, Technician and Conditional exams are given only by mail. See page 50, May 1954 *QST*, or the *License Manual* for details.)

Albuquerque, N. M.: April 2.
Amarillo, Texas: March 25.
Anchorage, Alaska, 53 U. S. Post Office Bldg.: By appointment.
Atlanta, Georgia, 411 Federal Annex: Tuesday and Friday at 8:30 A.M.
Baltimore 2, Md., 500 McCawley Bldg.: Monday through Friday. When code test required, between 8:30 A.M. and 9:30 A.M.
Bakersfield, Calif.: Sometime in May.
Bangor, Maine: May 18.
Beaumont, Texas, 329 P. O. Bldg.: Monday through Friday except Thursday only when code test required.
Billings, Mont.: Sometime in May.
Birmingham, Ala.: March 8, June 8.
Boise, Idaho: Sometime in April.
Boston, Mass., 1600 Customhouse: Wednesday through Friday 9:00 A.M. to 2 P.M.
Buffalo, N. Y., 328 P. O. Bldg.: Thursday.
Butte, Mont.: Sometime in May.
Charleston, W. Va.: Sometime in March and June.
Chicago, Ill., 826 U. S. Courthouse: Friday.
Cincinnati, Ohio: Sometime in February and May.
Cleveland, Ohio: Sometime in March and June.
Columbus, Ohio: Sometime in January and April.
Corpus Christi, Texas: March 10, June 9.
Dallas, Texas, 500 U. S. Terminal Annex Bldg.: Monday through Friday, except Tuesday only when code test required.
Davenport, Iowa: Sometime in January and April.
Denver, Colo., 521 New Customhouse: 1st and 2nd Thursdays, 8 A.M.

(Continued on page 130)

Correspondence From Members-

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

V.H.F. BURSTS

Thayer School of Eng.
Dartmouth College
Hanover, N. H.

Editor, *QST:*

I don't know whether or not you have heard from Dr. deBettencourt, but Edward P. Tilton's paper, "1000-Mile Burst Reception on 144 Mc. by Radio Amateurs," was duly presented at the XIth General Assembly of URSI at the Hague. Sir Edward Appleton, president of International Commission III, was chairman of the session in which the presentation was made, and he said that all of the bursts looked like meteors to him. Dr. G. Millington of Marconi's Wireless Company presented Mr. G. A. Isted's work on the correlation of v.h.f. bursts with lightning strokes, and suggested that some of the longer bursts on the tape might be this phenomenon. I mentioned that you were already on the trail of this matter and Appleton was most impressed with the fact that amateurs in the United States would be aware of such recent work. He asked that the Commission's highest compliments be conveyed to W4HHK, to W2UK, and to W1HDQ for such high caliber work being carried out by amateurs.

— *Millet G. Morgan, W1HDA*

RTTY ELECTION RETURNS

WNYC/WNYC-FM
New York, N. Y.

Editor, *QST:*

I wish to express my thanks for the fine work done by all concerned in transmitting by amateur radio the election returns for broadcast by the Municipal Broadcasting System.

The information collected and forwarded (by John Williams, W2BFD, and his fellow operators) was received at a central point in Manhattan and relayed from there by amateur radioteletype directly into the studio from which the broadcast originated.

Due to their good work, we were able to disseminate these returns about two hours ahead of commercial services.

It is jobs like this, well done, which bring to public attention the accomplishment of amateur radio.

— *Seymour N. Siegel, Director*

FAMILY CIRCLE

8157 Harper Ave.
Chicago 19, Ill.

Editor, *QST:*

Bet you are getting quite a chuckle out of the feud between the various groups whose interests seem to be at variance with each other. I've wondered, reading the letters, if it has ever occurred to each group how interdependent we are on each other, really.

To those who love to build gear is due the credit for much of our technical advancement, but if it weren't for those who love to operate, what good would advancement be? If no one wanted to operate, except to test, what use could be found for new circuits and equipment?

The ones who prefer net operation to free-lancing make possible the traffic handling which has been a major item in the justification of our amateur service. However, if it weren't for the free-lancers, no one would have developed the VFO.

If the bands hadn't been crowded, no one would have bothered to figure out the crystal filter, and if no one had been interested in "just operating" there would have been no one to use it.

If everyone built their gear and no one bought it, we would not have the advantage of manufacturers' research, and that is certainly nothing to be sneezed at. You don't sneer at the man who drives a Cadillac just because he didn't build a homemade car and use it instead.

The boys who brag about their design abilities seem to forget that radio has already been invented, and they are largely making improvements in design rather than originations, while the operators who razz the builders forget that their gear is the outcome of builders' ideas.

And so it goes, all through the picture. Each would be a total loss without the other. The boys who knock c.w. should try to handle traffic through heavy QRN and QRM, while those who knock 'phone should consider how it expedites the exchange of intelligence when conditions are right. One could go on and on, but this gives you the idea. We're really just one family!

— *Ralph C. Cole, W9LCG*

V.H.F. FOR C.D.

9330 TSU Ord., Det. B
Redstone Arsenal
Huntsville, Ala.

Editor, *QST:*

After each and every situation where emergency traffic is handled by amateurs I read the comments and complaints about stations failing to clear the emergency net frequencies and interfering with communications in general.

Here again is the time to consider the further exploitation of v.h.f. bands for practically *all* emergency communications. The state of the art has progressed to the point where the reliability and range of v.h.f. equipment even exceeds that of the lower-frequency units of equivalent power under most conditions. In the original organization of many nets, emphasis was placed on the use of existing equipment among the members. This fact dictated the use of the so-called "popular bands." As time progresses it becomes more important to turn attention to more effective equipment designed with civil defense, etc., specifically in mind for more permanent installations. This to me means v.h.f.

— *Rutherford L. Ellis, jr., W4LNG*

DX MANNERS

1414 Oakley St.
Orlando, Fla.

Editor, *QST:*

Oh, what lousy manners 20-meter DX hounds have. Why can't these gentlemen stop frothing at the mouth and wait? To hear some of them you'd think that the only way they will ever be satisfied to QSO a foreigner is to break up his QSO with someone else.

As a victim of the DX hunter's cunning, I speak! How many good ones have been snatched from my trembling grasp by some scheming American? Ouch, boys, pleez. You can wait!

— *Arthur M. Hale, W4TVQ*

HAWAIIAN PARADISE

P. O. Box 1748
Lihue, Kauai

Editor, *QST:*

In conversing with U. S. hams plagued with TVI and BCI, they frequently have expressed their desire to be in some place like Hawaii.

Far from being a dreamy South Pacific isle, Hawaii has 13 standard broadcast stations, 3 TV stations, and 3 f.m. stations, not to mention high-powered communications facilities by the major communications companies, CAA, Army, Navy, and electronic navigational facilities serving the entire Pacific.

So, you see, it is not all hula girls and pineapples in Hawaii.

— *K. Nose, KH6IJ*

(*Continued on page 138*)

YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

Well-Groomed YLs

LOOK to your dressing table . . . your manicure set is more valuable than you may realize!

In the General Electric Company's service publication, "Techni-Talk," radio serviceman L. A. Frankel of Astoria, N. Y., reveals that milady's manicure set can serve as a tool kit in the field of radio repair. A filed-down orange stick makes a good nonconductive screwdriver. Emery boards and nail files can clean connections to be solderd. Use nail polish for color-coding or cement, nail polish remover as a plastics solvent. Nail clippers can cut and strip small wires, and tweezers can pick up tiny parts dropped inside the set or hold small parts in place for work within cramped confines.

Wonder what useful purpose false fingernails would serve?

"XYL" or "MYL"

Wives of thirteen members of the East Bay Radio Club (Oakland, Calif.) have protested the use of the term "XYL." They suggest that unlicensed wives of hams be referred to as "MYLs" — married young ladies. This renews an unsettled discussion scanned in this department several times previously.

The complications are increasing, though. "MYL" is the term most frequently offered as a substitute for the popular but inappropriate epithet "XYL" — both terms denoting the unlicensed wife of a male amateur. However, if we consider the merit of W1YNI's suggestions as given in the January, 54, column, an "MYL" would be a married female amateur with license. (Betty's complete offering: "YL" — single woman with license; "MYL" — married woman with license; "SYL" — single woman without license; "XYL" — married woman without license.)

What will be the fate of our time-honored "YL" and "XYL"? Let's hear from interested parties and find out.

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

When Captain "Stay-put," W2ZXM/MM, of *Flying Enterprise* fame (see p. 36, March 1952 *QST*) is on the high seas, it's nice to have the home station in operation. Captain Kurt Carlsen's two young daughters, Sonia (*left*) and Karen, are now KN2IVT and KN2JAT, respectively. (*Photo courtesy E. D. Collins*)

80-Meter C.W. Net

A new 80-meter c.w. net for all YLs is announced by YLRL Vice President W6KER. The net meets Mondays on 3680 kc. at 2100 PST. NCS is W7GLK. The October issue carried the complete schedule of nets listed with the YLRL.

Keeping Up with the Girls

W1RJY, Esther, is happy to have her long-sought DXCC certificate. . . . W2EEO, Madeline, and OM W2CYK had a nice write-up in an article entitled "W2CYK Calling," which appeared in the August '54 issue of *Hardware Retailers*. . . . W1YYM, Ellen, finds it pays to start the day early. At 0530 EDST one morning she greeted VK1AC on Macquarie Island, good DX in anyone's log. . . . Allowed the use of a room in the Physics Building at Ohio Wesleyan University where she's a freshman, W8OSD, Virginia, daughter of W8SPU, Helen, operates portable with her Johnson Ranger. So long as high grades are maintained, the physics department doesn't mind the arrangement. . . . W6KER, Gilda, was instrumental in obtaining a pump organ to send to W7ROZ, Father Clem, for one of the churches in his 10,000 sq. miles of territory in King's Canyon, Ariz. . . . Teacher of a number of young girls who earned ham tickets, it was a thrill for W9MGT, Leonore, to have her mother become WN9KJF (Irene). . . . K2CLC, Barbara, has joined MARS along with her dad, K2BWQ. . . . W7OOY, Jeannine, has been appointed chairman of the YLRL Seventh District, replacing W7SBS, who resigned. . . . W5s SYL, Iva, WXY, Bernice, and YKE, Martha, helped relay some 300 messages at the Dallas Fair. . . . W9SEZ, technical instructor and code teacher for the Chicago YLRL Unit, is currently coaching nine students

(*Continued on page 136*)

Last October, 18 YLs from six states braved some nippy weather to carry out picnic plans at Big Meadows on Skyline Drive, Virginia. The girls are members of the YLRL net conducted by W4HLF, Arlie, which meets Tuesdays on 3900 kc. at 0800 EST. (*L. to r., top row*): W4BQI, W4DBP, W4AJV, W3YWK, W3OQF, W4WJX, W4TVO, W3MSU, W4KYI; (*seated*) W3RXJ, W4RIG, W1UKR, W4HLF, W1VOS, W3TYC, W4YYJ, W4BLR and W3TSC also attended.

Hints and Kinks For the Experimenter

BETTER AUDIO WITH THE MONITONE

After recent completion of a Monitone, it was discovered that the audio quality was somewhat distorted at normal settings of the receiver gain control. The received signals sounded chopped or clipped at the audio level I prefer to use. This condition was quickly remedied by the substitution of a 6SN7GT for the 6SL7GT recommended for the circuit. No component or wiring changes are required by the new tube.

— *Dick Bourne, W1TVJ*

USING A CARPENTER'S BRACE AS A WRENCH

A carpenter's brace makes an especially good "wrench" for turning the square-head cap screws used to tighten chassis punches. Frequently, when the corners or other hard-to-get-at places of a chassis are being tackled, it will be found that a brace is a more convenient tool to use than a regular flat wrench. Furthermore, the ratchet feature of the brace will make the job as easy as would be the case were a ratchet-type socket wrench employed.

— *Rev. Jos. A. Terstegge, W9LQE*

INEXPENSIVE FEEDER SPREADERS

Plastic clothespins, a product of Vermont Plastics, Inc., are available at many variety stores at a cost of approximately three cents each. Easily disassembled, each provides two spreaders for open-wire lines. One hole already exists in the improvised spreader, and the other can be drilled to provide two-inch spacing.

— *D. B. Angel, W8DBF*

THREE-BAND OPERATION WITH A 7-MC. GROUND-PLANE ANTENNA

Because of the growing popularity of the quarter-wave vertical, especially on 7 Mc., it may interest some of the gang to learn that this antenna can be made to do a fair job at 3.5 and 21 Mc. also. The method used to obtain 3-band operation here at W3NWA is shown in Fig. 1.

In the diagram, *L* is a loading coil used when the antenna is operated at 3.5 Mc. When the s.p.d.t. switch, *S*, is in the neutral position, it connects *L* in series with the radiator and the RG-8/U transmission line. In one of the closed positions the switch shorts the coil, permitting normal 7-Mc. operation of the system. The antenna will also take power at 21 Mc. when the loading coil is shorted out. In the third position, the switch connects the vertical to the grounded radial support to provide lightning protection.

In the original installation, the Premax whip was adjusted to favor operation at the low end of the 7-Mc. band. The loading coil used to resonate the system at 3550 kc. consists of 22 turns No. 12 enameled, 2½-inch diameter, 4 inches long. The

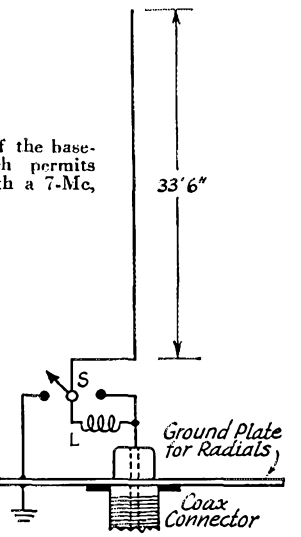


Fig. 1 — Drawing of the base-loading system which permits 3.5-Mc. operation with a 7-Mc, ground-plane antenna.

coil was cut from a 10-inch length of commercial stock which had been temporarily installed intact and then tapped experimentally during the initial stages of testing. A grid-dip meter may be used to help resonate the coil, provided the feed point (the coaxial connector shown in Fig. 1) is connected to the grounded radial support.

A liberal application of Duco cement along the existing support bars for the air-wound coil will provide added strength to the assembly. One coil so treated has been exposed to the weather for an entire winter with no apparent ill effects.

In actual operation at 3.5 Mc., good reports have been received from all over the eastern part of the U. S. A., using 100 watts on c.w. Reports are consistently better than formerly received while using a random-length horizontal wire, probably due in part to the low-angle radiation from the vertical. The s.w.r., while not as low as on 7 Mc. (using the same RG-8/U feeder), is not high enough to cause trouble, provided operation is limited to a 100-kc. band centered on the frequency for which the loading coil has been resonated.

— *R. E. Young, W3NWA*

8th V.H.F. Sweepstakes, Jan. 8th-9th

ARRL Certificates to Leaders; Gavel to Top Club

THE Eighth Annual V.H.F. Sweepstakes, open to all amateurs who can work 50 Mc. or higher, will offer the v.h.f. enthusiast unparalleled opportunities for new DX records, additional states, and meeting new friends. The contest period starts at 2:00 P.M. your local time, Saturday, January 8th, and continues to midnight, Sunday, January 9th.

Just call "CQ Sweepstakes" on 'phone or "CQ SS" on c.w. to get in touch with other contestants, then exchange SS data as shown elsewhere in this announcement. This information is similar to a message preamble, with the ARRL section (see page six of this *QST*) substituted for the city and state, and the RS or RST report for the "check."

Make contact with as many stations as possible. (You can rework a station for credit on other v.h.f. bands, so ability to work several bands pays off in score points.) When an exchange of SS "messages" has been completed in both directions, two points may be claimed.

To figure your score, multiply total contact points by the number of different ARRL sections worked. You may use 'phone, m.c.w., or c.w., with results all contributing toward one score.

Certificate awards will go to V.H.F. Sweepstakes top-scorers in each of the 73 ARRL sections from which entries are received. In addition, a certificate will be given to the top Novice or Technician in each section where *at least three* such licensees submit valid contest logs.

Clubs, especially, are urged to get their members on the air from their individual stations to compete for the certificates which go to leading club operators. The club whose members accumulate the top aggregate score will also receive a cocobolo gavel with a sterling-silver band engraved with the name of the winner.

Contest reporting forms are now available from the ARRL Communications Department and will be sent free upon request. If you don't use these forms, please follow the log arrangement shown. ARRL welcomes all contest reports to assist in cross-checking and to make complete results in *QST* possible. Novices and Technicians: be sure to report your totals, large or small, so that the license-class leader in your section will qualify for a certificate.

The 1954 V.H.F. Sweepstakes smashed all v.h.f. activity records before or since, with an unprecedented 610 stations reporting. The SS coming up may well be bigger yet. Why not give your v.h.f. set-up a check? In this one January week end, you'll be able to tell more about how your equipment and antennas are functioning than in months of casual operating. Plan now to take part! (Rules on following page.)

STATION W. . . . — SUMMARY OF V.H.F. SWEEPSTAKES EXCHANGES

SENT (1 point)						*RECEIVED (1 point)*							
Freq. Band (Mc.)	*NR*	*Stn.*	*CK-RST*	*Section*	*Time ..ST*	*Date (Jan.)*	*NR*	*Stn.*	*CK-RST*	*Section*	*Time*	*Date (Jan.)*	*Number of Each Different New Section as Worked*	*Points*
50	1	W1AW	57	Conn.	4:15 P.M.	8	3	W1PHR	47	Conn.	4:18 P.M.	9	1	2
50	2		43		4:35 P.M.	8	7	W1HDQ	59	Conn.	4:40 P.M.	9	..	2
50	3		58		9:09 P.M.	8	6	W1TAM	359	Maine	9:11 P.M.	9	2	2
144	4		49		9:30 P.M.	8	32	W1OOP	58	E. Mass.	9:36 P.M.	9	3	2
144	5		57		9:50 P.M.	8	15	WN1CGG	58	Conn.	9:46 P.M.	9	..	2
50	6		54		11:30 P.M.	8	11	W2AOC	48	N. Y. C.-L. I.	11:32 P.M.	9	4	2
420	7		58		11:35 P.M.	8	30	W1PHR	57	Conn.	11:35 P.M.	9	..	2
144	8		57		11:45 P.M.	8	21	W3LMC	59	Md.-Del.-D. C.	11:56 P.M.	9	5	2
144	..	...	...	...	.....	..	18	W9QXP	59	Ill.	12:34 A.M.	10	6	1
144	9	W1AW	34	Conn.	8:50 A.M.	9	27	W1RFU	59	W. Mass.	8:47 A.M.	10	7	2
50	10		479		9:18 P.M.	9	12	W5NHB	379x	S. Tex.	8:20 P.M.	10	8	2
50	11		589		10:40 P.M.	9	20	VE1QY	569	Maritime	11:35 P.M.	10	9	2

Bands Used: 50, 144 and 420 Mc. 9 Sec., 23 Pts.

Number and names of operators having a share in above work.....

Claimed score: 23 points × 9 sections = 207.

Participating for club award in the.....*(name of club), of which I am a member.*

I hereby state that score and points set forth in the above summary are correct and true.

Tube line-up..... *Signature*.....

Number of QSOs..... *Address*.....

EXPLANATION OF V.H.F. SS CONTEST EXCHANGES

Send Like Standard Msg. Preamble	*NR*	*Call*	*CK*	*Place*	*Time*	*Date*
Exchanges	Contest numbers 1, 2, 3, etc., a new NR for each station worked	Send your own call	CK (Readability and strength or RST of station worked)	Your ARRL section	Send time of transmitting this NR	Send date of QSO
Purpose (example)	QSO NR tells how you are doing (NR1)	Identification (W1AW)	RS or RST report (589)	See page six for section list (Conn.)	Time and date must fall in contest period (6:55 P.M. Jan. 9)	

Rules

1) *Eligibility:* Amateur operators in any ARRL section (see page 6) operating at home, or mobile or portable *under one call* on or above 50 Mc. are invited to take part.

2) *Object:* Participants will attempt to contact as many other stations in as many ARRL sections as possible.

3) *Contest Periods:* The contest starts at 2:00 P.M. your local time, Saturday, Jan. 8, 1955, and ends at midnight, Sunday, Jan. 9, 1955.

4) *Exchanges:* Contest exchanges, including all data shown in the sample, must be transmitted and receipted for as a basis for each scored point.

5) *Scoring:* (a) Contacts count *one point* when the required exchange information has been received and acknowledged, a *second point* when exchange has been completed in both directions.

(b) Final score is obtained by multiplying total contact points by the number of different ARRL sections worked (the number in each of which at least one SS point has been credited).

6) *Conditions for Valid Contact Credit:* (a) Repeat contacts on other bands confirmed by completed exchanges of *up to two points per band* may be counted for *each different station* worked. (*Example:* W1HDQ works W8BFQ on 50 and 144 Mc. for complete exchanges of 2 points on each band; 2 + 2 gives 4 points but only *one* section multiplier.)

(b) Cross-band work shall not count.

(c) Portable or mobile station operation under one call, from one location only, is permitted.

7) *Awards:* Entries will be classified as single-or multi-operator, a single-operator station being defined as one manned by an amateur who neither receives nor gives assistance to any person during the contest period. Certificates will be awarded in each ARRL section to the top-scoring amateur in the single-operator classification. In addition, a certificate will be awarded to the top Novice or Technician in each ARRL section where *at least three* such licensees submit valid contest logs. Multioperator work will be grouped separately in the official report of results in *QST*.

When three or more individual club members compete and submit logs naming the club with which they are identified, an ARRL certificate will be issued to the leading club member. When less than three individual logs are received there will be no club award or club mention.

A gravel with an engraved sterling-silver band will be offered the club whose secretary submits the greatest aggregate score, provided such scores are confirmed by receipt at ARRL of the *individual contest logs* from such members (resident club members *only*). Claims from federations, radio club councils, or other combinations of radio clubs, will not be accepted. Special memberships granted for contest purposes will not be recognized.

8) *Conditions of Entry:* Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Award Committee.

9) *Reporting:* Reports must be postmarked no later than January 24, 1955, to be considered for awards.

NEW BOOKS

RCA Receiving Tube Manual, RC-17. Published by Radio Corporation of America, Harrison, N. J. 300 pages, 8⅜ by 5⅜ inches, paper cover. Price, 60 cents.

Those who have owned preceding editions of the "Receiving Tube Manual" will hardly need more than the word that a new edition is out, since it is an old stand-by. In addition to containing more detailed data on receiving tubes and kinescopes than can be obtained from the conventional tube tables, the new edition continues (with additions) the sections on tube operation, installation and rating information, amplifier and oscillator design, and the resistance-coupled amplifier tables. Some new hi-fi circuits have also been added to the circuit section. Altogether a most useful member of the amateur's library.

The Oscilloscope at Work, by A. Haas and R. W. Hallows. Published for *Wireless World* by Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1. 171 pages, including index, 5¾ by 8¾, cloth cover. Price, 15s. 0d.

How the oscilloscope functions, and how to use it in making measurements. Over 200 patterns photographed from the c.r. tube screen, with interpretations. Also contains a chapter on shooting trouble in the 'scope itself, and one on auxiliary devices such as probes and the electronic switch.

Radio Troubleshooting Guidebook, Vol. 1, by John F. Rider and J. Richard Johnson. Published by John F. Rider Publisher, Inc. 156 pages, including index. 5⅜ by 8¼, paper cover. Illustrations. Price, $2.40.

A general treatment of the subject, divided into three parts. Part I covers the operating principles of superheterodyne receivers for both a.m. and f.m.. Part II the fundamentals of trouble-shooting, and Part III the most common symptoms and remedies.

The Oscilloscope, by George Zwick, published by Gernsback Publications, Inc., 25 West Broadway, New York 7, N. Y. 192 pages, including index, 5½ by 8½, paper cover. Price, $2.25.

For the ervice technician, principles of 'scope tubes, oscilloscope circuits, and accessories. Covers use of the oscilloscope in servicing TV receivers.

CONDUCTED BY EDWARD P. TILTON, W1HDQ

WE'RE indebted to W6BCX for bringing the idea back into focus. During a visit with him and W6VR, Woody dug into his *QST* file and came up with the July, 1928, issue. Did I remember the "Warner Splatter System" offered to a waiting world by the late K. B. Warner on the editorial page of that issue of more than 25 years ago? The idea was to spray large amounts of r.f. at the ionosphere; if you throw enough stuff up there some of it is bound to come back down again — "just as a firehose, with its nozzle directed at the ceiling would provide a sure-fire way of wetting every square inch of the floor in jig time."

KBW was always coming up with something like that; concepts that had everyone laughing at the time, but somehow had a way of proving out years later. He was talking of 10-meter DX then, but he'd be vastly amused to find what is essentially his splatter system in use today, providing consistent communication in the v.h.f. range over distances of 1000 miles or more. And making v.h.f. work possible from locations where no ham in his right mind would have tried 50 Mc. or higher bands even a few years ago.

It is just such "scattering from irregularities in the ionosphere, when other forms of ionospheric transmission are absent" [1] that is now assumed to be responsible for the success of the well-known Cedar Rapids to Washington experiment on 49.8 Mc. and higher frequencies. And a very similar kind of scattering, ionospheric and tropospheric, is being used by some of our best 2-meter stations in working consistently over distances up to 500 miles or so.

The beauty of all this is that, since an elevated scattering medium is involved, the location of the v.h.f. station is relatively unimportant. If the normal radiation pattern of your array clears obstructions in the immediate vicinity of your antenna, you may do just as well in this kind of v.h.f. DX as the fellow on the top of a hill. A high hill is still nice to have, but it is by no means necessary for successful v.h.f. work.

But suppose you're a valley dweller; you look out from your shack window to snow-capped mountain peaks in every direction. What chance is there for a v.h.f. man in such a spot? Well, don't give up until you've given it a good try; you may find that you have a really good location. No, don't send for the men in the white coats; it can be that way. Your snug valley may turn out to be better than a spot out on the open plains!

We've mentioned "knife-edge refraction" in these pages before, but our recent swing through much of our really high mountain country showed that few v.h.f. men (present or potential) in these areas have given much thought to the application of the theory to their particular set of circumstances. Yet it has been demonstrated that a sharp ridge at just the right point between two low-lying v.h.f. stations can provide enough refraction to bring the signal level up *more than 70 db.* above the value that would be obtained over the same distance in open terrain!

Few hams are likely to be fortunate enough to achieve any such "obstacle gain" but again and again in our mobile work in the western mountains we saw knife-edge refraction at work. In several instances we had strong signals over mountainous paths of greater length than we've ever worked over rolling New England or the flat Middle West. And of course the 2-meter work between Arizona stations and others at distances of 350 miles or more, recently reported in these pages, is further proof that high mountains are, at least, no certain barrier.

Add to these factors the still newer possibility of v.h.f. DX by reflection from meteor trails, now being exploited by W4HHK, W2UK and others, and the tropospheric and auroral phenomena we've known about for years, and you have rather convincing evidence that v.h.f. *can* be fun just about anywhere. Are you getting in on it?

Don't jump to the conclusion, from what we've been saying, that all you need is a 522 and a folded dipole to work 400 miles over the mountains on 144 Mc. It's not that simple, by any means, or we'd have been doing it long ago. The signals you get over long indirect paths are likely to be very weak at best; you'll need plenty of power, a good big antenna, and the best available receiver to turn the trick. Highly selective receivers and c.w. techniques are a must, at least at first. If you've tried a tough path and failed, with anything less than a combination of all these assets, you can't say that it can't be done. Working long hauls over high mountains is a job to separate the men from the boys. Give it all you've got, and the chances are you'll be pleased with the results!

OES Notes

W2RHQ, Syracuse, N. Y. — Now on 432 Mc. with 2C39 grounded-grid amplifier, driven by an 832A tripler. Would like to hear from anyone with dope on gear for 1215 Mc. Recently got 32-element 144-Mc. array working properly by bringing two 16-element sections closer together. With the original arrangement (sections a half wave apart between element ends) there was a split forward lobe. Now hearing W2UK, W3BGT and other distant stations off the backs of

[1] N.B.S. Technical Report No. 1682, August, 1952.

their beams fairly regularly; wish stations in New Jersey and Pennsylvania would aim toward central New York State more often.

W8UTH, Victor, N. Y. — Back in business in new location after extensive damage to house and antennas by Hurricane Hazel. Activity on 220 Mc. developing in Rochester area with W2s POM RTB MHU UXP and K2CEH on.

W3UQJ, York, Pa. — Would like to hear as to results from anyone who has tried 220-Mc. mobile. Suggest more use of c.w. on 220, as contacts have been made. As result of many skeds with W3LZD, W3SJB, W3UJG and W4UMF, it has been found that anytime a readable signal is heard on 144, 220 is just about equally good.

W4FLW, Dresden, Tenn. — Gradually developing more activity on 50 and 144 Mc. Working W4CYR, Nashville, and W4HFO, Martin, on 6 and W4BQG, McKenzie, on 2.

W4HHK, Collierville, Tenn. — Daily skeds continue with W2UK and W1HDQ. Burst count on W2UK runs as high as 79 for his 10-minute tape transmission at 0640 CST. W1HDQ heard fairly regularly, but with lower burst count, on 5-minute transmission at 0635 CST. Similar meteor-scatter skeds with W5VWU, Albuquerque, N. Mex., 960 miles, have produced only unidentifiable pings, though W5VWU copied complete call sequence on one occasion. Tests also being made with W7VMP, Phoenix, Ariz., 1300 miles, but no identifiable sigs either way as yet.

Revamped crystal-controlled converter recently, putting in overtone crystal on 45.667 Mc. Enough frequency variation is possible in tuning the oscillator plate circuit so that it can be set exactly on frequency, multiplying to 137 Mc. Now the communications receiver dial reads exactly 7000 kc. for 144 Mc., a real aid in keeping weak-signal skeds.

W5GIX, Baton Rouge, La. — New Orleans and Jackson, Miss., always reliable on 144 Mc. W4UUF, Pensacola, Fla., W4TLV, Demopolis, and W4OZK, Gadsden, Ala., also heard frequently.

W6ORS, Alhambra, Calif. — Working on 220-Mc. crystal-controlled converter. Rig for 220 Mc. (Feb., '54, *QST*) working nicely.

W6ZDO, Canoga Park, Calif. — Daily operation on 220.9 and 221.1 Mc.; conditions much like 112 and 56 Mc. of many years ago, even to superregen receiver QRM! Converted 1350-Mc. radiosonde to 1215-Mc. band.

W7JHX, Port Orchard, Wash. — Made first TV transmission Oct. 18th. Put rig on following evening and left it running while away from home. Main power transformer shorted, causing much smoke and excitement. Everything repaired within a few days, and can now transmit video on 441.36 Mc. any evening and Sundays by appointment. Can usually be reached on 2 meters, or through Puget Sound Net.

W9KLR, Rensselaer, Ind. — Here's a fellow who must hold some kind of record: W9JNZ, on the air three times since he was licensed, made 20 contacts in 15 states and 6 call areas on 144 Mc.!

VE7FJ, New Westminster, B. C. — Much talk, by W7s, of going horizontal on 144 Mc. VE7s, always in favor of horizontal, will welcome change.

VO6U and W7SNR/VO6, Goose Bay, Labrador — Local activity on 50, 144 and 220 Mc. These fellows should have a fine opportunity to make v.h.f. history, if they watch conditions closely for chances to work down the Atlantic Seaboard and elsewhere.

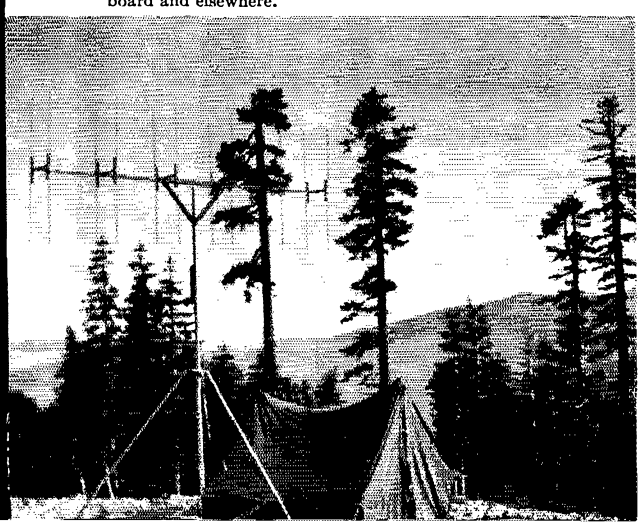
2-METER STANDINGS

	Call	States	Areas	Miles
W1RFU		19	7	1150
W1HDQ		19	6	1020
W1CCH		17	5	670
W1IZY		16	6	750
W1IEO		16	5	475
W1AZK		14	5	650
W1MNF		14	5	600
W1BCN		14	5	650
W1KCS		14	5	540
W1DJK		13	5	520
W1MMN		10	5	520
W2ORI		23	8	1000
W2UK		23	7	1075
W2NLY		23	7	1050
W2AZL		21	7	1050
W2QED		21	7	1020
W2BLV		19	7	910
W2OPQ		19	6	—
W2DWJ		17	5	632
W2AOC		17	5	600
W2UTH		16	7	880
W2PAU		16	6	740
W2PCQ		16	5	650
W2LHL		16	5	550
W2CFT		15	5	525
W2DFV		15	5	—
W2AMJ		15	5	550
W2QNZ		14	5	400
W2BRV		14	5	590
W3RUE		23	8	950
W3NKM		19	7	660
W3BNC		18	7	750
W3FPH		18	7	—
W3KWL		16	7	720
W3LNA		16	7	720
W3IBH		16	5	570
W3GKP		15	6	800
W3TDF		13	5	570
W4HHK		26	8	1020
W4AO		22	7	950
W4PCT		20	8	—
W4JFV		18	7	830
W4MKJ		16	7	665
W4UMF		15	6	600
W4OXC		14	7	500
W4JHC		14	5	720
W4WCB		14	5	740
W4TCR		14	5	720
W4UBY		14	5	435
W4IKZ		13	5	720
W4JFU		13	5	720
W4ZBU		10	5	800
W4UDQ		10	5	850
W4TLA		7	4	850
W5RCI		21	7	925
W5JTI		19	7	1000
W5QNL		10	5	1400
W5CVW		10	5	1180
W5AJG		10	4	1260
W5MWW		9	4	570
W5ML		9	3	700
W5ABN		9	3	780
W5ERD		8	3	570
W5VX		7	4	—
W5VY		7	3	1200
W5FEK		7	2	580
W5ONS		7	2	950
W6ZL		3	3	1400
W6WSQ		3	3	1390
W6BAZ		3	2	320
W6NLZ		3	2	360
W6MMU		2	2	240
W6GCQ		2	2	210
W6QAC		2	2	200
W6EXH		2	2	193
W7VMP		4	3	417
W7JU		3	2	247
W7LEE		3	2	240
W7YZU		3	2	240
W7JUO		2	2	140
W7RAP		2	1	165
W8BFQ		29	8	850
W8WXV		28	8	1200
W8WJC		25	8	775
W8RMH		22	8	690
W8WRN		20	8	670
W8DX		20	7	675
W8BAX		20	7	655
W8EP		18	7	800
W8UKS		18	7	720
W8RWW		17	7	630
W8WSE		16	7	830
W8SRW		16	7	700
W9EHX		23	7	725
W9FVJ		22	8	850
W9EQC		22	8	820
W9KLR		21	7	690
W9BPV		20	7	1000
W9UCH		20	7	750
W9KPS		19	7	660
W9REM		19	6	—
W9LF		19	—	—
W9ALU		18	7	800
W9MUD		18	6	640
W9JGA		17	6	720
W9WOK		17	6	600
W9ZHL		17	6	—
W9MBI		16	7	660
W9BOV		15	6	—
W9LEE		15	6	780
W9JNZ		15	6	560
W9DDG		14	6	700
W9FAN		14	7	680
W9QKM		14	6	620
W9DSP		14	5	700
W9UIA		12	7	540
W9ZAD		11	5	700
W9GTA		11	5	540
W9JBF		10	5	760
WØEMS		25	8	1175
WØIHD		24	7	870
WØGUD		22	7	1065
WØONQ		17	6	1090
WØINI		14	6	830
WØOAC		14	5	725
WØZJB		12	7	1097
WØWGZ		11	5	760
VE3AIB		20	8	890
VE3DIK		18	7	790
VE3BQN		14	7	790
VE3DER		13	7	800
VE3BPB		12	6	715
VE3AQG		11	7	800
VE1QY		11	4	900
VE2AOK		10	5	550
VE7FJ		2	1	365

C.W. Reception with the Communicator

Use of c.w. on 144 Mc. is increasing all the time, and probably would have progressed further if there were some

(*Continued on page 134*)



♦

With this 24-element array, W7LHL/7, Bolan Peak, in southern Oregon, worked the Northwest's best 2-meter DX in the September V.H.F. Party.

♦

QST for

September V.H.F. Party Results

Increased Western Activity Nets Record Number of Logs

WE MAY never be able to set up any wholly fair system for scoring v.h.f. contests, or any other operating activity, on a national scale, but the disparity between various sections of the country is dropping with every v.h.f. party. Of course, a "national high" is only a mythical honor, anyway, as there is competition only within your own ARRL section, but it is interesting to look through the tabulation at the end of this report and see where the really high scores were made.

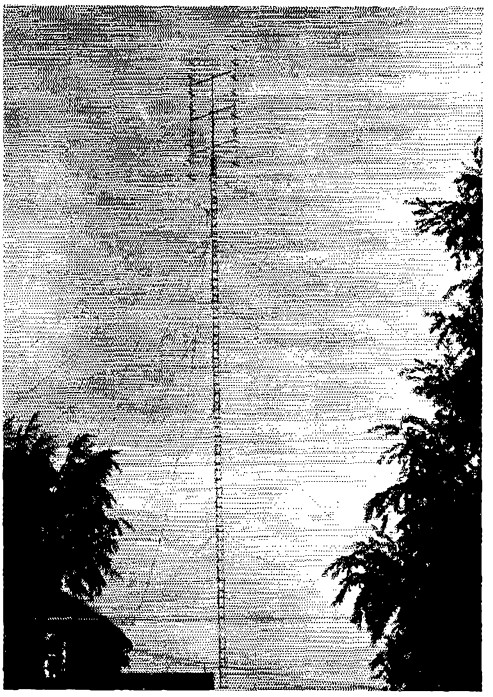
Of the geographically small and densely populated ARRL sections along the Eastern Seaboard, only Northern and Southern New Jersey, Western Massachusetts, New Hampshire and Connecticut reported September V.H.F. Party totals higher than the 2095 points piled up in the East Bay Section by K6GWE, Berkeley, Calif. Five eastern sections, supposedly cinches for high spots in a national ranking, were topped by Illinois, Ohio, Michigan, Santa Clara Valley, East Bay and Los Angeles.

Ignoring the section multiplier, an unfair factor in national comparisons, we find that the number of contacts made is becoming more uniform, the country over, with every contest. In only two ARRL sections, Northern New Jersey and Los Angeles, were more than 200 contacts reported. In the bracket between 150 and 200, we find Illinois, Ohio, Western Massachusetts and New Hampshire. Of the sections reporting 100 to 150 contacts, Indiana, Michigan, Santa Clara Valley and East Bay are outside the "favored" Atlantic Seaboard states. The country's highest one-band score was made, not by an East Coast station, but by W8WXV, Shiloh, Ohio, who worked 196 stations in 17 sections, 3332 points, on 144 Mc. alone.

The ability to work several bands is the most important factor in high scoring, in any section. The rules were set up with that in mind: to promote versatility and encourage the use of our higher bands. Working all bands from 50 to 1215 Mc. enabled K2CMB, Paterson, N. J., to make 280 contacts for 8456 points, the country's high for a single-operator set-up. The 230 contacts of W6WSQ, Pasadena, Calif., made on 50, 144 and 420 Mc., is second in number of QSOs. Lee Waite, W2FBZ, a frequent Northern New Jersey winner, worked 4 bands for 206 contacts and 7488 points, running K2CMB a close second for national single-operator high.

Mountain expeditions, as always in spring and fall parties, contributed greatly to the success of the contest. For once, the W1MHL/1 team came off second best. A combination new to v.h.f. contests but with long Field Day experience, W2GSA/2, Garden State Amateur Radio Association, nosed out the Waltham group, with 327 contacts on 50, 144 and 220 Mc., for 9715 points. Some nice 2-meter DX was worked in the Northwest by mountain portables. W7PVZ/7 in a fire lookout on Capitol Peak, near Olympia, Wash., worked W7LHL/7 on Bolan Peak in Southern Oregon, about 350 miles. An indication of the growth of 2-meter interest in that region: W7PVZ/7 worked 83 different stations on 144 Mc.

The 1215-Mc. band loomed as a v.h.f. contest factor of some proportions. As the result



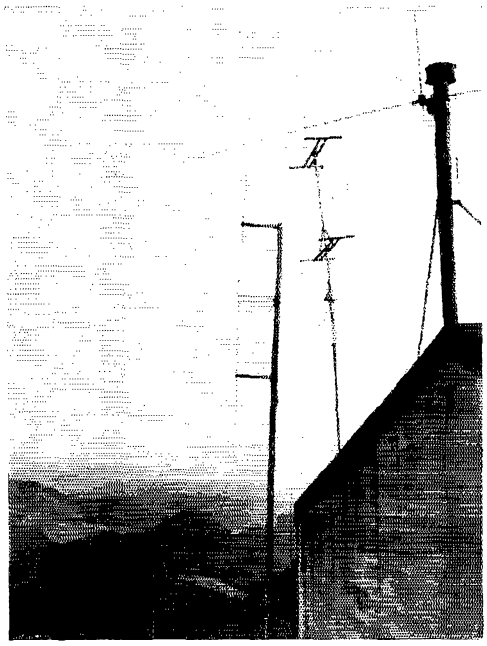
Sixty-four element beam atop a 100-foot tower — W8WXV, Shiloh, Ohio, country's top one-band scorer. Al worked 196 stations on 144 Mc.

of coöperative effort by K2CMI, K2DFS and W3UQB, five nearly identical 1215-Mc. stations were built. These used 2C39 cavity oscillators, delivering about 12 watts output. Tuned-cavity crystal mixers with 144-Mc. output worked into Gonset Communicators as tunable i.f.'s. Duplicate corner-reflector arrays were used for transmission and reception. The rigs were used by W1JRV/1 at Mead Pond, just over the line in Connecticut, W3UQB/2 at Balanced Rock, Nyack, N. Y., K2DFS, at his home in Bergenfield, N. J., and K2CMI/2 and W2FSN/2 in Manhattan high spots, to give K2CMB five contacts in four ARRL sections on 1215 Mc.

Around San Francisco there was enough doing

on 144 Mc. so that W6TDP made 56 contacts with 5 watts input to a 5763 doubler (rig built from W2IHW's description in February, 1954, *QST*), and a cut-down TV Yagi hung in his basement!

Two 0-0-0 scores don't appear in the tabulation, but they represent effort and good intentions. One goes to W7RCC, Panguitch, Utah, who was in there trying, but heard no signals. The other was earned by W1HDQ/Ø. Your conductor got up before 0600 Sunday morning and drove out from the Dakota Division Convention Headquarters in Rapid City, S. D., to a fine clear spot in the Black Hills. Having been in every v.h.f. contest since the first one in 1939, he was going to give this one the "college try," but he didn't reckon with the effects of the bright South Dakota sun. With the car parked, windows closed, all the previous day, the crystal mike just couldn't take it. Having no provision for keying the rig or copying c.w., on the mobile receiver, W1HDQ/Ø folded his beam and silently stole back to Rapid City.



Antennas and part of 360-degree view at the location of K6GWE, Vollmer Peak, Berkeley, Calif., East Bay Section leader.

In the following tabulation, scores are listed by ARRL Divisions and Sections. Unless otherwise noted, the top scorer in each section receives a certificate award. Columns indicate the final score, the number of contacts, the section multiplier, and the bands used. A represents 50 Mc.; B, 144 Mc.; C, 220 Mc.; D, 420 Mc.; and E, 1215 Mc. Multiple-operator stations, with calls of participating operators, are shown at the end of each section tabulation.

ATLANTIC DIVISION

E. Pennsylvania

W3TDF..2016-112-18-AB
W3TYX..1024-128- 8-B
W3MRQ/3.714- 48-14-BCD
W3YWF...644- 89- 7-BC
W3SAO....595- 85- 7-B
W3OLV/3..540- 60- 9-B
W3WED...112- 28- 4-B
W3THB....48- 16- 3-B
W3LCM....16- 8- 2-B
W3KX/3[6] (W3s DXT LZD YPG NNH QGX PMG) 4288-117-32- ABCD
W3LCK/3 (W3s LCK NEP) 228- 32- 6-BD

Maryland-Delaware-D. C.

W3TOM...988- 76-13-AB
W3CGV...832- 63-13-ABC
W3YHI...792- 88- 9-B
W3LMC...729- 81- 9-B
W3UJG....648- 51-12-ABC
W3LZZ....220- 44- 5-B
W3OJU....189- 27- 7-A
W3OTC....116- 21- 6-A
W3NZR....115- 23- 5-B
W3KMV....114- 19- 6-A
W3PGA....110- 22- 5-B
W3NH.....104- 26- 4-B
W3ONP....104- 26- 4-B
WN3YLQ...93- 31- 3-B
W3BYG....88- 22- 4-B
W3ZMK....75- 25- 3-B
W4WFL/3..36- 18- 2-B

S. New Jersey

W2QED..3425- 127-25- ABCD
W2UK....2006-118-17-B
W2BLV....561- 47-11-BD
W2ORA...248- 31- 8-AB
W2BAY....16- 4- 4-A

Western New York

W2ALR...1177-107-11-AB
W2RUI...1144- 79-13- ABCD
K2CEH....750- 75-10-AB
W2UTH....700- 70-10-AB
W2ORI....432- 72- 6-B
W2WFB....400- 50- 8-B
W2RHQ....384- 63- 6-AC
KN2HAO..284- 71- 4-B
W2FCG/2..204- 34- 6-B
W2KZ.....200- 50- 4-B
W2QNA....152- 38- 4-B
W2RXG....125- 25- 5-B
K2CVX....52- 13- 4-B
W2CTA....46- 23- 2-B
W2QY.....42- 21- 2-B
W2EFO....38- 19- 2-B
W2BLN/2..24- 8- 3-B
KN2INO...23- 23- 1-B
W2BLP.....10- 10- 1-B
W2RJL.....10- 5- 2-A
W2TBQ.....7- 7- 1-B
W2JGJ[6] (W2s JGJ UPT) 1660- 83-20-AB
W2OFQ/2 (W2s OXS M8M HAX K2s HWS AQP) 715- 54-13-BD

W. Pennsylvania

W3FPH...517- 47-11-AB
W3KWL...342- 57- 6-AB
W3KXI....275- 55- 5-B
W3QCN....10- 5- 2-B
W3KWH (W3s UHM SVJ ZDW MPK WHY) 585- 65- 9-AB

CENTRAL DIVISION

Illinois

W9WOK..2325-155-15-AB
W9EQC..1120-112-10-B
W9DRN..1070-103-10-BC
W9QKM...890- 89-10-AB
W9VIT....525- 75- 7-B
WN9HYG.434- 62- 7-B
W9VNW...402- 67- 6-B
W9ALR...390- 65- 6-B
W9UBI....345- 69- 5-B
WN9EGB..312- 52- 6-B
W9ADO...216- 36- 6-B
W9BOI....200- 40- 5-B
W9KCW...170- 34- 5-B
W9KLD...160- 32- 5-B
W9IFA....150- 25- 6-B
W9KCM...120- 24- 5-B
W9OEV....100- 20- 5-B
W9ZEX....80- 20- 4-B
W9MYC....46- 23- 2-B
W9CX.....45- 15- 3-B
W9PMN....30- 10- 3-B
W9OTV.....9- 9- 1-B

Indiana

W9KLR..1441-131-11-B
W9ZHL...732- 61-12-AB
WN9IMO..112- 16- 7-B
W9THW....90- 15- 5-B
W9VAY....88- 22- 4-B
WN9IOC...50- 10- 5-B

Wisconsin

W9RXS...408- 68- 6-B
W9ZAD...378- 54- 7-AB
W9TQ....210- 35- 6-AB
W9BTT....150- 25- 6-AB
W9UJM...144- 36- 4-B
W9GJE....100- 25- 4-B
W9DSP....80- 16- 5-B
W9ZJA....56- 14- 4-B

DAKOTA DIVISION

Minnesota

WØTJF....60- 12- 5-B
WØOAC....48- 12- 4-B
WØMVP....4- 2- 1-C
WØOFY....4- 2- 1-C
WØOFZ....4 2- 1-C

DELTA DIVISION

Tennessee

W4HHK...320- 32-10-B
W4GIS....69- 23- 3-B

GREAT LAKES DIVISION

Kentucky

W4PCT....935- 85-11-AB

Michigan

W8RMH..2040-115-17- ABCD
W8DX...1320- 80-15- ABCD
W8NOH...288- 48- 6-B
W8NSH...240- 48- 5-B
WN8PNX[3].205- 41- 5-B
W8GYU...200- 40- 5-B
W8DDO...180- 36- 5-AB
WN8PSN..164- 41- 4-B
W8BGY...152- 38- 4-B
W8GTK...148- 37- 4-B
W8JXU....90- 30- 3-B
W8TGH....63- 21- 3-B
WN8PCE...57- 19- 3-B
W8HLQ....52- 26- 2-B
WN8QOC (WN8 PJS QOO SXZ).....144- 36- 4-B

Ohio

W8WXV..3332-196-17-B
W8LPD...2100-133-15-ABC
W8NRM..1722-112-14- ABCD
W8SDJ...680- 85- 8-B
W8HOH...600- 73- 8-BC
W8LAH...512- 64- 8-B
W8JSW...486- 81- 6-B
W8HQK...432- 72- 6-AB
W8LOF....360- 60- 6-B
W8BMO...340- 68- 5-BC
WN8PER[3].325- 65- 5-B
W8BAX....290- 58- 5-BC
W8WRN...273- 37- 7-ABC
W8QLB....238- 34- 7-AB
W8IJL....235- 47- 5-B
WN8SRO..235- 47- 5-B
W8FAZ....215- 40- 5-BC
W8OIN....215- 43- 5-B
W8PMJ....185- 37- 5-B
W8KOM...114- 57- 2-B
W8LCY....112- 28- 4-B
WN8QEP...92- 46- 2-B
WN8QIU....74- 37- 2-B
W8NAF....72- 36- 2-B
W8HSY....70- 35- 2-B
WN8SVU...62- 31- 2-B
WN8PKS/8.56- 28- 2-B
W8IFZ.....44- 22- 2-B
W8WAB....34- 17- 2-B
W8INQ....12- 6- 1-C
W8OIM.....7- 7- 1-B

HUDSON DIVISION

Eastern New York

W2RMA..1134- 63-18-AB
W2MXJ...670- 67-10-B
W2ACY...624- 52-12-B
K2DRV....410- 41-10-B
W2MHE...341- 31-11-B
W2RTE....112- 16- 7-B
W2YIK....100- 20- 5-AB
W2RML/2 (W2s RML ESE K2GCH KN2HPK) 560- 70- 8-B

N. Y. C.-L. I.

W2KIT...2044-146-14-B
W2BRV...1260-126-10-B
K2IEJ/2...948- 79-12-B
W2JBQ....936- 78-12-B
W2DZR....882- 98- 9-B
W2KIR....882- 98- 9-B
W2AOD...856-100- 8-BD
W2FYQ....804-134- 6-B
W2DLO...748- 68-11-AB
W2GLU....546- 78- 7-B
K2DUI....480- 40-12-B
W2LID....470- 94- 5-B
W2FTN....455- 91- 5-B
W2BNX/2.370- 74- 5-B
W2AWH....312- 52- 6-AB
K2ESZ....252- 63- 4-B
W2BEN....240- 60- 4-B
W2YHP....188- 47- 4-B
W2LKP....186- 25- 6-BD

KN2HOR[2] 184- 46- 4-B
K2CMV....164- 41- 4-B
W2IN.....144- 48- 3-B
W2TUK....144- 36- 4-B
K2CWS....144- 36- 4-B
W2WOF....110- 17- 5-BD
KN2HMM/2
42- 21- 2-B
KN2IPH....15- 15- 1-B
W2JZT/2 (W2s HJM JZT)
270- 45- 6-B

N. New Jersey

K2CMB..8456-280-28-
ABCDE
W2FBZ...7488-206-32-
ABCD
W2RGV..5150-194-25-ABC
W2DZA...1683- 81-17-
ABCD
W2LHI....732- 61-12-B
W2MM....540- 60- 9-B
K2BJP....532- 76- 7-B
KN2IEY/M
460-115- 4-B
W2PEV....408- 51- 8-AB
K2EQD....200- 40- 5-B
W2ESC/M 123- 41- 3-B
W2OAE....92- 23- 4-B
W2GSA/2 (W2s FZY CQB PAT PWX GUM NBE HWX AF K2s EGO HNA)
9715-327-29-ABC

MIDWEST DIVISION

Iowa

WNØUSQ...66- 22- 3-B

Kansas

WØIIJ.....182- 26- 7-B
WØBDK....95- 19- 5-B
WØHAJ.....55- 17- 5-B
WØJAS.....60- 15- 4-B
WØMOX/Ø...27- 9- 3-B

Missouri

WØETJ....648- 54-12-B
WØIHD....192- 32- 6-B

Nebraska

WØHXH...156- 26- 6-B
WØVEC....150- 25- 6-B
WØLEF....105- 21- 5-B

NEW ENGLAND DIVISION

Connecticut

W2BVU/1
4263-137-29-
ABCD
W1KHL..2646-126-21-AB
W1HDQ[3,4]
2332-105-22-ABD
W1PHR...1683- 97-17-ABD
W1REZ...1260- 90-14-B
W1TXI....900- 90-10-B
W1URC....510- 51-10-B
W1QAK....459- 51- 9-B
W1ZDP[4]...420- 60- 7-B
W1RMU....336- 56- 6-B
W1YOB....270- 45- 6-B
W1AW[4,5]...228- 38- 6-AB
WN1CDD[2].228- 57- 4-B
W1ULY....210- 42- 5-B
W1STU....188- 47- 4-B
WN1AMY.150- 50- 3-B
W1YDS....111- 37- 3-B
W1AKX....98- 49- 2-B
W1KHM....84- 21- 4-AB
W1NEQ....75- 25- 3-B
WN1CDC...60- 30- 2-B
W1QJL/1...56- 28- 2-B
W1EFW....36- 18- 2-B
W1WHF.....4- 4- 1-B

Maine

W1TAM...374- 34-11-AB
W1LKP....24- 4- 4-
ABCD

E. Massachusetts

W1OOP...1921—102-17-
ABCD
W1AQE...1200-100-12-AB
W1JSM...1188-108-11-B
W1CTW...918- 92- 9-ABC
W1LYL....345- 69- 5-B
W1DJ.....240- 30- 8-A
W1BRK....108- 27- 4-B
WN1ZOC...75- 25- 3-B
WN1BYI...60- 62- 2-B
W1MEG....56- 14- 4-B
W1CTR....36- 12- 3-B
W1MGP/M..33- 11- 3-A
W1TUM....28- 7- 2-C
W1AEQ....22- 11- 2-B
W1QCC/1[6] (W1s QCC VZQ)
3500-120-28-
ABCD
W1KBN (W1s KBN VKT)
80- 20- 4-B
W1YIZ (W1s LJN YIZ)
48- 16- 3-B

W. Massachusetts

W1RFU...5348-191-28-AB
W1VNH..2875-113-25-ABD
W1JWV....150- 30- 5-B
K2GIR/1...128- 16- 8-A
W1HXD/1 (W1s HXD RGM UIY WRG)
742- 53-14-AB

New Hampshire

W1FZ/1..4752-166-27-
ABCD
W1UIZ/1.2976-119-24-ABC
W1WBM...78- 13- 6-AB
W1MHL/1[6] (W1s LUW PYM QMN RUD)
9316-257-34-
ABCD
W1LUW/M (W1s LUW QMN).....10- 5- 2-B

Rhode Island

W1ZJQ...2002-143-14-B
W1UEF/1 (W1s KFL UEF WUJ).....355- 71- 5-B

Vermont

W1MMN...96- 16- 6-B
W1YDM/1 (W1s VLJ YDM)
1691- 89-19-AB

NORTHWESTERN DIVISION

Oregon

W7OKV/7.180- 60- 3-B
W7NGW...112- 28- 4-AB
W7INX....81- 27- 3-AB
W7HBH....69- 23- 3-AB
W7NNR....42- 21- 2-B
W7JIP/7 (W7s JIP OAY SAO).....284- 71- 4-AB

Washington

W7UFE...315- 63- 5-AB
W7PVZ/7..249- 83- 3-B
W7JHX...200- 50- 4-AB
WN7UZB..153- 51- 3-B
W7SRL[7]...126- 43- 3-B
W7RT.....106- 53- 2-AB
W7TMU....87- 29- 3-AB
W7PRV....72- 36- 2-B
W7KO.....68- 34- 2-AB
W7ALU....56- 28- 2-B
WN7WRI...40- 20- 2-B
W7PQS....36- 18- 2-AB
W7BML....30- 15- 2-B
W7BYK....30- 15- 2-AB
W7BB/7 (W7s QKE IEE)
335- 67- 5-AB

PACIFIC DIVISION

Nevada

W7JU.....8- 4- 2-B

Santa Clara Valley

W6YEQ..1708-114-14-ABD
W6EDC..1224-100-12-ABD
W6SAW...612-102- 6-B
W6EXX...540- 90- 6-B
KN6CQG..208- 52- 4-B
KN6DTS..150- 30- 5-B
W6BDO/6 (W6s BDO YGX SSA ODK K6CZI)
1365- 98-13-ABD

East Bay

W6UPD...205- 41- 5-B
W6PEG/M.57- 19- 3-B
K6GWE[6] (W6s DNX MXQ RLB UOV VSV)
2096-121-16-
ABCD
W6JOX (W6s JOX MGO)
1111-101-11-AB
KN6EDX/6(W6QZE K6ERG KN6EDX) 636-106- 6-B
K6AZH/6 (W6s RKT EXL VDR JLG).540- 90- 6-AB

San Francisco

W6AJF...1425- 86-15-
ABCD
W6BAZ....610- 61-10-AB
W6TDP....280- 56- 5-B
KN6HIK..252- 63- 4-B
KN6HIT/6 189- 63- 3-B
K6GVB....108- 27- 4-B

Sacramento Valley

W6PIV....304- 38- 8-AB
W6OTN....216- 36- 6-B
W6VBU....88- 22- 4-B
W6KUI/6[6] (W6FXJ K6BIQ).....531- 59- 9-AB
K6BAT (K6s AXN BAT)
152- 18- 8-ABD

ROANOKE DIVISION

North Carolina

W4MDA....30- 10- 3-B

Virginia

W4UBV...1326-102-13-AB
W4UMF...876- 69-12-ABC
W4JCJ....783- 87- 9-B
W4MLR...354- 59- 6-B
W4VVE....175- 23- 7-BD
W6LON/4.155- 31- 5-B
W3SFY/4 (W3s SFY WBY)
780- 78-10-AB

SOUTHEASTERN DIVISION

Alabama

W4TLV.....28- 7- 4-B

SOUTHWESTERN DIVISION

Los Angeles

W6WSQ..1617-230- 7-ABD
W6MMU..999-109- 9-ABD
W6IWY...819- 82- 9-
ABCD
W6QGX...543-181- 3-B
K6ACF...396-132- 3-B
K6DNJ...333-111- 3-B
W6LIT...330- 66- 5-AB
KN6GMX.330-110- 3-B
W6MRH...294- 98- 3-B
W6HZ....280- 54- 5-BC
W6WRT...222- 74- 3-B
W6DXI....60- 60- 1-B
K6CJG.....6- 6- 1-B
W6LEE/6....2- 2- 1-B
W6YZU/6...2- 2- 1-B

Arizona

W7LEE....95- 19- 5-B
W7VMP....95- 19- 5-B
W7YZU....28- 7- 4-B

Santa Barbara

W6OHQ/6.364- 50- 7-BD
K6CRJ....129- 43- 3-B

KN6HEC...54- 18- 3-B

WEST GULF DIVISION

Northern Texas

W5SNX....3- 3- 1-B

Oklahoma

W5DFU....21- 7- 3-B

New Mexico

W5FAG/5...24- 12- 2-B
W5FPB.....11- 11- 1-B
W5EYR.....7- 7- 1-B
W9EYV/5...6- 6- 1-B

CANADIAN DIVISION

Maritime

VO6U.....12- 4- 1-AC
W7SNR/VO6.9- 6- 1-AC

Ontario

VE3BQN/3
1067- 93-11-
ABCD
VE3DNX..869- 78-11-BC
VE3AIB...776- 95- 8-ABD
VE3DIR...462- 66- 7-B
VE3AQG...335- 71- 5-B
VE3BGI...225- 45- 5-AB
VE3DSU...215- 43- 5-B
VE3DHG..210- 42- 5-AB
VE3DER..204- 34- 6-AB
VE3AET...185- 37- 5-AB
VE3AGW..168- 42- 4-AB
VE3BMB..132- 33- 4-B
VE3BPB....72- 12- 6-B
VE3KM.....9- 9- 1-A

Quebec

VE2AOK..126- 18- 7-B

British Columbia

VE7FJ.....48- 16- 3-B

[1] WN3ZAQ, opr. [2] Novice award winner.
[3] W1VLH, opr. [4] Hq. staff — not eligible for award. [5] W1WPR, opr. [6] Multiple-operator award winner. [7] W7QPM, opr.

CALLING ALL NOVICES: *CQ N-R!*

The Novice Round-up makes its fourth annual appearance this year, January 8th through 23rd. Old-timers are invited to join in the fun and give the newcomers contacts.

Full details appeared in December *QST*, but as a reminder, don't forget that the Round-up starts on Saturday, January 8th, at 6:00 P.M., local time, and ends on Sunday, January 23rd, 9:00 P.M. local time. A time limit of forty hours is available. This can be used any way you prefer in operation on 80, 40, 15 and 2 meters.

You've still time to get extra scoring credits by qualifying in the Code Proficiency Run from W1AW on January 14th, or from W6OWP on January 7th. In the meantime, send to ARRL Headquarters for your free map of the United States, a contest log, and reporting forms for the Novice Round-up. The fine outline map can be posted in your shack to keep a visual check on your worked-all-states progress.

Remember to read December *QST* again for full details on rules.

A.R.R.L. COUNTRIES LIST • *Official List for ARRL DX Contest and the Postwar DXCC*

AC3 ..... Sikkim
AC4 ..... Tibet
AP ..... Pakistan
BV, (C3) ..... Formosa
C (unofficial) ..... China
C3 ..... (See BV)
C9 ..... Manchuria
CE ..... Chile
CE7Z-, LU, VK1, VP8 .... Antarctica
CEØ ..... Easter Island
CM, CO ..... Cuba
CN2, KT1 ..... Tangier Zone
CN8 ..... French Morocco
CP ..... Bolivia
CR4 ..... Cape Verde Islands
CR5 ..... Portuguese Guinea
CR5 ..... Principe, Sao Thome
CR6 ..... Angola
CR7 ..... Mozambique
CR8 ..... Goa (Portuguese India)
CR9 ..... Macau
CR10 ..... Portuguese Timor
CT1 ..... Portugal
CT2 ..... Azores Islands
CT3 ..... Madeira Islands
CX ..... Uruguay
DJ, DL, DM ..... Germany
DU ..... Philippine Islands
EA ..... Spain
EA6 ..... Balearic Islands
EA8 ..... Canary Islands
EA9 ..... Ifni
EA9 ..... Rio de Oro
EA9 ..... Spanish Morocco
EAØ ..... Spanish Guinea
EI ..... Republic of Ireland
EL ..... Liberia
EQ ..... Iran (Persia)
ET2 ..... Eritrea
ET3 ..... Ethiopia
F ..... France
FA ..... Algeria
FB8 .. Amsterdam & St. Paul Islands
FB8 ..... Kerguelen Islands
FB8 ..... Madagascar
FC ..... Corsica
FD ..... French Togoland
FE8 ..... French Cameroons
FF8 ..... French West Africa
FG ..... Guadeloupe
FI8 ..... French Indo-China
FK8 ..... New Caledonia
FKS8 ..... (See OE)
FL8 ..... French Somaliland
FM ..... Martinique
FN ..... French India
FO8 ..... Clipperton Island
FO8 .. French Oceania (e.g., Tahiti)
FP8 .. St. Pierre & Miquelon Islands
FQ8 ..... French Equatorial Africa
FR7 ..... Reunion Island
FU8, YJ ..... New Hebrides
FY7 ..... French Guiana & Inini
G ..... England
GC ..... Channel Islands
GD ..... Isle of Man
GI ..... Northern Ireland
GM ..... Scotland
GW ..... Wales
HA ..... Hungary
HB1, 9 ..... Switzerland
HC ..... Ecuador
HC8 ..... Galapagos Islands
HE ..... Leichtenstein
HH ..... Haiti
HI ..... Dominican Republic
HK ..... Colombia
HKØ ... Archipelago of San Andres and Providencia
HL ..... Korea
HP ..... Panama
HR ..... Honduras
HS ..... Siam
HV ..... Vatican City
HZ .. Saudi Arabia (Hedjaz & Nejd)
I1 ..... Italy
I1 ..... Trieste
I5, MS4 ..... Italian Somaliland
IS1 ..... Sardinia
JA, KA ..... Japan
JY, ZC7 ..... Jordan
JZØ ..... Netherlands New Guinea
K, W ..... United States of America
KA ..... (See JA)
KAØ ..... Bonin & Volcano Islands
KB6 ... Baker, Howland & American Phoenix Islands
KC4 ..... Navassa Island
KC6 ..... Eastern Caroline Islands
KC6 ..... Western Caroline Islands
KG4 ..... Guantanamo Bay
KG6 ..... Mariana Islands
KH6 ..... Hawaiian Islands
KJ6 ..... Johnston Island
KL7 ..... Alaska
KM6 ..... Midway Islands
KP4 ..... Puerto Rico
KP6 ... Palmyra Group, Jarvis Island
KR6 .. Ryukyu Islands (e.g., Okinawa)
KS4 ..... Swan Island
KS6 ..... American Samoa
KT1 ..... (See CN2)
KV4 ..... Virgin Islands
KW6 ..... Wake Island
KX6 ..... Marshall Islands
KZ5 ..... Canal Zone
LA, LB ..... Jan Mayen
LA, LB ..... Norway
LA, LB ..... Svalbard (Spitzbergen)
LU ..... Argentina
LU-Z ..... (See CE7Z-, VK1, VP8)
LX ..... Luxembourg
LZ ..... Bulgaria
M1 ..... San Marino
MB9 ..... (See OE)
MP4 ..... Bahrein Island
MP4 ..... Kuwait
MP4 ..... Qatar
MP4 ..... Trucial Oman
MS4 ..... (See I5)
OA ..... Peru
OD5 ..... Lebanon
OE, MB9, FKS8 ..... Austria
OH ..... Finland
OK ..... Czechoslovakia
ON4 ..... Belgium
OQ5, Ø ..... Belgian Congo
OX ..... Greenland
OY ..... Faeroes
OZ ..... Denmark
PAØ ..... Netherlands
PJ2 ..... Netherlands West Indies
PK1, 2, 3 ..... Java
PK4 ..... Sumatra
PK5 ..... Netherlands Borneo
PK6 .... Celebes & Molucca Islands
PX ..... Andorra
PY ..... Brazil
PZ1 ..... Netherlands Guiana
SM ..... Sweden
SP ..... Poland
ST ..... Anglo-Egyptian Sudan
SU ..... Egypt
SV ..... Greece
SV ..... Crete
SV ..... Dodecanese (e.g., Rhodes)
TA ..... Turkey
TF ..... Iceland
TG ..... Guatemala
TI ..... Costa Rica
TI9 ..... Cocos Island
UA1, 3, 4, 6 ..... European Russian Socialist Federated Soviet Republic
UA9, Ø ..... Asiatic Russian S.F.S.R.
UB5 ..... Ukraine
UC2 ..... White Russian Soviet Socialist Republic
UD6 ..... Azerbaijan
UF6 ..... Georgia
UG6 ..... Armenia
UH8 ..... Turkoman
UI8 ..... Uzbek
UJ8 ..... Tadzhik
UL7 ..... Kazakh
UM8 ..... Kirghiz
UN1 ..... Karelo-Finnish Republic
UO5 ..... Moldavia
UP2 ..... Lithuania
UQ2 ..... Latvia
UR2 ..... Estonia
VE, VO ..... Canada
VK .. Australia (including Tasmania)
VK1 ..... (See CE7Z-, LU-Z, VP8)
VK1, ZC2 ..... Cocos Island
VK1 ..... Heard Island
VK1 ..... Macquarie Island
VK9 ..... Norfolk Island
VK9 ..... Papua Territory
VK9 ..... Territory of New Guinea
VO ..... (See VE)
VP1 ..... British Honduras
VP2 ..... Leeward Islands
VP2 ..... Windward Islands
VP3 ..... British Guiana
VP4 ..... Trinidad & Tobago
VP5 ..... Cayman Islands
VP5 ..... Jamaica
VP5 ..... Turks & Caicos Islands
VP6 ..... Barbados
VP7 ..... Bahama Islands
VP8 ..... (See CE7Z-, VK1, LU-Z)
VP8 ..... Falkland Islands
VP8 ..... South Georgia
VP8, LU-Z .... South Orkney Islands
VP8 ..... South Sandwich Islands
VP8, LU-Z ... South Shetland Islands
VP9 ..... Bermuda Islands
VQ1 ..... Zanzibar
VQ2 ..... Northern Rhodesia
VQ3 ..... Tanganyika Territory
VQ4 ..... Kenya
VQ5 ..... Uganda
VQ6 ..... British Somaliland
VQ8 ..... Chagos Islands
VQ8 ..... Mauritius
VQ9 ..... Seychelles
VR1 ..... Gilbert & Ellice Islands & Ocean Island
VR1 ..... British Phoenix Islands
VR2 ..... Fiji Islands
VR3 ..... Fanning Island (Christmas Island)
VR4 ..... Solomon Islands
VR5 ..... Tonga (Friendly) Islands
VR6 ..... Pitcairn Island
VS1 ..... Singapore
VS2 ..... Malaya
VS4 ..... Sarawak
VS5 ..... Brunei
VS6 ..... Hong Kong
VS9 ..... Aden & Socotra
VS9 ..... Maldive Islands
VS9 ..... Sultanate of Oman
VU2 ..... India
VU4 ..... Laccadive Islands
VU5 .. Andaman and Nicobar Islands
XE ..... Mexico
XZ ..... Burma
YA ..... Afghanistan
YI ..... Iraq
YJ ..... (See FU8)
YK ..... Syria
YN ..... Nicaragua
YO ..... Roumania
YS ..... Salvador
YU ..... Yugoslavia
YV ..... Venezuela
ZA ..... Albania
ZB1 ..... Malta
ZB2 ..... Gibraltar
ZC2 ..... (See VK1)
ZC3 ..... Christmas Island
ZC4 ..... Cyprus
ZC5 ..... British North Borneo
ZC6 ..... Palestine
ZC7 ..... (See JY)
ZD1 ..... Sierra Leone
ZD2 ..... Nigeria
ZD3 ..... Gambia
ZD4 ..... Gold Coast, Togoland
ZD6 ..... Nyasaland
ZD7 ..... St. Helena
ZD8 ..... Ascension Island
ZD9 ..... Tristan da Cunha & Gough Islands
ZE ..... Southern Rhodesia
ZK1 ..... Cook Islands
ZK2 ..... Niue
ZL ..... New Zealand
ZM6 ..... British Samoa
ZM7 ..... Tokelau (Union) Islands
ZP ..... Paraguay
ZS1, 2, 4, 5, 6 .. Union of South Africa
ZS2 ..... Marion Island
ZS3 ..... Southwest Africa
ZS7 ..... Swaziland
ZS8 ..... Basutoland
ZS9 ..... Bechuanaland
3A ..... Monaco
3V8 ..... Tunisia
4S7 ..... Ceylon
4W1 ..... Yemen
4X4 ..... Israel
5A ..... Libya
9S4 ..... Saar
..... Albadra Islands
..... Bhutan
..... Comoro Islands
..... Fridtjof Nansen Land (Franz Josef Land)
..... Mongolia
..... Nepal
..... Tannu Tuva
..... Wrangel Islands

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Why:

Well — 1955. A new DX year coming up!

We've instructed Jeeves to go out and pin down the reasons for all the wide smiles of high DX morale prevalent at this writing. Here's what the ear-tufted gentleman uncovered in the line of facts, ma'am, DX blessings that are no sorrow to comprehend:

. . . The propagational worm has turned and conditions on our higher-frequency DX bands are on a slow but sure mend. About time!

. . . Fifteen meters, our newest DX band of vast potentialities, is about to come into its own. If any band has a chance to unseat Old Pro Twenty as *the* DX band, 21 Mc. is it. Indeed, counting 11 meters, it won't be long before we have *four* DX bands simultaneously capable of producing rare daylight DX.

. . . There are more ARRL DXCC Countries List items readily workable than ever before, this despite the general absence of U-prefixed stations. Increasing traffic at W1WPO's Hq. DXCC desk reflects this and you'll be able to prove it for yourself next month in the annual ARRL DX Competition. QRV?

. . . Liberalization of amateur regulations in several overseas countries during 1954 now is evident in the increasing number of formerly rare prefixes heard on DX bands. Austrian, Japanese and Philippine nationals particularly benefited. The sluggish ITU "ban" list which originally included over a dozen countries now is whittled down to French Indo-China, Indonesia, Iran, Korea and Thailand.

. . . TVI terrors continue to wane. Guys who surrendered to the one-eyed monsters a couple of years ago now are back on the air with modern single-frequency-output rigs, working DX and grousing about another nuisance — ITV.

. . . Single-sideband DX in 1955 no longer is just around the corner. It's here. Flip your receiver on and you'll hear DXers eagerly putting s.s.b. to work on long-haul A3 paths, a facet of the game attracting converts and exponents daily.

. . . A relatively new DX-hunting gimmick is creating much interest and finding wide acceptance: the "midget" rotary beam. Thoroughly propounded in 1954 *QST*'s, these miniature squirters have given cliff dwellers a better chance to slug it out with the antenna-farm lads, and have made 7-Mc. rotaries highly practicable.

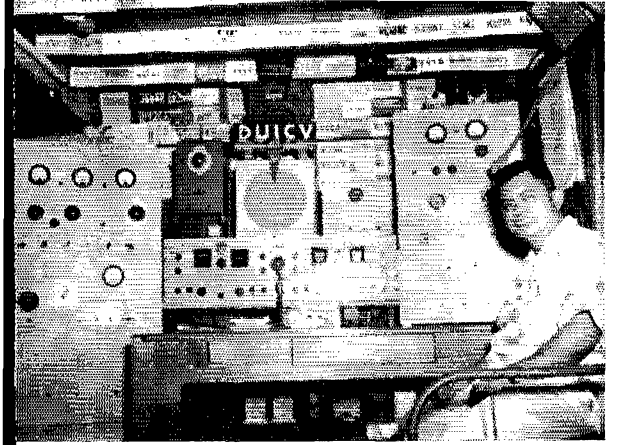
That's enough detail to go into in our limited space. And *there* you are, as George Gobel puts it. You need no rose-tinted specs to diagnose the 1955 DX world sound, substantial, and rarin' to go. And, as usual, your monthly chunk of *QST* is rarin' to record your 1955 reports and contributions — band by band, QTH by QTH, continent by continent, photo by photo and cliché by cliché. Like this, for instance. . . .

What:

Fifteen, as we were saying, is coming along nicely. W7AHX radiotelephoned with a wide selection of stuff including CX3BH, EL2X, HC2JR, KA8AB, KC6AA, KG6GX, KJ6AZ, OQ5RU and ZB2A . . . . CN8MM, ZC4JA, ZS3s BC and E came back to K2CHS on voice . . . . HCs 1MB 2PG and VK9DB top W5QXX's lengthy A3 list . . . . W6ZZ caught up with voicers DU7SV, HK3FV, JA4BB, KW6s AT BB, VP3YG, a VP8 and unusual XE5PD . . . . Ws 1JLN 1MGP and 4YQB catch their share of the goodies, W1MGP with a mere 3-watt mobile outfit . . . . *Newark News* Radio Club logged 21-Mc. 'phone candidates CP5EK, CT3AN, EA9s AR AS, ELs 3A 12A, TA3AA, SVØWK, VQs 2DT 4EZ 4RF 5BVF, ZB1s AUV BO, ZEs 2KR 5JJ, ZS3B, 4X4s BC and BL . . . . Fifteen c.w. is equally productive and ZD6BX recommends FY7YC, HZ1HZ, SU1XZ, YI2AM, YVs 1AD 5AE and ZD2DCP . . . . W2ESO stalks code men ZSs 7D and 9I; Ws 1CTW and 8DAW nabbed ZD6BX (73) 14 *EST* . . . . DU7SV, LU1ZT, PJ2AA, TI2BX, YV5BJ and ZE5JJ swapped c.w. with W7AHX . . . . KP4KD reached 83 15-meter c.w. countries by way of an FY7, OE5JK, TF3MB (80) 17 *GMT* and a ZD6.

Twenty 'phone reeks with goodies and K2CJN made off with CR4AL (125) 16 *EST*, FF8AP, LX1DU (148) 9, ST2NW 16, VQs 2DT 3RJB, ZD4BR and 3V8BB. VQ5DES, YO3CM, 4S7LM, 4X4DK and a ZD3 escaped . . . . VPs 1GG and 7NS (190) 15 *EST* worked VE5HR . . . . ET2XX (198), OD5AB and TA3AA will ship QSLs to W7AHX . . . . W5KUC and the 200-DXC boys drew beads on scrumptious FY7YE (185) 0, LH2P (145) 6–8 of Svalbard, VQ8CB, VS4HK (100–200) who moves to VS5, YK1AE (148) 14, ZC3AC, 4S7s FG (110) 18, YL (105) 18 and 9S4AP (190) 15, all times *GMT* . . . . The West Gulf *DX Bulletin*, W5s ALA and FXN prime movers, has these 20-meter 'phone items under surveillance: AC3PT (102) 13 *GMT*, GD2FRV (172) 14, M1CP (95) 14, YA2KB (108) 14, ZD3BFC (107) 19 and 4S7YL (107) 13 . . . . So. Calif. DX Club's *Bulletin* lists 'phones CR6BX (158) 14, CS3AC (195) 17, FE8AC, FM7WN (160) 8, FO8s AB (113) 10, AD (150), AG (197) 22, OQ5FO (125) 14, VSs 1FK (47) 9, 1MK (146) 8, 2DS (96) 9, ZC7DO, ZDs 4BL (180) 14–15, 9AB (150) 6, ZM6s AL (183) 19–20, AT (161–182) 18–22, 4S7BR (105) 7, 5As 2TZ (150) 17, 3TE (110) 11 and 4TR (150) 11, times *PST* . . . . NNRC sources tagged 14-Mc. A3ers CR6AC, CT2AG, DUs 1AP 1AS 9JY 8 *EST*, EAs 6QS 6SN 9AR 14, ØAC (150) 16, EL2X 14–15, FM7WF (172), FQ8AK 15, GCs 3EBK (100)

* *New Mailing Address:* Effective immediately, please mail all reports of DX activity to DX Editor Newkirk's new address: 5833 North Kenmore Ave., Chicago 40, Illinois.



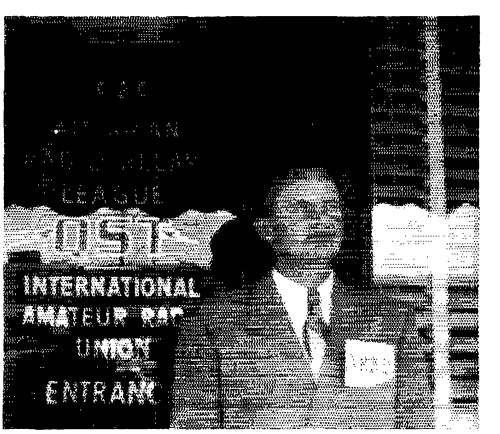
Though relatively a newcomer to DX ranks, DU1CV of Laguna, Luzon, P. I., has done more than his share to make the Philippines available on several DX bands. Vil runs 250 watts of 'phone or c.w. (*Photo via DU7SV*)

♦

17, 8MF (135) 17, GD3IBQ, HI8WF, HZ1AB, JA7BN, KC6AA, KM6AX, KR6KS (180), KT1s LU PU WX (185), KW6BB, KX6s AF NA, OD5s AJ AP BA LC, OQ5s CX ER 13, OX3ZO, PI1J in Holland, ST2NW 16, TAs 2EFA 3AA, TG9s BG BH, VK9s BS 8, RG 7, VG YT, VPs 1AB (160), 2DA (155) 2DL 7NG 7NT 7NU 8AA (143) 20, VQs 4ERR 4EU 4EZ (149) 14, 4RF (130) 16, VR3A 7, VSs 1FE 2BS 2DB 2DQ 2DY 2EB, YN1LB (110), YO3RL 17, YSs 1MS 1O2AG, YU1s AD CY GM (148) 12, ZBs 1AJX (173), 2A (125), ZP5s CF CG, 4X4s DR 16, ED, 5As 3TC 4TN and 4TU (120–145) 15.

Twenty c.w., night-shy in northern latitudes, remains top banana for the bunch. K2GFQ worked DU7SV (Volt really gets around!), HR1MC, LUs 2ZC 8ZS of So. Shetlands, VP8AQ (10) 22–23 *GMT* of So. Orkneys, VU2EJ (40) 2, YI2AM (65) 21, ZC4GF and a KM6 . . . . W4YHD raised CRs 6CS 7AG (15) 9, EAs 8BK (45) 11, 9DF (55) 11, FQ8AX, GD3IBQ (36) 12, IS1TAW, ST2AR (10) 19, VP2s GW, KB (100) 23, VQs 2AB (20) 19, 4RF, ZE5JA (73) 18, ZS3AH (80) 20, 3V8AN (102) 5, OQ5s CP (15) 22, GU RA (40) 13 and a flock of KA brethren, all times *GMT*. . . . . FY7YE (61) 17 *EST*, MP4BBL (87) 11, UB5KAB, VQ8CB (60) 11, VU2FX and ZM6AX chatted with W8DAW . . . . ZD6BX picked up FB8s BC BN BR XX, SU1CN, VK1PG (44) 15 *GMT*, VSs 1BJ 1EG 1EW 1FE 1GG 2DF (15) 15, 6CG 5CW 9GV, VU2AX, YO3RF (78) 15, ZC4XA, ZD2DCP, ZS8D, 4S7s KH LB NG NX (66) 15, 4X4s BX DH and DR . . . . KM6AX (60), VP7NG (10) and VP8AA (15) wound up in W7UAB's ledger . . . . Nearing the century mark, W1WAI grabbed HA5KBP (71) 18 *GMT*, IS1AHK (67) 20 and LZ1KAB (81) 17–18 . . . . CNs 2BE 8FQ 8GB, F9QV/FC, an FQ8, a GD3, KV4AQ, OQ5s BB BQ, OX3UD, OE13USA, SV1SP, VP7NN, YOs 3GY 6AW, ZB1JRK, ZE5JE and CP4MT answered W3UXX . . . . CN8FL caught FK8AC, KR6LP (65), KX6BF (50), MP4BBE, VR2AS (30), YN1AA, ZK1AB (35) 6 *GMT* and 4S7HK . . . . Among K2BZT's monumental assemblage we find CR7LU 14 *EST*, CT3AV (50) 13, FQ8AT 15, FF8AJ 17, HZ1HZ 11, JAs 4AF (69) 18, 6AD (66) 18, 9CA (70) 18 (not Iwo), KAs 2CG 2CR 3SV 9MF, LU9ZM (86) 17, VQ2AB (90) 16, a VQ6, YO3RD, ZE2JC (86) 15, a ZD6 and ZS3T (20) 16. This makes it 129 for Hayden . . . . Here and there, *W2OLU* hooked: FM7WP (42) 16 *EST*, a VP7. *W7AHX:* CT3AB, EA9AP, ZB1BF. *WØVFM:* VP6GT (76) 22–23 *GMT*. *W9UKG:* FY7YZ (32) 11 *CST*. *CO2SW:* CEØAD (18) 23–0 *GMT*, CR5JB, EAØAB, LUs 1ZT 7ZM, MP4BBL (20) 15, ZD4s AB BK, ZSs 7C 9I. *VE5HR:* YU2DU . . . . WGDXC 14-Mc. c.w. pickings: CP3CA (50) 21, CR6CJ (45) 20, ETs 2PA (62) 23, 3S (55) 19, FK8AO (75) 6, FQ8AG (68) 21, GC4LI (95) 14, OD5BA (65) 14, OY2Z (2) 23–0, VP8BE (57–78) 1–2, VQs 4BNU (38–50) 18–19, 6LQ (67) 14–15, VRs 2AA (30) 3, 3A (63) 3, 2RO (G2RO), ZE3JA (95) 0, ZS3s K (20) 20, Q (72–100) 19–20, T (18) 21 and 4X4CK (52) 14, times *GMT*. . . . . NCDXC offerings: FG7XA (20) 14, FR7ZA (20) 15, GC2FZC (20) 15, HKØAI (71) 15, HZ1AB (79) 15, MP4s QAH (12) 15, QAJ (59) 15–16, SP2KAC (59) 15, SVØWL (51) 15, TA3AA (26) 15–16, UA9KAB (64), VK9RH (72) 5 of Norfolk Isle, VQs 2JN (60) 20, 4EZ (24) 15, VS4HK (47) 16, YO3GY (45) 15, ZB1EB (88) 16, ZC4IP (94) 15, ZD3BFC (40) 20, 4X4s AM (53) 15–16, CK (88) 15–16 and GY (58) 17, all *PST*. . . . . Noted by SCDXC: C3AR (22) 23 PST, KG6IG (65) 20–21 of Chichi Jima, KJ6AN (40) 18–19, VK1s AC (20) 22, EG (36) 22–23 of Antarctica, and VQ8CE (11) 10 of the Chagos.

Forty c.w. served up EAs 8BF (10) 3 *GMT*, 9AP (1) 22, 9DF (30) 7 of Rio de Oro, HA5KBA (12) 22, IS1AHK (10) 22, KC6CG (20) 12, KG6GX (30) 12, LU7ZM (24) 3, ST2s AR (2) 0, NG (7) 1, VK1AC (7) 12, ZS3K (30) 5, 4X4s DE (10) 0 and FW (35) 2 to W4YHD . . . . ZD6BX accounts for JAs 3AA 6HK, VU2BY and 4S7NX on 40; 4S7DJ got away . . . . W2ESO collected LZ1KAB, an ST2, VK9AU (15) 6 *EST*, VS9AS, VQ2GW 20, ZL2QN/-VQ4 (30) 20, 4X4RE 17; HZ1HZ, OD5AX and other LZ1s were heard . . . . W6CAE and K6EC nailed down ZD6BX (24–28) 14–15 *GMT*. . . . . W6LRU worked CE3AG (12) 9 *PST*, DU7SV (28) 12 and FK8AO (38) 6. Don stalks FB8XX 15 and FR7ZA 15 on the low edge . . . . 7-Mc. c.w. doings at this shack and that shack, at *W1APA:* LU3ZB, VP6GT. *W1WAI:* HR1JZ (20) 12 *GMT*. *K2ALA:* IT1TAI, HK1TH, TI2PZ, YU3ABC, YV5DE. *W3WPG:* HA5KBA, OQ5GU, PJ2CE, YS1O. *W8DAW:* FG7XA (9) 18 *EST*. *W9UKG:* HKØAI (75) 5–6 *GMT*, LU2ZI, a VP6. *CN8FL:* AP2K (70), VS6CG (20). *DL4ZC:* ZE6JJ. *KP4KD:* VP8AZ (30) 8–9 *GMT*. . . . . 7-Mc. customers CRs 6AC (17) 18–19, 7BC (27) 5 *GMT*, 7CI (24) 3, HK4EF (20) 20, HR1AA (28) 20, LU7ZO (28) 6, OQ5GU (28) 5, VPs 7NG (23) 5, 8BE (22) 6 and ZS3K (37) 5–6 are recorded by WGDXC . . . . SCDXC



VR2CD's consistent Fiji signal easily will be recalled by the DX crowd. Chas. is shown here during a stop at ARRL Hq. while recently touring the U. S. A. with his family as VE7ASL/W/mobile. Ultimately, ex-VR2CD plans to settle down in Hawaii to await a future KH6 call sign.

cohorts add EL2X (5) 7 *PST*, FP8AP (40) 18–19, JA1AA (23) 7, VK1RJ (25) 5, VP8AD (12) 0–1, VQ6LQ (30) 7, VS1FE (16) 8, ZMs 6AI (1), 7AL (1) and ZS7D (35) 7.

Forty 'phone, tough as nails, furnished DU7SV and HP3FL for W7AHX . . . . HC1MB, HKØAI (204) of San Andres, KG4AJ, TI2WLC, VPs 5SC 6FR and YV5AB used 7-Mc. A3 with W1APA . . . . NNRC lists 40-meter radiotelephone activity by CP1BG, HP1TS, HR1AT, DUs 1EC 1GF 6IG 7NO 9JM, dozens of JAs, KC6s AA CG UX, KG6GX, KV4BD, OA2A, many VKs and ZLs, YN4CB YV5EY, ZS6s BW and DW (85) 23 *EST*.

Eighty c.w. mainly was featured by the pursuit of ZDs 2DCP (11) and 6BX (99) by the East Coast crew; and DU7SV plus VR3A by the West Coast contingent . . . . Europeans were the most common commodity and K2BZT found about a dozen Gs, several DLs, EIs 4X 9J, CT1TT, three PAØs, GI5UR and OK1KBW available . . . . Watch for ZD6BX around 3600 kc. between 9 and 10 *EST*

. . . . KP4KD went to 'phone to clinch Dominican Republic, HI6TC on 3900 kc.; a fast QSL resulted.

One-sixty c.w. saw many hands preening for this season's transatlantic efforts. TI2BX put a new country on the band; Ws 2EQS 2GGL 3RGQ 8ANO and 9PNE were among his lucky pursuers in late October . . . . G6GM got across to W1BB and W2EQS; G3PU swapped 1.8-Mc. reports with W1BB . . . . Quite a few rather rare Africans and Asians have reported 160-meter interest. Depending on conditions, we may see several new top-band "firsts" claimed in 1955.

Ten 'phone and its mercurial openings require quick work. Using his new 10-element rotary with corner reflector, W4NQM cashed in on 28-Mc. 'phones CEs 2HJ 3CZ, CR6BX, CXs 2CN 3AA 4CS, HC1s MB RT, LUs 3AAT 4AAR 4DJT 7DAA 8FP 9AQ, PYs 2CK 4AS 4EM, TI3LA.

JA6AD has one of the more potent 14-Mc. Asian signals these days and has accounted for over 125 ARRL DXCC List countries since activating in December, 1952. Hiro runs 300 watts to the transmitter at right. (*Photo via W1YYM*)

VPs 2MY 6WR, VQ2FU, XE1IQ, YVs 3BK 5AB, ZSs 4CX and 6OP . . . . 28-Mc. A3 luck here and there, at *K2AJD:* KV4BI, KZ5s, a VP2. *W3EDI:* HR1AA. *W3ESE:* LU4AAT, PY4PQ. *W3QMG:* LU3BQ, a VP2, ZS1KK. *WØBJP:* CE5GG, CX1GG, PY7HS, ZS4CW . . . . G3IDG finds ten open for DX on about one day out of four. Allan has heard FAs 3JY 9RZ, LUs 1DJC 3AQ 5DC 9AG 9AW, OQ5RU, PYs 1AGP 2AHS, VQs 2NS 4RF, ZD3BFC, ZS6s CV SG WW and ZK. All save FA9RZ were using voice. Other Gs were heard calling or working CN8s, OQØDZ and ZP stations . . . . Out west, W6NJU QSOd CE3QJ, CX3AA, KH6PM, LU6AB and a PY2. Who will claim the first 1955 WAC on 28 Mc.?

Where:

ARI General Secretary I1AXD writes that all Trieste-bound QSLs now can be sent through ARI, Via Paolo 10, Milan, Italy, or by way of I1BLF/Trieste who is ARI's manager for the Territory . . . . W2FCT has VP3JM's log for the period Sept. 20, 1946, to Oct. 10, 1948. If you still need Andy's QSL, send a stamped self-addressed envelope plus full QSO data to W2FCT's *Call Book* QTH . . . . F7BM is another who recently received a UB5CF QSL direct from Odessa. Several other UB5s now answer to the address to follow . . . . "All QSLs for XE6AM QSOs have been sent and anyone not receiving his please notify W6COH." Stations who worked other Todos Santos XE6s in August and who still need QSLs are also advised to contact W6COH who will alert the operators concerned . . . . From W1JDE: "I was formerly TG9FG in Guatemala and worked more than 3000 stations while stationed there. While I QSLd 100 per cent I feel that there are many hams who did not receive my QSL cards because of the poor mail situation there." Send QSO particulars to W1JDE if you still need his TG9FG pasteboard. He has his Guatemala logs and plenty of QSLs . . . . You must thank W1s APA UED WPO YYM, W2s MLO OLU, W3s SOH UKO WPG, W5KUC, W8DAW, ZC4FB, NNRC, WGDXC and 200-DXC for running down the following addresses:

C3AR, OARMA, APO 63, % Postmaster, San Francisco, Calif. . . . . ex-**CN8EG,** D. R. Thrasher, W8PHX, 6521 Berwyn St., Garden City, Mich. . . . . ex-**CN8FL,** Narvel W. Reece, W8EZF, 1578 Van Zandt Rd., Cincinnati 31, Ohio . . . . **CN8IB,** Norm Kiernan (W1ZIN), Navy 214, Box 40, FPO, New York, N. Y. . . . . **CO2OS,** Box 2425, Havana, Cuba . . . . **DL2WO,** K. G. Summerfiend, Sgts. Mess, RAF Sundern, BAOR 39, Germany . . . . **FY7YZ,** Box 7, Cayenne, French Guiana . . . . **HA5KBA** (QSL via HSWRL) . . . . ex-**HH3DM,** D. J. Morris, WØEMN, City Engineer, Waverly, Iowa . . . . **HP1EV,** E. Valencia, P.O. Box 1728, Panama City, Panama . . . . ex-**KM6AB** (QSL to KH6WW) . . . . ex-**MD5BY** (QSL to G3IUU) . . . . **MD5DD** (QSL via RSGB) . . . . **OX3KM,** K. Madsen (OZ4KM), Nipisat Loranstation, Disko Oen, Greenland . . . . ex-**OX3KS,** Knud Sorenson, Valbygaard Skov pr. Frederikslund st., Denmark . . . . **OX3ZO** (QSL via EDR) . . . . **PY1CK** (QSL via LABRE) . . . . ex-**SU1MK** (QSL to G3IGU) . . . . ex-**TA3MP,** Meade M. Padgett, K6EWZ, 428 Alameda Rd., San Anselmo, Calif. . . . . ex-**TG9FG,** F. W. Greene, W1JDE, 4 Ryder Dr., Woburn, Mass. . . . . **TG9MB,** Box 115, Guatemala City, Guatemala . . . . **TI2RMA,** P.O. Box 1523, San Jose, C. R. . . . . **TI2WZZ,** J. R. Acuna, P.O. Box 923, San Jose, C. R. . . . . **UB5KAB,** Box 52, Odessa, Ukraine, U.S.S.R. (airmail only) . . . . **UB5KFX** (see UB5KAB) . . . . **VK6KJ,** B. H. Gates, % A. K. Collins, Stirling Tce., Albany, W. A., Australia . . . . **VP2GW,** Box 108, Grenada, Windward Islands, B. W. I. . . . . ex-**VP3JM** (QSL to W2FCT) . . . . ex-**VP4LK,** D. C. Gittens, 68 Honor Oak Rd., Forest Hill, London SE23, England . . . . **VP6KL,** F. Roberts, % Ash & Watson, Ltd., Broad St., Bridgetown, Barbados, B. W. I. . . . . **VP7NN** (QSL via W3RUZ) . . . . **VQ3CF,** H. A. Seaman, P.O. Songea, Tanganyika Territory . . . . **VQ4FB,** I/P Ward, Signals Officer, Kenya Police Div. Hq., Meru, Kenya . . . . **VQ6LQ,** Box 11, Hargesa, British Somaliland . . . . **VQ8CB** (QSL to VQ8AB) . . . . **VR2AA,** % RNZAF, Lauthala Bay, Fiji Islands . . . . ex-**YI3BUX** (QSL to G3BUX) . . . . **ZB1CH,** Point de vue Hotel, Rabat, Malta . . . . ex-**ZB1EB,** (QSL to G3IJU) . . . . **ZC4RH** (QSL via ZC4IP) . . . . ex-**4S7XG.** (QSL to G3HVG).

Whence:

Asia — "Activity in ZC4 is on the upward trend again. ZC4GF is concentrating on 160 meters, 50 watts to a half-wave wire; ZC4CK is on 40 meters; ZC4s CA and PB are on 20 and 40; ZC4PB hopes to get on 160 and ZC4CA will have a week or two on top band before packing his sea baggage for the U.K.; ZC4MW is temporarily QRT; ZC4IP is, I believe, on 40, 20 and 15; and ZC4RH is a new one." This from ZC4FB who is giving 20 and 40 a final fling before he heads back toward England. . . . . Don't throw away your old Asian QSLs — JARL (Japan) has under consideration an All-Asia DX award to be avail-

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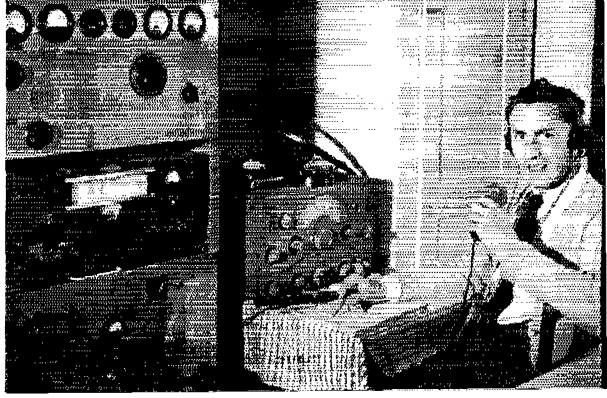
Here's the op and set-up responsible for providing hundreds of Liechtenstein QSOs and many a new country for DXers throughout the world. He's Kurt Bindschedler, HB9MX, active as HB1MX/HE on many 1954 week ends using mostly 15, 20 and 40 meters, 'phone and c.w. The rig is a Collins 310 and the receiver a Philips CR-101. HB1MX/HE has rolled up over eighty ARRL DXCC List countries since last September. (*Photo via HE9RZF*)



able on a world-wide basis. — 4S7XG goes back to G3HVG after over three years of diligent Ceylon DX work — Oender Tuezuenalp, Hamamonue Firin Sok No. 16/1, Ankara, Turkey, is a would-be Turkish ham who desires to correspond with W amateurs. He'll soon QSY to the U. S. for schooling. — W4TBQ, active since 1935 as W1PEF, W6NQY and KA1AC, expects to replace W6OME as one of TA3AA's 1955 operators. — Ex-TA3MP schedules an assault on his Turkey QSL backlog, circumstances ensuing from QSL orders that went astray. Check Meade's present K6EWZ QTH in "Where." TA3s AA, Ankara; US, Izmir; WD, Izmir; and TA2EFA, Ankara, still represent Turkey on ham bands. TA3QN also is in Turkey but for security reasons cannot QSL. — The hamshacks of VS6AE, JA8AG and KA2CC were visited in person by W9YDZ/KG6. — Recent geopolitical developments may have put a damper on future FN7-FN8 amateur operation. CR8AB continues to represent Portuguese India DX interests on 20 meters.

Africa — Illumination of Dark Continental DX doings thanks to ZD6BX: "ZD6EF now is postmaster at Blantyre and is rebuilding; he has a low-power rig on 40 temporarily. VQ5BVF, active on 15 'phone, reports several VQ5s on U.K. leave. VQ5EK is on 20 'phone. FB8BR is a new one in Tananarive with 20 watts on 20 c.w. SU1XZ operates all bands, 160 through 10 meters. ZS9I 'is getting some QSLs off soon.' ZS7D continues very active on 40 c.w." As for his own installation, Vic pens: "ZD6BX now is mainly on 15 meters, with occasional forays on other bands." He hopes to rack up some 3.5-Mc. DX this season but b.c. QRM makes it necessary to operate around 3600 kc. ZD6BX's power goes off from 2100 to 0400 GMT, considerably restricting night DX activities. — CN8s EG and FL return home to W8s PHX and EZF, respectively, where they're willing to clear up any outstanding QSL matters (see "Where"). — AAEM (Morocco) sponsors an interesting DX award based on 30, 25, 20, or 15 CN8-contact QSLs, the requirements depending on one's location. It's called *Diplome de l'AAEM*. For full details write *L'Association des Amateurs Emetteurs du Maroc*, B.P. 2060, Casablanca, Morocco. — EA9DF still is bent on 1955 *Ifni* activity. — QSL managers are familiar fellows, bless 'em, but here's a new sign of the times: EL2X and CN8MM act as *QSO managers* for ZD3BFC.

Oceania — Hats off to ZK1BG for alert monitoring and quick action in October when he did much to assure the rescue of adventurer Willis and balsa raft *Seven Little Sisters near* Samoa. — From the *DXer:* Ex-PK4DA is back in Indonesia for a spell but reports little possibility of ham activity there in the near future. — SCDXC advices: VK1HM and ZC2AC are QRT, their silence to be followed by that of ZC2AD who leaves the Cocos next month. Thus ZC2-land joins Christmas Island (ZC3) in the amateurless category; ZC3AB is in Australia and ZC3AA never activated. Don't forget that G2RO plans operation on Cocos around February 6th–8th. FO8AG swapped islands. Makatea for Tahiti, and VK1AC returns to VK3IB. The ex-FO8AJ team is thinking of possible DXpeditioning in the ZM7 area next summer. VR3A looks forward to more 40- and 80-meter work as well as a 1956 visit to California. VR2BZ continues his RNZAF flying visits to VR5, ZM7 and other areas, firing up a rig whenever he has the opportunity. ZM7AL (ZM6AL) is intermittently available on 40's low edge.

Europe — HV1AA hit the airwaves far behind schedule and QRTd far ahead of schedule. W4YHD reports that only two contacts were made, both of these on 14-Mc. 'phone (no Ws). — F7s BM DH and DZ are hard at work ironing out plans for a more tightly-knit F7 ham organization replete with hamfests, call book and local nets. Club secretary K2JCS notes that DL2WW (W2FKO), ON4ZI and YU1GM (W4GMP) probably are the only Americans operating ham stations in their respective countries or licensing areas. — In the wake of the recent Trieste settlement, AG2s and MF2s go off the air in favor of I1 licensees. MF2AA reports that the Trieste DX award rules now conform to omit reference to AG2 and MF2 prefixes. — Contact GW8WJ for info on the Tops C.W. Club, a group of code-hounds with members in 21 countries. — In QSO with W8DAW, UB5KAB states that certain U.S.S.R. "collective stations" are authorized to QSO outside the curtain. Finally? Now how about some UIs ULs and UMs.

South America — Coöperative LABRE Secretary Flavio Serrano now sports call sign PY1CK. — W2OHF was notified by PZ1RM that PZ1AL unfortunately has joined the ranks of Silent Keys. — "Chilean transport *Esmeralda* now is on its way to Easter Island and I expect to have at the end of November a copy of CEØAD's log for the communications he has made from the beginning of the year to date," writes CE3AG, ex-CEØAA. Luis then will be able to answer the 300-plus pasteboards RCC has received for CEØAD. CEØAC returned to Chile and will QSL the few contacts he made. Conditions on Easter remain inhospitable to hamming, the main difficulty being lack of generator fuel.

Hereabouts — CO2SW breaks a long silence and clews us in on Cuban DX doings. Active DXers down Sergio's way are CM9AA, CO2s BM CT OE OM WD SW, CO7AH, all c.w.; CO2s BL and OZ on 'phone. CO2CT is cranking up a new rotary and kw. while CO2SW rebuilds toward faster bandswitching. Sergio needs tracers on former EP1s C AL, MD5PC and KC6WA, all worked in '47 and '48 — September 18th, at Chicago, the annual W9-DXCC meeting drew the attendance of over 40 DX sharpshooters. W9s PNV TRD and ARRL QSL Manager W9CFT headed an entertaining program. W9s ABA ABB AEH AMU DHT ESQ EWC FDX FID FJB FJY FKC GDI GIL GRV HUZ IOD IU JIP JJF JUV KA KXK LI LNM MZP NN PGW QIY RBI RHA RKP RQM TKV UXO VND WFS WKU and YFV were on hand. W9s FID FKC NN and QIY were elected to the W9-DXCC executive committee for the new year, W9FID as chairman — W6s CAE BZE CHV GBG MGT, K6s DGB and EC invaded W6LRU's abode in early November for a meeting of the San Diego DX Club. Don looks for hints on how to pry QSLs from VK1s AF RL, ZM6AA and 5A2TR — The Fourth Informal Get-together of New England DXCC Members, held at Cambridge, November 4th, saw dozens of DXers enjoy a program featuring W1DX, W1FH and ARRL QSL Manager W1JOJ. Many of the gang could swap tales of antenna damage at the hands of YLs Edna, Carol and Hazel — Ex-HH3DM is QRX at the "Where" QTH for those who still need his QSLs — W9PRM would like lines from hams interested in, and specializing in, QRP DX — W6YY knocked off the NZART (New Zealand) WAP award, the first U. S. A. station to earn it on 'phone. — A letter from Hallicrafters Co., Chicago, to W2MLO mentions the possibility of future DXpeditions á la FO8AJ. QRV! — W2WC rolled up 173 ARRL DXCC List countries, 117 on 7 Mc., then moved from Brooklyn to become W1WY — W9VND is glad to be ex-W8GTV and is back in DX business just outside Chicago with 100 countries worked in less than four months. — The *DXer* mentions possible February TI9 activity courtesy W6MHB. Also that W6RRG, now in the Bahamas, may see some ZD8 activity. — Don't forget the gala joint meeting of the Southern and Northern California DX Clubs scheduled for the 15th and 16th of this month at Hotel Californian in Fresno. All DXers are welcome — waste no time in contacting meeting chairman W6TI for arrangements — OT KP4KD, now over the 200-mark confirmed, could use suggestions toward MP4BAU and VS9AP QSLs.

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A veritable European pile-up was snapped at the Yugoslavia International Hamfest held last August in Ljubljana. From left to right are well-known DXers YU1GM (W4GMP), OZ1FM, SV1SP, G2MI, DL1DH and OE5HN. (*Photo via YU1AD*)

***QST* for**

21st ARRL International DX Competition

'Phone: Feb. 11th–13th and Mar. 11th–13th; C.W.: Feb. 25th–27th and Mar. 25th–27th

AMATEURS all over the world are cordially invited to take part in the 21st ARRL International DX Competition, to be held four week ends in February and March. U. S. and Canadian operators will be trying to add to their DX country totals, other stations to work needed states and provinces for their WAS and WAVE awards, and everyone to match operating skill with others in his country or ARRL section.

Two week ends are devoted to c.w. and two to 'phone operation, giving everyone a chance to participate on both 'phone and c.w. "Rest up" periods are provided between week ends.

The rules of the contest are the same as those of last year, with this exception: U. S. and Canadian amateurs will send a signal report plus their state or province (instead of indicating input power). This information is of special interest to overseas stations aiming to fill in states for WAS and provinces for WAVE.

As in the past, certificate awards are offered to the top single-operator 'phone and c.w. scorer in each country and ARRL section. A special category recognizes multiple-operator stations in those sections or countries from which three or more valid multiple-operator entries are received. Within a club, single-operator entries can compete for the club certificate awards given to the highest c.w. and 'phone scorers. A handsome gavel is also offered to the club whose members run up the highest aggregate score.

Stations outside W (K) and VE/VO will call "CQ W/VE" or "CQ TEST" and trade contest exchanges with U. S. and Canadian participants. Those overseas, just as in past years, will transmit 5- or 6-digit numbers, the first numbers indicating the signal report and the last three the power input. Stations with 500 watts input would use a power number of 500; those with 25 watts, 025.

EXPLANATION OF DX CONTEST EXCHANGES

Stations in U.S. and Canada Send:

	RS or RST Report of Station Worked	*Your State or Province (or Abbreviation)*
Sample (c.w.)	579	VT
Sample ('phone)	57	Vermont

Stations Outside U.S. and Canada Send:

	RS or RST Report of Station Worked	*Three-Digit Number Representing Your Power Input*
Sample (c.w.)	579	075
Sample ('phone)	57	500

CONTEST TIMETABLE

'Phone Section:

Time	*Starts*		*Ends*	
GMT	Feb. 11th	2400	Feb. 13th	2400
AST	Feb. 11th	8:00 P.M.	Feb. 13th	8:00 P.M.
EST	Feb. 11th	7:00 P.M.	Feb. 13th	7:00 P.M.
CST	Feb. 11th	6:00 P.M.	Feb. 13th	6:00 P.M.
MST	Feb. 11th	5:00 P.M.	Feb. 13th	5:00 P.M.
PST	Feb. 11th	4:00 P.M.	Feb. 13th	4:00 P.M.
The second period of this contest starts at these same hours Mar. 11th.			The second period of the contest ends at these same hours Mar. 13th.	

C.W. Section:

GMT	Feb. 25th	2400	Feb. 27th	2400
AST	Feb. 25th	8:00 P.M.	Feb. 27th	8:00 P.M.
EST	Feb. 25th	7:00 P.M.	Feb. 27th	7:00 P.M.
CST	Feb. 25th	6:00 P.M.	Feb. 27th	6:00 P.M.
MST	Feb. 25th	5:00 P.M.	Feb. 27th	5:00 P.M.
PST	Feb. 25th	4:00 P.M.	Feb. 27th	4:00 P.M.
The second period of this contest starts at these same hours Mar. 25th.			The second period of this contest ends at these same hours Mar. 27th.	

Example: JA3AF, 500 watts input, might send "569500" on c.w., "56500" on 'phone.

U. S. and Canadian amateurs will transmit an RS or RST report *plus their state or province*, or some abbreviation for the state or province. *Example:* W2SAI, New Jersey, might send "579NJ" on c.w., or say "57 New Jersey" on 'phone. *Note that W (K) and VE/VO entrants will no longer indicate power inputs.*

For purposes of conformity, it is suggested that W/VE c.w. amateurs use this tabulation to indicate their states or provinces. Overseas operators may use it as a check-off list of states and provinces worked, and for logging abbreviations.

W1 — CONN MAINE MASS NH RI VT
W2 — NJ NY
W3 — DEL MD PA DC
W4 — ALA FLA GA KY NC SC TENN VA
W5 — ARK LA MISS NMEX OKLA TEXAS
W6 — CAL
W7 — ARIZ IDAHO MONT NEV ORE UTAH WASH WYO
W8 — MICH OHIO WVA
W9 — ILL IND WIS
WØ — COLO IOWA KANS MINN MO NEBR NDAK SDAK
VE1 — NB NS PEI
VE2 — QUE
VE3 — ONT
VE4 — MAN
VE5 — SASK
VE7 — BC
VE8 — NWT YUKON
VO — NFLD LAB

You can try a "CQ DX" or "CQ TEST" if you're in U. S. or Canada, but past experience

LOG, 21st INTERNATIONAL DX COMPETITION

Call..... *ARRL SECTION*.....

Band 14 *Mc.* *Sheet* 1 *of* 3

Country	*Station Worked*	*Date*	*Time (GMT)*	*Sent*	*Received*
Lebanon	OD5AX	2/26	1300	589CONN	479075
	OD5AV	2/26	1345	569CONN	579080
England	G6CL	2/26	1306	589CONN	469150
	G2MI	2/27	1245	579CONN	469125
	G3KP	2/27	1255	569CONN	579100
	G5BA	3/26	1430	469CONN	559100
	G6ZO	3/27	1822	579CONN	589125
	G5RI	3/27	1851	469CONN	459075
Germany	DL1KB	2/26	1315	559CONN	449050
	DL1DX	2/27	1149	469CONN	559080
	DL1BR	3/26	1502	559CONN	559045

Sample of report form that must be used by W/VE c.w. participants. When a station is worked for less than the maximum number of points allowed, the additional contact to make up the points not earned in the first contact should be entered at the bottom of the sheet. Canadian entrants should allow two blocks for each country, but may record no more than eight contacts therein. A separate set of sheets should be used for each band.

«

shows that this does not pay off very often. On c.w. W/VE amateurs have quotas, but this doesn't apply to 'phone. Amateurs overseas have no quotas; they will attempt to QSO as many stations in the 19 W (K) and VE/VO licensing areas as possible on each band, 160 through 10 meters.

Keep your log carefully and send a copy of it, in the form shown, to ARRL. Free contest forms are now available upon request from ARRL, West Hartford, Connecticut. Get your station functioning at top efficiency, make no social commitments for the important week ends, read the rules to acquaint yourself with the details, and then get set for DX aplenty.

Rules

1) *Eligibility:* Amateurs operating fixed amateur stations in any and all parts of the world are invited to participate.

2) *Object:* Amateurs in the continental U. S. and Canada will try to work as many amateur stations in other parts of

Sample of report form that must be used by W/VE 'phone entrants and *all* participants outside U. S. and Canada, 'phone and c.w. This example is a U. S. A. 'phone log. Foreign competitors, of course, would have reverse information in the "Sent" and "Received" columns; their "Received" column would show exchanges like "579CAL," "589ONT" (or, on 'phone, "46 Vermont," "58 Georgia," etc.), indicating signal reports received and different states and provinces worked; their "Sent" column would carry signal reports and power indicators transmitted.

LOG, 21st A.R.R.L. INTERNATIONAL DX COMPETITION

Sheet 1 *of* 1 *Call*..... *ARRL Section*.....*or Country*.....

Date & Time GMT	*Station Worked*	*Country*	*Record of New Countries for Each Band*							*Exchange*		*Points*
			1.8	*3.5*	*7*	*14*	*21*	*27*	*28*	*Sent*	*Received*	
Feb. 12												
0005	HR1FM	Honduras				1				56 Maine	57080	3
Feb. 13												
1300	PAØULA	Netherlands							1	58 Maine	47075	3
1306	G3COJ	England							2	58 Maine	46150	3
1345	PAØVB	Netherlands							2	56 Maine	59080	3
2030	LU1DDV	Argentina							3	58 Maine	57750	3
2310	VP9X	Bermuda				2				57 Maine	56050	3
Mar. 12												
1020	ZL1MB	New Zealand				3				58 Maine	58075	3
1035	VK5XN	Australia		1						47 Maine	46100	3
1105	VK2RA	Australia		1						46 Maine	45100	3
1421	PAØXD	Netherlands							3	45 Maine	57100	3
Mar. 13												
0925	EI9A	Ireland				4				57 Maine	57050	3
1245	G2PU	England							3		46125	2
1255	G3DO	England							3	56 Maine	57100	3
1350	G2PU	England							3	57 Maine		1
1430	G5BA	England							3	46 Maine	55100	3
2320	KZ5DG	Canal Zone				5				58 Maine	58500	3

SUMMARY, 21st A.R.R.L. INTERNATIONAL DX COMPETITION

.....*Entry Call*.....*ARRL Section*.....*or Country*.....
(*C.W. or 'Phone*)

Name.....*Address*.....

Transmitter Tubes.....*Power Input*.....

Receiver.....*Antenna(s)*.....

(Logs from W(K) and VE/VO show *number of foreign countries* worked. Logs from other countries show *number of U. S. A. and Canadian call areas* worked.)

Bands	*1.8 Mc.*	*3.5 Mc.*	*7 Mc.*	*14 Mc.*	*27 Mc.*	*28 Mc.*	*Total*
No. Countries *QSOd*		1		5		*3*	*9
No. of Contacts		2		5		*8*	*15*

Number of Different Countries Worked.....*Number of Hours of Station Operation*.....

Assisting Person(s): Name(s) or Call(s)

45 (*Points*) × *9* (*Multiplier*) = *405* FINAL SCORE

Participation for Club Award in the.....
(*Name of Club*)

I certify, on my honor, that I have observed all competition rules as well as all regulations established for amateur radio in my country, and that my report is correct and true to the best of my belief. I agree to be bound by the decisions of the ARRL Award Committee.

.....
Operator's Signature

* Figure in this box is multiplier.

Sample of summary sheet that must accompany all reports.

the world as possible under the rules and during the contest periods.

3) *Conditions of Entry:* Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Award Committee.

4) *Entry Classifications:* Entry may be made in either or both the 'phone or c.w. sections; c.w. scores are independent of 'phone scores. Entries will be further classified as single- or multiple-operator stations. Single-operator stations are those at which one person performs all the operating functions. Multiple-operator stations are those obtaining assistance, such as from "spotting" or relief operators, or in keeping the station log and records.

5) *Contest Periods:* There are four week ends, each 48 hours long: two for 'phone work and two for c.w. The 'phone section starts at 2400 GMT, Friday, February 11th and Friday, March 11th, ends 2400 GMT, Sunday, February 13th and Sunday, March 13th. The c.w. section starts at 2400 GMT, Friday, February 25th and Friday, March 25th, ends 2400 GMT, Sunday, February 27th and Sunday, March 27th.

6) *Valid Contacts:* In the 'phone section, all claimed credits must be made voice-to-voice. In the telegraph section, only c.w.-c.w. contacts count. Crossband contacts may not be counted.

7) *Exchanges:*

a) *Amateurs in U. S. and Canada* will transmit a three-figure number, representing the RST report, plus their state or province. (The latter may consist of an appropriate abbreviation.) 'Phone participants will transmit a two-figure number consisting of the readability-strength report plus the state or province. *Example:* W1ATE in Connecticut might transmit "579CONN" on c.w., "57 Connecticut" on 'phone.

b) *Amateurs outside W (K) and VE/VO* will transmit six-figure numbers, each consisting of the RST report plus three "power" numbers; the power indicator will represent the approximate transmitter power input. 'Phone contestants will transmit five-figure numbers, each consisting of a readability-strength report and the three "power" numbers. *Example:* VK2EO, with 100 watts input, might transmit "569100" on c.w., "56100" on 'phone. If the input power varies considerably on different bands, the "power" number should be changed accordingly.

8) *Scoring:*

a) *Points:* One point is earned by a W (K) or VE/VO station upon receiving acknowledgment of a contest exchange sent, and two points upon acknowledging an exchange received. Two points are earned by any other station upon receiving acknowledgment of a contest exchange sent, and one point upon acknowledging an exchange received.

b) *Final Score:* W (K) and VE/VO stations multiply total points earned under Rule 8(a) by the number of countries worked on one band plus the number of countries worked on each other band. All other stations multiply total points earned under Rule 8(a) by the sum of the number of W (K) and VE/VO licensing areas worked on one band plus the number of W (K) and VE/VO licensing areas worked on each other band.

Countries will be those on the ARRL Countries List. There are 19 licensing areas: 10 in the United States, 9 in Canada (VO, VE1–VE8). [See Countries List on p. 60 and Footnote 1 on p. 132 — Ed.]

9) *Repeat Contacts:* The same station may be worked again for additional points if the contact is made on a different frequency band. The same station may be worked again on the same band if the complete exchange for a total of three points was not made during the original contact on that band.

10) *Quotas:* The maximum number of points per country per band which may be earned by W (K) stations *in the*

(*Continued on page 132*)

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
R. L. WHITE, W1WPO, Asst. Comm. Mgr., C.W.
PHIL SIMMONS, W1ZDP, Communications Asst.

GEORGE HART, W1NJM, Natl. Emerg. Coördinator
ELLEN WHITE, W1YYM, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, W1ZJE, Administrative Aide

Proven Operating Ability. Some test their mettle as operators in the "SS" — others have a fine time and roll up accomplishments by brief daily participation in their Section traffic net. There's no better way to become an expert in procedure and the ability to copy accurately. The fullest enjoyment of all that amateur radio affords in working DX and other operating specialties goes hand in hand with operating ability and copying proficiency. This month we're glad to start honoring those consistently turning in BPL-dimensional totals by listing the first to receive the Traffic Medallions. See the rules and first announcement in August *QST* if you need more information. Any individual amateur working at his own station is eligible.

Speaking of "copying down" ability, ARRL provides to all comers daily transmission of code practice at stated speeds aimed at assisting newcomer and old-timer alike in knowing where he stands on the matter of copying ability. If not ARRL-certified, be sure you look for W1AW or W6OWP on their next Qualifying Runs. Send us what you get to be considered for certification. Don't stop with an initial speed unless at the top. Stay with us until you have the full set of endorsement stickers. Prove to yourself and others what you *can* copy, and at the same time you will have extended the range of what you can do in communication with amateur radio. If your casual hamming has never gone ahead to include DX countries and traffic ability along with some experimenting, this can be a suggestion to expand know-how and horizons in the New Year.

We've heard the sad story of the fellow who flunked the exam because he "guessed" he knew enough to pass. Few that have copied over the air until they got their 10-w.p.m. certifications

ever flunked the Novice Test; and few ARRL-certified through 20 w.p.m. ever failed on their General Class code test. The majority who have trouble, we're told, are those who mistakenly try to get by or are mistakenly working for medium (instead of maximum) progress. We mention this just to suggest, in starting the year, that all amateurs and amateur groups, including the Novice, work for new results, objectives, and top results, rather than the minimum, to get the most fun and know-how from amateur radio.

Club Operating-Versatility Contest? This is the season of the year when a good many affiliated radio clubs are starting their code and theory classes (and holding examinations) for the club members and other community members interested in qualifying for licenses. Also, clubs are announcing in many cases special events — a working toward WAS or competitions for the greatest number of DX QSLs that can be earned and turned in by club member operators as of some date next spring — encouraging competition between club members to help them reach these desirable goals. W1LLY comes forward with an idea that it would be interesting to set aside some designated week end for a Versatility Contest. The idea would be to credit all-around station and operator ability. The "package" set-up in the operational rules would establish a quota to limit points attainable by any one means, or band, to a small number. Then *multipliers* would be applied (1) for each band worked; (2) each mode of emission (c.w., a.m., f.m., n.b.f.m., f.s.k.-RTTY, a.f.s.k.-RTTY, s.s.b., facsimile and or TV); (3) each mobile band operated 'phone and c.w. (additional multipliers to that for fixed operation); (4) multiplier for originating one message; (5) multiplier for putting this into section-NTS net (each band or mode used); and (6) for working one foreign country outside the North American continent.

Operating Calendar for the New Year. The first month of the year is one of the top ones of the season from the standpoint of things to do in radio operating. Stations can be tested, states got for WAS and other awards. There's the V.H.F. "SS," Jan. 8th–9th, for the v.h.f. man; for the newcomer (and others to work him) the "NR" runs from Jan. 8th–23rd — a few QSOs a day and you have it "made"; appointees look forward to their quarterly c.w. and 'phone parties the week ends of the 15th and 22nd. DX men probably will be busy getting rigs and antennas ready for the ARRL DX Competition for which scheduled periods in February and March have been announced. To attract the foreign participation the W (K) and VE/VO contingent will identify their states and provinces (helping the DX station fill out working them all!) following the signal-report part of the

exchange this time; returns from across the water being the customary six numerals. So earmark the calendar and contest announcements you are interested in, and get in the swim. — *F.E.H.*

OCTOBER CD QSO PARTIES

Despite the depredations of Hurricane Hazel, which roared up the Atlantic Seaboard and left some appointees minus power and antennas, our c.w. CD Party was a highly successful event. The notable exploits of top-scorer W6MUR are chronicled with the accompanying photograph. Another Californian, ORS W6BIP, earned second place with 174,265 points. Rounding out the top three, Assistant Director W4KFC made his customary impressive showing with 155,295 points. Sections-worked honors were copped by W6MUR with 67, while W4KFC led in number of contacts with 486 in just 11 hours 30 minutes on the air.

An even dozen operators in the 'phone session turned in scores over 10,000. Tops among them was the 18,150-pointer of W9KDV, with W9VFY doing the talking. And CD regulars W8NOH and W4HQN, both of whom may always be relied on for outstanding voice work, earned second and third positions. QSO leader was W9KDV with 110, and W5MFX worked the most sections, 36.

The highest scores follow. Figures after each call indicate score, number of contacts and number of ARRL sections worked. Final and complete results will appear in the January CD Bulletin.

C. W.

W6MUR	271,953–451–67
W6BIP	174,265–294–65
W4KFC	155,295–486–63
W1MX[1]	147,735–462–63
W5RID	146,010–468–62
W4HQN[2]	144,875–468–61
K6FAE	127,710–215–66
W7PCZ	124,780–235–59
W1JYH	122,700–402–60
W1EOB	122,610–395–61
W7JLU	116,761–216–59
W2ZVW	112,240–361–61
W1ODW	105,020–356–59
W3DYO	105,000–368–56
W8NOH	105,000–345–60
W4YZC	99,840–377–52
VE7QC	97,200–200–54
W1RAN	97,185–335–57
W7UTM	95,468–179–58
W2IFP	95,190–327–57
W9SIK	92,335–306–59
W3PWN	91,120–321–56
W4YZE	90,100–297–60
W4PNK	89,040–336–53
W5TC[3]	88,800–292–60
W1ZDP	88,000–313–55
W8SYY	85,500–190–50
W1BIH	83,780–277–59
W8GRF	83,505–286–57
W1WPO	82,655–264–61
W4WKQ	81,810–303–54
K6HWD	81,290–162–55
W4LAP	79,750–275–58
W2IVS	79,060–261–59
W4NH	75,870–281–54
W1AQE	75,600–280–54
W8HZA	74,520–270–54
W6YHM	69,801–143–53
W1SRM	69,390–250–54
W4WQW	69,165–256–53
W9CMC	69,120–252–54
W3KLA	68,770–240–46
W9NH	68,750–244–55
W4WXZ	67,830–264–51
W8LHV	67,760–235–56
W8TZO	67,760–235–56
W3TMZ	67,500–270–50
W1WEF	67,320–300–44
VE1ZZ	66,375–225–59
W2HWH	64,220–243–52
W8JAR	63,335–233–53
W3ADE	62,910–226–54
VE6ZR	62,736–143–48
W2GXC	62,565–291–43
WØJTF	62,540–236–53
W7CT	62,322–153–51
W2LPJ	61,965–238–51
W3JNQ	61,570–262–47
W3LMM	60,840–230–52
W1WLW	60,580–230–52
W4BDU	60,135–211–57

'PHONE

W9KDV[4]	18,150–110–33
W8NOH	15,200– 90–32
W4HQN	14,685– 82–33
W1MRP	14,415– 93–31
W5MFX	13,500– 70–36
W3EAN	12,400– 75–31
W1CRW	11,880– 88–27
W4FV	11,600– 75–29
W2AEF[5]	11,005– 66–31
W4YE	10,850– 70–31
W8ZJM	10,270– 73–26
W2ZVW	10,000– 73–25
W1ZIO	8610– 78–21
W1KFV	8295– 72–21
W3MWL[6]	8190– 60–26
W9SZR/9	8190– 58–26
W8PBX	7410– 57–26
W1FZ	7140– 63–21
W4KMS	6890– 53–26
W5TWJ	6580– 44–28
W8ZXC	6240– 52–24
W1AQE	6200– 62–20
W9UTL	5760– 43–24
W4WOG	5405– 47–23
W2DLO	5400– 49–20
W1TRX	5355– 51–21
W8BOK	5060– 40–23

[1] W4YHD, opr. [2] W3GRF, opr. [3] W5JXM, opr. [4] W9VFY, opr. [5] W2AIP, opr. [6] W3ULI, opr.

BRIEF

Myron Bowden, W1YIL, Secretary, Port City Amateur Radio Club, sponsors of the Worked All New England award, advises that the first fifty WANE certificates have been issued to the following amateurs: W1FTJ, W1BFT, W1CDX, W2JIL, W6ZZ, W1TY, W1LQ, W1VUF, W1TCR, W1VUH, W8AQ, W2NIY, W3OP, W1GKJ, W1MEG, W2QHH, W2KTU, W1WTG, W1BJP, W1UET, W1MRQ, W2JCO, W1EFN, W2RSV, W2WZ, W1FZ, W2TYC, W4HYW, W1RNA, W1GMH, W1TYU, W1BBN, W1TOP, W1RLS, W1RFC, W1JWJ, W1FPS, W1NHJ, W8AL, W1HWE, W1VZI, W1AXN, W1WJA, W1YCU, W1UZR, K2BH/W1QGU, W1VMC, W1LIG, W1VVO, W1HA. Rules for obtaining the WANE award appeared on page 63, September 1953 and page 69, August 1954 *QST*s.

Any c.w. CD Party enthusiast who hasn't worked this fellow lately better turn in his receiver and headphones! Posting the nation's best score in both July and October, OO Bill Johnson, W6MUR, has really been ringing the bell. His tape fist and snappy operating bring credit to the CD gang, as does that crisp-keying "big sig" stemming from the home-brew 150THs at the right. Time was when 80 meters was thought a "must" as far as amassing huge tallies was concerned, but W6MUR does FB on just 40 and 20; in October he stacked up 451 QSOs in 67 sections for a smashing 271,953 points. Shown fingering the bug and bending over the operating table, Bill portrays the traditional stance of the inveterate DXer. Indeed, DX is his main interest. And if he can again be enticed from pursuit of Africans and Asiatics, you'll see him in the January CD!

CODE-PRACTICE STATIONS

The following schedules bring up to date the list of stations (p. 75, November *QST*) currently transmitting code practice in the ARRL Code-Practice Program.

W3VEJ, James Alcorn, 207½ Longfellow St., Vandergrift, Penna.; 7150 kc.; Mon. and Thurs., 2100 EST; 5–15 w.p.m.

W4ZRH, Carlton R. Commander, 17 Joyce St., Mt. Pleasant, S. C.; 3700 kc.; Mon. through Fri., 1830 EST; 5–13 w.p.m.

WØONF, for Se Kan Radio Club, Kenneth M. Parker, Box 141, Howard, Kansas; 3805.5 kc.; Mon., Wed. and Sat., 1730 CST; 3½–15 w.p.m.

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

C. W.		*'PHONE*	
3550	14,050	3875	14,225
7100	21,050	7250	21,400
28,100		29,640	

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be *vacated immediately* to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: *c.w.* — 3535, 7050, 14,060; *'phone* — 3765, 14,160, 28,250 kc.

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

With the AREC

The principal theme of letters being received by your NEC these days seems to be complaint regarding QRM to emergency operations on 75 meters. Before we make the comments that we're going to make, let it first be admitted that considered and impartial afterthought does not always coincide with actions or attitudes in the pressure of the moment. Or, to put it another way, it's all very well to rationalize, but not always so easy to act accordingly.

It *is* maddening to have someone's casual CQ break up a message concerned with the safety or life of a person or persons, and perfectly natural for one's thoughts on such occasions to be along lines of daggers, machine guns and gallows. When such QRM appears to be deliberate (very difficult to prove), and derogatory remarks are passed around ("tin soldiers," "paper policemen," etc.), it is indeed difficult to restrain a homicidal impulse; the only wonder is that all that results are numerous letters to us saying, in effect, that "there oughta be a law." We know; we've been through the wringer ourselves.

But — and here comes that rationalization — we cannot help but observe that the most crowded band in the radio spectrum is really not the best suited for emergency communications purposes. This is especially true in the evenings, when long skip conditions wash out local communication almost entirely and bring in stations from far away loud and clear. By all logic, it is ridiculous to try to pursue an emergency purpose under such conditions when it could be done easily, given the proper equipment, using a frequency band without such idiosyncrasies. Still, logic or not, the guys are *there*, on 75; most of them *cannot* use other bands, for one reason or another, so what are we going to do about it?

Several suggestions have been made. W4NV proposes establishing monitoring frequencies (3801 and 3995 kc.) and appointment of "National Emergency Broadcasting Stations" in each state to man the two frequencies during any emergency. His plan is very reminiscent of our former National Emergency Net, and reminds us to remind you that there still exists a set of National Calling and Emergency frequencies for just such purposes. W4ANK, incensed at QRM from stations participating in a contest during Hurricane Hazel, urges a national or divisional emergency organization aimed at reducing QRM on emergency frequencies, automatic conversion of traffic nets to emergency nets during an emergency, and some means of making allowance for an emergency arising during a contest.

Certain provisions already exist for emergencies, and perhaps before considering the merits and demerits of proposals being made, we should examine those which now exist. Let's do this briefly:

(1) FCC provides a measure of respite for amateurs plagued by QRM in emergencies in its Section 12.156 of the amateur regulations. This is summarized in our booklet *Emergency Communications* (p. 8), and outlines a procedure by means of which stations operating in an emergency may apply to FCC for a "clear channel."

(2) Nets of ARRL's National Traffic System are under instructions to activate themselves automatically in the event of an emergency, to handle emergency traffic if called upon. This procedure was described in an *Emergency and Traffic Bulletin* some time ago, and is due for repetition. Many non-NTS traffic nets have an agreed-upon procedure for automatic conversion for emergency purposes.

(3) As mentioned above, we still have National Calling and Emergency Frequencies. You will see these listed in a box somewhere in the Operating News section of *QST* each month (unless the space problem is *extremely* acute, when the editor usually finds room for them elsewhere in the issue). Instructions for their use are included.

The question then is: what other measures need be taken, besides plugging and publicizing present arrangements, to make our alertness for emergencies more widespread and instantaneous? Your thoughts on this question are solicited. Just in passing, however, let's also observe that QRM is a quite natural phenomenon when an amateur band is crowded six-to-a-kilocycle, and the real solution lies not in regimentation of our existing bands, but in "selecting the channel to suit the need" — a clause borrowed from *Emergency Communications*, which more of you ought to read.

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Extensive flood conditions in Northern Indiana and Illinois precipitated some activity among AREC groups, over the SET weekend of October 9-10 and extending to the eleventh. We have three reports:

(1) In La Grange Park, Illinois, heavy rains caused backup of sewers and natural drainage into the streets and basements. As the situation worsened, W9JJD called Radio Officer W9FKY and suggested some action be taken. The e.d. radio group was activated, and within a very few minutes two mobiles were in action. One of the cars worked with Water Department trucks and the other one accompanied the fire engines. At 1830 that evening as the rain continued a third mobile unit was pressed into action. Shortly afterward, calls from alarmed residents became so numerous that all three cars were placed in service answering them, each accompanied by one or two firemen. All mobiles were kept extremely busy, each with a backlog of calls, until after midnight. W9KMT and W9MAT also participated in this activity.

(2) The Calumet Area Emergency Net was called into action on October 11 by request of Hammond (Ind.) city officials as the Little Calumet River went on a rampage due to heavy rains. The Lake County Amateur Radio Club station, W9ZKW, was set up at the Hammond City Hall, with W9GRA/9 at the Woodmar Country Club in the middle of the flood area. Other fixed portable stations assisting were W9CWO/9 at Highland, W9PVQ/9 at Black Oak, W9SNF/9 at Hammond and W9RWN at East Hammond. EC W9KRJ monitored and assisted in clearing the frequency. Mobiles operated on 1805 kc. and included W9s KRJ PVQ IFC DRJ DWF JZA IBZ WFI MNO DDK UXK RXB MOC EHY UVR WTW ZJH and APO.

(3) In Indiana, the towns of Plymouth and Knox were hard hit. In Plymouth, EC W9AYP set up communication facilities at that point, assisted by W9ATT and W9LDJ with W9JWI of Culver also assisting. Both the Michiana Radio Club and the Mobile Amateur Club of St. Joseph County participated, the former keeping W9AB, the Red Cross station of South Bend, on the air. The Indiana Phone Net also greatly assisted by relinquishing the net frequency for emergency traffic when the occasion warranted. Later, a call came from Knox that help was needed in communications. Eight mobile units with two base station operators were formed into two groups, one for immediate use and the other to furnish relief when needed.

♦

One of the most active mobile emergency groups in the country is the Philmont Mobile Radio Club. W3JGB is NCS of the weekday "Scrambled Egg Net" on 29,493 kc. Everyone or anyone is invited to drop in on this frequency to say hello.

♦

The problem at Knox was protection of the local disposal plant from rising waters. The Mobile Amateur Club of St. Joseph County furnished the equipment and personnel. The c.d. base station, W9UB, at South Bend, acted as a base. W9YEA of Knox did most of the organizing as EC. W9AYP, W9JWI and W9YEA went many long hours without sleep in helping out.

Others not mentioned above who also assisted included W9s GAV DDE UZP AQA AQB YME ZIB CC JEG EKK ECH QWI EHZ AWN SNT QXF EOG YRF LVS MYI BRM YVR OGZ OGF SMW LVS CKR BRM NAR BRR EZS.

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On August 15th, the Red Cross in four Florida counties held a hurricane drill in which amateurs actively participated. Many stations throughout the Eastern Florida section gave assistance, and stations out of state assisted in relaying traffic to Atlanta and Washington. The counties involved were Palm Beach, Broward, Dade and Monroe, an area in which reside an estimated 800 amateurs and in which 197 amateurs are registered in the AREC. Eastern Florida SEC W4IM records 73 stations as having participated, 21 of them mobile, in this well-planned and extensive exercise.

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The AREC of De Kalb County, Georgia, on the Labor Day week-end repeated their July 4th performance for the Red Cross by assisting in rendering aid to accident victims in the general vicinity of the intersection of Highways 12 and 78 near Avondale, Ga., reputed to be one of the worst places for highway accidents. On Friday night 75 meters was used, but QRM and QRN hampered operations, so on Monday the mobiles were shifted to ten meters. Contact was maintained mobile to mobile and with fixed stations set up at police headquarters. Seven accidents occurred within one two hour period, three of them requiring first aid and one involving three cars requiring ambulance service. Red Cross personnel were standing by at the police stations to rush to the scene wherever need was reported by the mobiles. Twelve operators participated in this "Operation Bandaid": W4s NS PUM MV EPM IPL ZUF LXR SOV RVH PDD FKE UMO.

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Members of the Blossomland Amateur Radio Association of St, Joseph, Mich., assisted the Berrien County Sheriff Department in providing mobile communication during the heavy traffic period over the Labor Day Weekend. The main control station was set up at the Sheriff's office, using W8MAI/8. Alternate control stations at strategic points around the country were W8s FGB/8 SCS and RAE. Mobiles were W8s FGB JFW MWO JUA SCS MVO BKL QBN HKT NSA QQO FBV GTM and QFV. The boys operated in eight hour shifts, five units in service at a time. A regular uniformed Deputy Sheriff was assigned to each mobile to perform regular police duties. The frequency used was 1890 kc. Other participants were W8s MXI PQI ORM CRD YKS and WN8QOD.

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Another Labor Day exercise was the furnishing of radio communication for the annual Pikes Peak races by Colorado Springs EC WØTV and his gang. The group loaded up their field gear in WØMJD's truck and took off at 0500 on September 6th. Individuals were assigned posts along the winding road to the summit, ten of them in all, to report every racer by number as he passed his post. WØWPK was at the starting line, WØHEM at Post 1 and WØEYN and W5BTI/Ø at the summit, operating on 29,624 kc, for the purpose of passing official orders as requested. The others operated on 3885 kc, as follows: Starting line and NCS — WØSDW; Post 1 — W2IMC; midway between Post 1 & 2 — WØANX; Post 2 — WØHHR; Post 3 — WØPBN; Post 4 — WØMJD; Post 5 — WØCVG; Post 6 — WØCVG; Post 7 — WØMFF; Post 8 — WØQQX; midway between Posts 8 & 9 — WØJMB; Post 9 — WØMEY; Post 10 (summit) — WØPTR and WØVCZ. WØTV was standby on either band at the starting line, operating with his receiver on the PA system so that observers at the starting line could trace the racers to the summit.

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Our SECs are improving greatly in the matter of reporting. For the month of September, *seventeen* SEC reports were received, representing activities of 4256 AREC members, and three new sections have been added to this year's reporting roster: Arizona, Louisiana and Vermont. The September record this year tops that of both 1953 and 1952, and the total number of sections for the year is now 28, compared to 22 in 1953 and 29 in 1952. We're also ahead of last year in total number of reports (135 to 114), but trailing our 1952 record of 157 at this time.

Let's keep those reports coming in, fellows!

MEET THE SCMs

Thomas J. Morgavi, currently serving the Louisiana section in the capacity of SCM, was issued his first license in 1935 with the call he now holds, W5FMO.

A former Official Relay Station and Official 'Phone Station, he is presently an Official Observer. Since his participation several years ago in a Frequency Measuring Test with a home-built Wien bridge, he has become extremely interested in frequency measurement and has built a secondary standard, cycle counter, and other associated equipment. SCM Morgavi is active in the Greater New Orleans Amateur Radio Club and is trustees of the club station,

W5UK. Two Public Service certificates have been issued to him for his work in the 1947 Florida Peninsula-Gulf Coast Hurricane and the Big Freeze of February, 1951. He likes to handle traffic for overseas stations on MARS frequencies.

W5FMO's station layout consists of push-pull 810s in the final modulated by push-pull 805s, 600 watts on 'phone and c.w.; also a low-power BC-610 exciter, 75 watts 'phone and c.w. Receiver is an HQ-120. Antennas include an 80- and 40-meter vertical, a three-element 20-meter rotary beam, and a Marconi for the small rig. All bands 160 through 15 meters, 'phone and c.w., are used.

Tom expects to be successful in the near future in inducing his XYL, Helen, to get her ham ticket. Baseball and boxing are his favorite sports. The Corps of Engineers, U. S. Army, has employed him as radio operator and radio service engineer since 1940.

A.R.R.L. ACTIVITIES CALENDAR

Jan. 7th: CP Qualifying Run — W6OWP
Jan. 8th-9th: V.H.F. Sweepstakes
Jan. 8th-23rd: Novice Round-up
Jan. 14th: CP Qualifying Run — W1AW
Jan. 15th-16th: CD QSO Party (c.w.)
Jan. 22nd-23rd: CD QSO Party ('phone)
Feb. 5th: CP Qualifying Run — W6OWP
Feb. 8th: Frequency Measuring Test
Feb. 11th-13th: DX Competition ('phone)
Feb. 14th: CP Qualifying Run — W1AW
Feb. 25th-27th: DX Competition (c.w.)
Mar. 5th: CP Qualifying Run — W6OWP
Mar. 11th-13th: DX Competition ('phone)
Mar. 15th: CP Qualifying Run — W1AW
Mar. 25th-27th: DX Competition (c.w.)
Apr. 1st: CP Qualifying Run — W6OWP
Apr. 13th: CP Qualifying Run — W1AW
Apr. 16th-17th: CD QSO Party (c.w.)
Apr. 23rd-24th: CD QSO Party ('phone)

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for October traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	219	1974	1411	426	4030
W3WIQ	53	973	881	71	1978
W9TQD	8	914	901	13	1836
W9JUJ	17	817	635	55	1524
W9DO	7	662	587	82	1338
WØSCA	29	560	533	2	1124
W5MN	36	529	396	128	1089
WØCPI	7	460	410	50	927
KG6IG	20	444	457	3	924
K6FAE	16	432	438	12	898
W7FRU	1	450	374	63	888
W4PFC	9	438	431	4	882
W9VBZ	52	402	360	29	843
W6PHT	42	347	307	135	831
W7BA	12	408	385	20	825
W4OGG	9	406	348	50	813
W7PGY	152	294	282	12	740
W2KEB	27	335	234	101	697
W9NZZ	178	254	2	252	686
W9SNT	65	301	263	38	667
W6LYG	36	306	180	126	648
W2KFV	22	310	295	15	642
W5TFB	16	316	287	19	638
W4DVR	497	28	43	11	579
WØBLI	5	284	262	15	566
W7APF	7	273	273	0	553
KA2MC	80	236	209	27	552
K5FFB	36	238	198	76	548
K6FCZ	30	256	244	12	542
W6IZG	5	26	261	246	538
K2BSD	12	262	247	15	536
W1UKO	10	263	250	12	535
W2RUF	34	267	185	39	525
W8ELW	17	250	225	25	517
W4PJU	6	254	210	44	514
W3WV	15	280	167	45	507
WØQXO	9	246	190	56	501
Late Reports:					
K6FCZ (Sept.)	37	513	499	14	1063
W4PFC (Sept.)	40	350	345	5	740

More-Than-One-Operator Stations

Call	Orig.	Recd.	Rel.	Del.	Total
KG6FAA	256	2112	2062	50	4480
W6IAB	51	1515	1444	72	3082
KA2USA	67	1149	1199	31	2446
KØAIR	28	643	577	66	1314
K6FDG	70	615	542	54	1281
K4WAR	245	463	415	48	1171
K9FCA	111	525	380	34	1050
KA2AK	332	260	237	23	852
KA2GE	191	331	226	97	845
K4FDY	58	335	286	41	720
Late Reports:					
W3USA (July)	39	569	511	97	1216
W3USA (Aug.)	111	458	441	128	1138
W3USA (Sept.)	92	463	424	131	1110

BPL for 100 or more *originations-plus deliveries:*

KA7SL	320	W4YRX	158	W3CVE	114
K2CBD/1	245	VO6N	152	WØKQD	113
KA8AB	239	WØWNA	150	VE3NO	113
KA2HQ	202	VE3NG	150	W1BDI	103
WØFQB	181	W6KVB	146	Late Report:	
W6CMN	163	WØNIY	117	K2FAV (Sept.)	321

More-Than-One-Operator Stations

W1AW *129* K4WBP *103*

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs up to and including September traffic: W2BO, W2JOA, W2JZX, W2KEB, W2KFV, W3CUL, W3CVE, W3WIQ, W6ELQ, W6LYG, W6PHT, W6QMO, W6SWP, W6USY, W7BA, W7PGY, W8RJC, W9CXY, W9DO, W9JUJ, W9NZZ, W9VBZ, WØBDR, WØBLI, WØCPI WØGAR, WØSCA, VO6N.

The BPL is open to all amateurs in the United States, Canada, Cuba, and U. S. possessions who report to their SCMs 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.

TRAFFIC TOPICS

What's in a name? Among the hundreds of nets registered in the ARRL Net Directory, some call themselves traffic nets and some emergency nets, but in actual practice the traffic nets frequently mobilize in an emergency, and the emergency nets usually handle traffic in their drills and test — and *always* during the real thing. A good general rule in that a traffic net should be an emergency net as well, and an emergency net should also be a traffic net. The designation as one or the other is to indicate the principal, not the only, dedication.

That the emergency net should know how to handle traffic (and that means *doing* it as a matter of course) is incontestable. This is not to say that they all *do* know how to handle traffic, only that few people if anyone will argue that they *should*. We think that, generally speaking, emergency nets are better versed in the handling of traffic than traffic nets are in organization for emergencies. And that brings us, finally, to the subject for this column this month; that *every traffic net should have an emergency plan*.

Many already have. We can't mention them all, but more power to those traffic nets which have swung into action in emergencies, and even more power to those which have a *plan* for doing so. On the other hand, a good many of them handle only routine traffic and, in an emergency, find themselves on the outside looking in — looking for a place wherein they may be of assistance.

The National Traffic System has a policy for emergency operation which was set down in an Emergency and Traffic Bulletin dated Spring, 1950. Its salient points bear repeating. During an emergency, NTS nets should be self-activating; that is, they should be able to swing into action or take care of an emergency situation in any affected area. NTS nets in surrounding areas should be activated to take care of outside communications if and when called upon. Depending upon the urgency involved and the volume of emergency traffic, official or otherwise, the net manager concerned must determine whether his net in any particular situation shall handle official traffic only, all emergency traffic, or *all* traffic as usual. In most cases it will be possible to handle all types of traffic but to give precedence to official emergency traffic in view of its inherent public interest and importance.

The extent of NTS activation in emergencies will depend entirely on the extent of the emergency. If a local flood, the section traffic net will probably be adequate, with activation of the regional net, if required, to handle outside contact. If the emergency extends over several states or ARRL sections, probably the regional net should be activated in addition to section nets, with "shuttle liaison" from one to the other, and possible activation of the area net to provide outside contact. If the emergency is area-wide, all NTS nets within that area should be on the job, with possible activation of an adjacent area net to provide outside contact.

There is much more to this subject of using traffic nets for emergency purposes than can be discussed here and now. We simply wish to point out that it is not a new idea, and to renew the thought that traffic nets have an emergency application, and that ECs should know of traffic affiliations of any of their AREC members for possible use in emergencies. And you net managers — have you a plan for operation in emergencies? Better give it some thought.

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Three miscellaneous October net reports: (1) The Early Bird Net reports traffic amounting to 686. (2) The North Texas — Oklahoma Section Net held 31 sessions, 1010 check-ins and a traffic count of 319. (3) The Transcontinental Phone Net registered 782 message counts with eleven stations participating in the First Area.

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National Traffic System. NTS has a place for every traffic man if said traffic man has a place in his inclinations for NTS. The System is built on the basis of the "bestest for the mostest." Any amateur who really *wants* to participate may do so, and welcome. This includes old shellbacks who can copy 45 w.p.m. with a four-inch paint brush down to the newest Novice who had to hump to get past five w.p.m.

But this does not mean that you may participate at any level you please. NTS has many levels, and each participant must find his own — section novice or training nets for rank beginners, section traffic nets, regional nets, area nets and the Transcontinental Corps — depending on such factors as experience, dependability, and aptitude. We have been sniped at for this policy, but we still think it's a good one. The system was not set up to serve any individual or organization, but to serve amateur radio by creating an organized nationwide service.

Of course it does not always work as planned; even major leaguers never bat 1.000. If you are not participating, naturally you are hurting NTS, especially if you are one of the experienced traffic men we need to make it work. But we'll do what we can with what we have, and hope that the system will continue to show improvement through the years as traffic-handling amateurs learn that there is pleasure to be had in operating as part of a team.

An announcement: effective November 15, 1954, the ARRL National Traffic System officially adopted a six-day week. Many NTS nets already have been operating on Sat-

urdays and others expanded their schedules to cover Saturday at our suggestion. Some are finding it difficult to obtain Saturday NCSs and liaison stations (volunteers needed). Generally speaking, however, there will no longer be that crucial 48-hour period from Friday to Monday that NTS does not function.

October reports:

Net	Sessions	Traffic	Rate	Average	Representation
1RN	20	297	0.47	14.8	92.1%
3RN	16	193	0.70	12.1	97.9%
4RN	24	184	0.58	7.0	46.4%
RN6	42	275		6.5	
RN7	39	237		6.1	37.3%
8RN	32	165		5.1	76%
TEN	68	1826		26.8	58.6%
TRN	20	101	0.46	6.0	75%
EAN	21	813		38.7	95.2%
CAN	20	702		35.1	100%
PAN	23	526	0.56	22.8	89.1%
Sections*	377	2244		6.0	
Summary	702	7562	3RN	17.7	CAN
Record	766('52)	7562		17.7	
Late Reports:					
2RN (Aug.)	22	175	0.25	7.9	87.9%

*Section Nets reporting: AENB & AENP (Ala.); MSN (Minn.); KYN (Ky.); CN (Conn.); Tenn. Hi Speed & Tenn. Sectional; WSN (Wash.); NEB (Nebr.); SCN (Calif.); WVN (W. Va.); QKS & QKS-SS (Kans.); TLCN (Iowa).

Connecticut, New Hampshire and Western Mass. get stars for perfect attendance on the 1RN report. 3RN started operating a session at 1830, starting November 15. W4OGG has taken the reins as manager of RN5, and VE7ASR is the new manager of RN7; we wish them both the best success. W8DSX says the second session of 8RN is not very well attended. VE3GI commends VE3AJR for her performance on TRN. W8SCW says he is still trying to get out an EAN bulletin. CAN certificates have been issued to W5CAF, W5MXQ and W4TYU; Peggy is having trouble getting NCSs for CAN. If interested, drop her a line or radiogram. A PAN certificate has been issued to W6ZRJ; W7NH is back at the helm of PAN.

The TCC roster is gradually filling up, but some of the long haul schedules are having difficulty with conditions so screwy. What we ought to have are midwestern relays to stand in on the schedules. Anyone want to be considered for that role once or twice per week?

W1AW OPERATING SCHEDULE

(All times given are Eastern Standard Time)

The W1AW Fall-Winter operating schedule remains in effect. Master schedules showing complete W1AW operation in EST, CST or PST will be sent to anyone on request.

Operating-Visiting Hours:

Monday through Friday: 1500–0300 (following day).

Saturday: 1900–0230 (Sunday). Sunday: 1500–2230.

Exceptions: W1AW will not observe its regular hours from 0300 Jan. 1st to 1500 Jan. 2nd and from 2230 Feb. 21st to 1500 Feb. 23rd.

General Operation: Refer to page 70, September *QST*, for a chart to determine times during which W1AW engages in general operation on various frequencies, 'phone and c.w. This schedule is still in effect but is not reproduced herewith for space considerations. Note that since the schedule is organized in EST, certain morning operating periods may fall on the evening of the previous day in western time zones. W1AW will participate in all official ARRL operating activities, using scheduled general operating periods for this purpose if necessary.

Official ARRL Bulletin Schedule: Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules:

Frequencies (kc.):

C.w.: 1885, 3555, 7125, 14,100, 21,020, 52,000, 145,600.

'Phone: 1885, 3950, 7255, 14,280, 21,350, 52,000, 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.

Code Proficiency Program: Practice transmissions are made on the above listed c.w. frequencies, starting at 2130 daily. Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday. Approximately ten minutes of practice is given at each speed. Code-practice transmissions will be replaced by Code Proficiency Qualifying Runs on January 14th and February 14th, and by a Frequency Measuring Test on February 8th.

BRIEF

Ray Grob, jr., W8YFJ, President of Sandusky Valley Amateur Radio Club, reports that a Mobile Caravan held July 18th, sponsored jointly by the Toledo Radio Club, Toledo Mobile Radio Club and SVARC, was a big success. A caravan of 160-meter mobiles started out from Toledo on a tour through the SVARC area, including Port Clinton, Fremont, and Woodville, Ohio. At their home stations the members of SVARC formed a net and worked the mobiles one by one as they passed through the area. In this manner the Toledo boys qualified for the SVARC honorary membership award by working five or more members, and the SVARC gang qualified for the WTO award by working fifteen Toledo stations. QRM was non-existent due to strict maintenance of net discipline.

DXCC NOTE

Effective November 1, 1954, French India, FN8, has been deleted from the Countries List, since on that date it became a part of India. All confirmations of FN8 contacts prior to November 1, 1954 will be credited for DXCC, but confirmations of contacts after November 1st will be credited as India.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH....252
W8HGW...251
W6VFR....250
WØYXO....250
W6AM.....249
W3BES....248
W6ENV....247
G2PL.....247
W3GHD...244
W2BXA...243
W3JTC....242
W3KT.....242
W6MEK...242
W6SN.....242
W2AGW...241
W4BPD....241
W6SYG....241
G6RH.....241
G6ZO.....241
PY2CK....241

RADIOTELEPHONE

PY2CK....235
W1FH.....224
VQ4ERR...222
ZS6BW.....219
XE1AC....215
W1MCW..214
W8HGW...214
W1JCX....213
W1NWO...212
W9RBI....210
SM5KP....207

From October 15 to November 15, 1954, 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

W6PCS.....166
W8LKH....148
W1AWE....125
PAØHP....121
W4NBV....116
GI3DQE...116
G2BVN....107
W5OFM...104
GW2CPU..102
SM3AKW..101

RADIOTELEPHONE

CP5EK.....136
I1BJC.....121
W4NBV....107

ENDORSEMENTS

PAØUN....240
KV4AA....230
W9FID.....222
VK2ACX...220
W9NLM....212
W6MHB...200
G3FNN....200
CP5EK.....183
PY1HX....183
W7AH.....182
CN8MM...180
WØAIH....170
W4HVQ...161
W5BNO...160
W4ML.....140
WØDGH...132
W7NKW...130
WØFNN...130
VO3X.....130
YV5BZ....130
W2IJU.....124
W8TMA...121
W1APU....120
W9DGA...120
WØNLY...120
W5LCI....119
PAØTAU...117
EA3CK....112
W1EIO....110
W2ZGB....110
W9IHN....110

RADIOTELEPHONE

W8GZ.....190
G3FNN....175
PY2AHS...162
I1CAR.....151
W8ZOK....122
I1CTE.....121

CALL AREA LEADERS

W5MIS....239
W7AMX...238
W9NDA...240
VE4RO....222

RADIOTELEPHONE

W2APU....202
W3JNN....203
W4HA.....175
W5BGP....203
W6AM.....196
W7HIA....175
WØAIW....162
VE3KF....163

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made on January 14th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7125, 14,100, 21,020, 52,000 and 145,600 kc. The next qualifying run *from W6OWP only* will be transmitted on January 7th at 2100 PST on 3590 and 7138 kc.

Any person may 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 will be made from W1AW each evening at 2130 EST. Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday. Approximately 10 minutes' practice is given at each speed. References 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 get sending practice, hook up your own key and buzzer and attempt to send in step with W1AW.

Date Subject of Practice Text from November *QST*
Jan. 3rd: *A Multiband 813 Final*, p. 11
Jan. 6th: *The Lazy Man's Panoramic Adapter*, p. 14
Jan. 11th: *A Public Relations Project*, p. 18
Jan. 13th: *Audio for the Mobile or Fixed Station . . .* , p. 21
Jan. 19th: *An R.F. Bridge . . .* , p. 29
Jan. 21st: *Simplified "Break-In with One Antenna,"* p. 30
Jan. 24th: *The CD-10-TC*, p. 32
Jan. 27th: *Fulminatin's from Ol' Fogey*, p. 34

SUPPLEMENT TO NET DIRECTORY

The following list will supplement and correct the listing on page 78, November *QST*. Please inform us promptly of any errors or omissions so that they can be included in the March *QST* installment. An asterisk (*) indicates correction from previous listing in November *QST*. This listing brings the record up to date as far as November 17, 1954. Registrations received later than this date will appear in the March *QST* supplement.

Name of Net	*Freq.*	*Time*	*Days*
Albert Net (Conn.)	29,460 145,200 52,420	1945 EST	2/Mon., Fri.
Alberta Phone Net (APN)	3765	1930 MST	Mon., Wed. Fri.
American Legion Amateur Net	3975	1900 PST	Daily
Anthracite Net (AN)	3610	1900 EST	Mon.-Fri.
Amateur Radio & Coffee Society (ARCS)	29,400	Always	Daily
Arizona CW Net (AZN)	3690	2000 MST	Tue., Thu.
Arizona Emerg. Net (AEN)	3865	1900 MST	Tue.-Thu.
AREC Net (Calif.)	3900	1030 PST	Sun.
Atlanta Forty CW Net	7150	2100 EST	Sun.
Atlanta Ten Phone Net	29,600	2200 EST	Sun.
Azalea Emerg. Net (Ala.)	29,680	2000 CST	Mon.
Badger Emerg. Net (Wis.)	3950	1800 CST	Daily
Bakersfield & E. Kern Co. (Calif.) Emerg. Net	145,440	1900 PST	Mon.
Barn Yard Net, The	3960	0700 EST	Mon.-Sat.
Barnyard Net	3924	0700 EST	Mon.-Sat.
Batavia Amateur Radio Assn. Net (N. Y.)	3565	2030 EST	Wed.
Bedford (Mass.) Club CW Net*	3600	1815 EST	Thu.
Bergen Co. (N. J.) CD Net	29,510 29.550	1945 EST	Wed.
Berks Civil Defense Net (Pa.)	145,400	2000 EST	Mon.
Bloomfield (N. J.) Communications Group	29,520	1100 EST	Sun.
Blue Ridge 160 Meter Net	1800	0830 CST	Sun.
British Columbia AREC Net (BCAREC)	3755	1800 PST	Mon.-Sat.
Brooklyn (N. Y.) AREC	3700	1100 EST	Sun.
Buckeye Net (Ohio) (BN)	3580	1900 EST	Mon.-Sat.
Catalpa Amateur Radio Society Net	3970 29,610	1000 EST 0900 EST	Sun. Sun.
Centinella Valley AREC	28,680 147,120	1930 PST	Tue.
Central Area Net (CAN)	3670	2030 CST	Mon.-Fri.
Central Gulf Coast Hurricane Net	3935	1815 CST	Daily
Central Illinois Net	1815	0830 CST	Sun.
Central Virginia Amateur Radio Club CW Net	3650	1945 EST	Mon.-Fri.
Charlotte CD Net (N. C.)	3825	0900 EST	Sun.
Colo. Emerg. Phone Net	3980	0830 MST 1700 MST	Sun. Tue., Thu.
Colo. Slow Speed Net	3570	1715 MST	Mon., Wed., Fri.
Columbia Amateur Radio Pool (Fla.)	7183	0630 EST	Mon.
Commanche County (Okla.) AREC Net (CCEN)	3860	1230 CST	Sun.
Conn. Nutmeg Net (CN)	3640	1845 EST	Mon.-Sat.
Coastal Emerg. Radio Net	146,800	2000 CST	Tue.
Cranston (R. I.) Civil Emerg. Net	39,510	2000 EST	Alt. Thu.
Davidson Co. (Tenn.) 2 Meter Emerg. Net	145,200	2000 CST 1930 CST	Mon. Thu.
Delaware Lehigh Amateur RC Net (Pa.)	29,640	1000 EST	Sun.
Dixie Traffic Net	3970	0800 CST	Mon.-Fri.
Duluth Emerg. Net	29,600	2130 CST	Tue.
Dutchess Co. (N. Y.) 2 Meter CD Net	145,350	2100 EST	Mon.
East Able Fox (EAF)	3915	2030 EST	Sun.
East Able Baker (EAB)	3503	2030 EST	Sun.
East Tennessee Net	3980	0545 CST	Mon.-Fri.
Eastern Area Net (EAN)	3670	2030 EST	Mon.-Fri.
Eastern Mass. Net (EMN)*	3660	1300 EST 1900 EST	Mon.-Fri.
Eglin Amateur Radio Society's Hurricane and Incidentals Radio Net	29,560	1900 CST	Mon.
Eight Ball Net, The (Ohio)	1895	1000 EST	Sun.
Elbow Benders Net	1806	2100 EST	Tue.
Fall River Emerg. Net (FREN) (Mass.)	29,200	1900 EST	Wed.
Falmouth (Mass.) Emerg. Net	3585	1415 EST	Wed.
Fifth Regional Net (RN5)	3645	1945 CST 2130 CST	Mon.-Sat.
First Regional Net (1RN)	3605	1915 EST	Mon.-Fri.
Fish Net	3740	1930 CST	Thu.
Florida Phone Traffic Net (FPTN)	3945	0700 EST	Mon.-Fri.
Forest Hill (Ont.) Amateur Radio Club	3765	1900 EST	Sun.
Garfield Co. (Okla.) Emerg. Net	3825	0900 CST	Sun.
Gator Net (GN) (Fla.)	7105	1005 EST 1835 EST	Sun. Tue.
Gem Net (Idaho)	3638	2000 MST	Mon., Wed., Fri.
General Coverage	3990	1400 EST	Sun.
Georgia Cracker Net	3995	0930 EST 1830 EST	Sun. Tue.-Thu.
Golden Empire Emerg. Net (GEEN)	1920	2000 PST	Mon.
Grand Rapids (Mich.) Emerg. Net	29,610	2030 EST	Mon.
Green Bay (Wis.) Emerg. Net	3950 29,620	0730 CST 1300 CST	Sun. Mon.
Gulf Emerg. Mobile Net (GEM) (Miss.)	29,600	1900 CST	Thu.
Hair Net	29,560	1900 CST	Mon.
Hillsborough Co. (N. H.) Emerg. Net	29,000	1900 EST	Fri.
Hi Noon Net (Colo.)	3945	1200 MST	Mon.-Fri.
High Noon Net, The (Mich.)	3663	1200 EST	Mon.-Fri.
Holbrook CD Net	28,570	1900 EST	Mon.
Illinois Emerg. Net (IEN)	3940	1800 CST 0900 CST	Tue., Thu. Sun.
Indiana CW Net (QIN)	3656	1600 CST 1830 CST 2200 CST	Mon.-Sat.
Iowa 160 Meter Net	1815	1900 CST	Daily
Iowa Tall Corn Net (TLCN)	3560	1830 CST	Mon.-Fri.
Kansas 75 Meter Phone Net	3920	1230 CST	Tue., Wed., Fri.
		0800 CST	Sun.

Kennehoochee Emerg. & Traffic Net	29,460	2130 EST	Sun.
Kent Emergency Group	145,160	2000 EST	Mon.
Kentucky Korn Krackers	3945	0700 CST	Daily
Kentucky Phone Net	3945	1830 CST	Mon.-Fri.
Knights and Ladies of Round-table Net (KLR)	3885	0830 CST	Mon.-Sat.
Knights of the Kilocycles	3910	0730 EST	Sun.
Lucas Co. (Ohio) Emerg. Net	29,200	1030 EST	Sat.
"MAK" Chap. 2 (Mass.)	29,240	1900 EST	Tue.
Malden (Mass.) Emerg. Net	29,540	1930 EST	Mon.
Manitoba CW Net (MAN)	3700	1900 CST	Daily
Manitoba Phone Net	3760	1900 CST	Daily
MARC Net (Ind.)	29,620	1900 CST	Mon., Wed., Fri.
Maryland Delaware DC Section Net	3650	1930 EST	Mon.-Fri.
Maryland Emerg. Phone Net	3820	1830 EST	Mon., Wed., Fri.
		1300 EST	Sat., Sun.
Merced Co. (Calif.) Emerg. Net	3995	1900 PST	Fri.
Mercer (N. J.) Emerg. Net (MEN)	147,150	2100 EST	Sun.
Mich. Buzzards Roost Net	3930	1730 EST	Mon.-Fri.
Michigan Emerg. Net	3930	0900 EST	Sun.
Milton (Mass.) Emerg. Net	146,808	1930 EST	Mon.
Minn. Section Net (MSN)	3595	1830 CST	Mon.-Sat.
Mo. Amateur Radio Teen Age Net	3830	0700 CST	Sun., Tue., Thu.
		1645 CST	
Monmouth Co. (N. J.) Emerg. Net	147,150	2130 EST	Mon.
Morning Conn. Net (MCN)	3640	0630 EST	Mon.-Fri.
Nassau Co. (N. Y.)	28,720	2000 EST	Thu.
10 Meter Net	28,680		
Nebraska CW Net	3525	1845 CST	Daily
Nebr. Slow Speed Net (NSS)	3750	1700 CST	Daily
New Hampshire Emergency Net (NHEN)	3850	1300 EST	Sun.
New Hampshire Slow Speed Net	3685	1730 EST	Mon.-Fri.
New Jersey Civil Defense Net	3993	0930 EST	Sun.
New Hampshire CW Traffic Net	3685	1800 EST	Mon.-Fri.
N. J. 75 Meter Emerg. Phone Net	3900	0900 EST	Sun.
New Jersey Net (NJN)	3695	1900 EST	Mon.-Sat.
New Mexico Breakfast Club	3838	0700 MST	Daily
New Mexico CW Net	3633	1900 MST	Mon.-Fri.
N. M. 75 Meter Emerg. Phone Net	3838	0730 MST	Sun.
		1800 MST	Tue., Thu.
Newport (R. I.) Emerg. Net	28,900	1000 EST	Sun.
N. Y. State Phone Emerg. & Traffic Net	3925	1800 EST	Daily
Night Owl Net (N. J.)	29,000	2300 EST	Sat.
Nine Jacks and Queen Net	3870	1210 CST	Mon.-Sat.
Ninth Regional Net (9RN)	3640	1700 CST	Mon.-Sat.
		1945 CST	
Northampton Co. (Pa.) CD Net	29,640	1000 EST	Sun.
North Central Phone Net (NCN)	3915	0700 CST	Mon.-Sat.
North Fork Net (Okla.)	3815	1215 CST	Mon.-Sat.
Northland Net (Que.)	3680	1915 CST	Mon.
	3775	1915 EST	Wed.
North Texas CW Net (NTN)	3770	1900 CST	Mon.-Fri.
N. Texas-Okla. Net (NTO)	3960	1730 CST	Daily
Northwest Texas Emerg. Net	3950	0800 CST	Sun.
NYC-LI CW Traffic Net (NLI)	3630	1930 EST	Mon.-Fri.
		1900 EST	Sat.
Oak Ridge (Tenn.) Emerg. Net	50,700	1900 EST	Tue., Fri.
Ohio Emerg. Net	3860	1800 EST	Thu.
Okla. CW Net (OLZ)	3682.5	1900 CST	Mon.-Sat.
Okla. Phone Emerg. Net (OPEN)	3860	0800 CST	Sun.
160 Meter Screwball Net	1992	1230 CST	Mon.-Sat.
Ontario Civil Defense Net	3765	1900 EST	Tue., Thu., Sat.
Ontario Forty Meter Net (QON)	7160	1930 EST	Daily
Oregon Emerg. Net	3840	1800 PST	Daily
		1900 PST	
Oregon State Net (OSN)	3585	1830 PST	Mon.-Fri.
Ottawa Six Meter Emerg. Net	50,400	2100 EST	Tue.
OX Net (Me.)	29,500	2000 EST	Daily
Pacific Area Net (PAN)	3670	2030 PST	Mon.-Sat.
Penna. Fone Net (PFN)	3850	1830 EST	Mon.-Fri.
Pensacola Emerg. Net	29,560	1900 CST	Mon.
Polecat Net (Pa.)	3665	1130 EST	Sun.
Potomac-Rappahannock Valley Net (PRVN)	3935	0900 EST	1/3 Sun.
Prep School Net, The	3950	1400 EST	Wed.
Province of Quebec Net (PQN)	3670	1915 EST	Daily
Puerto Rico Amateur Emerg. Net	3559	2000 AST	Mon.
	3925	2000 AST	Wed.
Quarter Century Wireless Assn. Net	3810	1100 EST	Sun.
Restricted Speed Net (Ont.)	3645	1330 EST	Sun.
Rhode Island Novice Net (RINN)	3743	1830 EST	Mon.-Fri.
Rhode Island Traffic Net (RIN)	3540	1900 EST	Mon.-Fri.
Rockland Co. (N. Y.) CD Net	147,210	1930 EST	Mon.
Sask. ARRL Phone Net	3780	1830 MST	Daily
Sea Gull Net (Me.)	3960	1700 EST	Mon.-Fri.
Second Regional Net (2RN)	3690	1830 EST	Mon.-Fri.
		1945 EST	
Seventh Regional Net (RN7)	1988	1945 PST	Mon.-Sat.
		2130 PST	Thu., Sat.
	3575	1945 PST	Mon.-Sat.
		2130 PST	Thu., Sat.
Sheridan Emerg. Net (SEN) (Wyo.)	3825	1930 MST	Tue.
6 Meter Emergency (Tenn.)	50,700	1900 EST	Tue., Fri.
Sixth Regional Net (RN6)	3615	1945 PST	Mon.-Fri.
		2130 PST	
St. Paul Civil Defense Net (Minn.)	29,520	1930 CST	Fri.-Wed.
South Bend Mobiles	29,493	1930 CST	Mon., Wed., Fri.
South Carolina Net (CW) (SCN)	3525	1900 EST	Mon.-Fri.
So. Dak. 160 Meter Phone Net	1905	0800 CST	Daily
Southern Calif. Net (SCN)*	3600	1930 PST	Mon.-Fri.
		2030 PST	Mon.-Sat.
		1000 PST	Sun.
Sunrise Radio Club Net (N. Y.)	3950	1000 EST	Sun.
Tar Heel Net	3865	1930 EST	Mon.-Fri.
Teenage Net (TAN)*	3630	2315 EST	Daily
Teen Age Rag Chewers Net	3525	1700 EST	Mon.-Fri.
Tennessee HI SPEED Net	3635	1830 CST	Mon.-Sat.
Tennessee Phone Net (TPN)	3980	1245 CST	Mon.-Sat.
		1830 CST	Tue., Thu.
		1300 CST	Sun.
Tenn. Regular	3635	1900 CST	Mon.-Sat.
Tenth Regional Net (TEN)	3545	1945 CST	Mon.-Sat.
		2130 CST	
Thirteenth Regional Net (TRN)	3675	1945 EST	Mon.-Fri.
		2130 EST	
Topeka Emerg. Ten Meter Net	29,500	0930 CST	Sun.
Toronto Ten Meter Net	28,250	0930 EST	Sun.
Traffic Exchange Net (TXN)	7165	1900 CST	Daily
Tropical Phone Tfc Net (TPTN) (Fla.)	3945	1800 EST	Daily
Trans Continental Relay Net	7042	0215 GMT	Daily
		0615 GMT	
Tri Town Radio Amateur Club	3860	1900 CST	Wed.
		0900 CST	
Tulsa Co. (Okla.) Teenagers Net	3735	1900 CST	Mon.-Fri.
	3883	1200 CST	Sat.
Tuboro Radio Club L. I. N. Y.	29,520	1900 EST	Tue.
		1130 EST	Sun.
Union County AREC Net	145,940	2000 EST	Tue.
Upper Peninsula Net	3950	1000 EST	Sun.
Virginia Fone Net (VFN)	3835	1900 EST	Daily
Virginia Slow Net (VSN)*	3680	1830 EST	Mon.-Fri.
Waltham (Mass.) CD Net*	145,800	2100 EST	Mon.
Wash. Section Net (WSN)*	1988	1900 PST	Mon.-Fri.
		1930 PST	
	3575	1900 PST	Mon.-Fri.
		1930 PST	
Weakley Co. (Tenn.) Civil Defense Net	50,353	2130 CST	Mon.
Wellesley D. D. Net (Mass.)	147,250	0900 EST	Sun.
Western Mass. Net (WMN)	3560	1900 EST	Mon.-Fri.
Western Penna. ORS Net	3585	1900 EST	Mon.-Fri.
Westlake Net (Ohio)	3950	1000 EST	Sun.
West Park Radio Ops Emerg. Net (Ohio)	29,520	2200 EST	Mon.
West Virginia CW Net	3570	1900 EST	Mon.-Fri.
Whittier Emerg. Net (Calif.)	3885	2015 PST	Thu.
	29,520	1900 PST	Thu.
	145,280	1930 PST	Thu.
Wisconsin CW Traffic Net (WIN)*	3625	1800 CST	Daily
Wisconsin Phone Net	3950	1215 CST	Mon.-Sat.
		0930 CST	Sun.
Worcester (Mass.) Civil Defense Phone Net	28,720	1930 EST	Mon.

• 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, W. H. Wiand, W3BIP — SEC: IGW. RM: AXA. PAM: PYF. E.Pa. Nets: 3610, 3850 kc. A new radio club was formed by the amateurs of Tamaqua with meetings held the 2nd and 4th Mon. of each month. The new group has applied for ARRL affiliation under the name of Tamaqua Amateur Radio Club. The organizing officers of RZV, pres.; PTM, vice-pres.; WN3ZRQ, secy.; WN3ZPW, act. mgr.; KJJ chairman, emergency committee. The club publishes a monthly bulletin known as the *Sardine Wrapper*. New officers serving the DX Club for another year are VSS, pres.; PQB, act. mgr.; SDE, secy.-treas. The West Philadelphia ARA offers code and theory classes every Tue. with Novice examinations given every month. Hurricane Hazel found the club station, MKA, fully staffed with OWK, VCE, VCY, RKP, and WN3ZFC at the operating positions. PYF, manager of the PFN, reports a total of 121 stations reported into the net on Hurricane Hazel night with the FCC declaring the net frequency a clear channel emergency frequency. With the aid of the reporting stations, PFN was able to track Hazel at least one-half hour ahead of the weather bureau notifications. PDJ, secy. of the Abington Township ARA now stationed in Baltimore and reporting for other members of ATARA also with Uncle Sam, says RFI is operating 20-meter mobile while stationed at the White Sands Proving Grounds, N. M., and RCE skeds RFI from his QTH in Warrington. OQG is operating 10-meter mobile while stationed at Ft. Devens, Mass. WN3ZUB, YL and sister of PDJ, operates portable from Bucknell University where she's a junior. NQT is back home again at Mountain Top near Wilkes Barre and can be found wherever there is traffic to be handled. Traffic men will be interested to know that NQT was the operator at K4USA signing Hank. Welcome to the E.Pa. Net, Hank. JNQ reports losing all his antennas but one during the big blow. Traffic: (Oct.) W3CUL 4030, PYF 95, NOK 94, AXA 68, BFF 58, GES 56, RXW 52, UOE 51, OZV 50, DUI 46, NQT 46, TEJ 32, MWL 27, OK 26, QLZ 18, YJM 18, PVY 12, JNQ 9, GIY 6, VXQ 6, VPY 5, YGX 2. (Sept.) W3NQT 54, MWL 43, ABT 5, YHX 4, CHU 3, KFK 2.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Arthur W. Plummer, W3EQK — SEC: PRL. The MDD Section Net operates each of the five week days on 3650 kc. at 7:30 P.M. EST. The NCS is WV. The MEPN operates each Mon., Wed., and Fri. at 6:30 P.M. EST and Sat. and Sun. at 1:00 P.M. EST on 3820 kc. The NCM is FDK. The MMRC meets at 9:00 P.M. EST the 1st and 3rd Fri. of each month on 29,560-kc. mobile. The NCS is QLG. QQS now has a new folded dipole antenna. WV appears to be about the most active c.w. man in the section. HC took part in the 2nd Army "Tobacco Leaf IV" activity. TGF calls into MDD and 3RN occasionally. PRT has organized the Lafayette Amateur Radio Club with 17 members. ECP reports that the prize purchase at the recent Falls Church, Va., club auction was a 60-ft. triangular tower by a WN4 for $1.00. The catch is he has to remove it from the seller's QTH! CDQ attended the Roanoke Division Convention in Richmond Oct. 30th. She reports a visit from Ada, ØRNO, Oct. 3rd. NPQ assisted several WN4s in getting their tickets. TKE won an NC-98 receiver, a BC-906 frequency meter, and a Heathkit grid-dip meter kit. ONB is now the proud possessor of a mill. EEB made a contact recently on 160 meters with his new Viking, his first 160-meter QSO in 20 years. JZY reports he has buried several hundred feet of antenna wire for ground-plane radials at his place. GRF reports operating 4HQN in both the CD and World Wide DX Contests. PZW, jr. operator of WV, at present operates KL7FAF. Maj. Frederick B. McIntosh, of the USAF, gave a very interesting talk Oct. 25th to the Chesapeake Amateur Radio Club on "The Effect of the Novice on Ham Radio." A movie, "The Functions of the Air Research and Development Command" also was shown. Maj. McIntosh is a member of MARS and the Annapolis Radio Club. The MMRC elected VAG as pres. and NKY as secy.-treas. The first hidden transmitter hunt of the Maryland Mobile Radio Club was held Oct. 22nd with 15 mobiles competing. 2PAV stunned everyone by traveling 13 miles and finding 3YLL/3 in 35 minutes. WN3ZBV, secretary of the Woodrow Wilson High School, Washington, D. C., announces that JEP, located at the school, is in operation and ready for business. 1FTV, formerly of Massachusetts, now is 3ZBH. NSV is getting back on the air soon after a two-year layoff. WN3YVR is moving from a trailer to an apartment so he will have more room for a 40-meter antenna. He also is building a 36-ft. ketch in which he intends to circumnavigate the globe with plans for expeditions to remote islands in the South Pacific. WN3YVS is building a Viking Ranger. Hurricane Hazel took down all of EQK's antenna. "Hazel" also took down HWZ's antennas and bent an element on JLX's beam. AVL was flooded out of his country QTH at Hollywood, Md., and HL, at Crisfield, was off the air for a week. JZY lost his antennas up in the hills near Smithburg. Communications for the Mummers Parade in Hagerstown was furnished by 3EHA, 8GPD, 3NZT, OYX, WTO, WWM, and VAM of the Antietam Radio Association. OXL, TJV, and RAH attended the Roanoke Division Convention. MFJ is back after doing some mobiling on 75 meters in Wisconsin and Nebraska. QLF gave a most interesting talk at the first November meeting of the Chesapeake Club on the construction of 10-meter direction finders for transmitter hunts. WKB now has a new 44-ft. vertical for 40 and 20 meters. Your SCM is now an official member of ARRL's Old Timers Club. The Andrews Electronics Assn. is conducting code classes for Novices 5 nights each week. Traffic: (Oct.) W3WV 507, CVE 251, RV 178, COK 131, UE 40, ECP 30, PKC 16, NNX 12, HC 10, WKB 9. (Sept.) W3USA 1110, COK 86, UE 79, ONB 63, RV 55, JZY 35, ECP 30, EQK 5, WKB 2, TGF 1. (Aug.) W3USA 1138. (July) W3USA 1216.

SOUTHERN NEW JERSEY — SCM, Herbert C. Brooks, K2BG — PAM: ZI. During Hurricane Hazel the South Jersey Radio Assn. demonstrated its ability to organize quickly and maintain communications on both 2 and 10 meters. Those participating were W2ABQ, K2AFJ, W2ASG, K2BWG, BZK, W3AOE/2, K2DWY, W2EGP, FTO, KN2GHY, KN2GYN, KN2JEI, W2JRO, LY, NFL, W3OEN/2, W2OQN, PAU, PEN, PTM, PZX, QBH, TBD, TXP, VX, YPQ, and YRW. The Burlington County Radio Club also did a swell job with EVR, GOK, JJV, WKI, WUP, and ZNB. NFL now is located in Merchantville. 3ESX's new QTH is Audubon. The JP Net promoted a transmitter hunt to stimulate activity on 10 meters. SDB is doing a good job keeping everyone posted on DX activities, especially the International DX Contest. K2JIG is a new member of this section. Woody is ex-3BOX and is located in Glassboro. KN2IJC and KN2HXD are interested in starting a Novice Net. If interested, please contact these fellows. ZVW is on 15 meters working DX in addition to his regular EAN assignment. SUG has received his MARS certificate. BAY is rebuilding all his antennas as a result of the hurricane damage. ASG also has repairs to make. ZI has returned from a Florida vacation; he worked mobile all the way. KN2JID is the dad of K2ART and K2DSL. K2CLD has dropped the "N" and is heard occasionally operating W2ZQ. The Hamilton Twp. Radio Assn. is planning to reactivate its Friday night mobile net. Traffic: W2RG 126, K2BG 66, W2ZI 14, SUG 12, ZVW 12.

WESTERN NEW YORK — SCM, Edward G. Graf, W2SJV — Asst. SCM: Jeanne Walker, 2BTB. SEC: UTH/FRL. RM: RUF. PAMs: GSS, NAI. NYS meets on 3615 kc. at 6:30, and 3925 kc. at 7 P.M.; NYSS on 3595 kc. at 8 P.M.; NYS C.D. on 3509.5 and 3993 kc. at 9 A.M. Sun.; TCPN 2nd call area on 3970 kc. at 7 P.M.; SRPN on 3970 kc. at 10 A.M.; ISN on 3980 kc. at 3 P.M. The v.h.f. group of the RARA held a meeting at the QTH of UXP. K2CUR received a personalized, hand-made QSL card nearly 3 ft. square from 1BWB. EMW has the 50-watt rig on while getting the bugs out of the 813. Under the leadership of K2BEG, CUU, LXE, CYE, and K2s HUK and DVD provided mobile communications for the annual Sports Carnival Races held in Buffalo. RHQ worked 40 miles on the first try on 420 Mc. K2AHH/2 is working mobile to and from college. QBB is working DX on 40 meters running 500 watts to a pair of 813s. Receiver is a BC-312, antenna a 7-Mc. ¼-wave Zepp up 25 feet. K2CEH is the most active ham on 220 Mc. in the Rochester Area. Also on are POM and RTB. ZYQ was elected prexy of the Utica ARC with SSL, vice-pres.; and QJH, secy.-treas.

A committee headed by QXA will handle Novice and Tech. Class exams. SSL, with the help of former 8KOD and WNK, is organizing c.d. KBT has resigned as manager of NYSS. OPD has been named as NYSS mgr. with BNC as asst. mgr. Hurricane Hazel removed UTH's 2- and 6-meter beams. FE is active in Frequency Measuring Tests and LO and CD Parties. Speakers at RAWNY meetings were TKO on RTTY, and R. Russell and C. Confers, of Bell Labs., on Meters and their Uses. NAI, Schoharie EC, reports that her group was activated for the S.E.T. QCO now is 4FSS in Florida. BGN was M.C. of the OT Nite sponsored by the RARA. ICE presented the RARA OT show, films, and displays at the New England Division Convention. GVJ has a new 20-meter beam. GBN dropped the "N." KN2s IJV, INP, and JBV are members of the Timon HS ARC. K2BUI uses a Matchbox and VFO and is building a Heathkit VFO for his brother, 1ZNH/2. We regret to report the passing to Silent Keys of VZ. OLH is on 80 meters with 45 watts, S-40B receiver and 75-ft. long-wire antenna; also on 7050 kc. KEL would be glad to have those who hear his Official Bulletins come back to him for repeats if desired. Hurricane Hazel took down RUT's antennas. There is much interest in the code classes conducted by K2GDI. CXM lost his antenna during Hurricane Hazel but is back on 20 meters with a kw. QQ visited VE3DJI while vacationing. NYS is coöperating with NTS on a full-time schedule. Traffic: (Oct.) W2RUF 525, QHH 171, K2DXV 125, W2BNC 108, HKA 96, K2DSR 84, W2ZRC 65, OE 50, K2BUI 36, DJN 30, W2DSS 29, CXM 22, EMW 14, SJV 13, GBX 9, K2CUQ 6. (Sept.) K2FAV 393, DJN 14, W2RQF 11, OPD 10, DVE 5. (Aug.) K2DJN 9.

WESTERN PENNSYLVANIA — SCM, R. M. Heck, W3NCD — SEC: GEG. RMs: UHN, NUG, GEG. PAMs: LXE and AER. The WPA Traffic Net meets at 7:30 P.M. on 3585 kc. Newly-organized is the Radio Club of Indiana County with the following officers: VKD, pres.; OTN, vice-pres.; YUG, secy.; Cliff Porter, treas.; and WXX, act. mgr. Good luck, gang, and keep us informed as to your activities. LOD reports on the McKean County Radio Club activity. Those active in the S.E.T. there were SJV, LQQ, OCR, LPO, MEY, and WN3ZMF. The Club also is attempting to hold study in radio and code and has set up a committee to aid in mail-licensing needs there. The Radio Association of Erie still holds weekly classes in theory and code and is having a bumper attendance, with enrollment around 75. STK is chief instructor with NXK, VNB, and KNQ assisting. The RAE c.d. mobile units have been conducting tests to find the best spots for good coverage of the county and expect soon to coöperate in a c.d. test. A box social was held and enjoyed by all who attended. Fine lunches, movies, and music were the features. WSO is new General Class licensee in the area. A reliable source reports MMI and OIH taking to the air now with wings as well as by radio. Put both together and let us know how they come out. I also had the fine newspaper, *KWH*, here but am sorry to report that I seem to have mislaid it at this writing and will have to humbly ask the SCARC to please excuse my bad manners. However, I can report that the SCARC was host to the Western Pennsylvania Amateur Radio Club Council at its October meeting, when the following officers were elected: GEG, chairman; OVM, vice-chairman; KWL, secy.; and MTP, treas. Traffic: W3WIQ 1978, QPQ 206, LMM 154, YA 92, LXQ 54, UHN 30, NCD 13, UTR 12, LXE 11, PWN 8, RVS 8, MIZ 6, KNQ 5.

CENTRAL DIVISION

ILLINOIS — SCM, George T. Schreiber, W9YIX — Section nets: 1LN (3515 kc.), IEN (3940 kc.). RMs: BUK, MRQ. PAM: UQT. SEC: HOA. Asst.: VTL. Cook County EC: HPG. 1VMW, author of *How's DX*, again has returned to the section and is operating under his old call, 9BRD. More than 25 amateurs handled the communications for the Chicago civil defense authorities in a mass feeding experiment early in November, the first time hams were called on to do such work. Calls included HPG, FZI, GRW, ZRF, YWH, NPN, KIK, QAO, GPV, SES, BWN, YLB, ZGX, VSV, ZQG, QQS, KCW, PZP, PEN, HXI, IKZ, MCS, ZIH, GOB, and EGB. Possibly there were some others we have left out. JMG is a new OPS. New ORS appointees are AA and YRS. KJ has a kw. on the air which he claims is TVI proof. PBI again placed first in the September F.M.T., with ATY second and 6CIW/9 third. Incidentally 6CIW, who is a Naval Commander, has been ordered to Puerto Rico, 10th Naval District, as industrial manager. PTZ is stationed in Japan and is trying to get a 20-meter rig going to talk to his dad. STZ. The Southtown Net operates in the Chicago Area each Mon. at 7:30 P.M. with HPG as NCS, and on Tue. with GPV directing the western section. Frequency is 29,640 kc. VL is back on the air operating on 7 and 21 Mc. His former call was EWG. VTO has moved to Iowa. SEH, ACZ, and ZYE are the amateurs composing the license exam committee of the Twin City Radio Club. The Quarter Century Wireless Operators Assn. is putting on a drive for members. Chairman of the Illinois chapter is LZ, with WR, CYD, and EVA the other officers. REC, ex-8AUB, again is operating in Illinois and enjoyed the S.E.T. New Novice calls are JZK, KZA, and IXN. They are interested in forming a Novice traffic net. HUX built a new relay rack out of a discarded day bed. The Starved Rock Radio Club makes it a practice to keep track of the membership in ARRL of club members and reminds them of expiration. The XYL of IDA is recovering from an operation. TLC is back on the air after repairing fire damage. DKW has completed a new station with Viking II and NC-183D. ZEN finished his boat in time to store it in the garage for the winter. RQY really has been busy at OO work. He sends in a list of 22 stations to whom friendly warnings were mailed. FLL and IOS enjoy 15 meters with great success. LI is working DX like mad with his new switchable vertical. His brother, GDI, also has a vertical that works, but neighbors have a pool on when it will bend double in the wind. YLU motored to Mexico City and secured a permit to operate as XE5PD. KWK is a new call in this area. Goodbye and luck to NXC, who is moving to California. As assistant radio editor for a Chicago paper Tony always had a good word to say for amateur radio in print. The committee for the '55 DXCC Convention is FID, QIY, FKC, and NN. The latter is trying to interest ex-BB in again getting a ham call. ATH and CKU are eying the multi-band vertical antenna. OAV, after three years of study, can now order a cup of coffee in Spanish. The strange frying noise in PEB's modulator has stopped, but so has the modulator. The fire department had a nice run to his home. KHJ is now on 20, and 10 meters is again peaceful. Traffic: (Oct.) W9DO 1338, K9FCA 1050, W9AA 124, YIX 81, QGG 74, HPG 67, OR 46, CEE 43, MRQ 41, SXL 30, WN9GMK 26, W6CIW/9 25, W9LXJ 21, STZ 16, REC 13, FRP 10, VTO 10. (Sept.) W9OR 32, LMC 13, HPG 8, FRP 4. (July) W9OR 49.

INDIANA — SCM, George H. Graue, W9BKJ — The Indiana Radio Club Council (IRCC) met at Indiana U., Bloomington, Oct. 24th. Officers elected were CMT, pres.; QBJ, vice-pres.; WTY, treas.; GRA, secy.; IHO, MBL, and JBQ, directors. ECs in Hammond, Plymouth, and Knox offered amateur radio assistance during the recent heavy rains. Mobile units of the Mobile Amateur Radio Club of South Bend, the Michiana Radio Club, and the Lake County Amateur Radio Club were in operation. The LCARC has 11 active 160-meter mobile units, and is setting a goal of 15 2-meter mobile units. WWT reports for RFN with a total traffic of 203; OLX, for QIN, reports a total of 446; NTA, for IFN, reports a total of 119. New in Evansville are N9KCU, KFE, KDJ, and KEP. Active in Princeton are URQ, ZZR, AYK, ZYV, N9JEP, IYR, IYX, and N4HRU/9. OVB has an 813 rig per Jan. *QST*. GPR has an all-band mobile. WEI is active on 20- and 40-meter c.w. or 'phone from Lake Lawrence. TGX is active at Vincennes on all bands with a B. & W. rig. RVM has 30 countries and 43 states on 15-meter 'phone. GZT is active on 80-meter s.s.b. GFS and UMS were mobile in Canada. DGA was elected president of TARS. The TARS transmitter hunt was won by NYX. The ham colony at Saint Meinrad Archabbey consists of NTR, WWF, ABW, UVJ, INT, AOO, N9INX, and 2GQW/9. ERB transmits Official Bulletins on 2, 6, 20, 40, and 80 meters. The IRC will have an amateur radio exhibit at the hobby show in Indianapolis. HXR received a 20-w.p.m. sticker. NZZ has 150 on his DXCC. SNT rebuilt for higher power. The Mike and Key Club of New Albany purchased 24 mobile and 2 base stations for the 2-meter F.M. Net. The Clarke Co. Radio Club has code and theory classes under way. LNA and ZVS are on 29-Mc. mobile. DFW is active on 80- and 40-meter c.w. EAO has a new modulator. TT is building a new shack in the basement. WRO is active on 75-meter 'phone. JKR is on with a complete Heathkit station. 8OPZ now is 9PSJ in Muncie. CEA has a new antenna. KLR worked Virginia for his 21st state on 2 meters. Traffic: W9JUJ 1524, NZZ 686, SNT 667, JBQ 466, TT 401, QYQ 213, UQP 168, UWU 100, STC 81, VNV 49, WRO 44, EHZ 40, NTA 31, CMT 30, SVL 30, YIP 26, CC 25, KDV 25, TG 25, YB 22, EQO 21, ZRP 21, BKJ 16, DKR 16, FYM 14, DOK 12, WBA 12, ZIB 12, YVS 7, NH 6, QR 6, DGA 4, CEA 3, NTR 3.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: OVO. PAMs: ESJ, GMY. RMs: IXA, RTP, UNJ. Nets: BEN, 3950 kc., 6 P.M. daily; WIN, 3625 kc., 6 P.M. daily; WPN, 3950 kc., 1215 Mon.-Sat., 0930 Sun. Mobile and c.d. frequency: 29,620 kc. VBZ received a BPL Medallion, and qualified for Traffic 12,000 Messages Club. ESJ has 4 states worked on 144 Mc. Net certificates (BEN) were issued to UTN, GTJ, WLW, and FFC. WWJ operates only week ends. OVO reports that there are 437 members and 187 mobiles officially registered in the Wisconsin AREC. SZR has 48 countries with FQ8, CEØ, TF, and EA8 on new inverted "V" Windom 100 feet high. UTV and RUB won the FLARC hidden transmitter hunt. RUB is building a two-element 20-meter beam. FFC is building a Viking II rig. LSK is E.E. student at M.U. New officers of the Point Radio Amateurs are CFW, pres.; DPN, vice-pres.; BCC, secy.-treas. CFS and CFW have dropped the "N" from their calls. UIM is working on break-in for his station. UIT, after 5 years of almost 100 per cent daily transmissions of ARRL Bulletins, has decided to relinquish his OBS schedule. MRAC members participating in harbor accident communications were GPI and HIF fixed, and YFW, PD, SNK, and ONY, mobiles. UFX, Wisconsin RO, is getting the State RACES Net on an operational basis. MQK is Madison RO, while UGT is a new EC. HAT has TBS-50 and SX-43.

SQM's mobile has Gonset Super-6 and Stancor transmitter with Hy-Q whip on 75 meters. MRAC mobiles CUW, TKY, MPF, VLK, ROH, and ONY took part in M.U. Homecoming Parade. The MSOE Club (HHX) has as new officers ØCEO, pres.; 1BNA, vice-pres.; 6IM, secy.; 9AXY, treas.; VCH, trustee. AXY is interested in RTTY. After losing his 828, DYL is designing around a pair of 826s. Now at MSOE, 6IM has been licensed since 1923. Congrats to IXA on an FB issue of the WIN bulletin. IIU operates from the WHKW site with a B. & W. 5100 and S-20 or 348-L, and Windom antenna 100 feet high. KKK has TBS-50 and S-20R with VHF-152A. LVB's new QTH is a "Ham's Paradise." Traffic: (Oct.) W9VBZ 843, ESJ 346, WWJ 99, IXA 62, RPT 61, FXA 57, SAA 55, GMY 36, OVO 13, SZR 11, RQM 9, LSK 8, RUB 8, AEM 7, IBF 6, RKP 6, KWJ 4, FFC 2. (Sept.) W9KWJ 10.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Earl Kirkeby, WØHNV — RM: FVG. PAM: GZD. ORSs: CAQ, EBA, KTZ. OBSs: KZZ, MXD. Sorry we had no news to report the last two months but, fellows, if you want our section to appear in this space every month let us know what you are doing. *Thanks to the few who faithfully send in their traffic reports* every month. I know most of you have been too busy this summer for ham radio but with winter here we expect renewed activity. Orchids to GZD for the fine job of rejuvenating the North Dakota 75-meter 'Phone Net, which meets on 3845 kc. at 6 P.M. every night except Sun. SHZ has dropped the "N" from his call. DAO now is at Condo, N. Dak. QOB is active at Devil's Lake and UXQ is stationed at Finley, N. Dak. Your SCM reports the arrival of YL operator No. 1 at his house Oct. 9th. Traffic: WØKTZ 179, EXO 142, KLP 141, FVG 85, NPR 69, EBA 62, KZZ 8.

SOUTH DAKOTA — SCM, J. W. Sikorski, WØRRN — Asst. SCMs: Earl Shirley, ØYQR, and Martha Shirley, ØZWL. SEC: GCP. RM: SMV. PAMs: BNA, PRL, NEO. DES received a Ranger for his birthday. BNA is NCS of the NJQ Net, with NEO as assistant, and GDE is NCS of the night 75-Net, with RMK as assistant. EYB, now General Class, has a new Globe Scout. The Mitchell ARC is conducting "Amateur Radio from Scratch" classes. GCP now has a Gonset converter in his Ford. October average attendance on the 75-Net was 37 per session. The C.W. Net reports a total QNI of 117 in 13 sessions, handling 46 messages. SMV is asking for more operators on the C.W. Net. BJH, NOT, and RRN attended 3 weeks' microwave school in Omaha. The 160-Net reports 436 QNI in 30 sessions. MZJ reports some of the Brookings gang are working on 420 *Mc. Thanks to those who sent in reports.* Traffic: (Oct.) WØSMV 61, GDE 52, MPQ 49, DVB 35, SCT 30, ZWL 26, NEO 17, GCP 12, BNA 9, OOZ 6, OJQ 4, AYD 3, HOH 1, WUU 1. (Sept.) WØPRL 20, DVB 7.

MINNESOTA — SCM, Charles Bove, WØMXC — Asst. SCM: Vince Smythe, ØGGQ. SEC: GTX. RMs: DQL, OMC. PAMs: JIE, UCV. The St. Paul Radio Club, Inc., held an election of officers. Results were as follows: HKF, pres.; THY, 1st vice-pres.; KWG, 2nd vice-pres.; PAK, secy.; and FGN, treas. HFY is planning on going on 2 meters. KLG is the new manager of the MSN C.W. Net. DQL has a new Viking. DQL, KLG, HFY, and TKX attended the Midwest Division Convention at Des Moines. *KJZ is visiting 4ZDB and family.* WQL *is a new ham in* Minneapolis. The Mankato Radio Club's station is now licensed with the call WCL. TOK now has his General Class license. OJH bought a new SX-71 from LUX. QKA is teaching code at the Mankato Vocational School. All beginners are requested to join the class on Thurs. nights. DJT is in the hospital and should be OK by the time you read this. BWF has purchased a 20-meter beam from LIL. The St. Paul Radio Club's emergency station, REA, has in its possession a bunch of new equipment. This includes four 2-meter Gonset Communicators, four Gonset Commanders which are 30-watt transmitters for all bands, 6 through 80 meters, and three 2-, 6-, 10-, and 11-meter *receivers with 2 more on the way, together with various gen*erators, mikes, antennas, etc. These boys really are serious about emergency work. QBW has been working DX since getting on 20 meters. TQQ is back home again after operating portable up near Ely all summer. KFN and EUI were mobiling in Florida. OVO is reactivating KØWAA at the National Guard Armory in Minneapolis. He will be using the big vertical tower on the 6th Ave. side. Traffic: WØWNA 289, KLG 213, KFN 127, KNR 91, UCV 69, IRJ 55, DQL 48, QNY 48, TKX 40, EHO 34, GTX 32, LST 30, LUX 30, PBI 25, KJZ 24, OJH 22, TJA 19, TUS 15, IKJ 14, GGQ 13, ABA 10, CID 10, RVO 10, ALW 9, MXC 8, BZG 6, DYC 6, GWU 6, GWJ 5, PUO 4, BUO 3, LIG 3, QDP 3, OPA 2.

DELTA DIVISION

ARKANSAS — SCM, Owen G. Mahaffey, W5FMF — Hi, gang, here we go with our first report. First let us all thank our past SCM, Fred Ward, LUX, for the great job he did for us. The OIK Net meets at 7 P.M., on 3695 kc., Mon. through Fri. Meet you there. VQD paid us a visit. He is building a pi-network antenna tuner. CAF meets RN5 and is doing an FB job. Send a report on what you are doing and what you want. Ham clubs should appoint a reporter to send me the dope on what you do, meeting nights, dates, etc., as I may drop in sometime.

LOUISIANA — SCM, Thomas J. Morgavi, W5FMO — PAM HEJ advises that an emergency 'phone net has been organized for the Monroe Area which meets on 1825 kc. at 0900 Sun. HEJ and IVF have CD appointments in Monroe. KRX is back on after working over his transmitter. ZSP lost his plate transformer but expects to get back on soon. In the meantime he is practicing on his Lampkin 105 for the next Frequency Measuring Test. GIX advises no 2-meter activity to the west but several contacts in Mississippi and Florida. The Istrouma ARC is sporting a panel truck with a BC-654, BC-669, a new PE2Ø1, 1-kw. a.c. generator, and a brand-new club call, HUD. ONM is its president. LV is MM on 15 meters. INL has a new Johnson Ranger on the air. IIA is an s.s.b. fanatic and is active on 75 meters. BUK is constructing a new bandswitching exciter. JCC has gone mobile. VND is back in town and on the air. UPM is operator on the SS *Dick Lykes* and is operating MM. SEC IUG reports the participation in the nationwide Simulated Emergency Test of Oct. 9–10 was very successful. Contact was maintained with 11 areas in Louisiana by the State Civil Defense Mobile Communications Control Center. Participating were LFF, DHE, UXG, KHJ, YCO, IHR, MWE, YNG, DKU, FMO, and SQB. NLK reports 26 hours transmitter operation time, 5 hours of which were spent sending 17 bulletins, 21 hours ragchewing, and no time testing. That last item should be noted and adhered to by all of us. Ex-SCM DKR is back and active on 40-meter c.w. His jr. operator, a Novice, is GRW. Traffic: (Oct.) W5NDV 91, EA 36, MXQ 31, HEJ 13, SQI 2. (Sept.) W5KRX 12, MWE 10, HEJ 8. (Aug.) W5KRX 74.

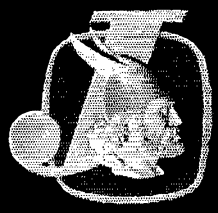
MISSISSIPPI — SCM, Dr. A. R. Cortese, W5OTD — We need some new ECs in various cities. Let's get Mississippi well lined up. Now for the news: TIR is now in Jackson. *EPI has a new* General Class license. CTY *is* now in Japan. That's all the news as received. Traffic: W5VME 201, EWE 73, TIR 56, KYC 34, JHS 33, CTY 28, OTD 4, BSE 2.

TENNESSEE — SCM, Harry C. Simpson, W4SCF — SEC: RRV. PAM: PFP. RM: WQW. PL still is vacationing in Texas. Weather reports now are being given by stations QNI Tennessee 'Phone Net. Information thus collected is being used by a Nashville TV station as a public service. FWX and CRP are opposing candidates as president of the Memphis Club. TPI's homecoming game fell on the same date as the S.E.T., so UWA/4 had many visitors. DZM, ZLT, APD, ZLZ, IAY, ZLK, WXL, ETJ, SGU, ZJY, PVD, and WJH visited and operated the 20-watt emergency rig set up by UWA, GUE, and KN4AAU. A new ham in So. Fulton, Tenn., is KN4AOK, just 11 years old. FLW reports 6- and 10-meter use during the S.E.T. BQG now is working Jackson, Memphis, and Marks, Miss., on 2 meters with sixteen-element rotary beam. A nice *RN5 Bulletin* was received from Mgr. OGG, who informs us that all NTS nets are now 6-day. WQW reports both c.w. nets are in full swing and invites more attendance. UWA reports fine attendance on the Upper Cumberland Net, with CTF missing *no* sessions. Roses to PVD and UWA for the fine *UCN Bulletin*. Thanks to the efforts of WQW, AEE, and others, the c.w. net was an integral part of the Tennessee *Communications Alert* and colors are flying! HIH is a new ORS. New ECs are RHK and BTS. RRV reports the section in fine shape on ECs with only a few counties open. Traffic: (Oct.) W4OGG 813, PFP 138, IIB 129, HIH 119, K4FET 113, W4BQG 110, WQW 103, UWA 100, OEZ 52, WAX 52, SCF 49, TZD 35, RRV 30, PQP 29, ODR 24, UVS 24, VJ 24, RET 17, YPG 14, WIJ 13, IV 12, PNG 12, BAQ 11, FLW 10, PVD 10, COY 9, PAH 9, RMJ 8, TIE 5, WN4HSX 3, HUT 3, W4SGI 1. (Sept.) W4UZY 35, PQP 32, BBD 9, TUO 5.

GREAT LAKES DIVISION

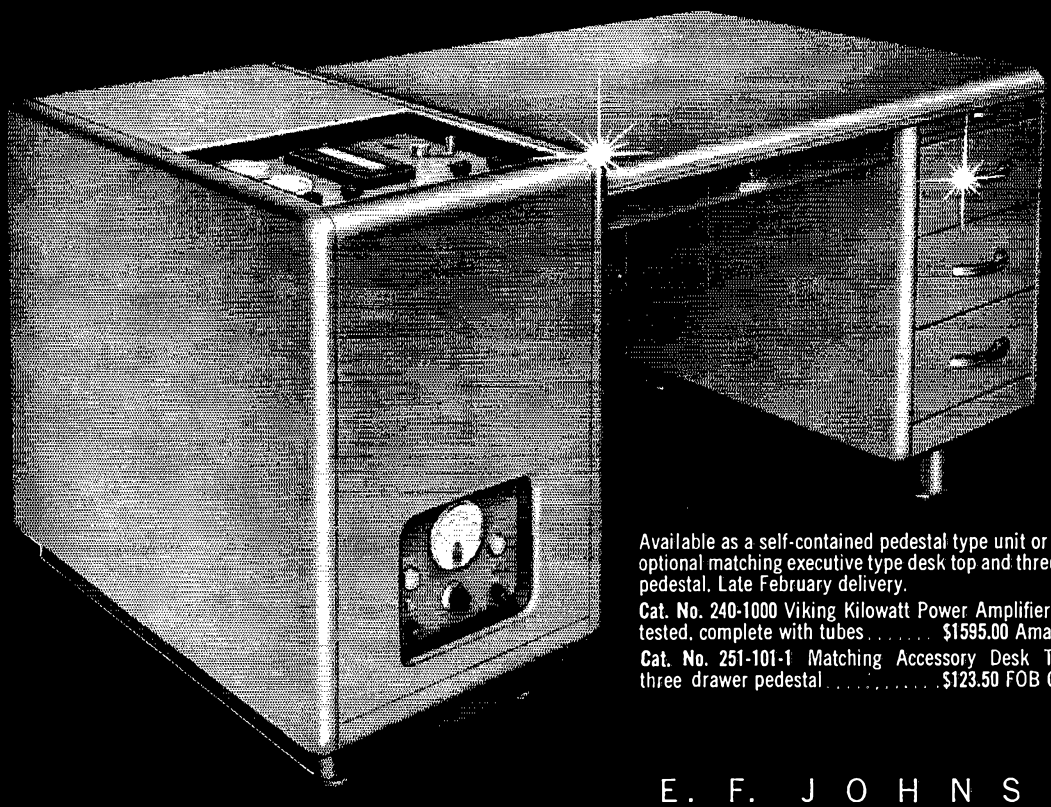
KENTUCKY — SCM, Robert E. Fields, W4SBI — Looks like JUI is our No. 1 station with an OO appointment. He is working on the 6- and 2-meter rig and already has receivers and standards for those bands. CDA has a very potent 'phone signal on 75 meters now, the first time on 'phone since he got his ticket in 1930. SYD says skip is causing him no end of trouble handling traffic on KYN. WN4GTC is asking for information about a Novice net on 80 meters. WNH has a 32-element beam up for 2 meters, but blew up a relay on the big rig, temporarily curtailing operation on 80 meters. K4FBW has completed a 6146 parallel final and is rebuilding an exciter. KKW is working the traffic nets. KYN, 9RN, and UTL, and getting his share of traffic. YZE *is a new* OBS *appointee and is doing* an FB job with Official Bulletins. The following stations make up the KYN C.W. Net: BAX, BAZ, BBU, BRI, CDA, K4FBW, FR, GFG, HEA, IAY, JBQ, JCN, JDU, JHU, JSH, KFA, KKG, KKL, KKW, KTA, LDL, LUR, LXA, MGT, MRT, MMY, MWX, NBY, NEP, NIZ, NVR, OEE, OGP, OXX, PRT, PXX, RAE, RHZ, RYL, SBI, SUD, SXP, SYD, SZL, TAV, TRO, TQC, UVH, UWA, UYA, VBA, VKC, VYO, WAO, K4WBG, WHC, WNF,

(Continued on page 82)



Tomorrow's Transmitter

Viking KILOWATT



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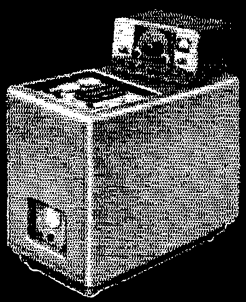
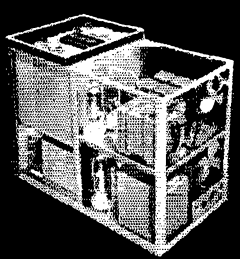


This compact pedestal contains the complete Viking Kilowatt. Excitation requirements are 30 watts RF and 15 watts audio for AM and 10 watts peak for SSB. The Viking "Ranger" transmitter/exciter (shown above) is an ideal RF and audio driver for AM and CW, and the New Viking SSB transmitter/exciter, soon to be announced, will drive the Viking Kilowatt to full output on SSB.



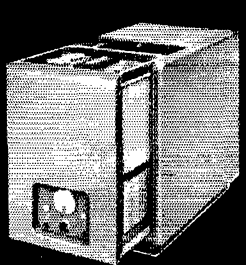
Interior view showing conservatively rated power equipment, heavy duty (PP810) modulator and push-pull ventilating fans. Shielded RF power amplifiers are parallel connected 4-250A's. High voltage supply (872A's) delivers 2500 volts at over 700 ma. Screen supply is VR tube regulated.

A magnificent new kilowatt . . . unequalled in performance . . . luxurious in appearance! This boldly styled Viking Kilowatt is truly tomorrow's concept of electronic equipment design and operating convenience. Of course you'd guess it's built by Johnson, unquestioned leader in the amateur transmitter field.

Operating the Viking Kilowatt is a never-to-be forgotten experience . . . you'll marvel at the ease of selecting SSB, AM, or CW with the flip of a single switch . . . you'll enjoy the convenience of its desk top controls . . . and you'll immediately sense the authority of its full kilowatt signal lifting you into a select group of leading amateurs . . . commanding the admiration of all. You'll be delighted, too, knowing that all this can be yours at an unbelievably low price. This Viking stands alone as a crowning achievement in all things that make a perfectly engineered kilowatt a pleasure to own and operate.

For more than just a look at the functional exterior beauty of the Viking Kilowatt, a deluxe brochure with the complete inside story may be yours on request. Write for your copy today.

CONTINUOUS COVERAGE FROM 3.5 TO 30 MC. MAKES THE VIKING KILOWATT AN IDEAL CHOICE FOR COMMERCIAL APPLICATIONS, TOO.



The Viking Kilowatt is compact yet completely accessible. Containing RF power amplifier, modulator, power supplies, and all control equipment, the entire unit rolls out of the pedestal on ball bearing rollers. This provides complete accessibility to all electrical components for adjustment or maintenance.

COMPANY • WASECA, MINNESOTA

(*Continued from page 78*)

WNH, WPY, WXL, YDL, YYL, YZE, ZCI, ZCM, ZDA, ZDB, ZKS, ZLK, ZPM, ZRE, and ZXO. Most of these stations already have earned their Section Net certificates. Traffic: W4KKW 180, K4FBW 138, W4ZLK 92, SBI 80, SYD 30, JCN 25, ZDB 22, PXX 20, AZQ 18, CDA 16, JUI 6.

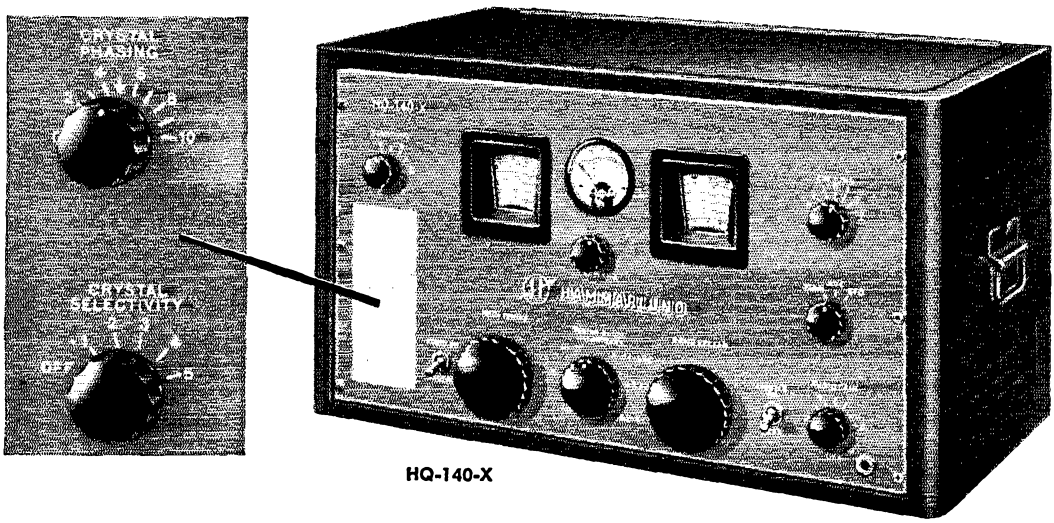
MICHIGAN — SCM, Fabian T. McAllister, W8HKT — Asst. SCMs: Bob Cooper, 8AQA; and Joe Beljan, 8SCW. SEC: GJH. RMs: URM, NUL. At this writing the SCM has just returned from a couple of weeks down in Norfolk and Portsmouth, and found the mailbag loaded with letters from the gang! Patience, fellows, and I'll get them all answered. There was a goodly pile of traffic reports, too, and quite a few new calls were seen. Welcome, fellows, let's hear from you often. ELW made BPL again this month; our only one. Looks like Seth is going out after that award in earnest. MQH and OQH are new NCS on QMN, and have been doing very well. FX is battling power-line noise in the receiver, and thinks he has it licked. MGQ has moved to Huntington Woods, so won't be heard (except on mobile) for a month or so. DLZ reports a new "wind direction indicator" on his garage roof. He says his 40-meter vertical really leans under the wind! The Mount Pleasant Club has taken over the radio class in the Adult Education Program at High School. The Motor City Club has a new and very interesting club bulletin. The Hard Luck Award of the month goes to SCS. He moved as far into the country as he could in order to avoid powerline QRM, etc., and now the power company is building a high voltage line (and we do mean high!) right past his property! Traffic: W8ELW 517, NUL 280, ILP 187, FLM 175, ZLK 150, IX 110, RTN 94, NOH 78, FX 59, MQH 52, QQO 50, MLR 48, JKX 45, NTC 41, DSE 36, PHA 29, OQH 25, TBP 22, IV 17, TJJ 17, HKT 14, ZHB 14, OT 12, MGQ 11, DLZ 10, INF 8, KOX 8, WVL 8, AUD 7, EGI 7, HSG 7, WXO 6, IUJ 5, JPE 4, PHM 1.

OHIO — SCM, John E. Siringer, W8AJW — Asst. SCMs: J. C. Erickson, 8DAE; W. B. Davis, 8JNF; and E. F. Bonnet, 8OVG. SEC: UPB. RMs: DAE, FYO. PAMs: EQN, HUX. In an effort to more closely coördinate the State's communication department OVG, Dayton, has been appointed Asst. SCM and EQN, Springfield, has been made a PAM. On Oct. 9th the Ohio Council of Amateur Radio Clubs held a meeting in Columbus. The delegates voted in favor of FCC Docket No. 11157. New OCARC affiliates are the Toledo Mobile Radio Assn. and Franklin Mike and Key. A copy of the Council's constitution and by-laws may be had by writing Ralph E. Cramer, W8VHO, 236 South Burgess Ave., Columbus 4, Ohio, secy. The OCARC offers trophies for both Field Day and Sweepstakes Contests, awards the WAOC certificate, and sponsors the Ohio Intrastate QSO Party. EQN is contest and awards manager. HUX is on s.s.b.s.c. with an SS75 exciter and 813 final. LJ has moved from Dayton to Cleveland. LJS, former QSL Mgr., has returned from Florida to live in Cleveland. DAE got tapped by an induced voltage from lightning during a recent snowstorm. WAV was appointed NCS, Air Force MARS Net No. 9. RXM is the call of the Dayton Civil Defense Hq. GDQ was heard by EL2X and LU3EL on 160 meters. MQQ made WAS. SPU and QOV are holding the c.d. fort in Wyandot Co. NYL was married Oct. 23rd with 9JZN as best man and 9QBJ as usher. ZOD got married recently. The Tiffin group meets the 1st and 3rd Mon. at 8:00 P.M. in the Tiffin City Hall. The CACARC reëlected its 1954 officers. Thirty-one Toledo amateurs participated in the recent S.E.T. with CRA and HUX serving as net control stations; 44 messages were handled. Congratulations to ERR and his group on the noteworthy job they did during the recent Ohio River flood. According to DSX, mgr. of 8RN, RO, DSX, LHV, and FYO are the most consistent Ohioans in the net. TLW lost his masts three times during the month, once because of termites, once from a windstorm, and lastly from falling tree limbs. Dayton's *RF Carrier* advises that PTF and HCD are on s.s.b.s.c. on 75 meters; HB, CUJ, YCP, and GQ rank 1, 2, 3, and 4, respectively, in the Ohio section in the recent F.M.T.; FIB showed up as a fireman at a fire at HCD's QTH recently; JAO/M now is a minister in Athens; KKH recently suffered a broken ankle; ZOF is suffering from an allergy called drooping antenna; and the Dayton 5:00 P.M. Mobile Net meets on 29,600 kc. We regret to report the untimely death of DL, and extend our deepest sympathy to his family. Cincy's *Mike and Key* states that PR and YTM are in Germany where they are working with the "Voice of America," while Queen City's other publication, *Ether Waves*, informs us that LI'D and PBU have 32-element 2-meter beams; EV recently worked his 143rd country; and 14 members have gotten past the 100-countries-worked goal. The *Fort Hamilton Bulletin* mentions that HXB lectured on grid-dip meters at the last club meeting and RDJ was a guest at a recent get-together. Springfield's *Q-5* advises that the club soon will become incorporated. The Columbus *Carascope* states that MRC has installed three 9 full-wave 20-meter "V" beams; BAX has worked 20 states on 144 Mc.; OMV has a kw. on s.s.b.s.c.; and GL has returned from the hospital. *Shack Gossip* from over Toledo way tells us that there are 10 licensed YLs in town; NB,

(*Continued on page 84*)

THE HQ-140-X...

SEEMS TO STRETCH THE BANDS



HQ-140-X

In these days, when the amateur bands are more crowded than ever, it's important to make sure the receiver you buy will bring in the desired signal with minimum interference from adjacent channels. That's why more and more 'hams' are turning to the HQ-140-X communications receiver.

The HQ-140-X's outstanding performance under today's difficult operating conditions is achieved because of the Hammarlund patented 455Kc crystal filter and phasing network. This circuit, identical to the one used in the Super Pro-600-JX professional receiver, is controlled by a front panel 6-position Crystal Selectivity switch and provides an OFF position and five increasingly selective bandwidths.

The Crystal Phasing control is a differential-type variable air capacitor which permits precise adjustment of the crystal selectivity for extremely high attenuation of closely adjacent channel interference.

Because there is no interlocking effect, the Selectivity or Phasing Controls can be changed without de-tuning.

THE HQ-140-X IN ACTION AT SEA

The HQ-140-X is *the* receiver in the radio shacks of many American Merchantmen. Its dependability and ruggedness make it very popular with seagoing hams.

Get the details on these and other important advantages of the HQ-140-X. Write to The Hammarlund Manufacturing Co., Inc., 460 W. 34th St., New York 1, N. Y. Ask for Bulletin R1.

HAMMARLUND

SINCE 1910

IZQ, and BZD form the TRC's committee for giving Novice exams; the HYEs received a bundle from heaven — a girl; Novice QCT has 41 states confirmed toward WAS; and a Lucas Co. QSO Party will be held on Jan. 15th from 8:00 P.M. until midnight on 160, 80, and 10 meters, sponsored by the AREV with HNP serving as referee. Eastern Ohio's *Ham Flashes* reports that SKF is a new Novice in Newton Falls; HSP, of Phalanx, has a new 50-foot steel tower; SFG has 21 states on 2 meters, while RSW has 19; JZY recently completed a 35-day leave prior to assignment in England; KBC has finished basic training at Sampson; and EJC is attending Kent State U. Traffic: (Oct.) W8FYO 342, ARO 222, LHV 164, REL 133, DAE 109, DQG 106, MQQ 102, AMH 94, RO 83, HUX 76, RXM 60, AJH 52, CRA 48, ILC 48, AL 31, OXS 28, FPZ 26, SRF 23, AJW 22, LMB 21, HNP 19, RN 18, IJH 17, KIH 13, TLW 12, BEW 11, HHF 11, HXB 10, PBX 10, WAV 10, ROX 9, ET 8, QIE 8, GZ 7, HFE 7, BLS 6, EQN 6, OQP 6, LXE 5, SPU 5, MGC 4, NQQ 4, AQ 2, GDQ 2, PM 2. (Sept.) W8AMH 57, ZAU 28, LFX 24.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Stephen J. Neason, W2ILI — SEC: RTE. RM: TYC. PAMs: GDD, IJG. K2EHI has a very effective 14-Mc. beam working. Congrats to K2BSD, who made BPL again. I regret to report the passing of our PAM, JQI; also 7IPM, recently modified to K2HTD. K2HVN is active on NNETN. OKI is working plenty of DX on 7 and 14 Mc. with a new all-band rig and dipole antennas. CGT, WVS, and ZBS have new sixteen-element beams on 144 Mc. MHE is back on 144 Mc. and is organizing a v.h.f. society. AIH and K2BCU are operating portable from Boston on 144 and 29 Mc. LEL joined the CAP. LWI moved from Long Island to Pok and is active on 144 Mc. with an 829 final. HIQ squirts a signal from Brewster on 144 Mc. Welcome to BGO, who moved into Rockland County. HJO has a new VFO for his Bandmaster. LDS and PCQ have new beams on 144 Mc. HFQ, RO for Rockland, is on 144 Mc. from Nyack. Our annual Eastern New York section conference held at the YMCA in Pok recently proved to be worth while and interesting to all who were able to attend. Your SCM acted as chairman. SEC RTE and EC LDS were in charge of the arrangements and provided the meeting place. Other officials and guests present were OBU, Hudson Division Director; 1NJM, ARRL NEC; BGO, of the NYSCD commission; J. Gaul, C.D. Director Putnam County; and ECs LEL Ulster, ZTZ Rockland, and HZZ Pok. K2DQH is mobile on 29 Mc. K2BRY is operating portable from Johns Hopkins University. Because of a change in QTH BVU will be limited to mobile and portable operation on 144 Mc. New in Schenectady is KN2JTY. RML is back on 144 Mc. All clubs interested in the Eastern New York Council of Clubs, please write EFU for information. Traffic: (Oct.) K2BSD 536, BE 50, EOQ 42, W2EFU 31, ILI 24, K2EHI 12, HVN 5, W2APH 1. (Sept.) K2EOQ 20, W2BSH 18, K2HVN 4.

NEW YORK CITY AND LONG ISLAND — SCM, Carleton L. Coleman, W2YBT — Asst. SCM: Harry Dannals, 2TUK. SEC: ZAI. PAM: JZX. RMs: VNJ, LPJ. ZAI reports a good increase in AREC activity with excellent S.E.T. results. KGN, Brooklyn EC, sparkplugged the biggest AREC gain in the section. Nassau County radio amateurs once again demonstrated amateur radio in action at the Mineola Fair, operating K2DHC/2 on all bands. YBT is active from a new location in East Hampton on 75 and 80 meters and reports that WSL is 100 per cent ham-controlled at the transmitter plant with W2s AJR, BTC, CRZ, and YBT there. AEE participated in the Columbia University Bicentennial Convocation. K2CRH reports that the BAREC Net has shifted operations to 3700 kc. and invites Novice participation, listening for KNs around 3710 kc. GP says he has been QRL but reports into four nets and had a high score in the CD Party. MDM says business pressure keeps him from more than 20 hours of hamming per week. K2EWJ reports fine results with new 20-meter two-element shortened beam with Viking II and HQ-140X. The CCNY club station, HJ, is on the air with high power and 75A-3 receiver. KN2JPG is a new Novice at HJ. K2HTO recently dropped the "N." Stuyvesant HSRC, CLE, has reorganized with K2DGR, president, and K2DKQ, trustee. The station is on the air with an NC-98 and ARC-5 looking for traffic skeds around 3650 kc. weekdays between 1250 and 1400. The Amityville Memorial School Club has elected KN2IYK, pres.; and K2DOQ, vice-pres. New members of the Fordham Radio Club are W2AMR, K2HID, and KN2s IAD, JBK, and JRR. MFW is on 10 meters with 300 watts to a ground plane. K2HKH has a pair of 6146s in the new rig under construction. K2AMP was made a Class I Observer. Besides some excellent observing, Wally visited 1AW and had time to snag F8FW/FC on 20 and 40 meters. K2DGT is active on 20, 40, and 80 meters with HT-18 pushing 813s. IEH can be heard on 75 meters. EBZ reports excellent attendance at the Amateur Radio Teletype Society meeting, where BFD demonstrated some RTTY gear. K2EOF and KN2ITS are new members of the ever-growing NYRC. AEE has changed Novice code and theory instruction to Wed. night. K2IYK

(*Continued on page 86*)

New Heathkit VFO KIT

MODEL VF-1

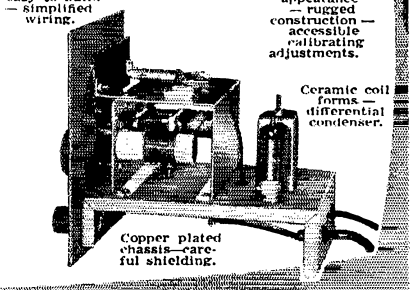
$19.50

Ship. Wt. 7 lbs.

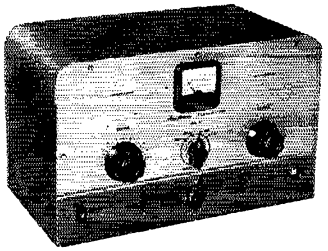
- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OA2 voltage regulator.
- 7 Band coverage, 160 through 10 meters—10 Volt RF output.
- Copper plated chassis—aluminum cabinet—easy to build—direct keying.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at .45 amperes and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard ½" crystal holder. Construction is simple and wiring is easy.



Heathkit AMATEUR TRANSMITTER KIT



MODEL AT-1

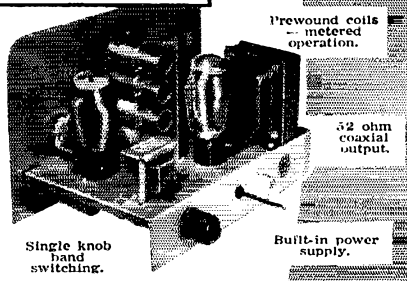
$29.50

Ship. Wt. 16 lbs.

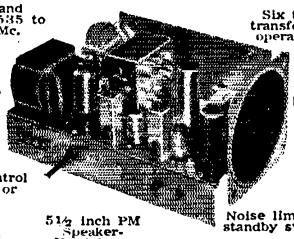
SPECIFICATIONS:

Range 80, 40, 20, 15, 11, 10 meters.
6AG7 .....Oscillator-multiplier.
6L6 .....Amplifier-doubler
5U4G .....Rectifier.
105-125 Volt A.C. 50-60 cycles 100 watts. Size: 8⅛ inch high x 13⅛ inch wide x 7 inch deep.

Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporaring many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

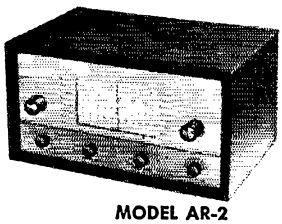


Heathkit COMMUNICATIONS RECEIVER KIT



SPECIFICATIONS:

Range.....535 Kc to 35 Mc
12BE6 .....Mixer-oscillator
12BA6 .....I. F. Amplifier
12AV6 Detector—AVC—audio
12BA6 ....B. F. O. oscillator
12A6.....Beam power output
5Y3GT .....Rectifier
105-125 volts A. C. 50-60 cycles, 45 watts.



A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio. Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.

MODEL AR-2

$25.50

Ship. Wt. 12 lbs.

CABINET:

Proxylin impregnated fabric covered plywood cabinet. Shipg. weight 5 lbs. Number 91-10, $4.50.

HEATH COMPANY

BENTON HARBOR 9, MICHIGAN

is now General class and can be found rock-bound on 7052 kc. AOD worked 7 stations on 420 Mc. in the recent V.H.F. QSO Party. PF now is single-sideband ing with 20A exciter. KR, JVO, GJX, K2DW, and others are pushing high power on s.s.b. It was your reporter's pleasure to attend the recent QCWA dinner with my OM, GG. The old-timers had a splendid turnout and presented an excellent audience for KUJ's talk on s.s.b. The QCWA Net meets on Sun. at 1100 on 3810 kc. RB soon will be heard on 144 Mc. now that the boating season is over. GYL was heard chasing DX on 7 Mc. EEN has high-power final under construction. With 1955 upon us, let's check our equipment so that we radiate the best signal possible. Watch the modulation and the keying. Remember, too, switch to safety! See you in the V.H.F. Sweepstakes. Traffic: (Oct.) W2KEB 697, KFV 642, LPJ 411, K2CQP 301, W2AEE 153, OME 84, K2CRH 80, W2JOA 63, K2ABW 58, W2GP 40, GXC 39, K2DDU 17, W2EC 17, IAG 14, GPQ 12, K2HID 10, EWJ 9, CMV 3, W2JBQ 3, OKU 3, K2DVT 2, HYK 1, W2TUK 1. (Sept.) K2EOR 175, DEB 54, W2GXC 52, JGV 30, ZM 16, MUM 9.

NORTHERN NEW JERSEY — SCM, Lloyd H. Manamon, W2VQR — Asst. SCM: Charles Teeters, K2DHE. SEC: IIN. PAM: CCS. RMs: NKD, CGG, EAS. K2DSW is temporarily QRL because of school at RCA in New York City. K2CHI was active in the CD Party. The Irvington Radio Amateur Club meets in the Community Center Bldg. the 1st and 3rd Mon. of each month. Code and theory classes are conducted every Mon. night. Automatic tape machines are available for code practice, which are run at speeds qualifying the students for either Novice or General Class. Interested parties are invited to attend the club meetings and code classes. If you desire to work the Club Net look for it on 28.7 Mc., every Sun. at 1200 hours. This is a very business-like club, gang, so take advantage of the offer and pass the word around to prospective new hams. If you desire to write the club, contact K2DZR, 65 Garrison St., Newark. K2BEV again is active in OO work. CQB, PAT, GUM, ENM, and K2DHE put on a demonstration of amateur radio communications for local fire departments. The Windblowers V.H.F. Society held its installation dinner on Nov. 14th. A special QSL card still is available to anyone working a member of the society. K2EUN is NCS on JN each Mon. evening. Bogota is organizing a mobile civil defense net. K2GPB has his new mobile rig working FB. KN2JOM is working out real well with his Heathkit transmitter. BRC worked in the CD Party for the first time in over four years. K2BCK will be QRL after this month because of active duty at sea with the Navy. EAS has been out of town on a business trip K2BAY is back on the c.w. bands and is doing a bit of experimenting on antenna systems. Brad also is active on the New Jersey C.W. Civil Defense Net, 3505.5 kc., Sun. at 1900. 2ZEP/7 is in the Air Force down Arizona way. He has obtained an ORS appointment in the Arizona section, but will be back in Northern New Jersey next year. DRV is active in JN, daily except Sun.; 3695 kc. OO reports were received from DME, GVZ, TPJ, NIY, K2BEV, AFQ, and BWQ. K2DHE is making test runs with his new mobile installation up and down Sunset Ave. Much QRM to K2ICE results from these tests which pass by in front of his QTH. Annie, the assistant YL operator at K2ICE, holds the local QSO record on 144 Mc. K2HNA discovered to his extreme regret that his 144-Mc. antenna has been terminated at the change-over relay box. Result, no DX. HJL is on 75-meter 'phone with the new rig. George visited New England and came home with his brother's 150-B rig. KN2GVB is keeping the 144-Mc. band hot at his QTH. NIE has terminated his yachting activities for the season and is back on 75 meters again. K2CTL is sporting a new ham shack in the attic. The arrival of a new daughter forced him to vacate his former downstairs comfortable shack. K2ARQ, a member of the local Marathon QSO Net, stays right with them with the aid of a full pot of coffee. Traffic: (Oct.) W2CQB 68, K2BWP 61, BWQ 43, EUN 42, W2EAS 26, FMP 21, K2IKS 14, W2BRC 10, K2GER 8, W2CVW 6, K2BAY 5, BCK 4, KN2JOM 3, K2CHI 2, W2CJX 2, NIY 2. (Sept.) K2DSW 63, W2DRV 12. (Aug.) W2DRV 16.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — PP returned much refreshed from his vacation. Many thanks to SCA for subbing for me. The North East Iowa Radio Club had a very successful c.d. drill Oct. 31st, with 13 mobile rigs and all towns in Black Hawk County using their emergency rigs. BDR and SCA have received their traffic award medallions. BLH was elected TLCN mgr. CGY is getting some DX with his ½-kw. TNY completed his 813 VFO-controlled all-band transmitter and gave it to the radio club, BXR. HMM is conducting radio classes at the club with 30 prospects up for examination soon. There are 5 YLs in the class. BJP, laid up with kidney trouble, is getting in a lot of hamming. LJW is a new ORS. ZAM is back on TLCN. KVJ, a recent addition to TLCN, is NCS on Mondays. Ex-QAO now is K4AQQ. VYH is a new Burlington ham just out of the Army. LCX is getting on 2 meters. NGS reports that Ft. Dodge now has 49 paid members. BQC/Ø along with IVS/Ø and WNØUNC, is trying to get a ham club going at Luther College. LGG has a new Collins 32V-3. TVC reports most of his activity is on 2220 and 4020 kc. on MARS and 1815 and 3970 kc. KWT and HWU have been holding weekly radio classes. THU is a brand-new father. SFK got his Conditional Class license Oct. 22nd. The reporting was swell this time. Keep it up, fellows. Traffic: WØSCA 1124, CZ 257, LJW 106, BLH 35, KVJ 31, KJN 30, QVA 22, LCX 20, NGS 19, JTF 18, SFK 16, W9BQC/Ø 14, WØDDV 12, RMG 12, EHH 11, LGG 10, TVC 7, HWU 6, NYX 3, PAN 1.

KANSAS — SCM, Earl N. Johnston, WØICV — SEC: PAH. RM: KXL/NIY. PAM: FNS. The Scott County RACES Plan has been approved with ZUX as Radio Officer and YLO as CD Director. The Topeka-Shawnee County c.d. area hams are organizing a 2-meter net on 145.5 Mc. ONF, of Howard, plans to start a code practice schedule Mon., Wed., and Sat. at 1730 on 3805.5 kc. EOT plans to help part time. The Lawrence Emergency Net meets each Sun. at 1400 on 3820 kc. KØFED is a new National Guard station at Concordia with a Viking II, VFO, and NC-125 receiver, according to KSY, and will be active in the Air Force MARS nets as well as other amateur activity. VGA is a new station in Mulvane. Bob uses a Viking Ranger with a vertical antenna to put out that FB signal. LBJ, who is working on a new 600-watt rig, took time to participate in the CD Party working 10 sections. MOX, of Lawrence, keeps daily skeds with EMS in Adair, Iowa, on 2 meters. Louis has six states on 2 meters and is open for skeds with anyone anywhere. WIZ, of Emporia, is new Asst. EC for the Neosho Valley Amateur Radio Club at Emporia. UAT, of Fort Scott, is building a new 250-watt rig. Thanks, fellows, for your support in the SCM election. We hope to do bigger and better things for the section in the next few years. Traffic: (Oct.) WØBLI 566, NIY 331, OHJ 138, EOT 137, WGM 107, TOL 94, FDJ 85, MXG 84, MLG 51, ECD 45, NFX 41, FEO/Ø 35, QMU 33, MAE 32, UMV 26, ABJ 22, SVE 22, ONC 21, ONF 21, AAJ 20, LOR 19, HS 17, DEL 16, UAT 16, LIX 15, KFS/Ø 12, LBJ 10, RBO 9, ICV 8, KAJ 8, NLV 8, TNA 8, YFE 8, REP 7, TSR 7, YOS 7, QGG 6, VRZ 6, LOW 4, LQX 4. (Sept.) WØEOT 138.

MISSOURI — SCM, Clarence L. Arundale, WØGBJ — SEC: VRF. PAM: BVL. RMs: OUD, QXO. Missouri lost one of its most active old-time hams when CRM recently passed away. CPI handled a large volume of traffic originating in the area affected by Hurricane Hazel. OUD advises that MON is meeting at 7:00 A.M. in addition to the regular evening net schedule time because of present skip conditions. WYJ/4 has received his ticket and will be at home in St. Louis in April. BZK has earned his 1,000 Traffickers Club certificate. ORP and GFF are located at the Ardmore AFB. SZT now has a 75A-2. TDF has a Viking II and SX-71 in operation. WNØVPM uses an Eldico TR-75TV and HQ-140X. S.E.T. activities were reported by HUI and FKM. CPI raised his doublet to fifty feet. Bad skip conditions on 40 meters kept GAR's traffic total down. FLN reports 25 members are taking code classes in preparation for their Novice Class examination. KØFBO is installing a Johnson 20-meter beam. The radio club at Southwest Missouri State College, with LQC as trustee, has applied for a station license. IJS recently visited CKQ to pick up a few pointers on the new 813 rig that IJS is building. We hear that CKQ recently received an A-1 Operators Club certificate. DOA has a 10-watt s.s.b. exciter that works out in fine shape. MUX recently completed his new rig which runs 450 watts to an 813. JUY did a beautiful job in constructing the all-band 2E26 rig recently described in QST. AKS still has audio "bugs" troubling him. Traffic: (Oct.) WØCPI 927, QXO 501, GAR 240, BVL 175, CKQ 55, EBE 39, KIK 30, HUI 29, OUD 27, KA 24, GBJ 21, BKV 20, RTW 18, QWB 12, BUL 10, CXE 4, FLN 4, QBX 4, QMF 4, TGC 4, BZK 2, ETW 2, TCF 2, ZWI 2. (Sept.) WØBVL 59, QMF 6.

NEBRASKA — SCM, Floyd B. Campbell, WØCBH — Asst. SCM: Tom Boydston, ØVYX. SEC: JDJ. PAM: EUT. The North Platte Club now has a call, WØWYM. The transmitter will be located upstairs over the County Sheriff's office. The SCM suggests that appointees check certificates and get them in for endorsement. EXP has a 20A exciter and is figuring on 811s for the s.s.b. final. IJK is rebuilding his s.s.b. for 300 watts. RIG has the 4-65A working fine. RIG has a new 7-lb. 8-oz. YL. CBH built the 50-kc. frequency standard in July QST. AQJ gets nice reports with his new B. & W. 5100. JCK has moved to Albuquerque, the land of mobiles. QMD is using a WRL Globe King. QMW is using 40-meter vertical. QOU, PHW, VKQ, and AIY are heard on 2 meters. A 2-meter net for Nebraska is shaping up with 145.35 Mc. as the frequency. State-wide coverage is almost assured. The frequency was picked to be in the RACES portion of the band. NET has stacked a TV antenna on his 65-ft. 10-meter beam. ERM had such good results with his flea-power mobile recently that he has given up the idea of more power (mobile). VQR is president of the Tri-City Radio Club at Scottsbluff; QKR is vice-president. IRW and FTQ are members of AREC. UOV is NCS for the North Platte Club Net. Traffic: WØTQD 1836, KØAIR 1314, WØFQB 230, ZJF 230, FTQ 51, AEM 49, MAO 38, HTA 35, KDW 25, VYX 23, EGQ 16, ORW 14,

(Continued on page 88)

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4X150G	450TH
4X500A	450TL
4X500F	592/3-200A3
4E27A/5-125B	750TL
3K20,000LA, F, K	1000T
3K50,000LA, F, K	1500T
3W5000A3	2000T
3W5000F3	2-25A
3W10,000A3	2-50A
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3X2500F3	2-240A
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NEW ENGLAND DIVISION

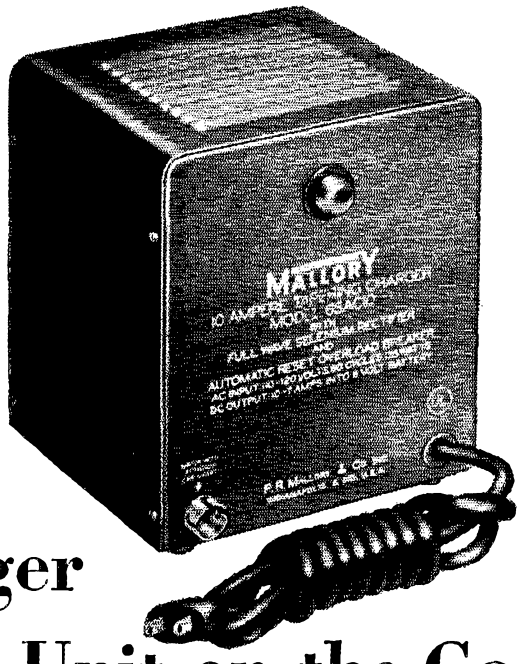
CONNECTICUT — SCM, Milton E. Chaffee, W1EFW — SEC: LKF. PAM: LWW. RM: KYQ. MCN and CN 3640, CPN 3880, CEN 29,580 kc. RAN got home from W.P.I. for the CD Party and has added a beam for 14 Mc. UBM, daughter of EBO, married YOC in September and ham radio was the factor that brought them together. CHX is ex-4TGO, now active from West Hartford. UJG has abandoned 220 to concentrate on 144 Mc. NFG reports a successful "Operation Goblin" as a Hamden Halloween c.d. exercise. Current officers of the Bristol Radio Club are VOV, pres.; ZFH, treas.; and YOE, secy. The Southington Amateur Radio Assn. was organized in October with GVT pres.; ZZK, vice-pres.; GVZ, secy.; ZTQ, treas.; and SBI, activities. New ECs: OGQ and RMG for Waterbury and New Haven. ORS renewals: RWS, QJM, and KV. EC renewal: RPX. LWW reports for CPN: 101 stations participated with ZFF, LIG, VWL, MLT, and DAV most active. MNF has gone s.s.b. AWV now has General Class ticket and is active on 2- and 10-meter mobile. RRE is much better after a long illness. COB is active again with a Viking. Welcome to ex-3EDA, 9ADE, now active in West Hartford as 1EDA. APA snagged HKØAI for country No. 30 on 40-meter 'phone. WPO now is DXCC. We regret to note FWH now is a Silent Key. NJM enjoys mobile c.w. BDI hit BPL this month largely from the RTTY Net. GTH and ZZK are on 420 Mc. RBF is rebuilding for a pair of 6146s in the final. WN1CKA is building up practice on 40 meters. VOS and VOV attended the W4 YL picnic in Virginia. TD transmits Official Bulletins on 146 Mc. CN handled 300 messages in 22 sessions, according to RM KYQ, with a high of 36 in one night. KYQ, RGB, and LV are high in QNI. MCN handled 88 in 21 sessions with IBE, YYM, and RFJ sharing QNI honors. CTN, just underway, has adjusted schedule to Sun. morning, with RFJ and HYF doing the NCS work. New Net certificates went to FMU, FTM, LWW, MLT, RMZ, VWL, DAV, KGT, VOV, UED, HUM, and YUP. Everybody set for the FCDA radio test in Region 1 in February? Thanks for the many reports; keep 'em coming. Traffic: W1AW 309, CUH 268, YBH 198, KYQ 154, BDI 132, LIG 90, NJM 87, HUM 82, HYF 73, RGB 58, QJM 56, YU 47, YYM 43, VOS 38, LV 37, BVB 33, EFW 33, FTM 28, RFJ 25, KV 19, VOV 19, UED 16, APA 6, EDA 2.

MAINE — SCM, Bernard Seamon, W1AFT — SEC: BYK. PAM: WRZ. RM: OHT. The Sea Gull Net meets at 1700 on 3960 kc. Mon. through Fri.; the Barnyard Net at 0730 on 3960 Mon. through Fri.; and the Pine Tree Net at 1900 on 3596 kc. Mon. through Fri. Recent OPS appointees are WTG, LYR, UDD, and WRZ. Ex-1IXE is back on in Damariscotta with a new call, BWM. BX has worked seventeen countries with his underground antenna, using 35 watts input. ZNL is in the veterans hospital at Togus for a check-up. TWR is in the CMG hospital at Lewiston for an operation. Latest report is that both are doing well. LHA is off for his annual cruise in southern waters with the Maine Maritime Academy Training Ship. He is the radio officer. Our new PAM is going great guns and is keeping your SCM busy issuing OPS and Section Net certificates. What is with you and the Pine Tree Net, OHT? We miss your usual fine reports. BPI has his Donald Duck working. The BBC has been coming in right well on 3960 kc. during Sea Gull Net time. The music is very pretty blended with the cries of the wild gulls. Your SCM and his YL wish you all a Happy New Year. Traffic: W1WTG 220, LKP 131, UDD 38, TVB 32, YYW 18, AFT 17, LYR 15, BTY 14, LHA 13, BX 12, EFR 11, UOT 11, VYE 9, WRZ 9, ZBN 9, NXX 7, YTE 7, RSC 5, LOA 3.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — New appointments: WLU as EC for Watertown, NF as OBS, BPW as OES. Appointments endorsed: ATP Holliston, AVY New Bedford, HUP Dover, MON Stoughton, UBB Boxford, QQL Lynn as ECs; AVY and HUP as OPSs; AVY, BDU, EMG, and EPE as ORSs; ALP and UIR as OBSs; QQW as OES; UE as RM for 80-meter c.w.; TVZ, Hopkinton, as EC. Please add to your list of nets the Braintree Emergency Net on 28,560 kc. Mon. at 2100, and change the frequency of Weymouth and Holbrook to 28,580 kc. TF3CJ is attending M.I.T. and took part in the recent F.M.T. along with PXH and LQQ. GAG's XYL won an SX-88 receiver at the New England Division Convention. AKN moved to Sandwich. A Region 5 committee meeting was held with DFS, BL, RM, TQP, KTG, NJN, ALP, ZYX, and CQ present. A Sector 5 meeting was held with GNK, GOF, FWS, SH, UXN, MME, THY, SMV, ISU, EKG, ALP, and MD present. K2BJB/MM is on 10 meters in Boston Harbor. The Braintree, Weymouth, and Quincy mobiles were out on Halloween with the auxiliary police. Heard on 2 meters: CAV, YTB, and LXR. Heard on 10 meters: FED, VAI, AL, BFV, VPP, CNG, UKG, TWN, EYP, AYN, KIX, ALX, TFD, ABJ, BJT, MNW, QNC, LIU, and YKD. Mobile

Continued on page 90)

MALLORY HAM BULLETIN



MALLORY 6-Volt Battery Charger Keeps Mobile Unit on the Go

Those of us who have tried mobile operation are fully aware of the very difficult problem of how to keep the car battery charged adequately for starting purposes, and still provide plenty of juice for a reasonable amount of time on the air.

Recently, one of our good amateur friends, who is a red-hot mobile fan, told us of a method he used for keeping his battery at top performance and still add no extra equipment to his automobile. His system sounded so practical, that we'd like to pass it along.

Here is what he did. First, he visited his Mallory distributor and bought a small, inexpensive Mallory 6-volt Battery Charger (the 6SAC6 or 12SAC5 for 12-volt systems) together with a special automobile Cigarette Lighter Plug (Mallory R675) to be used for inserting the Charger output into the electrical circuit of his car. The Lighter Plug was attached to the Battery Charger and the whole business was then mounted conveniently in his garage.

After an evening of mobile operation, he simply inserted the Plug into the cigarette lighter socket, turned on the 117 VAC line, and the next morning, presto, his battery was ready for heavy starting action.

With this very convenient arrangement, this ham was able to operate his mobile rig the year 'round, with little fear of even tough wintertime starting.

Incidentally, if your car is not equipped with a cigarette lighter, don't let that handicap you, simply ask your distributor for a Mallory Dashboard Receptacle (R652) which may be clamped to the dashboard without drilling a single hole. Used in conjunction with a Cord Assembly (R670) this arrangement will provide all the convenience afforded by the lighter plug method of installation.

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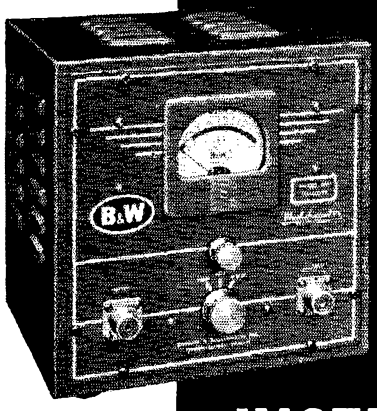
on 10 meters: UCP, RBA, LXZ, KZW, RES, OHB, ZPI, QLB, TTS, and YMV. WN1CRO is a new ham in Quincy. KLC is on 2, 6, and 10 meters. New Novices: CAF, CAS, CDR, CNW, CPQ, CPW, CQB, CQC, CQE, CQL, and CSP. Tech. Class: WQH and YRI. Other new hams: BTX, AAV, and CPP. BJW has General Class license and added 2E26 to the rig. MKW reports a Cape Cod 10-meter Net on 28.9 Mc. with VTX, FQK, YXJ, YQT, UMC, DVS, BLM, ONK, ZHC, and BMW on 160 meters. BPA, ex-3FAU and 8ZNQ, now is in Acton and will be on with a Viking Ranger. The Braintree Radio Club held a meeting and a discussion on a 2-meter net. Radio Amateur Open House held a meeting at the Cambridge YMCA with a talk by CTW. ZVI is the call of the Pequossette ARS in Watertown. ALP has his Viking II kit going and is on 10 meters. WPW is all-mobile operation and is on MARS and other nets. VTT has a new NC-125. MKW reports the following on during the storms on the 2-meter Net: MFI, BCN, ARC, CFQ, MKW, MBQ, PMC, BLM, JNI, DJK, WMN, MNF, OMQ, LYV, WHC, TQS, BFI, AOQ, UUM GRC, OH, LNR, TYZ, WNs ZSJ, ADQ, and AQN. YPT has new 10-meter ground plane. VTZ has co-ax for 10 meters on the roof. BLM has a Viking Ranger. BBM is on 144 and 230 Mc. JNI has mobile Elmac. BGW is on RTTY most of the time, and worked DL4RO on 20 meters. RCJ is on 2, 6, and 10 meters and his wife, ZEN, also is on. OSS is on 20, 40, and 80 meters. The License Plate Committee of the South Shore Club is going into action. TVF is in Germany with the Army. AKN's son, VP7NV, is on 20 meters. New officers of the Waltham ARA, MHL, are NXY, pres.; QMN, vice-pres.; 2BVU, secy.-treas. New officers of the Wellesley ARS are FFO, pres.; HRY, vice-pres.; OQP, treas.; WGM, secy. SS gave a talk on "Proper Procedure within the Operations of an Emergency Net" at the last meeting. The Malden ARA held an auction with HKG as auctioneer. Sorry to report the death of QPR, trustee of BWU. The T-9 Radio Club held a meeting at WNK's. AZU has an antenna farm location. ZPE is teaching his XYL the code. CNT has TBS-50D and HQ-129X. CDO is awaiting a Ranger transmitter. BND has an Elmac rig. PJ, Everett EC, reports that TNI was on during the storm using gas power with walkie-talkies and mobiles BHD, YID, HXY, KNA, SXH, RLF, and VXE. TJW, Falmouth EC, reports that during Hurricane Hazel the net was on with QLT, LYV, DVS, UXG, and TJW, with WNM, the club station, as NCS. BB is getting ready for the 160-meter DX tests. BPW is working on Yagi beam and is on 2 meters. The Falmouth Amateur Radio Club has a training program going on at the Recreation Bldg., Wed. at 8 P.M. New members are CCR, AIV, UXH, CMT, and DJK. The Winthrop drill had BDU, CMW, DJ, OIR, MQB, BOX, BB, and XYLs on the air. VIS is busy on the crystal units for their TR4s. BOX is running a code class. PYK and YZP are on 10 meters. Traffic: (Oct.) W1UKO 535, EPE 144, EMG 67, AVY 56, UE 42, IBE 32, QLT 32, VTT 25, NUP 10, TY 9, WU 9, WPW 6, BY 4, UTH 3, AHP 2, DWO 2, LLY 2. (Sept.) W1NUP 38, UE 34, IBE 32, BGW 13, ZDQ 4, AHP 2, EMG 2. (Aug.–Sept.) W1MKW 26.

WESTERN MASSACHUSETTS — SCM, Roger E. Corey, W1JYH — RM: BVR. WMN meets at 7 P.M. EST Mon. through Fri. on 3560 kc. New officers of the Hampden County Radio Assn., Inc., are KUE, pres.; HRV, vice-pres.; VNE, treas.; and UKR, clerk. RAD, AAY, MVF, and PGQ were elected directors. Proud new owners of Viking Rangers in the Springfield Area are TTL, OBQ, and MNG. JRA will maintain Official Bulletin schedules on 3555 and 3830 kc. daily. For times drop a card to JRA at Amherst College or to the SCM. EFQ has a new tower with a 10/20-meter rotary ready for the DX Contest. UVI conducts a code class twice weekly at his home in Westfield. Any prospective hams who are interested may contact him. The October CD Party produced a record turnout in Western Massachusetts with ABD, YXV, WCG, TVZ, WDW, SRM, ZIO, HRC, JYH, WEF, VE2AKJ/W1, CJK, RRX, KFV, WCC, YCG, and AMI taking part. WDK is operator at MARS station K1WAV and has a new Elmac AF-67 at his home station. BVR spoke at the New England Division Convention held at Manchester, N. H. This is my last column as SCM. Your new SCM is Art Zavarella, MNG, 1702 Main St., Agawam, Mass. I would like to thank those who contributed to this column during the last two years and especially BVD, BVR, COI, TVJ, and TAY, who reported every month without fail. My special thanks also to the many throughout the section who gave so much of their time to support ARRL activities in the public interest and in every phase of the hobby. I know you all join me in promising Art the same coöperation that I have had and in wishing him the best of success. Traffic: K2CBD/1 445, W1UKR 372, WCG 84, HRV 79, BVR 66, WCC 34, MNG 28, UVI 25, TAY 19, WDK 14, RRX 12, WDW 11, JYH 9, ABD 7, YXV 5, OBQ 1, TVJ 1.

NEW HAMPSHIRE — SCM, Harold J. Preble, W1HS — SEC: BXU. RM: CRW. Asst. RM: TBS. PAM: AXL. At the request of the new SCM, HS, GMH is writing this month's report as HS has just been elected and has not had time to get started. All the best to you, Hal. WUU is NCS for the TCPN on Saturday nights. He has the rig formerly owned by GMH with 813s in the final. The Concord Brass

(Continued on page 92)

meet the Matchmaster



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Pounders held an enjoyable Halloween Party at the Kettle and Crane House in Boscawen, N. H. PTB received honorable mention in the local paper for keeping the c.d. personnel well informed of the progress of Hurricane Edna. YVK has a new 32V-3. TRM is having fun on 40-meter 'phone. WUG has an Elmac A67 and says it is FB. UNV gets to use the Marine station, K4MC, to QSO back home. We welcome BVD to New Hampshire from Pennsylvania. Glad to see PFU has recovered enough from his fractured hip to discard his crutches. 9BQC wants schedules with New Hampshire stations to complete WAS during the Christmas holiday. Write to him at 2811 Custer Ave., Rockford, Ill., if you can help him out. Traffic: (Oct.) W1WUU 54, GMH 50, COC 36, QGU 26, FZ 7. (Sept.) W1QGU 22.

RHODE ISLAND — SCM, Walter B. Hanson, jr., W1KKR — SEC: MIJ. RM: BTV. RIN meets Mon. through Fri. at 7 P.M. EST on 3540 kc. Meet the gang Sundays at 11 A.M. on 1890 kc. This 160-meter net is growing fast and is the best we've had yet. JFF, YAO, and WN1AYZ did a great job providing communications for the sport car time races at Newport. AYZ's new Gonset at the finish complemented JFF's home-built at the start. In an attempt to learn just how the various towns on Aquidneck Island could perform together when we have our next hurricane, BBN Portsmouth, ULS Tiverton, and JFF Newport acted as control centers on a combined 2-meter 10-meter fixed/mobile test. 4TSD/1, 4CVO/1, ZUX, and ZUL were the mobile end of the team. All the control centers were operated on emergency power. TRX, ZJQ, YAO, YAP, and MMX monitored the test. The NAARO's bean supper and auction on Nov. 4th was attended by about 125 Rhode Island hams. A very welcome letter was received from ZXA which will be turned over to KKR for next month's report. JBB, with the writing of this report, completes his tour of SCM duty and wishes KKR a prosperous two years. Please help KKR as much as you have JBB. Traffic: (Oct.) W4CVO/1 33, W1FDS 8, YAO 8. (Sept.) W1VXC 127, ULS 115, YAO 66.

VERMONT — SCM, Robert L. Scott, W1RNA — SEC: SIO. PAM: RPR. RM: OAK. Vermont nets: VTPN 3860 kc., 0930, Sun. only; VTN, 3520 kc., 1900, Mon. through Fri.; GMN, 3860 kc., 1200-1300, Mon. through Fri.; Vt. C.D. 3993 and 3501.5 kc., alternate Sun., 1000. Several XYLs of the Burlington boys are active on Novice frequencies. Is that why we seldom hear the boys from that area on 75 meters? The news comments around the State seemed to have faded out before reaching this QTH, so — Traffic: W1OAK 126, AVP 85, RNA 69, IT 24, VZE 14, TXY 6, UGW 1.

NORTHWESTERN DIVISION

ALASKA — SCM, Dave A. Fulton, KL7AGU — AOW, formerly of Anchorage, now is looking for KL7 QSOs from home with the call W4BFO. ABT expects to depart for W7-Land early in '55. AWB still is looking for a DXCC prior to his departure sometime in '55. Many KL7s in the Anchorage Area expect to go s.s.b. on all bands in the near future. BEW has worked eight maritime mobiles on 15 meters; she also has 29 states confirmed for her WAS and sure is working hard to get the balance. CP has tied a Viking Ranger to his squashed rhombic and it sounds mighty fine. The Anchorage Amateur Radio Club held an election and the lineup for '55 is as follows: AOT, pres.; ATL, vice-pres.; BHE, secy.; BDU, treas.; PIV, act. mgr. The long-awaited c.d. radio gear has arrived and is in the process of being placed now and should be in operation before too many more months. Traffic: KL7AWB 18.

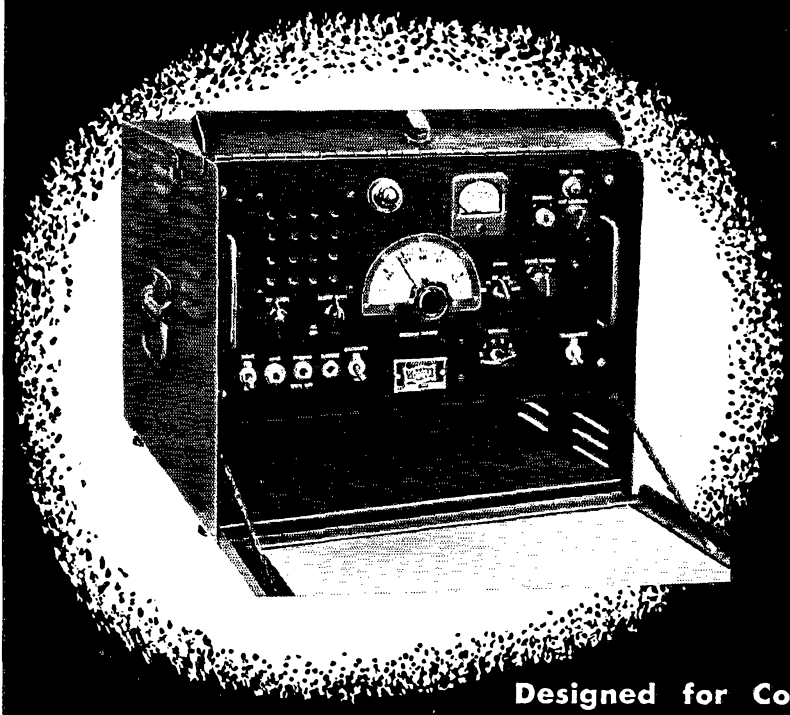
IDAHO — SCM, Alan K. Ross, W7IWU — Twin Falls: NH is busy with PAN trying to find some volunteers with high power for NCS. Kellogg: RQG is the new Emergency Coördinator for Shoshone County. Gifford: VWS is applying for ORS appointment. Lewiston: ONP has his mobile installed in the new Oldsmobile. OOV has recovered after spending four days in the hospital. WN7VIO is looking for some new crystals since he took the Conditional Class exam in October. From hamming radio to Hammond organ is OOW's range. The Lewiston and Boise gang helped the police on Halloween. Boise had a 2-meter link to 10-meter mobile stations. Caldwell: EYR now has a Viking II and is putting up a 20-meter beam. Preston: RKI is active as Official Observer. Boise: GVN is back with us now after 6½ years in Africa. Two meters is active again with a station at the KBOI-TV site, up 7000 feet. Traffic: (Oct.) W7NH 113, RQG 66, RSP 34. (Sept.) W7VWS 6.

MONTANA — SCM, Leslie E. Crouter, W7CT — The Great Falls Radio Club is starting a training program in theory and code. WIF and RIL are on 420 Mc. RRI is on mobile. QPK returned to school in California. UWN is on s.s.b. RIL moved across town. JRG rebuilt the s.s.b. exciter and 813 linear final. SFK is building a ham shack. SFK and TGF are NCS for the North Montana 160-meter 'phone net operating on 1995 kc. at 1900 MST. Laurel reports the Simulated Emergency Test was witnessed by the local Red Cross and newspaper representatives. TTC and RDM built new VFOs. SMY and UXA are rebuilding transmitters. LER, JFR, CJN, LNS, LNU, OIO, and CDW, all Butte mobile stations, operated a mobile relay chain

(*Continued on page 94*)

PROVEN PERFORMANCE ON

144-148 MEGACYCLES



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- ANTENNA INPED.: 32 - 72 OHMS
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between Butte and Helena during the Simulated Emergency Test. FUB checks in regularly on Montana and South Dakota c.w. nets. NZJ checks into the North Montana and South Dakota 160-meter 'phone nets every day. CT sends ARRL Official Bulletins Mon. through Fri. on 3520 kc. at 1830 MST. Recent endorsements or appointments: RSJ, FUB, and DSS as EC; NSJ, PCZ, and TDW as OPS; SFK as OO. Traffic: W7CT 56, CJN 32, LBK 28, FUB 14, SMY 7, TTC 5, NZJ 3, QGJ 2, RDM 2, IRN 1.

OREGON — SCM, John M. Carroll, W7BUS — OJA now believes that roller skates and radio do not mix and has a broken leg to prove it. SBT uses a bicycle mobile. ISP is new Medford Area EC. IEY is visiting clubs on the Coast speaking on MARS. HUI is out of the hospital and back on the air. JHA has retired from the Navy and plans to spend the rest of his life hamming. WAT is new Asst. ESC and is ORS and OPS for Oregon. QFY and the OARA planning committee are working on the convention to be held in Portland May 7 and 8, 1955. KTL finally got a one-eyed monster. HDN and NSD are the same fellow. The Teenagers Net in Oswego is going along fine. UAB has WAS. RVN is teaching code classes for the OARS. TNF is a CAP communications officer. NWE finally is planning on s.s.b. SY and family have moved to Salem. AZP and KR have been hunting elk. TVW was reëlected president of the Pendleton Radio Club. FFD has turned brick-layer and is building a fireplace. VCH has a new jr. operator. The Cascade Net on 29.2 Mc. had 425 check-ins, with PRU as high check-in station for the month. The Oregon State Net had 24 sessions with a total attendance of 203. The whole net is out for AREC with a c.w. net for AREC stations. Traffic: (Oct.) W7APF 553, WAT 93, ESJ 74, AJN 52, LZG 51, QET 50, TBT 49, THX 42, PRA 41, WLL 13, HDN 11. (Sept.) W7HDN 19, KTL 6.

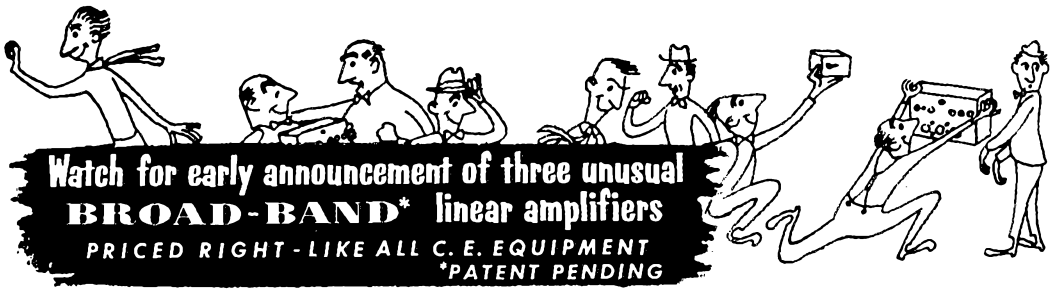
WASHINGTON — SCM, Victor S. Gish, W7FIX — The Richland Amateur Radio Club, Inc., meets the 2nd or 3rd Mon. at the QTH of OHS at 8 P.M. Officers are NLI, pres.; RMQ, vice-pres.; KHZ, secy.; RJO, treas. The Tacoma Amateur Radio Society meets the 1st and 3rd Fri. at South Park Community Center at 8 P.M. Officers are SOI, pres.; ETK, vice-pres.; GVV, secy. The Radio Club of Tacoma, Inc., meets the 2nd and 4th Wed. at the Red Cross Bldg., 7th & Broadway, at 8 P.M. Officers are AZI, pres.; RXS, vice-pres.; OVW, secy.; QPM, treas. Tacoma's RACES plan has been approved by FCDA and now is in the hands of FCC. EVW and OS attended the Puget Sound RTTY meeting at the QTH of KV. Bremerton Club members attended a Tacoma Club meeting at which there was a discussion of call letter license plates. UYK is mobile with the Babcock transmitter he won. MFG had to unwind his antenna after a recent windstorm. JHX is on 441.36 Mc. video; also the Puget Sound 2-meter Net, 145.8 Mc., at 8 P.M. Mon. UQY submitted an FB 40-meter OO report. 6REF/7 now is at Redmond. Welcome back to the section, Betty! FRU, BA, and PGY made BPL again. PGY is displaying his BPL medallion. BA made BPL in the first half of October and took off for another vacation in KH6-Land. LFA is back Stateside after duty in the Far East. EHH lost ten days on the air because of a broken ankle as the result of a hunting accident. FWD sends code practice Mon. through Fri. 1800 PST, 3695 kc., followed by Official Bulletins transmitted at 1845 PST. AIB spent the last half of October vacationing in the Southland. ZU skeds jr. operator (PRZ) on 14 Mc. each Sun. at 2CXM. TGO reports school is cutting into his hamming. AMC is setting up a ham demonstration at the state capitol to help get plates. KT talked to six state senators and representatives re license plates. AHQ is building a new 'phone-c.w. rig. AVM is QRL work. SFN is hunting TV Indians. PHO has 94 countries and is handling Far East traffic. ULK's family is 100 *per cent* ham. ETO is hunting deer. ETK is running 1-kw. s.s.s.b. — about 500 watts a.m. OCA reports Army Radio was assigned 3612 kc. by mistake. Happy New Year to all! Traffic: (Oct.) W7FRU 888, BA 825, PGY 740, FIX 69, OEB 64, VAZ 40, USO 34, AMC 23, APS 18, EHH 18, TGO 18, BG 16, AIB 14, WND 14, ZU 13, FWD 12, ETO 11, KT 10, PQT 10, JEY 9, EVW 5, ULK 5, AHQ 4, AVM 4. (Sept.) W7KZ 101, SOI 66, EHH 21, VRL 17.

PACIFIC DIVISION

NEVADA — SCM, Ray T. Warner, W7JU — KOA, of Elko, received very favorable newspaper publicity when he talked down a disabled Douglas Skyraider to safety from the Elko CAA tower. UPS has erected a new 20-meter three-element beam. VIU received his "Worked 25 Nevada" certificate. Virginia, SNP, keeps busy on 75 and 40 meters, 'phone and c.w., since receiving her new ticket. Al, of K7FDB, reports activity in a 2-meter net picking up and increased mobile activity on 7268 kc. K7FDB, who makes BPL every month, handled 1048 during October. VZS, of Las Vegas, is heard on 10 meters when the band is open. VIU, UPS, KOA, and QYL were active during the recent S.E.T. SEC, PAM, and OO appointments are available to qualified members. Traffic: W7JU 8, VIU 8, UPS 2.

SANTA CLARA VALLEY — SCM, R. Paul Tibbs, W6WGO — K6BAM is holding daily sked with KL7BEX. K6EER is active on 40 meters. EEX is spending time on v.h.f. UTV is very QRL with color TV. YHS is finishing

(*Continued on page 96*)



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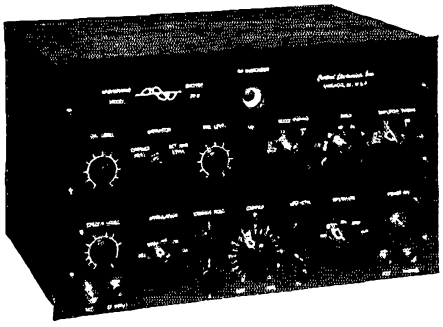

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MULTIPHASE EQUIPMENT

and for good reason. It's versatile, permits all-band operation 10 thru 160, it's extremely stable and it's a well engineered, dependable piece of communications equipment.

MODEL 20A

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MODEL 20A

- **20 Watts Peak Envelope Output SSB, AM, PM and CW**
- **Completely Bandswitched 160 thru 10 Meters**
- **Magic Eye Carrier Null and Peak Modulation Indicator**

Choice of grey table model, grey or black wrinkle finish rack model.

Wired and tested.....**$249.50**

Complete kit.....**$199.50**

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Upper or lower sideband reception of SSB, AM, PM and CW at the flip of a switch. Cuts QRM in half. Exalted carrier method eliminates distortion caused by selective fading. Easily connected into any receiver having 450-500 KC IF. Built-in power supply. Reduces or eliminates interference from 15 KC TV receiver sweep harmonics.

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NOW IN BOTH MODELS

- **Perfected Voice-Controlled Break-in on SSB, AM, PM.**
- **Upper or Lower Sideband** at the flip of a switch.
- **New Carrier Level Control.** Insert any amount of carrier without disturbing carrier suppression adjustments.
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- **40 DB or More Suppression** of unwanted sideband.

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s.s.b. exciter using surplus crystals. It can be heard being used by TTB. BM has a new QTH in San Jose. Pappy puts in time off the air working at the plant of EI. NX reports working ZLs on 20-meter s.s.b. as early as six in the evening. WHB is using grounded-grid amplifier one 837 driving two in parallel driving up to about 500 watts input in s.s.b. This amplifier is the answer to you boys looking for medium power at little expense. C.w. operators are needed in the section to work on RN6, PAN, and TCC appointments. All those who can give one night a week to this work will find much pleasure helping with an important job. More information can be obtained by contacting HC in San Jose. Well, gang, this is my first report as your SCM. With your help the section can be one of the most active in the ARRL field organization. You can help by sending reports of your activities as well as those of your friends. Keep others posted on activity in your club through this section in *QST*. Many of your club members keep in touch with home by reading this each month. Have your reports in the mail by the first of each month. Traffic: W6HC 145, UTV 50, K6BAM 16, EER 6.

EAST BAY — SCM, Guy Black, W6RLB — Asst. SCMs: Oliver Nelson, 6MXQ (v.h.f.); Harry Cameron, 6RVC (TVI). SEC: WGM. RMs: IPW, JOH. PAM: LL. ECs: CAN, CX, FLT, QDE, TCU, ZZF, K6ERR. A reminder to all ARRL appointees — it's time for most of you to have your appointments renewed. Those who have not made any kind of report for the last year are especially urged to drop me a note. If I do not hear from them it will be assumed that they no longer are interested in their appointments. The Skyriders Radio Club has new officers: NCL, pres.; BSE, vice-pres.; Dot Crill (ZOZ's XYL), secy.; MMK, treas. and net control. The East Bay teen-agers have KN6HEJ, pres.; KN6GBZ, vice-pres.; K6EHW, secy.; and KN6HRE, program chairman. HRE also is president of the El Cerrito High School Radio Club. EHW says her QTH seems to be headquarters for the Magoons and the K6NCG gang. Second-hand reports have come this way to the effect that the Richmond gang feels that there is not enough news about them in the column. Shucks, gang, don't be so bashful. Let me know what's cooking and you'll see it in print. EJA is reported to be enjoying a receiver, and QDE is reported to be rebuilding. The Richmond Club now has a Viking for a club rig. The Hayward Radio Club's TVI committee includes PUH, LGE, SIF, and AXW. ØHTG is the East Bay Radio Club's TVI chairman. FDJ is heading the Oakland TVI Committee. All of these groups report a very satisfactory TVI situation this last year with relatively few complaints. BXE has built a new speech limiter. FDG is working s.s.b. skeds with Japan. ITH reports work on 15- and 40-meter 'phone. YDI had a spell in the hospital. ACN had an operation which it is hoped will get him back in tip-top shape. WZR has a new job. GOP recalls the good old days on 160 meters with flea power. NDR has a new beam due from his XYL. LL reports traffic despite his busy duty as MTN traffic manager. Region 3 civil defense has started a series of drills on 6 meters, 47 Mc., 1761-kc. DCS band. K6ERR will get two different AREC nets going in the Berkeley-Albany-El Cerrito Area. Fifty-eight persons attended the East Bay Radio Club's dinner. The Mt. Diablo Radio Club meets the 3rd Fri. at 8 P.M. in the Coast Counties Gas. Co. Bldg., Walnut Creek. The teletype gang has set up a Sunday brex schedule 8 A.M. on the last Sun. of the month, percolator, Oakland. See FDJ for more details. Traffic: (Oct.) K6FDG 1281, W6QPY 243, K6GK 156, WAY 108, W6LL 80, JOH 77, EFD 63, ASJ 35, ITH 34, YDI 9, EJA 8, CIB 6, K6EDN 4, W6OUU 1. (Sept.) W6LL 90.

SAN FRANCISCO — SCM, Walter Buckley, W6GGC — SEC: NL. Congratulations to the new officers of the San Francisco Radio Club: AHH, pres.; PHS, vice-pres.; QMO, secy.; and Harry Witzke, treas. Harry always keeps the books in the black instead of red. Although it was thought best for the club to change officers every two terms we couldn't spare Harry. The HAMS have decided to go on 6 meters. Those interested and new members are expected to join the group. The San Francisco Naval Shipyard Club is busily making plans for the Christmas Dinner to be held at the Naval Shipyard. AJF, of Sonoma, is busy rebuilding the rig, is doing additional work on the 2-meter beam design, and has completed a new v.h.f. receiver. The 29ers lost FVK to Uncle Sam. Gordon was a very faithful net control on 10-meter transmitter hunts and always Johnny-on-the-spot for c.d. drills. SLX was stationed at Treasure Island during October. Friends saw him at the San Jose Hamboree but he must have had very little free time as he never showed up at any of the local amateur club meetings. Ed said he was taking notes from the Bay Area back to Eureka with him. The 14 Mobileers and their families took a trip up to Carson City, Nev., to handle communications for the Admission Day Parade. EJY acted as net control in his new Oldsmobile. CTH sat at the judges' stand, acted as relay station, and watched all the beautiful girls as they marched by. GGC had the portable Elmac rig set up. ISO helped set up the antenna and the XYLs made corrections, omissions, and additions on the parade sheets for the announcer. Oh, yes, they also called the two amateurs to attention when the boys were too busy to hear net control contact them. They

(Continued on page 98)

Technical Bulletin for Amateurs and Experimenters

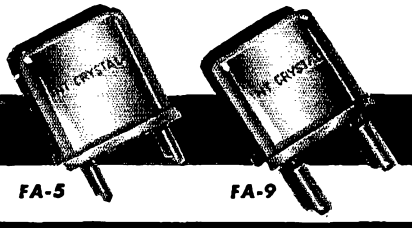
A Note About Crystal Tolerance:

In the manufacture of crystals, certain limits must be adhered to when finishing the unit. Such limits are often held to better than .001% for commercial applications. Tolerances of this magnitude mean nothing unless the oscillator in which the crystal is to operate is an exact reproduction of the oscillator in which the crystal was calibrated. This same thing applies to wider tolerances. Persons doing work where close tolerances are required, (Broadcast, Commercial Two-Way, Civil Defense, CAP, etc.) should keep this in mind. The FA-5 and FA-9 Crystals are guaranteed to be calibrated to better than .01% of the specified frequency. The average FA-5 or FA-9 Crystal is held to better than .005%. This tolerance applies only when the crystal is operated into 32 mmf, for fundamental crystals and anti-resonant operation for overtone crystals. The information shown in Table I is of value in setting the crystal to frequency. (Crystals of closer tolerance, and for special circuits, are available from our commercial line.)

TABLE I — OSCILLATOR LOAD CAPACITANCE

	32 mmf	50 mmf	20 mmf	10 mmf
MEASURED	2000	1999.950	2000.060	2000.200
CRYSTAL	3000	2999.800	3000.200	3000.600
FREQUENCY	4000	3999.700	4000.400	4001.000
IN	7000	6999.200	7001.200	7003.300
KC	14000	13998.0	14003.1	14008.1

Watch this space each month for useful notes, circuit diagrams, etc., published by the Technical Services Division of International Crystal Mfg. Co., Inc. Write for FREE booklet.



FA-5 FA-9

ONE-DAY Processing

Spot Frequencies 2000 KC to 54 MC

PRICES

FA-9* (Pin Diameter .093)*
FA-5 (Pin Diameter .050)

*Pin Spacing .486 (*FA-9 fits same socket as FT-243)*

RANGE	TOLERANCE	PRICE	
Fundamental Crystals		FA-9	FA-5
2000-9999 KC	.01%	$2.80	$2.70
10000-15000 KC	.01%	$3.90	$3.80
Overtone Crystals (for 3rd overtone operation)			
15 MC—29.99 MC	.01%	$2.80	$2.70
30 MC—54 MC	.01%	$3.90	$3.80

.01% TOLERANCE—Crystals are all of the plated, hermetically sealed type and calibrated to .01% or better of the specified frequency when operated into a 32 mmf load capacitance.

Orders for less than five crystals will be processed and shipped in one day. Orders received on Monday thru Thursday will be shipped the day following receipt of the order. Orders received on Friday will be shipped the following Monday.

HOW TO ORDER

In order to give the fastest possible service, crystals are sold direct and are not handled by any jobber. Where cash accompanies the order, International will prepay the Airmail postage; otherwise, shipment will be made C.O.D. Specify your exact frequency and the crystal will be calibrated to .01% or better of this frequency with the unit operating into a 32 mmf load capacitance.

International CRYSTAL Mfg. Co., Inc. 18 N. Lee Phone FO 5-1165 OKLAHOMA CITY, OKLA.

were very busy watching the beautiful girls, also. The boys have taken over the 49ers Motel at Carson City each year and latest reports have it that the owners of said motel intend to spend the winter studying the code and hope to have W7 calls next year. 7ZT held his usual party for the gang the evening of the parade. Carson City certainly gives the amateurs a royal welcome each year. W6 calls heard in W7-Land were CTH, EJY, GCG, ISO, PAZ, UJ, UUQ, BMY, YPM, FNC, LFZ, OPU, and GGC. Sunday morning the boys had their usual club breakfast before setting off for home — all with a little lighter pocketbook. The 2-meter boys on c.d. have been invited to join the East Bay C.D. Net, 2 meters. ACN recently underwent an operation. Archie worked hard to get the license plates for the W6 boys. Calls were heard on MTN for blood donations and many responded. Congratulations to PHT on the BPL total. SWP didn't get his usual high score in as his wife was in the hospital. Reports are that she is well on the road to recovery now. Traffic: W6PHT 831, SWP 452, QMO 357 GGC 34, MWF 12.

SACRAMENTO VALLEY — SCM, Harold L. Lucero, W6JDN — Asst. SCMs: Ronald G. Martin, W6ZF; Edward V. Fuller, K6BMU; Gerald R. Hobbs, W6TMP. SEC: JEQ. Asst. SEC: EKP. OBSs: FNS, MWR, ILZ, SBN, AKF. OPSs: FNS, MWR, LJ. ORSs: ASX, SYY, FYK, LJ, OMR. ECs: ULC, AYU, EXP, JKA, NCV, SIY, SLV, CFZ, JDN. PAM: TYC. OESs: LSB, QAC. RM: OPY. OOs: BIL, FYK, FNS. These calls are for your future field and other ARRL contests. From now on the winter will bring us added contests as to our ability to cope with any emergency so, fellows, let's really be on the ball. We have lost one of our main traffic stations, REF. Betty has moved to Washington State. Luck to you at your new location, Betty. TYC reports that he is getting along very well with the PAM appointment. OPY is the man to get the c.w. nets on their way and I believe Harvey is doing everything possible. Keep up the good work, Harvey. SUP, K6GKR, and KN6HLO are father, mother, and son. SBH is more than filling his schedule as OBS. New officers of the Tehama County Amateur Radio Club are OEY, pres.; SBH, vice-pres.; TMP, secy.-treas. This is a very fine choice and the Club should go far. The new SJVN is now going and has several members in this section. I hear that this net is to change its name to the Central Valley Net. We are sorry to report that BHV had an auto accident and broke his back. 6ANR has moved to Nevada and now has the call 7ANR. Well, fellows, the appointments are coming along fine. Let's have more. Traffic: W6MWR 20, K6CFZ 15, W6JDN 10.

SAN JOAQUIN VALLEY — SCM, Edward L. Bewley, W6GIW — SEC: EBL. RM: K6BGM. PAMs: ZRJ, WJF. The SJVN is active again on 3635 kc. After getting poor results on CCN, our RM decided to try to get the old SJVN gang active again, and so far it looks hopeful. Any of you who are interested in handling some traffic, check in on 3635 kc. at 1900. A net has been started on 3900 kc. at 1100 Sun. by EBL in an attempt to bolster AREC activity and to help formulate ideas for the good of the section. It is hoped that all ECs and representatives from all the clubs in the section will check in regularly, and inform the rest of the section of the local activities. This also should help to coördinate activity between the various clubs. TXM is the new Kern County EC. FKY is in Detroit for a visit. A club is beginning to take shape in the Sonora Area. This will take in a large mountainous area, with hams widely scattered. These are adverse conditions for a club, but the gang is determined and we are sure it will be a success. A 2-meter transmitter hunt held by the Turlock Club was won by SQR, who was accompanied by GYN. The Stockton Club visited a TV station, watched a studio program, and then took a tour of the entire station. K6DUU and W6ZRJ presented very interesting and informative talks to the Turlock Club on incorporation and c.d. K6BGM is NCS on PAN Sat. nights. OHB is hunting in Wyoming. DVI attained an excellent rating in the last Frequency Measuring Test. Traffic: K6FAE 898, W6ZRJ 290, TTX 133, EBL 43, FEA 21, WJF 18, SJJ 15, ADB 10, K6BMM 3.

ROANOKE DIVISION

NORTH CAROLINA — SCM, C. H. Brydges, W4WXZ — SEC: ZG. RM: VHH. PAM: ONM. OO: SOD. NCN is trying to get a new start on 3605 kc. There might be a few hams who remember the c.w. alphabet. YPZ has a new Telrex 20-meter beam. The Gastonia C.D. Net meets at 7 o'clock on 29,300 kc. A project by the members is to build portable transmitters and receivers with batteries for fixed or portable operation. The Charlotte C.D. Net meets on 3825 kc. at 9 A.M. Sun. Plans are now being looked over for a state-wide emergency organization in case of another "Hazel." FUS is making a roster of stations and their hours of operation during the hurricane. If your station has not been reported, mail information to FUS, Maiden, N. C. The call letter license plate bill is one we all have to work on. It is not a one-man or a group job. I have lots of information from the Virginia group which pushed it through in that State, and we have lots of work ahead of us. CZR is a new Official Bulletin Station. He transmits on 3860 kc.

(*Continued on page 100*)

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These multi-tapped Stancor transformers will match all common impedances of Class "B" modulators to Class "C" load impedances of 2,000 to 20,000 ohms. With these versatile units in your rig you can change transmitting tubes or operating characteristics without having to invest in a new modulation transformer.

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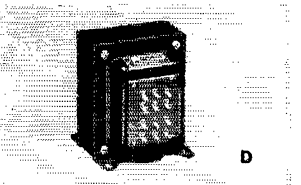

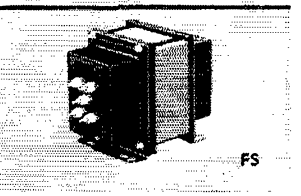

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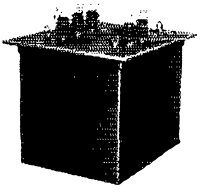

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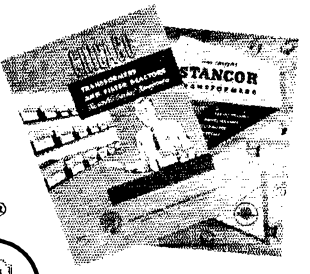

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at 2015 Mon. through Thurs. YPY has p.p. 813s and will be on with a "killer-watt" in the near future. A wide-spaced beam is used on 20 meters. I would like to take this opportunity to congratulate everyone who helped during Hurricane Hazel. All did a noteworthy job, especially the Wilmington boys, who were red hot. MVP and TLA are new ECs and VHH is the new RM. Happy New Year to all. Traffic: W4WXZ 20.

SOUTH CAROLINA — SCM, T. Hunter Wood, W4ANK — South Carolina amateurs did an outstanding job in providing emergency communications during Hurricane Hazel. Reports from ECs in Georgetown and Florence, W4FFH in Charleston, our PAM, and W9MQV/4, who operated from Myrtle Beach, have been consolidated in a report to the NEC. W9MQV/4 now is K4AQQ. ZIZ reports that his activity must be reduced because of the doctor's orders. LXX reports from Florence that FGX is working DX on 20-meter c.w., TSU has a new Harvey Wells transmitter, and LXX still is working toward WAS. ANK and TL in the last Frequency Measuring Test made average errors of 3.0 and 5.0 parts per million, respectively. WN4HOZ has worked 22 states with his 60 watts and reports that ERN, FM, HQC, and SBR have been a big help to him and he hopes to pass his General Class exam soon. WN4HGW has an HQ-129X and Heathkit transmitter. ANK and 3HH/4 attended the Roanoke Division Convention and were the only South Carolina hams there. Traffic: W4ZIZ 88, FM 2.

VIRGINIA — SCM, John Carl Morgan, W4KX — VN and VSN meet on 3680 kc.; VFN on 3835 kc.; VON on 1820 kc., and ODN on 3845 kc. An outstanding job was done by the Virginia gang during Hurricane Hazel. The Blue Ridge ARC, Roanoke, keeps PCC fired up. The RARC is to be congratulated on its usual fine job of putting on a bang-up Division Convention. The Shenandoah Valley ARC's new club house now is under construction. New officers of the PVARC are 3GRF, pres.; KXV, veep and act. mgr.; AMZ, secy.; CC, treas. NRO, back at William and Mary, says the college club and PYN are back in business. Ex-PYNers 2KJE and 3UQU now are Mr. and Mrs. ZFV, back at V.P.I., reports a club is in formation there. The University of Virginia club station, SKI, was quite active during the summer. 3QQE really is keeping the Quantico Marine Hobby Shop station, PFC, rolling as evidenced by traffic totals. 3WDP does likewise at K4MC but complains of lack of outlets for southbound traffic, which indicates the need for more Virginia participation in 4RN. CHK, now Gen. Class, is NCS of the Southeastern Novice Net (3735 kc., Mon., Wed., and Fri. at 1700 EST). YHD, now back at M.I.T. and 1MX, says he worked 87 countries during the summer vacation from his home QTH in Loudoun County. LW is taking time out between issues of his FB *Virginia Bulletin* to build a new VFO and an all-band transmitter. JUJ has a new B. & W. 5100. CGE is trying new skywires to squeeze more out of 40 watts. JOS moved to North Carolina. KFC reports a mess of new plumbing atop a 50-foot pole. IF is complaining of skip snafuing VN. RJW says, "Back to the salt mines in mobile." YVG does music-making five nights, watch-repairing every night, yet keeps the rig mighty warm. Traffic: (Oct.) W4PFC 882, TFZ 138, K4MC 122, W4BLR 106, YKB 106, VYZ 72, YVG 70, KX 67, DWP 58, RJW 45, PCC 30, TYC 27, YZC 24, OLD 13, IF 9, LW 9, CKI 7, BYZ 5, BZE 4, ZYV 3, JUJ 2, ZFV 2, HJK 1, PYN 1. (Sept. corrected) W4PFC 740.

WEST VIRGINIA — SCM, Albert H. Hix, W8PQQ — USO has a new 20-meter beam. IXG has mobile rig on 40 meters. JUW is home from 5A3-Land and is at K4AF. HNC has a new rig with p.p. 810s at a kw. QHG has a new Ranger and is building new high-power final. KDQ has the new c.w. break-in system working well. GCZ got his 2nd-class telephone commercial ticket and is active on both nets. VCT should be back from Texas before too long. The following attended the Roanoke Division Convention in Richmond: GBF, JWX, PZT, BOK, NYH, CLX, and PQQ. NLT had a ham get-together at his home recently. PQQ was in Texas for a month. BKI had DX as a guest recently. He is doing a lot of 2-meter work. ATF, now in Weston, will be on soon with new all-band rig. YPR, the SEC, has the AREC plan for this State worked up and it is urged that clubs get a copy of same in order to make final criticism and comments before it is printed and distributed. If any groups have suggestions and ideas as to what can be done to further organize for emergency operations, please contact YPR by letter as soon as possible. Tests are being conducted on 160-meter 'phone to determine what its possibilities are in being used for emergency communications. Traffic: W8AUJ 130, GEP 67, HZA 36, JWX 33, ETF 29, NYH 29, DFC 21, KDQ 8, HNC 7, IXG 5, PQQ 4.

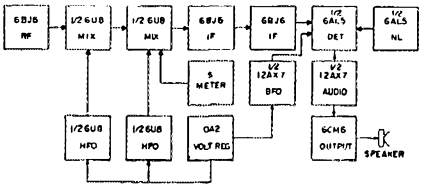
ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Karl Brueggeman, WØCDX — SEC: MMT. RM: KQD. PAM: IUF. Congratulations to KQD on her appointment as RM and to IUF as new PAM. KQD also was elected to the Pacific Area Staff as member-at-large. The new officers of the Ski-Hi Radio Club are DRY, pres.; OHB, vice-pres.; OXS, treas.; W. H. Kadesch, secy. 7QHF and family have moved to Alamosa from Phoenix,

(*Continued on page 102*)

Also Worth waiting for!

THE *Harvey*-WELLS BANDMASTER RECEIVER R-9



This is a double-conversion, super-heterodyne receiver featuring a high signal to noise ratio and sensitivity. The low frequency second I.F. stages provide high selectivity. Minimum frequency drift for phone and CW operation is assured by stabilization of the variable H.F. Oscillator, Fixed H.F. Oscillator and the B.F.O. This is accomplished by the use of temperature compensating capacitors and voltage regulation of the d.c. supply to the oscillators.

The circuits employed on all five bands consist of one stage of radio frequency amplification, a first detector and high frequency oscillator, one stage of 1600 Kc. intermediate amplification with another detector, and a stabilized high frequency oscillator. This is followed by two stages of low frequency intermediate amplifiers (260 Kc.) followed by a detector of the diode type, a noise limiter, a high gain audio stage, and the audio output stage. Automatic volume control, beat frequency oscillator, voltage regulator, and rectifier circuits are included.

The audio output stage provides a full five watts of audio which is sometimes needed in mobile or marine installations having high ambient noise conditions. The unit is designed to operate from either 115 V 60 cycle power, 6, or 12 volts d.c. An illuminated "S" meter and rear lighted lucite dial assure ease of operation.

A socket mounted on the chassis provides a mounting place for a crystal filter or a crystal calibrator which will be available as accessories.

Rigid steel construction affords reliable performance under the most trying conditions, such as marine and mobile installations where vibration effects become very serious. This performance packed receiver is packaged in a very small case measuring only 12⅜" x 10½" x 6¾" overall.

R-9 receivers have self-contained 115 V 60 cycle a.c. power supplies. For mobile or marine installations, 6 or 12 volt d.c. vibrapacks are available. No modification to the equipment is necessary for operation with 6 or 12 volt d.c. supplies.

PERFORMANCE DATA R-9 RECEIVER:

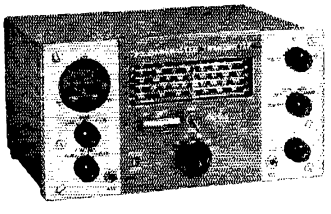
Image Rejection:	30 to 60 db. from Band A to Band E.
I.F. Rejection:	40 to 65 db. from Band A to Band E.
S/N Ratio:	10 db. on all bands measured with 2 microvolts signal input, 30% modulation, and five hundred milliwatts output into an 8 ohm load.
I.F. Selectivity:	4 Kc. between 6 db. points.
Audio Response:	200 - 7000 cycles at 3 db. points.
Input Impedance:	Nominal 50 ohms over all bands.

Price only **$149.50*** completely built and tested and with tubes

T-90 MATCHING TRANSMITTER

90 watts — The Midget with the mighty punch! Same size as R-9 Receiver to make a complete Station in only one cubic foot. Factory built and tested and complete with tubes.

Price **$179.50***



*Prices subject to change without notice

Harvey-WELLS ELECTRONICS, INC., SOUTHBRIDGE, MASS.

Ariz. The Hi-Noon Net handled 231 messages in 18 sessions. WVZ is bucking the Rio Grande RR extra board and is home a lot working DX on 20-meter c.w. LZY will be keeping the same OBS schedules. They are Mon., Tue., and Wed. at 1200 noon on 7094 kc. Elmer is working nights and can't keep any net schedules. IA has a new Class B final that puts out about 100 watts. Gene reports that there still is no activity on the Colorado Army MARS. The Colorado Slow-Speed Net will be active this winter, meeting on Mon., Wed., and Fri. at 1715 hours on 3570 kc. KØWBB and WØKQD will alternate as NCS. The Fort Collins group has applied for affiliation with the League. The Club's name is the Trout Route Mike and Key Club. Our Director, IC, has prepared all the necessary paper work for the introduction of the auto license bill to the State Legislature. It is now up to all of us to contact the officials of our districts and acquaint them with the bill before it is introduced. If we all do our part, fellows, we'll get this through; so don't shirk, just work. Traffic: WØKQD 473, CYT 49, AMR 39, IUF 36, HOP 13, IA 9.

UTAH — SCM, Floyd L. Hinshaw, W7UTM — The UARC program for October embraced a discussion of s.s.b. which was very ably directed by JPN, OOK, of the Club's TVI Committee, gave details of its activities. The Club is conducting a drive for new members and expects a large increase because of the prizes being offered by NMK. SAZ is mobile with war surplus and junked car receivers. Bert uses modified vibrator pack for filament supply. His signals are very FB even if the gear is not "commercial." RQT is sporting a new all-band whip antenna. RPY and QDJ won the second transmitter hunt held by the Ogden Club. Six mobiles participated in the hunt. KUX has a new 10B exciter and is running about 500 watts on s.s.b. now. Ery also is active on 2 meters. VEX, VHV, WMM, and RVX recently received General Class licenses and are now heard almost daily on 75 meters. The Novice Net still meets at 2 P.M. every Sun. on 3735 kc. Traffic: (Oct.) W7PIM 141, UTM 10, QWH 2. (Sept.) W7QWH 5.

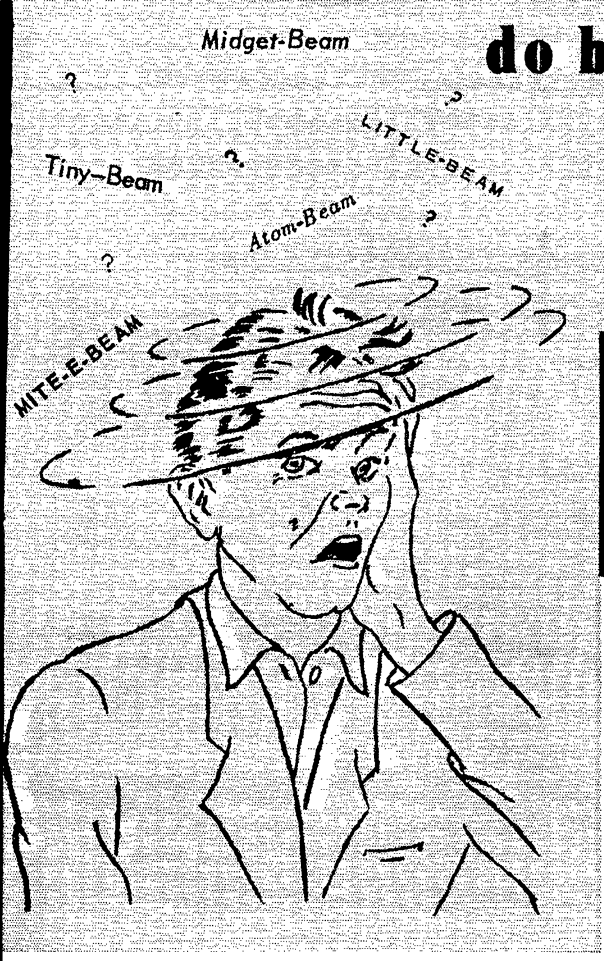
SOUTHEASTERN DIVISION

ALABAMA — SCM, Joe A. Shannon, W4MI — SEC: TKL. RM: KIX. PAM: RNX. New appointments: TKL as SEC; DZF, WOG, and WOH as ECs; WOG as OBS. Welcome to the following newcomers in the section: KN4s AIW, AIL, and AIP in Huntsville; AJG in Tuscaloosa; AJJ in Childersburg; and KN4FMI and W4BHF in Tuskegee. S.s.b. is hopping in Birmingham with EBD, KNW, RKS, and YEG each striving to get on first. DFE now has Old Timers Club certificate. WJX, ARR, and YYJ took in the YLRL picnic in Virginia and visited with KYI, SIB, CXI, and ZOI in Kannapolis, N. C. The Birmingham Club held a hot dog supper for members with about fifty turning out. The Montgomery Club is holding raffles of parts to raise money for a new club house. FMW does the honors as auctioneer. Transmitter hunts again are being held the 2nd Sun. of each month at 1400 on 3825 kc. HFK, in Northport, now has his General Class license and is making plans for a new rig to work 75 meters. OR reports that activity is increasing in Cullman and lists the following newcomers at St. Bernard College: BFT, GUR, and WN4s FTO and HFZ. Welcome, fellows. Traffic: (Oct.) K4FDY 730, W4KIX 140, WOG 96, TXO 39, YRO 29, TKL 26, DXB 24, PWS 22, EJZ 17, OAO 14, OR 11, VIY 8. (Sept.) W4UHA 69, PWS 28, WHW 7.

EASTERN FLORIDA — John W. Hollister, Jr., W4FWZ — Birthday greetings to the Flamingo Net. In the October S.E.T. held near Palatka five ECs and 19 stations participated in a joint drill. The Miami S.E.T. brought out 45 stations. Thanks to ECs UHY, DVR, OBB, UHC, WEM, and IYT. A new net is the Transcontinental C.W. Net, on 3790 kc., starting at 4 A.M., with BMY as NCS. Use it to QSP the left-overs or to originate; it has very wide coverage. There will be plenty of net traffic for all at the State Fair at Tampa which starts Feb. 5th. The Novice *Hurricane Net Bulletin* (by YJE) is full of news about the gang. Get a copy. The NHN is going places. Ft. Lauderdale: FNR reports twenty 144-Mc. stations are expected as the result of renewed interest. AB, club station, uses Viking and NC-240D. PM says JZV, EUV, and ZUJ are using 20-meter VP beams. EC PPR turned out a good drill for the S.E.T. Jacksonville: The DCEN mobile gang meets Thurs. at 1931 on 29.0 Mc. and now includes 7 stations. The JARS sets up traffic-taking booths wherever they can. Key West: DRT finally got WAS. ELS reports a ham club on board at the NAS with 20 very active members. Merritt Island: FIQ reports new club officers are FIQ, FXH, and GED. Ken uses a Viking II. Miami: Here's a new wrinkle: The club auctioned off kits! IEH moved to Ft. Lauderdale. BSX, an Asst. EC, moved to Oklahoma. DRD got a Coast Guard citation for doing a good job with the Auxiliary Net. PBS has a 500-watt emergency generator for use with DEN work. The DEN has 36 active members on 29,044 kc. Clippers and compressors are being built like mad, says PBS of the gang. Ocala: That traffic booth at Silver Springs made BPL for DVR again. Orlando: We grieve with DQA in the loss of his jr. operator. BMY has p.p. 813s for a kw. on c.w. St. Augustine: WN4FJE

(*Continued on page 104*)

do beam ads have you CONFUSED?



Then read what Hams say who own the

MOSLEY 'Vest Pocket' Beam

60 countries in 4 months, says *Leo*, W4ERK, Miami

"...used a Vest Pocket Beam on 20 about four months. Cannot praise it too highly. We worked all 48 states in 7 weeks. To date, over 60 foreign countries. ...compliments daily on our signal."

40 Meter QRM no Bogey for *Mel*, WØGQY, Denver.

"...the 40 Meter (Vest Pocket) Beam has proven very satisfactory. *We have not lost a single contact from being covered up with QRM.* ...I think this beam is really worthwhile."

Expanded Ham horizon for *Bill*, WØRFC, Waverly, Ia.

"I am very well satisfied with my Mosley V–P Beam. I hear countries I have not heard with any other antenna in my 20 years as a Ham."

"Such good reports hard to believe", says *Frank*, VE6AC, Calgary, Alberta, Canada.

"...I have found it hard to believe my ears. My power input ranges from 22 to 50 watts ...yet *my* reports are, almost without exception, much better than those I am able to give. My Mosley V–P Beam (is) a joy beyond words."

"Outstanding results" for *Whitey*, W4PQ, Miami.

"...the performance and results obtained have been outstanding. W.A.C. and W.A.S. accomplished in a matter of days after the Vest Pocket Beam was installed, with many fine DX contacts."

Zed-L's say S–9 on 40 meter sig now, reports *Nick*, WØMUY, Salina, Kansas.

"Just a few lines to tell you how pleased I am with the (Mosley) 40 Meter Vest Pocket Beam. It is the best antenna, possible, for a city lot. It solved all my problems. I have been getting S–9 reports from New Zealand consistently. I have had several reports of 35 Db front-to-back. (I) do hope others will be able to enjoy the same advantages I have found."

Called stations answer *Mac*, W9CVQ, Wilmette, Ill.

"...I have found the Vest Pocket Beam highly satisfactory. Its power gain appears to be virtually equal to that of full sized beam antennas. I think I can summarize its performance by saying that when I call stations on the V–P Beam, they come back! Assembly of the beam was a straightforward, simple task in view of the clear instructions and color coding. I assure you I am well pleased with the MOSLEY Vest Pocket Beam Antenna."

and remember, when choosing Your beam–

MOSLEY 'V–P' Beams are made as small as possible, consistent with *True Beam Performance.* Element lengths are correctly proportioned to the loading coils to practically eliminate end-fire. Boom lengths and element spacings are such as to provide outstanding forward gain and front-to-back ratio with negligible SWR over a convenient bandwidth.

MOSLEY 'V–P' Beams are built *up* to high standards ...not down to a low price for *false economy.* Quality materials and good design assure Long Service Life and *True* Beam Performance. MOSLEY Beams for 20 and 40 are available *NOW!* A V–P Beam for 10 and 15 will be announced soon!

Order from your favorite Ham supplier!

Write for specifications and data sheets:

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8622 St. Charles Rock Rd., St. Louis 14, Missouri

says he lost his good antenna that really snagged the QSOs. At Ketterlinus are AGK, AGU, WN4FJE, and KN4AHA, a good group for EC UHC. St. Petersburg: With a sad heart we report the death of EYI. Tampa: New club officers are YII, LAW, YFI, and ALP. Traffic: W4DVR 579, PJU 514, LAP 139, WEO 114, BMY 100, IYT 76, DRD 71, WS 47, TRN 34, RWM 25, FWZ 24, ZIR 21, DSC 18, FSS 12, FIQ 5, YW 4, WEM 3, YNM 1.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PLE. ECs: HIZ and MFY. QK has a pair of 813s going on 75 meters. CCY is perfecting his mobile gear. JPD has put up 40-meter ontenna for the winter season. TTM had transformer trouble with the HT-9. 9CPI/4 is enjoying 20-meter c.w. on the B. & W. HJA is looking at the s.s.b. unit for his B. & W. DAO/DEF is QRL with the club station, K4ALI. UYS, YRF, BGG, BBU, HBK, KN4AGM, and W4AYS are planning big things for the Pensy High School Radio Club station, K4AFF. GMS keeps weekly sked with Pensy from Tallahassee. UUF keeps the 144-Mc DX stations jumping. KN4AEP is having transmitter trouble. MUX reports from Rome, Italy, while on vacation. OWN reports many early morning QSOs on 40 meters. EAR meets the gang on 10 meters. ZFL has FB vertical and gets out FB on 20-meter c.w. The gang wishes Mrs. UCY a speedy recovery. MS is working on linear amplifier for 10B exciter. WKQ worked 303 in 54 sections during the CD Party. CPE has a new converter in the car. ROM is back on 10 meters. RKH has the monitor for 10 meters going full time.

GEORGIA — SCM, George W. Parker, W4NS — SEC: OPE. PAMs: ACH, LXE. RMs: MTS, OCG. Nets: Georgia Cracker Emergency Net meets on 3995 kc. Sun. 0803, Tue. and Thurs. 1830 EST; Georgia State Net (c.w.) 3590 Mon., Wed., Fri. at 1900. New appointments: IKK as OES. CFJ and FZO as OPS. The Atlanta Radio Club has a new meeting place in the Red Cross Building on Peachtree St. Meetings are held the first Thurs. of each month at 7:30 P.M. All Atlanta hams and visitors are invited to attend. KN4ANZ now is on in Moultrie. FGH, of Quitman, and CFJ, of Atlanta, are building on TV stations. BXV has a new 348-R. OCG reports that the c.w. net is picking up; he still needs more Georgia outlets and more Georgia traffic. IKK, in Rome, EUK in Marietta, KGD in Dahlonega, and CFJ in Atlanta, are getting rigs on 420 Mc. IKK wants to hear from anyone who would like to try for Rome on 220 or 420 Mc. WN4HYV, the XYL of OGG, is on the Novice bands in Augusta. YRX, active on 75 meters in Warner Robins, is looking for traffic. K4WBP operated from the Southeastern Fair this year. FZO got 32 states on 40-meter 'phone in October. LXE has a new mobile rig. IPL is rewiring his mobile for a new 12-volt car, and is moving his home rig into a new pine-paneled shack. The Macon Club meets every other Mon. at the City Hall. All Macon amateurs and visitors are welcome. WKP is getting a new mobile from Santa this year. Thanks to the club secretaries and others for all the news this month. Happy New Year. Traffic: K4WAR 1171, W4OCG 285, YRX 166, IMQ 140, K4WBP 127, W4BWD 107, WN4HYV 76, W4ZWT 63, MTS 44, NS 22, MA 11, FZO 3, BXV 2.

WEST INDIES — SCM, William Werner, KP4DJ — SEC: HZ. ZW received ORS appointment. DV renewed ORS, OBS, and OO appointments. WD and MS have Tel Rex beams on 20 meters. RK built a short beam for 20 meters. WR has a 300-watt Eldico on 15 meters. The PRARC meets at the N. G. Officers Club the first Tue. of each month. ZV is ex-W4KZT, W6PXC, DL4XD. WF sends greetings from the U. of Miami; WS sends greetings from the U. of Maryland. KD worked HI6TC for No. 209. ES, CI, BI, and EE loaned the Ponce c.d. their Gonset Communicators when c.d. equipment failed during the floods. The first 2-meter contact from Red Cross station ID was with AAN and CX, using Gonset Communicators. AC and PK are using 430 Mc. ID will call the roll of the P. R. Emergency Net at 7 P.M. AST because of skip at 8 P.M. on 3925 kc. The Antilles Net, YX NCS, meets at 7 A.M. and 6 P.M. on 3865 kc. OOs DV, KD, and RL qualified in the September F.M.T. 2-meter activity in the San Juan Area now includes VX, CX, HZ, DV, EA, JM, and AAN, all using Gonset Communicators. HN uses a Millen 75-watt job; the frequency is 145.26 Mc. MV built a copy of the Tel Rex beam for 20 meters. K2BLN and W3HOU visited KP4-Land. YX has new 75A-3 receiver. W4DKW now is ABC. W7SVJ/KP4 and W8DRT/KP4 are on 75 meters. KH6ABS/KP4 is on 20-meter c.w. AAO is a Navy 'copter pilot. ML is back from stateside military training. ZN was sent a 100-signature scroll from Rosario, Argentina, thanking him for sending a vitally-needed drug that saved a lady's life. QA sent reports to a Colombian amateur station on their team's progress in the international bicycle race here. PRARC's Work KP4 Contest will be held in January. Traffic: KP4ZW 5, GP 3, RK 3, ZD 1.

CANAL ZONE — SCM, Roger M. Howe, KZ5RM — WA replaced RM as SEC, DG is the new PAM, and DE and GF continue as RMs. GF finally got that hundredth card. W5FJA spent a week here as the guest of WA and had a fine time. He even had the privilege of seeing those "mad beam erectors," the washer crew, in action at GF's QTH. DG and KA are "witches" No. one and six, respectively, and handle quite a bit of traffic for the Maritime Mobilers

(*Continued on page 108*)

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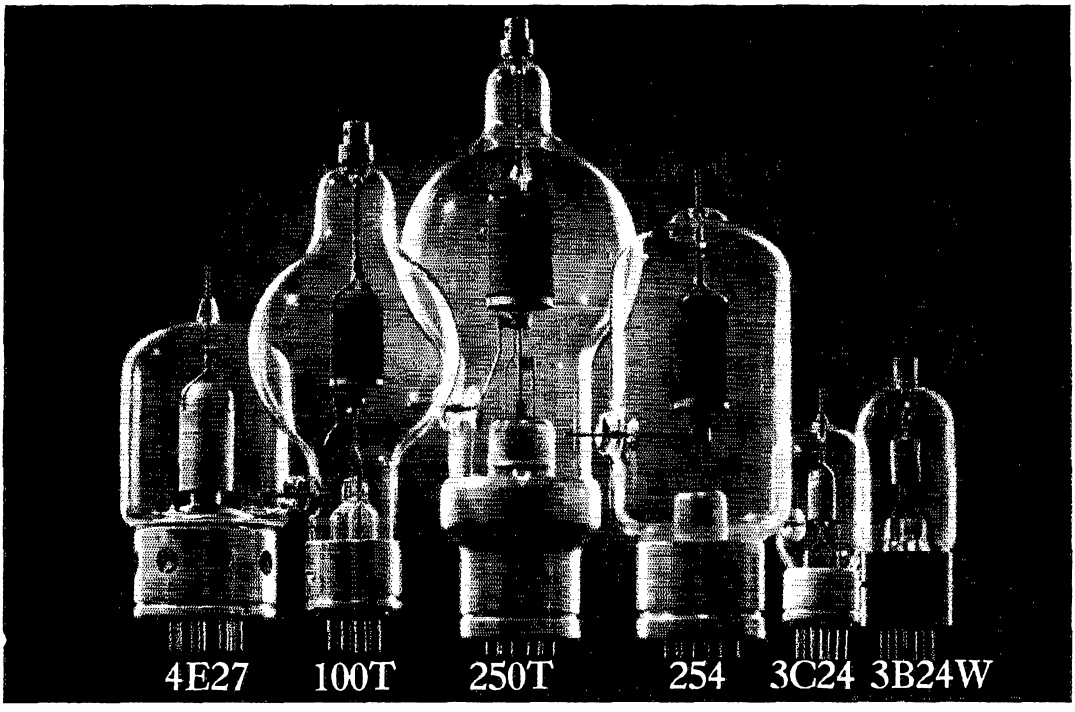

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on 15 meters. Ex-KZ5BL, now K4AEE, is on the air at Miami Springs, Fla. Your former SCM, NM, has been very ill but is improving daily. For a while FL, DG, and XYL LM were keeping daily skeds with W5TAF to report on his condition to his family. DL6NU was in town and attended the monthly meeting of the CZARA, which was held at the home of club prexy, RV. The CZARA station, KZ5JW, is on the air with a Viking I and NC-125. Traffic: KZ5WA 57, KA 5, RM 2.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Howard C. Bellman, W6YVJ — Latest happenings include the appointment of Hank Garman, 6BHG, as Assistant SCM, with Bill Schuch, 6CMN, taking over Hank's job as RM of SCN. The last Traffic Breakfast of the year was held at Clifton's again and BHG was the chairman. The next meeting will be held in January. The following qualified as Class I Observers in the September E.M.T. in order of accuracy: AXV, LIY, RW, NKT, MUR, MSG, CK, ENR, and K6FA. Although not qualifying, K6HB also took the test. Included in the *Oscillator*, the magazine of the Associated Amateurs of Long Beach, are two pages of "Cures for TVI Caused by Fundamental Blocking." SCW, scoutmaster, informed me that his Explorer Post 177, sponsored by the Whitney High Handicapped School, has a radio unit with a 300-watt, 20-meter layout. The financial backing comes from the Studio City Rotary Club. One of the Explorers is KN6ICI, of Canoga Park. Ages run between 14 and 18. Bob, the scoutmaster, used to be 7MQH. NCP was visited by KL7AMT, ex-W6ZFV. LVQ reports that the Whittier 50 Club had seven mobiles patrolling the city on Halloween at the request of the police. The boys also participated 27 hours in the S.E.T. in Whittier. LDR is running 1 kw. now and says he is sporting a new 20-meter beam. ORS tells of a rig blowing up at UID/6 while mobile on 2 meters. LYG is bragging about his Viking Ranger. He now needs outlets in Santa Ana and Newport Beach on 2 meters. K6BEQ is trying to form a 40-meter net. For details see K6DDI and/or K6EZM. Walt went bike-mobile with a buzzer and worked a mobile. LPE, of K6FCZ, wants to start a 20-meter net on 14,260 kc. Dave Wersen, K6CV, announces that the Frank Wiggins Radio Club, YAS, is a member of the Council of Radio Clubs in Los Angeles. K6DIM and CV are delegates to the Council while KPQ is alternate. New officers at the Club include K6DIM, pres.; KN6EBJ, vice-pres.; IPS, secy.; K6IDW, treas.; K6IDX, sgt. at arms; KPQ, station mgr.; and K6CV, sponsor. The members will accept traffic from 1600 to 2200 Mon. through Fri. on 14.1 Mc. Traffic: (Oct.) W6LYG 648, K6FCZ 542, W6CMN 384, K6FCY 278, W6FMG 180, GYH 94, NCP 94, USY 64, BHG 46, CK 24, K6BWD 22, DQA 17, W6ORS 16, K6BEQ 13, W6DWP 13, FAI 13, NTN 11, K6COP 6 KN6HOV 6, W6LVQ 6, AM 2, PZN 2. (Sept.) K6FCZ 1063, DQA 89, W6GYH 86, GJP 27, PZN 6. (Aug.) K6DQA 84, W6GYH 50, PZN 10. (July) W6GYH 30.

ARIZONA — SCM, Albert H. Steinbrecher, W7LVR — Asst. SCMs: Kenneth P. Cole, 7QZH; Dr. John A. Stewart, 7SX. SEC: VRB. PAM: KOY. Arizona 'Phone Net: Tue. and Thurs., 7 P.M., 3865 kc. Arizona C.W. Net: Tue. and Thurs., 8 P.M., 3690 kc. In accordance with the recent policy of our new SEC, VRB, of having the ECs in various sections around the State sponsor alerts, October saw the AREC in action in a statewide "Operation Car Count," sponsored by Tucson, with LAD, local EC, in charge. The purpose of the alert was to spot mobiles on the main highways leading to and from Arizona communities; to count all incoming and outgoing vehicles; to report same to a local fixed control station, which in turn would relay this information to headquarters at Phoenix. The alert was a huge success, thanks to the following ten fixed and mobile stations located in ten communities around the State: BFA, CDQ, DRQ, HUV, IRX, KUJ, LAD, LHF, LND, LVR, MQE, MVV, MWD, NYT, OEE, PJY, PSH, QHD, QHT, RBA, REO, ROZ, SQX, STQ, TJT, TNY, TOA, UCA, UCX, UNL, UXK, VRB, VVJ, 6SBK, K6BAW, and KB6AN. RUX received MARS appointment. ULP and VAG got General Class licenses. TVJ is new EC for Douglas Section. 5BDB/7 is moving back to Dallas. VOZ is back from Alaska. VRB won a Worked All Tucson (WAT) certificate. Traffic: W7LVR 15, RUX 8.

SAN DIEGO — SCM, Don Stansifer, W6LRU — Asst. SCMs: Tom Wells, 6EWU; Shelley Trotter, 6BAM; Dick Huddleston, 6DLN. SEC: VFT. ECs: BAO, BZC, DEY, DLN, HFQ, HRI, IBS, KSI, KUU, and WYA. RM: ELQ. K6DBG, OBS, in Santa Ana, now is putting out bulletins on 145.3 Mc. Mon., Wed., and Fri. nights. The Rohr Club is giving instruction on Tue. and Thurs. for beginners in both code and theory. K6DGB is building a Ranger Kit. GBG tells the gang to try 21 Mc. more often with good openings from sunrise on noted. The Orange County gang went all out in the recent S.E.T. with 33 stations participating. The AREC in San Diego County held a very successful S.E.T. on 75, 10, and 2 meters with the majority of its members participating. The organization was much better than last year, and the speed of traffic-handling because of frequency allotments was noted. GBM passed his exams for Naval Air Cadet. K6HKX is a new amateur in Santa Ana.

(Continued on page 108)

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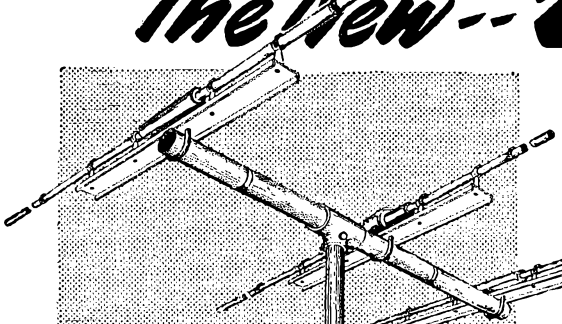

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MGT is chasing DX, and is up to 50 countries. Nine San Diego DX men attended a DX meeting at the home of LRU in November. We are glad to note more activity in this field locally, which should have more representation DX-wise considering the number of active amateurs. For information on meetings, contact LRU or BZE. KN6DVF has a new HQ-140. K6BEC has an LM frequency meter now. K6CUZ has a new VFO and 33-foot vertical, and swears he might work out of the State now. The Convair Club is very successful with its classes, and many are taking their Novice and General Class exams as a result of the knowledge gained attending this worthwhile activity. Happy New Year and good hunting in 1955. Traffic: W6IAB 3028, IZG 538, YDK 439, KVB 207, ELQ 169, K6DBG 38.

SANTA BARBARA — SCM, Vincent J. Haggerty, W6IOX — The traffic report from K6NBI by radiogram was delivered by JPP. K6CRJ reports of 2-meter signals from Santa Maria being heard in Santa Barbara, which constitutes an extensive "over the hills" jump. IHD is building an amplifier to go with his 20A s.s.b. exciter. FYW is active on CARS and runs skeds with JFP on 145.8 Mc. Art Monsees, HJP, reported from Offutt Air Force Base in Nebraska to say he will be locating his antenna system in the Santa Barbara Area one of these days. Members of the section are reminded that it is time to be considering a replacement for the present SCM, who wishes to retire at the end of his term. Traffic: K6NBI 121, CRJ 7, W6FYW 2.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, T. Bruce Craig, W5JQD — SEC: RRM. PAMs: IWQ, PAK. RMs: PCN, QHI. The Dallas Amateur Radio Club had an interesting program on Transistors with a movie on "The Atom Goes to Sea" as part of the Nov. 2nd meeting. A new Novice in Dallas is WN5IHK. Our Vice-President, NW, has every *QST*, since the beginning except Jan. 1943. K5FFB reports the BC-610 is back on the air with 3-band vertical. JLT reports the visit of a Navy buddy, ØIGP, recently, the first time since 1945. SYL reports as one of the operators at the Dallas Fair where 200 operators made over 2000 contacts and handled 308 messages. PTK has completed the 300-watt rig, complete with VFO power supply, speech amplifier, etc., all in 8¾ panel. He uses a 4-125A final with a pair of 811A modulators. KVA is completing the kw. rig with 4-400, 100TH modulator, and power supply all in a 17½-inch panel space. DYU reports as one of 55 amateurs in the Fort Worth c.d. test on Oct. 31st. Sixteen mobile units were employed and 25 "handy-talkie" units. CVA headed the Fort Worth amateurs. YIJ, at Marlin, is handling traffic for vets in the hospital there. The October SEC report shows a gain to 311 reporting stations. The Terry County Amateur Radio Club has been issued the call HPI. The club (NFO, pres.) has 30 members and meets the 1st and 3rd Tue. of each month. SNX, OES, reports a v.h.f. meeting was held in Brownfield on Oct. 23rd with 50 present. Fellows, please have your club secretary send in a postal card with activities to your SCM. The v.h.f. boys are making progress and we are still hoping to get a complete link of 2-meter operation across the entire northern half of Texas. Traffic: W5TFB 638, K5FFB 548, W5YPI 207, AHC 172, KPB 162, PAK 121, UBW 63, UFP 54, ACK 47, ZWR 33, CF 30, SYL 24, TFP 21, RRM 18, DYU 9.

OKLAHOMA — SCM, Dr. Will G. Crandall, W5RST — Asst. SCM: Ewing Canady, 5GIQ. SEC: KY. PAMs: PML, SVR, ROZ. RM: GVS. While on a Goodwill Tour of the South American countries for the Federal Department of State, Governor Murray of Oklahoma kept in regular touch with his office in Oklahoma City by means of amateur radio via GZK. The North Fork Amateur Radio Club of Western Oklahoma obtained excellent state-wide publicity on its Simulated Emergency Test on Oct. 17th with very favorable editorial comment in the *Greer County News of Mangum*. Publicity of this sort should be the aim and object of every amateur and amateur group as it amply justifies the retention of amateur frequencies for public service. KY, as SEC, has definitely enlivened the State for AREC by appointment of many new county ECs and is holding a weekly EC round table following OPEN on Sun. morning. The Will Rogers High School Amateur Radio Club has been organized with 15 members and has the club call ETJ. Officers are DCC, pres.; CEG, vice-pres.; DCA, secy.; WN5DBZ, treas.; and ZWT, trustee. Newly-elected officers of the Enid ARC are GIQ, pres.; PCQ, vice-pres.; KWF, secy.-treas.; REC, asst. secy.; WN5HBL, custodian. A new code class also has been started. Many thanks to those sending in news and traffic reports. Traffic: W5MRK 192, PML 35, SVR 32, SWJ 25, FEC 23, MQI 20, QAC 20, KY 17, TNW 16, RST 15, ADC 14, WSM 12, EHC 10, TC 9, REC 8, VAX 8, MFX 7, PAA 5, PNG 5, BYC 2, WTA 2.

SOUTHERN TEXAS — SCM, Dr. Charles Fermaglich, W5FJF — ZIH, MRV, and RPH detected a faint c.w. signal on 75 meters from RES mobile in the hills of New Mexico. His car was broken down "60 miles from nowhere." They made a long distance call to Hobbs, N. Mex., and had repair parts taken to him. New officers of the Temple ARC: VLF, pres.; VRN, vice-pres.; WDW, secy. The TARC is sponsoring a local mobile emergency net. Drills

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are held Tue. at 5:30 P.M. on 3855 kc. PNP is NCS. UPO and VLF are now mobile. VRN found the hidden transmitter at the Oct. 24th family picnic. AET, Hidalgo County EC, reports a considerable amount of activity on the border. The Rio Grande Valley staged the 1st Red Cross simulated disaster just a few weeks before the recent flood. FZO, control station for STEN Zone 4, and member of TSG and MARS, has a kw. power unit for emergency work. The RGARC in Edinburg is doing an FB job and many new amateurs will be heard in the near future. The boys in Harlingen have organized a new club and had a transmitter hunt in cooperation with the Harlingen AFB amateurs. SZB found the transmitter and AET was second. The Rio Grande Valley has organized a motorcycle corps of Boy Scouts, industrial mobiles, USNR, National Guard, State Guard, Border Patrol, amateurs, etc. SZB reports from the RGARC. AET changed his mobile loop to a center-loaded whip. YDI has a new mobile. SU is putting up a new 15-meter beam. BRD is on 40-meter c.w. working DX. TVL is back with a new rig. WN5BWT took the Tech. Class exam. CRA has a new B. & W. transmitter. AUO has a new mobile converter on all bands. VIT has a new TCS. NVQ has a new 813 rig on the air. MBU has a new low-drain emergency rig. FZO has a vertical on 75 meters and a 40-meter vertical beam. PAR is operating on *Padre I.* with a kite antenna. PBU is building a new shack. BYI has a 40-meter beam which is a pair of 40-meter dipoles fed 135° out of phase. GLA has an HT-9 on the air. Mary Ann reports the GCARC club house is coming along FB. YDO is spraying it. OGG is giving code lessons. AUN is looking for a pair of 813s. VUS is putting up a vertical for his 813. Gateley is now WN5HWS. Devaney has been racking up a lot of DX with a new ground plane. BPF also is doing FB with DX. DJD is decorating the club walls with QSL cards. OGG is custodian and trustee of the club transmitter. URU has been elected to the board of directors of the HARC. FJF, recently in Washington, passes along 73 from Mr. and Mrs. George Ashenden, formerly of the F.C.C. office in Houston. JQ made all-40-meter c.w. WAS. IUY is operating mobile. The HARC is conducting a drive to raise funds for a new club house. Traffic: W5MN 1089.

NEW MEXICO — SCM, G. Merton Sayre, *W5ZU* — SEC: KCW. PAM: BIW. V.H.F. PAM: FPB. RM: JZT. The NMEPN meets on 3838 kc. Tue. and Thurs. at 1800, Sun. at 0730; NM Breakfast Club every morning except Sun. 0700-0900 on 3838 kc.; the NM C.W. Net daily on 3633 kc. at 1900. GEM has taken NCS for NMEPN until BIW gets the big rig back on. On Oct. 9th WBJ, THA, UDM, GEM, EDN, OME, BIW/DRA, and 1RII/5 helped out with "Seaborn Collins Day" at Las Cruces. The Tularosa Valley ARC's new officers are JMM, pres.; DVA, vice-pres.; FWV, secy.-treas.; ORP, program ch.; DGR, station mgr.; Lou Oliver, pub. mgr. The Caravan Club is very active in the Albuquerque Area. SUC won the award for the most outstanding Junior Amateur in the West Gulf Division at the Kerrville Convention. RFF won the V.H.F. Award for New Mexico in West Gulf competition, AYU in Texas, and SCX in Oklahoma. VWU has worked 7VMP in Phoenix on 2-meter c.w., and has been copying meteor scatter from 4HHK. He now has 32-element 2-meter beam operating. FAG also copies VMP. HZC, HZG, HZH, and HZP are new Novices in Albuquerque. In the Sept. 16-17 F.M.T. the following average errors in parts per million were made: QHK 5.7; BIH 13.0; GRI 40.3. This qualifies them as Class I Observers. Ruidoso in 1956! Traffic: W5ZU 115, WPA 40, AQQ 35, HJF 33, BXP 13, ZSL 10, GEM 7, WBC 6, CEE 5, QR 5, UTS 5, ZGG 5.

CANADIAN DIVISION

MARITIME — SCM, Douglas C. Johnson, VE1OM — Asst. SCM: Fritz A. Webb, 1DB. SEC: RR. PAMs: VE1OC, VO2AW, VO6N. ECs: VE1DQ, VO2G, VO6U. RM: VO6X. New appointees are VE1HJ as RM, W7SNR/VO6 as OPS. HJ reports formation of the Maritime Provinces C.W. Net (MPN) which meets on 3570 kc. daily except Fri. and Sun. at 7:15 P.M. AST. Give this net your full support. We regret the passing of FJ. Back home to the Halifax Area are ex-VE1EP (VO6EP) and ex-VE1HT. OC is active on 14- and 21-Mc. 'phone. PB is signing portable VO2 from Torbay. A recent visitor to Halifax was VE6HM. During Fire Prevention Week FRAC members set up club station VE1ND for exhibit and operated 75 meters. EC VO2G reports 7 AREC members in the Gander Area and hopes for a permanent club station set-up soon. VO2JH is rebuilding the station, including the winding of his own power transformers. W4KVM/VO6 is active on all bands. W1UBW/VO6 transmits Official Bulletins regularly. VO6N is getting good results with 4-65A final. VO6X is QRL with bartending. New calls at Goose are VO6Q and VO6AB. Traffic: (Oct.) VO6N 409, VE1FQ 176, VO6U 135, VO6AH 59, VO6S 51, VE1UT 39, VE1ME 28, VE1OM 22, VE1OC 18, VE1HJ 12, W4KVM/VO6 7, VO6X 5, VE1DB 1. (Sept.) W4KVM/VO6 5.

ONTARIO — SCM, G. Eric Farquhar, VE3IA — Thanks are extended to all hams who assisted in emergency work during Hurricane Hazel. NG and NO are this section's

(*Continued on page 118*)

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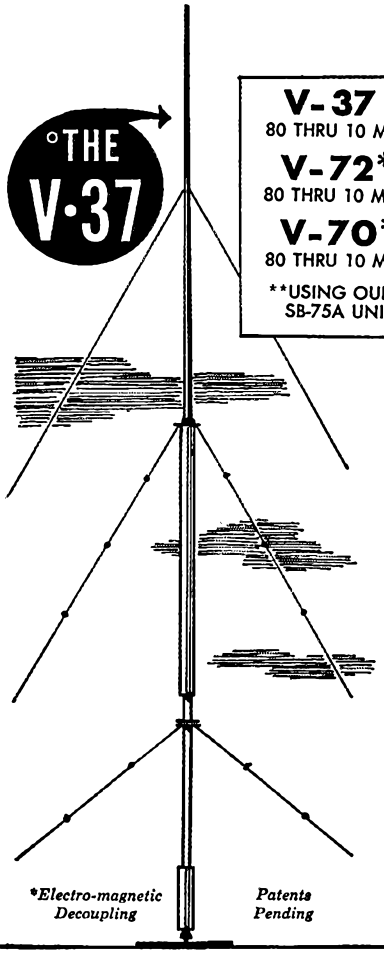

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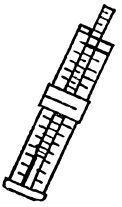

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latest members of the Brass Pounders League. DFE gave his antenna system its annual pre-winter overhaul. AEH and BMY have completed mobile installations. DRE has an antenna rotor. AXZ, at Carmat, operates a Mark Nineteen set on batteries. DLN is trying hard for Class A. AIG, who visited VE2FL and OB recently, hopes to be working mobile soon. There was an uplift in 10-meter activity in October. The Hamilton Emergency Radio Corps gave fine demonstrations at home and school association of the Prince Philip School. BSW covered 3300 miles on his vacation trip to the Deep South. NN gets good reports on 10-meter f.m. mobile. The Quinte Club held a successful auction. VZ, manager of OSN, which operates nightly on 3535 kc., solicits your traffic. AJR contacted W8RP/VE3, who was mobiling in the Windsor Area and piloted him and his family right to her festive board. Up Kapuskasing way AVS has formed a northern net in an effort to provide coverage to northern Ontario and Quebec and to provide traffic-handling experience for amateurs situated in the Bush Country. The Net operates twice weekly at 1915 EST Mon. on 3680-kc. c.w., and Wed. on 3755-kc. 'phone. Newly-elected officials of the West Side Radio Club of Toronto are AYO, pres.; IZ, vice-pres.; AIB, secy. At the helm of the Mohawk Radio Assn. we find CC, pres.; DQU, vice-pres.; BLT, secy. This club has a fine 2-meter mobile program well under way. The Hamilton Amateur Radio Club officers are CJM, pres.; IQ, vice-pres.; DFE, secy. BNQ is editor of the club's monthly bulletin. Traffic: VE3NG 260, NO 220, BUR 129, BJV 126, AJR 113, VZ 94, TM 87, ATR 82, GI 82, AUU 73, DQX 61, AOE 45, CP 37, DFE 14, AVS 5.

QUEBEC — SCM, Gordon A. Lynn, VE2GL — WW has five-element beams on both 20 and 15 meters, also a six-element beam on 10 meters, and placed guys on the supporting mast after Hurricane Hazel! JR has 120 watts on 20-meter 'phone with a two-element beam. PZ has 500 watts 'phone on 20 meters. APH is using three-element beam on 20-meter c.w. AAO took part in the Frequency Measuring Tests with gratifying results. EC reports with regret the death of XV. VE1YW now is VE2ANK. AM and VA are newcomers in Victoriaville. AUH is on 3.7 Mc. from Forestville. ACS, LE, and AME are now operating VE2CL, the club station at Laval University. KG has completed walkie-talkie and gave it a workout during the C.D. Test and is converting the home rig from 814 to 833A. PL reports formation of the Northland Net on 3755 kc. at 1915 hours Wed. with 13 reporting stations, all members of AREC. ZZ visited several of the boys in Trois Rivieres. AON has flea power on 75 meters. ADK has had the call changed to IQ. UQ, formerly VE3DPG, has Command transmitters on 80, 75, and 40 meters with 1155 receiver. II again is active with battery-operated equipment from his summer place at Wallis Lake, with 175 watts c.w. on 80 and 40 meters and Elmac AF-67 on 'phone with S-76 and NC-240D receivers from Sherbrooke. AGG now has the big rig operating from Drummondville on both c.w. and 'phone. CP has been appointed alternate PQN net control and EAN liaison TRN Wed. DR reports conditions poor with net work difficult. Traffic: (Oct.) VE2DR 104, GL 32, EC 25, ATQ 10, FL 9. (Sept.) VE2EC 21.

ALBERTA — SCM, Sydney T. Jones, VE6MJ — XG has been appointed Route Manager and is in the process of organizing a new net to be known as the Pipe Line Net on a frequency of 3620 kc. This net meets daily except Sun. at 1930 hours, and will have outlets to OSN, WSN, RN7/VE7, and the Polar Net. Harry is interested in hearing from all who may wish to take part in this net activity. AL is a new ORS. OS is a new OBS. HM has returned from a visit to Halifax. A new radio club has been formed at Coaldale with AM, pres.; CK, vice-pres.; and TS, secy.-treas. WC reports he will have to rebuild to get away from TVI. The Northern Alberta Radio Club has code classes under way on 3687 kc. on Mon., Wed., and Fri. at 1930. Comments regarding reception would be appreciated. Calls of the code practice stations are 6CE, 6WR, 6YP, and 6ZR. Your SCM will welcome applications for any of the ARRL appointments. Emergency Coördinators are needed in all the larger centers in Alberta. Traffic: VE6HM 47, OD 22, WC 8, YE 8, MJ 7.

BRITISH COLUMBIA — SCM, Peter McIntyre, VE7JT — Congratulations to ASR, who was nominated by the W group of RN7 to take over the managership of the RN7 traffic net. As he has accepted, your coöperation with Whitey would be appreciated by him. Also congrats to AV upon winning the BCARA Trophy Cup. Denny Readville has been untiring in his efforts in amateur affairs and has been president of the BCARA for three terms. Both he and his capable executive have just been reëlected for another term. Others who had been nominated for the BCARA Trophy were FY, QC, JB, US, and XW, all of whom have contributed to the betterment of amateur radio in one form or another. The thanks of the British Columbia amateurs is extended to them for the work they have done in their individual fields for amateur radio. A new revised edition of the *Amateur Radio Telephone Directory* is being revised and brought up to date as soon as possible and the listings will be as of the latest DOT address listing, so if any errors in QTHs are made you didn't get your change of address in soon enough for the "Book."

(Continued on page 114)

AQS and his XYL have left for the Barbadoes. The Island seems to be having a surge of mobilitis, with more reports of fellows going mobile. The interior gang wants to start a 2-meter net. Anybody want to start the ball rolling? Traffic: VE7TF 118, QC 70, DH 39, KL 27, ZV 19.

MANITOBA — SCM, Leonard E. Cuff, VE4LC — NW has been doing some experimenting recently and finds that using a lamp bulb as a dummy load is just the thing to work up to 50 miles on 75 meters. GY, the Air Force Club station, has been heard again on the 75-meter band putting out a big signal. AY, at Haskett, is being heard again after a long lay-off with a very good signal. YR has moved to a new home in the same locality. AP is reported to have been visiting AI at Binscarth. AN is a new one on 75-meter 'phone. KG went hunting in the Dauphin Area but did not report what he was hunting or what success he had. HL paid one of his periodic visits to Winnipeg and informs us that he has new antennas on 80, 40, and 20 meters. AI is a frequent visitor to Winnipeg these days. The Manitoba C.W. Net is in full swing on 3700 kc. daily at 1900 CST. Anyone interested in the c.w. net, please contact HL, the RM. The NCSs for this Net are AZ, KL, and KN. Those of you who wish to keep up to date with the ARRL Official Bulletins should tune in to JM, who is an OBS and may be heard at the following times on 3760 kc.: Mon., Wed., and Fri. at 1830 CST., and Sun., Tues. and Thurs. at 1230 noon. Traffic: VE4AI 33, GE 19, EF 17, HL 14, KG 7, RB 5, GB 4, QD 4, NW 3, JW 2, MK 2, MO 2, WS 2.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR — CW reports from Regina that local AREC members had a good workout in the Oct. 9-10 Simulated Emergency Test. JK, JW, GH, RH, HA, DM, DP, ZZ, and CW, as control station, made 112 points. Besides the home stations 1 mobile and 2 walkie-talkies were used. New officers of the Regina Club are CW, pres.; TS, vice-pres.; HA, secy. The Club visited the local TV station and gained considerable knowledge but no equipment. OC is on a new shift and should find it better for chasing the rare ones. EO is now on 'phone and is a new member of the 'phone net. HJ has moved to Lloydminster; GK also is a new ham there. JZ is new at Pelican Narrows. 5RE did better than the VE6s, getting 100 per cent check-in on their 'phone net. TH is in VE3-Land for a few months. RC took unto himself an XYL. FY says amateur frequencies are poor at Uranium City. YF is heard occasionally between home and school meetings. DN advises that activities at Prince Albert are at a low ebb. JO and DA work 21 Mc. with good results. The XYL of MV presented him with a young YL. Traffic: (Oct.) VE5HR 28, DS 22, CW 17, DR 14, FG 13, RE 12, BF 10, GC 10, BZ 8, JN 8, GX 6, LU 6, GO 2, KG 2, QL 2. (Sept.) VE5DS 29.

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

W1GWA, Thomas J. O'Brien, South Windham, Me.
W2JQI, Harry C. Condon, Albany, N. Y.
W2VDM, Harry Green, White Plains, N. Y.
W2VZ, Samuel Woodworth, Jordan, N. Y.
ex-W3AWT, A. A. DeVine, Palo Alto, Calif.
W3ME, Charles Robert Sherrer, Baltimore, Md.
W4EYI, Wilton C. Spence, St. Petersburg, Fla.
W4WHG, L. O. DeLonchaw, jr., Bellflower, Calif.
W6FTH, William Race, Sherman Oaks, Calif.
K6GLO, Thomas T. McCoy, Oakland, Calif.
W6GPN, Richard G. Cowell, Sacramento, Calif.
W6LLJ, Damon D. Barrett, San Francisco, Calif.
ex-W6YEZ, John C. Leo, San Mateo, Calif.
W7KTD (ex-W6MBN), Harry J. Henke, Portland, Ore.
W8DWB/W8KTD, Ralph H. Babcock, Cedar, Mich.
W8FWK, Virgil E. Farrell, Hamilton, Ohio
W8JRS, Lawrence T. Johns, Aurora, Ohio
W9MDO, Dr. Worrall S. Kelly, Chicago, Ill.
W9PZM, J. Michael Murphy, West Lafayette, Ind.
WØBDO, Bud Crawford, Broken Bow, Nebr.
WØCPA, Graham C. Dodge, Denver, Colo.
VE2LP, Luc Bernier, Ville Lemoyne, Que.
VE3DCE, Russell Sudden, St. Catharines, Ont.
EI9T, Rev. Fr. P. Macartney, Dublin, Eire
PZ1AL, Eugene Van Leeuwaarde, Paramaribo, Surinam

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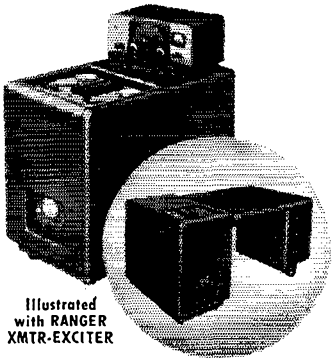
- Requires 210-240v., 50-60 cy., 1-phase.
- Thoroughly TVI-suppressed.
- Entire compact chassis unit slides out of cabinet on rollers for instant and complete accessibility.
- Engineered throughout for safe operation. Complete overload protection with electrical reset switch and fuses located on power control panel.



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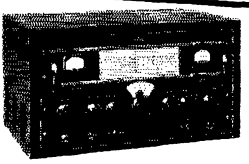

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Auroral Propagation

(Continued from page 15)

visible portion of such formations, but one might expect that a good returned signal could be obtained from the ends of the arc which appear near the horizon. The rotary Yagi showed, however, no signals coming from those directions. This is another case of no signal coming from the brightest part of the visible aurora. This is in agreement with Figs. 7 and 8, showing that signals are rarely observed in the east or the west, but only in the northern quadrant.

V.h.f. auroral radar echoes have been studied at several other places in the northern hemisphere, where the above-described large ranges and restrictions of the echoes to the north have also been found. At most locations, however, the visible aurora has occurred predominantly at large distances from the observing site, and so the radar results were to be expected. For example, at Ithaca, New York, most visible aurora is at low angles in the north. Overhead visible aurora is seen only for a total of a few hours over the whole year, and southern aurora is even more difficult to study. For high latitudes, with generous quantities of aurora, the experimental observations require some unusual process to be involved which will limit the echoes to the ranges and azimuths that are found.

An Explanation

Supported by these observations, Booker, Gartlein, and Nichols[11] at Cornell have enlarged upon a theory by Moore[12] which considers the auroral ionization to be composed of numerous streaks of ionization running parallel to, or concurrent with, visible auroral rays. Aurora is believed to be caused by charged particles shot from the sun which are able to enter the earth's atmosphere only if they follow the lines of the earth's magnetic field. Indeed, auroral rays are sloped slightly with respect to your horizon, because they are following the lines of the earth's magnetism. A corona (overhead star-shaped formation) is a bundle of such rays viewed up from the bottom, the center appearing slightly to the south. Now meteor trail ionization has been previously studied and has been found to give v.h.f. radio reflections best when looking perpendicular to the trail.[13] The perpendicular requirement becomes more severe as one uses higher frequencies. The strength of the reflected signal fluctuates during formation and during wind distortions of the meteor trail, because the contributions to the total signal from the different parts of the trail interfere with each other.[14] The Booker, Gartlein, and Nichols theory im-

(Continued on page 118)

[11] Booker, Gartlein, and Nichols (to be published). Presented at URSI-IRE Meeting at Ottawa, Canada, October, 1953.

[12] Moore, *Journal of Geophysical Research*, *56*, p. 97 (1951).

[13] Lovell, Banwell, and Clegg, monthly notices of the Royal Astronomical Society, *107*, p. 164 (1947).

[14] Manning, Villard, and Peterson, *Journal of Geophysical Research*, *57*, p. 387 (1952).

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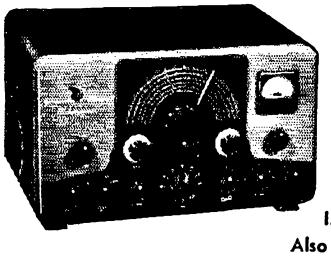

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Collins 32V3 .....775.00	Central 20A wired..249.50	Hallicrafters SX96..249.95
HQ140X 264.50	Morrow 5BR-1..... 74.95	Hallicrafters SX71..249.95
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agines the auroral ionization to be composed of hundreds of such "meteor" trails. This would explain the observed fast-fading or growl of the aurorally-propagated signal. It would also require that the radio-ray paths be nearly perpendicular to the trails, or in this case, the earth's magnetic field. (See Fig. 10.)

Calculations have been made by Chapman [15] for locating the feet of perpendicular lines from the receiver and transmitter to the lines of the earth's magnetic field. These calculations relate the height above the earth, the range of expected echoes, the angle of elevation of the radio path, and the latitude of the echo point for a given magnetic latitude of the observing site. Theoretically, auroral echoes should be limited to northerly directions in the northern hemisphere and should occur only at large distances having low angles of elevation. This, as shown in earlier paragraphs, is verified by experiment.

Since auroral reflections can come only from low angles of elevation with respect to the horizon, the amateur should design his antenna to favor these directions. The antenna should be very sharp in the vertical plane and pointed at the horizon. Thus, vertical stacking is highly recommended. Low-angle radiation requires that the antenna be high above the surrounding terrain and emphasizes the importance of a good QTH and a tall tower. The perpendicularity theory would suggest a greater spread in azimuth than in the elevation angle, and indeed, simultaneous echoes have been obtained from separated directions in the north. It would, therefore, be wise to leave the horizontal pattern as broad as 30 degrees or so, meaning that the antenna should not be wider than about 4 dipoles. Frequently, during violent aurora, there is difficulty in finding the direction that gives maximum signal. It is tempting to think that such behavior is due to signals arriving from high angles of elevation, where the auroral light appears brightest, but this explanation is probably false. The perpendicularity theory may explain why aurora seen visually does not give a signal because of its position. (In addition, it is felt by some that active ray forms will give stronger signal than quiet arc forms.) In general, sufficient low-angle radiation is a more important aid in getting strong auroral signals than was previously expected.

Acknowledgements

A large vote of thanks is due the many amateurs that have sent in auroral reports via Tilton and *QST*. Here is a further example of amateur radio supplying research information difficult to obtain in any other way. Assistance has been rendered by Ken Bowles, W2MTU, and Ed Tilton, W1HDQ. Financial aid has been provided by the U. S. Army Signal Corps at Cornell and the Geophysical Institute at the University of Alaska.

[15] Chapman, *Journal of Atmospheric and Terrestrial Physics*, 3, pp. 1–29 (1952); see also *Journal of Geophysical Research*, 58, September, pp. 347–352 (1953).

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Relocation of applicant must not cause disruption of an urgent military project.

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HUGHES

RESEARCH AND DEVELOPMENT LABORATORIES

Culver City, Los Angeles County, California

Mobile Converter

(Continued from page 20)

The r.f. amplifier may now be lined up, band by band, by tuning in a signal from a generator or the antenna, and then adjusting the amplifier grid and plate coils for maximum response. The grid-coil slug should be adjusted with signals near the high-frequency end of the band, and with C_3 set near minimum capacitance. The antenna coupling should then be adjusted to the point where a slight peak in signal or background noise is heard within the range of C_3.

At 3.5 and 7 Mc., it is important that the receiver used with the converter be well shielded if broadcast-band interference is to be avoided. Most car receivers are well shielded, but some of the less-expensive communications receivers may not be. However, the converter will be most useful to a communications receiver at the higher frequencies where feed-through will usually be negligible. When interference from local broadcasting stations is experienced, the slug of L_1 should be adjusted to minimize the strongest b.c. signal toward the low-frequency end of the b.c. band, while the slug of L_2 should be likewise adjusted for the strongest signal toward the high-frequency end of the band. These two adjustments will usually serve to attenuate most other b.c. signals between the two extremes of frequency. However, other combinations may be advisable, depending on the frequencies of the local stations. In most cases, it should be possible to wash out b.c. interference, by adjustment of these two traps to the point where it is no longer bothersome.

In some parts of the country, the second harmonic of the 2900-kc. crystal will beat with WWV's 5-Mc. signal, so that it will be heard when the b.c. receiver is tuned to 800 kc. (or signal frequency of 3700 kc.). This can be used as a check point for the frequency alignment of the b.c. receiver.

With the crystal frequency known, ham-band frequencies can be determined quite accurately (if the b.c. calibration is correct) by simply adding the h.f.-oscillator frequency, given in the table, to the reading of the b.c. dial.

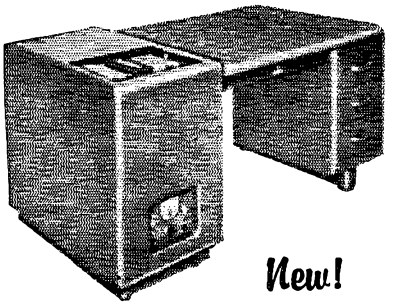
Measurements with a signal generator showed that recognizable audio output could be obtained with a signal input as low as 0.1 μv. Most of the background noise disappeared with the input signal raised to 0.3 μv., and solid reception was possible with an input signal of about 0.5 μv.

The cost of a complete set of components for this converter will run about $65.00. The crystal and set of three coils required for each band runs about $7.65, so that the cost will be reduced by this amount for each band that is not needed.

Strays

TVI and BCI we're all familiar with, but K2EPD has WPI. Everytime he fires up the rig, his mother complains she can hear him in the *water pipes!*

"Might As Well Drop Me Off At Walter Ashe"



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JOHNSON VIKING KILOWATT POWER AMPLIFIER For CW, AM, and SSB. See Johnson Viking ad elsewhere in this issue for full particulars. Get your deal working now for early delivery.

HALLICRAFTERS SX-96.
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Whether you visit us personally or resort to other means of contact, you'll find this friendly house of service "right there" with its fabulous money-saving "Surprise" trade-in allowances on your used (factory-built) test and communication equipment. For the deal of your life, drop in, wire, write, phone or use handy coupon—today!

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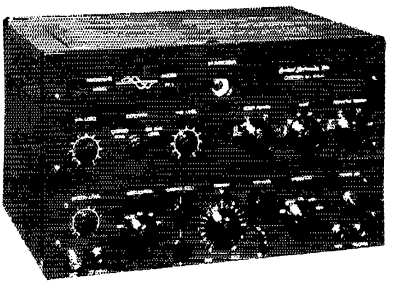

MODEL 20A EXCITER KIT
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Cubical Quad

(Continued from page 23)

loop are at equal distances from the center. A permanent joint can then be made between antenna wire and pole by wrapping several turns of bare copper wire tightly around the pole where the antenna touches it, threading the ends of this bare wire through small holes drilled in the bamboo pole, and then soldering together as shown in Fig. 3. Use a good grade antenna wire so it will not stretch later.

The main boom consists of a 12-foot piece of 2 × 2 pine with another 6-foot piece used as a center brace to prevent the ends of the boom from dropping. This boom is mounted at its center by bolting it to a piece of angle iron welded to the top of the rotator shaft. A lower boom composed of a 12-foot piece of 1 × 2 pine is mounted by means of a small bracket 8 feet 4½ inches down the rotator shaft parallel to and in the same plane as the main boom. The completed radiator and reflector are fastened to the ends of the main boom by means of the mounting brackets, and the center insulators for the radiator and reflector are fastened to the ends of the lower boom which also serves to support the feed line and the reflector stub. This lower boom is probably unnecessary but it does make the beam neater and stronger.

The radiator and reflector are made exactly the same. Small insulators are placed in the center of the bottom side of both reflector and radiator and the stub is fastened to the one and the feed line to the other. Seventy-two ohm coax will give a very close match, but 52-ohm coax has been used here with very good results, even though there is some mismatch. The stub for the reflector is 6 feet long and spaced 3 inches. A very simple sliding short can be made by putting a Fahnestock clip on each wire of the stub and then soldering a wire between these clips. This "short" can be easily slid along the stub from the top of the antenna tower or pole by means of a small stick. Remember to use bare cooper wire for the stub or the sliding short will not work. After the beam is in place atop the tower, the reflector may be tuned by sliding the shorting bar up and down the stub until a minimum S-meter reading is obtained from a local ham located off the back of the beam. That is all there is to it; you are now tuned on the nose and ready for business.

Antenna articles always seem to contain a paragraph or two telling about the results achieved with the antenna under consideration, usually in very glowing terms. This article is no exception. This beam has consistently given good results, DX reports averaging about 1 "S" point higher than on the old three-element job, and if the band is open at all it is unusual to call CQ DX and not receive at least one reply. The power usually runs 125 watts here. This beam is not a cure-all for your DX and QRM problems, but it will certainly give the three-element boys a good run for their money. Put one up — you'll like it.

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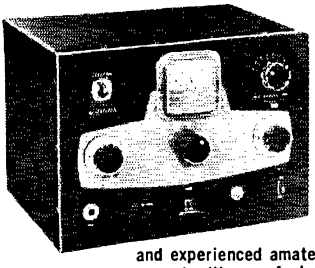

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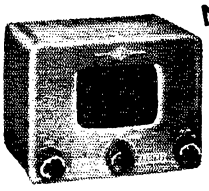

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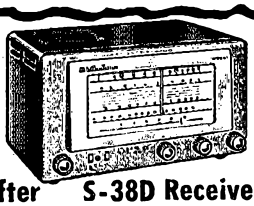

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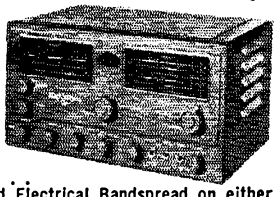

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Receiver Performance

(*Continued from page 27*)

extremely large signal-handling capabilities required. Several tubes recently announced show some promise, but until they are proven the receiver designers laughingly suggest a 4-125A or similar for the receiver r.f. stage.

To prove cross-modulation when operating "on the air," the received signal can be reduced with a 20-db. resistive attenuator. This will reduce an S9 signal to about S6, which is still readable, but at the same time drop a 1-volt signal, due to that kilowatt next door, to 0.1 volt. If the splatter disappears when the attenuator is placed in the antenna lead, then the difficulty is in the receiver. Remember not all modulation splatter is in the receiver. A few inconsiderate amateurs are guilty of severe overmodulation. A more simple test is to remove the normal antenna and connect any short piece of wire that will reduce the desired signal to a just readable level, and then note the presence or absence of splatter. Either test is acceptable for tracing the source of this type of interference.

If you are not looking for weak signals, either of the above methods for reducing input signal level can help receiver cross-modulation. A separate r.f. gain control (variable cathode resistor) is also sometimes helpful in reducing the cross-modulation that occurs in the mixers.

This receiver discussion has been handled in general terms. A later article will give some hints as to how the 75A-3 can be adapted best to serve the amateur with special interests like DX work on one hand or just local rag-chewing on the other.

I would like to express my appreciation to the many Collins engineers who assisted in this discussion of receiver performance.

Appendix

So-called thermal noise is generated in any resistance whether it is the antenna resistance, the parallel tuned impedance of the r.f. stage grid circuit, or an actual resistor. Noise power is proportional to absolute temperature, bandwidth, and resistance. Noise power is given by

$$N = \frac{E_n^2}{R} = \frac{4KT\triangle f R_{eq}}{R}$$

where

K = Boltzman's constant = 1.38×10^{-23};
T = Absolute temperature, 300° at room temperature;
$\triangle f$ = Bandwidth in cycles;
R_{eq} = Noise resistance of the receiver plus the dummy antenna; and
R = Sum of the receiver input resistance plus the dummy antenna resistance.

Signal power is given by $S = \frac{(mE_c)^2}{R}$

where m is the percentage of modulation divided by 100 — sometimes called modulation factor;

E_c is carrier voltage of receiver signal; and R is as above.

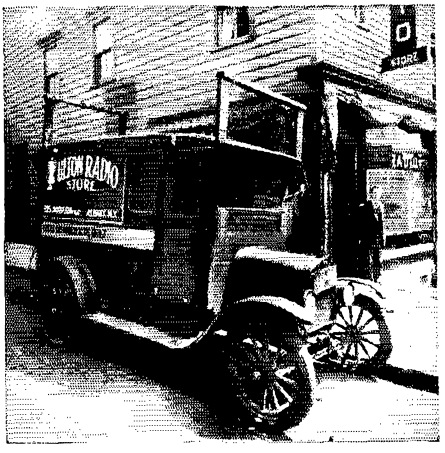
A perfect receiver is one which has no noise due to coupling circuit, r.f. stage shot noise, mixer noise, or any other noise contribution except that of thermal noise given by the above expression.

$$\text{Noise figure} = N.F. = \frac{S/N \text{ theoretically perfect receiver}}{S/N \text{ actual receiver}}$$

(*Continued on page 126*)

Gratitude is a debt I intend to repay.

Uncledave



← Then

Now →

For the past 35 years radio amateurs throughout the world have been purchasing equipment and supplies from me. Their friendship and loyalty have been the determining factors in our success. For this we are grateful and it is time that we made an effort to express our appreciation in a material way.

Many amateur radio clubs need financial aid. Many others can use extra funds if these funds can be obtained without assessing their members. We have a plan which will greatly assist all amateur radio clubs.

For every order received until March 1, 1955, we will send our check for 15% of your order — to your radio club for deposit in their treasury. When you place your order, be sure to include the name and address of your club and treasurer.

My best wishes for a healthy, happy and prosperous New Year.

73 — CUL

Uncledave, W2APF

As the actual receiver approaches theoretical performance, the above expression approaches 1.0, or 0 db. If the receiver noise is zero except for thermal noise across R_{eq}, and the antenna matches the receiver input resistance, then $R_{eq} = 2R$ and the noise figure is 2.0 (3 db.), because the noise power is doubled over that of the ideal receiver.

Example 1:

Assume a perfect receiver of 6-kc. bandwidth and a 100-ohm antenna with no input circuit losses or set noise. What is the required input level at $m = 0.3$ for a signal-plus-noise-to-noise ratio of 10 db.?

$$\text{If } \frac{S+N}{N} = 10, \frac{S}{N} = 9$$

$$\frac{S}{N} = \frac{(mE_c)^2}{4\ KT\ \Delta\ \text{ant}\ fR} = 9$$

$E_c = 0.98$ microvolts.

If the receiver is matched to the antenna (which should be done in the practical case), then the noise is 3 db. greater and, to preserve the same signal-to-noise ratio, the signal must increase 3 db.

$$E_c = 0.98 \times 1.4 = 1.39 \text{ microvolts.}$$

Example 2:

Suppose the receiver of Example 1 was found to have a signal-plus-noise-to-noise ratio of 10 db. with an input of 1.8 microvolts in a matched case. What is the noise figure?

From Example 1: 1.39×10^{-6} volts for $N.F. = 3$ db.

$$N.F. = 3 + 20 \log \frac{1.8}{1.39} = 5.2 \text{ db.}$$

Grounded-Grid

(Continued from page 36)

near cut-off. An oscilloscope is necessary for proper adjustment. With the 'scope connected to the r.f. output of the linear the loading, bias and excitation should be adjusted until the waveshape of a 400-cycle tone is a replica of the same tone being applied to the driver. When modulation is removed the amplifier input should not vary and the height of the r.f. envelope on the 'scope should be reduced to half the full-modulated size. For adjustment with single-sideband exciters refer to the 1954 ARRL *Handbook*.

A copper plated, expanded steel shield was used over the top of the chassis and no TVI complaints have been filed.

Don't forget that every point in this circuit contains potentially dangerous r.f. or d.c. power. Pull out the wall plug before monkeying with the works.

The final test is an 8 P.M. CQ on forty. The blast of QRM answering on your frequency is very satisfactory!

FEED-BACK

The following errors have been detected in Burns, "Sideband Filters Using Crystals," in the November, 1954, issue:

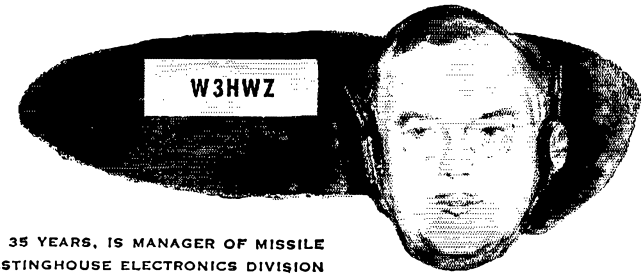
Page 39, reference 14, should be *Electrical Communications*, December, 1949.

Page 148, seven lines from the bottom of the column, C_c should appear instead of one of the C_{DS}.

Page 150, third line, replace C_c with C_D.

Page 150, f_{L2C2} and f_{L3C3} in the equations of Appendix I should each have an exponent "2." In other words, the correct values will be the square roots of those determined by the formulae as shown.

CQ



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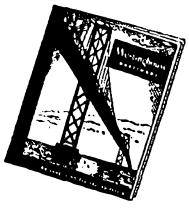

YOU CAN BE SURE...IF IT'S

Westinghouse

Noise Reduction

(*Continued from page 37*)

really big advantage of the traps is that they do not interfere with motor performance. The decreased motor performance will bother the amateur who loves his car, as he does his ham rig. Here in the Cumberland Mountains, the loss in power on grades when suppressors were used was distinctly noticeable.

The traps are easily constructed, and the mounting problem solved, by drilling through standard commercial suppressors to open their resistance (not strictly necessary, but it will increase the Q of the circuit), and then winding the coils around them. If no grid-dipper is available, 7 turns of No. 20 wire, close-wound, tuned with a 50-$\mu\mu$f. disk ceramic condenser, will be effective over the entire ten- and eleven-meter bands. If only one-band operation is desired, these traps are well worth the effort spent in constructing them. Similar traps should effectively solve your noise problems in circuits where simple by-passing fails.

In case anyone is worried about it, removal of the suppressors did not result in an increase in noise on the b.c. band.

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W1TS	D. H. Mix, "don"
W1UED	Perry Williams, "pw"
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W1WPO	R. L. White, "bob"
W1WPR	C. R. Bender, "cr"
W1WRJ	A. Murray Rommé, "mr"
W1YYM	Ellen White, "ln"
W1ZCS	Marie L. Page, "rie"
W1ZDP	Phil Simmons, "phil"
W1ZIB	Ann Furr, "ann"
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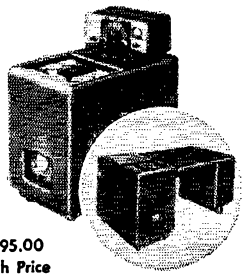

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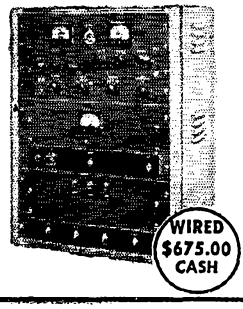

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Happenings

(*Continued from page 49*)

Des Moines, Iowa: Sometime in January and April.
Detroit, Mich., 1029 Federal Bldg.: Wednesday and Friday.
El Paso, Texas: March 29.
Fort Wayne, Ind.: Sometime in February and May.
Fresno, Calif.: March 18, June 17.
Grand Rapids, Mich.: Sometime in January and April.
Hartford, Conn.: March 8.
Hilo, T. H.: April 5.
Honolulu, T. H., 502 Federal Bldg.: Monday through Friday.
Houston, Texas, 324 U. S. Appraisers Bldg.: Tuesday and Friday.
Indianapolis, Ind.: Sometime in February and May.
Jackson, Miss.: March 9, June 8.
Jacksonville, Fla.: April 16.
Juneau, Alaska, 7 Shattuck Bldg.: By appointment.
Kansas City, Mo., 3100 Federal Office Bldg.: Friday.
Klamath Falls, Oregon: Sometime in May.
Knoxville, Tenn.: March 23, June 22.
Lihue, T. H.: April 12.
Little Rock, Ark.: January 12, April 13.
Los Angeles, 539 U. S. Post Office and Courthouse: Wednesday, 9 A.M. and 1 P.M.
Louisville, Kentucky: Sometime in May.
Manchester, N. H.: June 8.
Marquette, Mich.: May 11, 10 A.M.
Memphis, Tenn.: January 7, April 7.
Miami, Fla., 312 Federal Bldg.: Thursday.
Milwaukee, Wisconsin: Sometime in January and April.
Mobile, Ala., 419 U. S. Courthouse and Customhouse: Wednesday and by appointment.
Nashville, Tenn.: February 2, May 4.
New Orleans, La., 400 Audubon Bldg.: Monday through Friday except Monday through Wednesday only at 8:30 A.M. when code test required.
New York, N. Y., 748 Federal Bldg., 641 Washington St.: Monday through Friday.
Norfolk, Va., 402 Federal Bldg.: Monday through Friday except Friday only when code test required.
Oklahoma City, Okla.: January 13–14, April 14–15.
Omaha, Nebr.: Sometime in January and April.
Philadelphia, Pa., 1005 U. S. Customhouse: Monday through Friday, 8:30 A.M. to 2 P.M.
Phoenix, Ariz.: Sometime in January and April.
Pittsburgh, Pa.: Sometime in February and May.
Portland, Maine: April 12.
Portland, Ore., 433 U. S. Courthouse: Friday, 8:30 A.M. for 20- and 13-w.p.m. code tests.
Rapid City, S. D.: Sometime in May.
Roanoke, Va.: April 2.
St. Louis, Mo.: Sometime in February and May.
St. Paul, Minn., 208 Federal Courts Bldg.: Friday.
Salt Lake City, Utah: March 18, June 17.
San Antonio, Texas: February 3, May 5.
San Diego, Calif., 15-C U. S. Customhouse: By appointment.
San Francisco, Calif., 323-A Customhouse: Friday.
San Juan, P. R., 323 Federal Bldg.: Thursday, and Monday through Friday at 8 A.M. if no code test required.
Savannah, Ga., 214 P. O. Bldg.: By appointment.
Schenectady, N. Y.: March 16–17, June 15–16, 9 A.M. and 1 P.M.
Seattle, Wash., 802 Federal Office Bldg.: Friday.
Sioux Falls, S. D.: March 9, June 8, 10 A.M.
Spokane, Wash.: Sometime in May.
Springfield, Mo.: Sometime in June.
Syracuse, N. Y.: Sometime in January and April.
Tampa, Fla., 410 P. O. Bldg.: By appointment.
Tulsa, Okla.: January 17–18, April 18–19.
Tucson, Ariz.: Sometime in April.
Wailuku, T. H.: April 8.
Washington, D. C., 415 22nd St., N. W.: Monday through Friday, 8:30 A.M. to 5 P.M.
Wichita, Kansas: Sometime in March.
Williamsport, Penna.: Sometime in March and June.
Wilmington, N. C.: June 4.
Winston-Salem, N. C.: February 5, May 7.

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Lafayette Greatest Tape Buy Ever!

$1.89 per roll plus postage

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Genuine Plastic Base
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NC-88 "World-Master"..... 119.95

CARDWELL UHF CONVERTER SALE!

List ~~42.50~~

Net **13.95** ea.
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Outstanding Value! The Cardwell ES-1 UHF converter covers the entire UHF spectrum—channels 14-83. Has 6AF4 oscillator, 6CB6 IF amplifier and 1N72 crystal diode. Features printed circuit oscillator, high overall gain (3 to 4 times), high sensitivity, constant L/C ratio tuner, 25-1 gear drive. Has AC cord and plug, 3-pos. switch for UHF, VHF and OFF. Handsome wood cabinet 8¼ x 6½ x 3½" with easy reading dial. Shpg. Wt 4½ lbs.

CARDWELL ES-1 Converter—Lots of 3 each.....13.95
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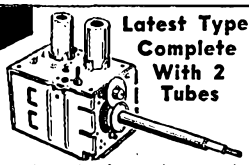
SARKES TARZIAN VHF TUNER



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TL-24—In lots of 3 each..... **4.45**
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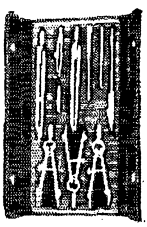

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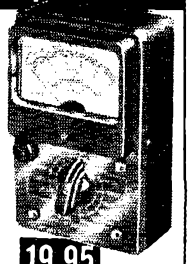
11 Pieces—Fitted Felt-Lined Case

Made in Germany, of heavy brass, nickel plated and polished. Instruments include 5⅛" Compass with pencil and pen points and lengthening bar. 5½" Divider, three 3¾" sidewheel bow dividers with needle point, pen point and pencil point. 5" Ruling pen, extra handle for pen or pencil, capsule with extra leads. Interchangeability of these many parts makes this an exceptionally versatile set. Your money back—if this set is not worth twice our price!

F-13..... Net 2.75

HIGH SENSITIVITY AC-DC MULTITESTER 20,000 ohms per Volt

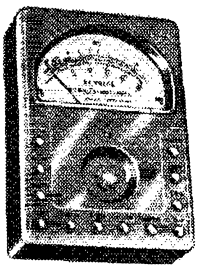


19.95

The new Lafayette High Sensitivity Multitester is a complete instrument (not a kit). Here is an instrument packed with every desirable feature found only in instruments costing twice as much. One of the most sensitive multitesters ever offered. **20,000 ohms per volt DC; 8,000 ohms AC,** having a high sensitivity 45 microamps meter. Full scale AC-DC voltage ranges are 0-10V, 0-50V, 0-250V, 0-500V, 0-1 000V; DC current ranges 50 microamps, 2.5 ma, 25 ma, 250 ma. Resistance: 0-5K ohms, 0-50K ohms, 0-500K and 0-5 megohms. Decibel range: —20 +5 db; +5 +22 db (0 db - 0.775V - 600 ohms). Extreme versatility and accuracy. 1% precision resistors; 5" meter; beautiful plastic front, with metal bottom for ruggedness. Size: 3¾" x 5¾" x 2⅝". Complete with batteries and leads. Shpg. Wt. 4 lbs.

RW-30G ..... NET **19.95**
In lots of 3 **19.25**

NEW POCKET AC-DC VOM MULTITESTER 1,000 ohms per Volt



9.95

This instrument is one of the best buys that Lafayette has ever offered in a Wide Range **AC-DC MULTITESTER.** An ideal portable unit that meets the need for a compact, yet rugged test instrument. Has ease of operation usually **FOUND ONLY IN MORE EXPENSIVE INSTRUMENTS.** Has 1000 ohms/volt sensitivity on both AC or DC. Uses full 3" rectangular meter with large easy to read scale. Uses 1% precision resistors, jeweled D'Arsonval microamp meter movement. Ranges: AC-DC and output volts 0-5, 0-25, 0-250, 0-1000V; DC current 0-1, 0-10, 0-100. MA; Resistance 0-10K and 0-100K ohms. In handsome sturdy bakelite case. Size: 4¾" x 3¼" x 1¾". Supplied Complete with test leads and batteries. A Must for every serviceman, shop, Laboratory or experimenter—and at Lafayette's Price you can afford to own one. Shpg. Wt. 2½ lbs.

MODEL RW-27C—Complete
In Lots of 3 **9.45**
Single, ea. **9.95**

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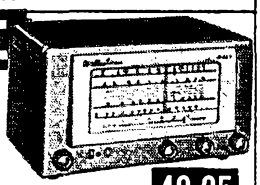

HALLICRAFTERS S-38D — Net **49.95**
220 Volt Adapter Cord for above — Net 2.00

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F-86, 8x30 with case Net 19.95
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PLAINFIELD, N.J.	139 West 2nd St.
BOSTON, MASS.	110 Federal St.

DX Competition

(Continued from page 67)

c.w. section is 18, and contacts made on the same band with the same country after the quota is filled will not count. Thus complete exchanges with 6 stations in one country on one band fill the band quota for that country. The maximum number of points per country per band which may be earned by VE/VO stations *in the c.w. section* is 24, and contacts made on the same band with the same country after the quota is filled will not count. Exchanges with 8 stations in one country on one band are thus permitted Canadian participants. There is *no quota* for stations in the c.w. section *outside* of the U. S. and Canada. There is *no quota* for *any* station in the 'phone section.

11) *Reporting:* Contest work must be reported as shown in the sample form. Each entry must include the signed statement as shown in that example. Contest reports must be mailed no later than April 29, 1955, to be eligible for *QST* listing and awards. All DX Contest reports become the property of the American Radio Relay League. No contest reports can be returned.

12) *Awards:* To document the performance of participants in the Twenty-First ARRL International DX Competition, a full report will be carried in *QST*. In addition, special recognition will be made as follows:

a) A certificate will be awarded to the high scoring single-operator 'phone and to the high-scoring single-operator c.w. entrant in each country (as shown in the ARRL Countries List) and in each of the 73 U. S. and Canadian ARRL sections (see page 6 of this issue) from which valid entries are received. In addition, a certificate will be awarded to the high scoring multiple-operator station in each section or country from which three or more valid multiple-operator entries are received.

b) A suitable certificate will be awarded to the operator making the highest single-operator 'phone score in each ARRL-affiliated club, provided the club secretary submits a listing of a minimum of three 'phone entries by bona fide resident members of such club, and provided further that these scores are confirmed by receipt at ARRL headquarters of the individual contest logs from such members. The highest single-operator c.w. scorer in each club will be awarded a certificate under the same conditions.

c) ARRL will award a gavel to the affiliated club submitting the greatest aggregate 'phone and c.w. score by bona fide resident club members, whether single- or multiple-operator entries, provided such scores are confirmed by receipt at ARRL headquarters of the individual contest logs from such members.

13) *Judges:* All entries will be passed upon by the ARRL Award Committee, whose decisions will be final. The Committee will void or adjust entries as its interpretation of these rules may require.

14) *Disqualifications:* Each participant agrees to observe the contest rules as well as all regulations established for amateur radio in his country. Some examples of grounds for disqualification are: off-frequency operation as confirmed by a single FCC citation or advisory notice or two ARRL accredited Official Observer measurements; low tone reports in logs; working countries on the "banned list[1]" — footnote information applies to U. S. A. amateurs only.

[1] As we go to press, prefixes to be avoided are FI8, PK (except PK7), EP-EQ, HL, HS, 3W8 and XW8.

Strays

Patience, practice and persistence have paid off for W3TOC of Etna, Pa. Licensed as a Novice three years ago, he qualified for his General Class license in November. Suddenly stricken by blindness sixteen years ago, the code was quite an obstacle. Bill isn't resting on his laurels, though — he's now busy helping five blind friends become hams!

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Terrific Trade-Ins—As liberal as anyone in the country . . . and yours may be worth more at Burghardt's. Trade-ins usually cover down payment on your new gear.

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100% Guarantee

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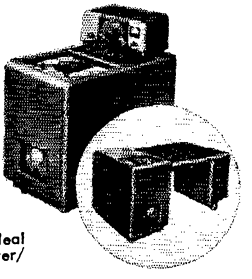
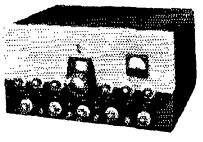


VIKING KILOWATT POWER AMPLIFIER—The new Viking Kilowatt has every conceivable feature for safety, operating convenience, and peak performance. Low power or maximum legal input AM, CW, or SSB may be selected with the flip of a single switch. Tuning is continuous over the range 3.5 to 30 mc. with no coil change necessary. A compact pedestal contains the complete unit, including RF power amplifier, modulator, power supplies, and all control equipment. This unit rolls out of the pedestal, providing complete accessibility to all electrical components for adjustment or maintenance. Excitation requirements are 30 watts RF and 15 watts audio for AM and 10 watts peak for SSB. The Viking "Ranger" transmitter/exciter (shown above) is an ideal RF and audio driver for AM and CW, and the new Viking SSB transmitter/exciter will drive the Viking Kilowatt to full output on SSB.

Viking Kilowatt Power Amplifier—wired, tested, complete with tubes . . . **Only $159.50 down . . . $86.92 per mo. for 18 months.**

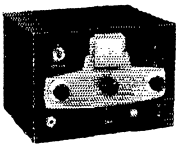
Viking Kilowatt complete with Matching Accessory Desk Top and 3 drawer pedestal . . . **Only $171.88 down . . . $93.65 for 18 months.**



VIKING RANGER—A rugged, compact transmitter—the Ranger may also be used as a flexible exciter unit without modification. As an exciter it will drive any of the popular kilowatt level tubes and provides a high quality speech driver system for high powered modulators. As a transmitter it is a self-contained 75 watt CW or 65 watt phone input unit with 100% AM modulation. 10 through 160 meter amateur bands. Extremely stable, built-in VFO—or may be crystal controlled.

Viking Ranger Kit, less tubes, crystals, key, and mike . . . 18 months for balance. **$17.95 down**

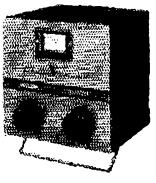
Also available wired and tested, less tubes . . . . . **Only $25.80 down**



VIKING II TRANSMITTER—TVI suppressed. All amateur bands from 10 to 160 meters. 100 watts phone output, 130 watts CW. Instant band-switching—VFO input provision—dual power supplies. All stages metered. Pi-network coupling output amplifier. Self-contained—no plug-in coils. 100% amplitude modulation.

Viking II Transmitter Kit complete with tubes, less crystals, key, and mike . . . **$15.23 for 18 months. $27.95 down**

Also available wired and tested . . . **Only $33.70 down . . . $18.36 for 18 months.**



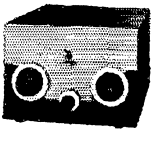
VIKING ADVENTURER—Big transmitter features in a new, compact CW kit. Single-knob bandswitching 80 through 10 meters—50 watts input—TVI suppressed. Easy to assemble and operate. Self-contained power supply wired for use as "extra" station power source when transmitter is not in use. Clean, crisp break-in keying.

Viking Adventurer Kit with tubes, less crystals and key . . . **$4.33 for 12 months. $5.45 down**

VIKING VFO KIT—Variable frequency oscillator with 160 and 40 meter output for frequency multiplying transmitters.

Viking VFO Kit . . . $6.56 for 6 months. $4.25 down

Viking VFO wired and tested, with tubes . . . **Only $6.40 down . . . $5.06 for 12 months.**



VIKING "MATCHBOX"—Performs all antenna loading and switching functions required in most medium power Amateur stations.

Only $4.95 down . . . $7.70 for 6 months.

TOP TRADE-INS—10% cash discount on the following with no trade:

Viking I	$175.00	Hallicrafters S40B	$ 75.00
Elmac A54H	99.00	Hallicrafters 538C	35.00
Central Electronics 10A Wired	120.00	Hallicrafters S38-38A-38B	25.00
Lysco 600	80.00	National NC 57	75.00
Harvey Wells TBS Series 60 to	95.00	National NC 125	120.00
Meissner Ex Shifters	30.00	National HRO 50	275.00
Hallicrafters SX71	165.00	Gonset Tri-Band	29.00

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World Above 50 Mc.

(Continued from page 56)

simple means for obtaining a c.w. beat note with receivers like the 522 and Gonset Communicator. W6NOB suggests a b.f.o. method that may not have occurred to some owners of these receivers. He has a Command transmitter hooked up near his Communicator. Turning on this unit and tuning it so that it beats with the Communicator i.f. does the trick very nicely. A simple crystal oscillator on a frequency about 1000 kc. away from the receiver i.f. will also do.

Such makeshifts will allow you to copy the c.w. sigs you hear, but remember that they will not give you a full appreciation of the value of c.w. in weak-signal reception until you go to the higher selectivity that c.w. makes possible. Narrow the passband down to a few hundred cycles and you'll be amazed to hear the way the readability of weak c.w. shoots up. This, however, also shows that the tunable oscillators in these receivers are rather unstable. The next step is, of course, a crystal-controlled converter, a must for any real 2-meter DX enthusiast.

U. S. N. R.

An ardent amateur radio operator is the commanding officer of Naval Reserve Electronics Division 8-12, Paris, Texas, which won the Hooper trophy in national competition for excellence in Naval Reserve electronics training. He is Cmdr. Paul H. Daniels, USNR, W5CTM. He has held an active amateur license for 30 years and a commercial license for 28 years.

Cmdr. Daniels' interest in amateur radio activities helped him to progress rapidly in the Naval Reserve. He enlisted as a radioman first class in 1931. Three years later he was chief petty officer in charge of USNR Communication Reserve Unit No. 7, Junction City, Kans. At that time he was discharged to accept a commission as ensign in the Naval Reserve. He reported for active duty to the Commandant, Norfolk Navy Yard, as assistant communications officer in April, 1941.

Cmdr. Paul H. Daniels, USNR.

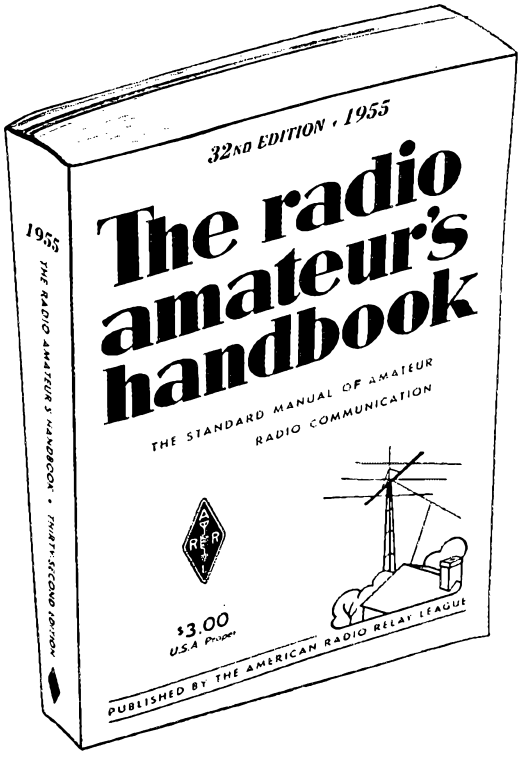
During World War II Cmdr. Daniels served on the staff of Commander, Operational Training Command, U. S. Atlantic Fleet. In 1947 he was designated to command Volunteer Electronics Warfare Company 9-146, Emporia, Kans. He was relieved of command when he moved to Paris in 1949. Cmdr. Daniels was assigned to Volunteer Electronics Warfare Company 8-51, Paris, as training officer. He assumed command of the company in August, 1950. On deactivation of the volunteer company in 1951 and activation of Organized Electronics Company 8-12, Cmdr. Daniels was named commanding officer.

He has made his hobby his profession. In civilian life, he is chief engineer for the Paris radio station, KPLT.

—•••—

Six members of Naval Reserve Electronics Platoon 8-50, Clarksville, Ark., hold amateur radio licenses. They are Lt. James K. Harrison, W5WXN, officer in charge; Russell E. Murray, CWO, W5VUL; Phillip B. Latimer, ETC, W5JPY; Grover F. Krohn, ATC, W5SXM; Frank Carl Eichenberger, SA, W5WUP; and Joseph V. Murray, SN, WN5BGX. W5WXN, WN5BGX, and W5WUP obtained their General Class licenses through membership and training in the Clarksville unit.

Last year W5JPY organized a code class for members of a Boy Scout troop to qualify them for a code merit badge. Eight scouts continued their study and four now hold Novice licenses.



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YL News and Views

(Continued from page 61)

for ham licenses. Eleanor was also elected president of the Unit for the coming term. . . . The daughter of W4MS, SCM of Western Florida, recently became K4AGM (Gwen). . . . YLs who attended the ARRL West Gulf Division Convention were W5s DEW EGD JAD KQG RYX SPV WXT YAJ. . . . Ten hours after the birth of her first child, KN6HRP, Laura Lee, began a series of two-meter QSOs from her hospital bed with OM KN6ELR at their home in Santa Barbara. The baby's pediatrician was K6CRJ (this item by way of OM K6ATX). . . . YLs who attended the October hamfest of the Federation of Long Island Radio Clubs were W2s EEO IGA JZX KDP MWY; K2s AFR CFF EBU; KN2JHQ. . . . OM W3IIX points out an article in the *National Radio-TV News*, Oct.-Nov. '54 issue, which briefly describes the educational use of amateur radio by W8NEJ and XYL W8NEK, Marianne, in connection with their work on the Seney National Wildlife Refuge in Michigan. . . . The licensing of four more YLs who work at Headquarters (see photo, December *QST*, page 52) brings the total of YLs at 38 La Salle Road to ten, thanks in large measure to W1YYM, Ellen, who has conducted classes during lunch hour for months. Several of the girls who started as Novices have gone on to General or Technician Class licenses. Calls of the Headquarters girls are W1s YYM ZCS ZIB ZID ZIM ZJE; WN1s CIE CIJ CIM CLC.

YLs You May Have Worked

Since acquiring her license in August, 1953, WØOMM, Donna Hosey, has worked various frequencies daily from morning until late at night. Active in RACES, a member of

WØOMM

the Independence Three Trails Radio Club, the Missouri Emergency Net, the Kansas Net, and the YLRL, Donna particularly likes to handle traffic going into Kansas City. She usually makes several telephone calls a day to deliver messages from servicemen and college students. Donna works 10, 20, 40, and 75. Her OM is WØQZY and her son is WØOMP.

1955 FIELD DAY DATES

ARRL is pleased to announce that the 1955 Field Day will be held the week end of June 25th and 26th. Whether you plan to participate with a club or on an individual basis, it's not too early to start thinking about Field Day. Watch *QST* for complete rules.

Correspondence

(*Continued from page 50*)

FOGEY

8637 9th Court So.
Birmingham 6, Ala.

Editor, *QST*:

Keep up the good work ("Fulminatin's from Ol' Fogey," Nov. *QST*). To me, a great deal of the pleasure of amateur radio operating is gone today because of the sloppy techniques that are in use — even in my favorite game of traffic handling. . . .

— *Marc Molyneux, jr., W4MVM*

1917 Glenview
Park Ridge, Ill.

Editor, *QST*:

. . . Such articles as "Fogeys" are very exasperating to me; you may as well devote the space to advertising. . . .

— *Jim Strandberg, W9JBZ*

SEEK YOU

Rice Rd., R.R. No. 2
East Aurora, N. Y.

Editor, *QST*:

I just got my Novice about two months ago, and am I ever having fun!

One thing which is very noticeable on the Novice band is the time spent on calling CQ. A lot of the Novices call CQ ten times or more before giving their call. I feel that a CQ consisting of CQ three times, the call three times, and then that again is very adequate. Also, after making a contact with a station it is only necessary to give his call and sign yours once, or at the most twice. I am quite sure that when someone calls CQ for a seemingly endless period of time, he loses contacts because a lot of people don't want to wait until the call letters come around.

So, Novices, let's make our CQs a little shorter, thus our QSOs a little more interesting and numerous.

— *Nancy Townsend, KN2JIR*

PI-NET SAFEGUARD

Chatham, Mass.

Editor, *QST*:

There are many transmitter circuits in *QST* and the *Handbook* which use a pi-network output circuit. In most of these circuits danger exists in case of failure of the d.c. blocking condenser. This can place the d.c. plate voltage on the antenna and feeder. In commercial designs this possibility is anticipated and protection provided by the use of an r.f. choke between the output terminal and ground. Examples of circuits in which this danger could exist may be found in Dec. 1953 *QST*, p. 18, June 1954 *QST*, p. 18, and the 1952 *Handbook*, pages 171, 156, 138.

After giving a little thought to this situation I think you will agree that you should bring this point to the attention of readers of your publications.

This problem is not based on theory only. I know of an instance where a serious shock resulted.

— *William C. Ryder, W1JNM*

[Editor's Note — This source of danger has been recognized in the *ARRL Safety Code* which appeared in the June, 1952, issue of *QST*. This measure also reduces the peak voltage across both input and output condensers, since it provides a d.c. short across the capacitors. Since the failure of the blocking condenser may cause the choke to burn out, the primary of the plate transformer should be fused, not only as a measure of personal safety, but also to save the equipment.]

HAMFEST CALENDAR

District of Columbia — The Old Timers Club of the Washington and Baltimore area will hold their winter dinner and meeting the third Saturday in February in Washington, D. C. Tickets for the event will be $3 per person, and reservations may be obtained from Dr. A. J. Dalton, 1007 Paul Drive, Rockville, Maryland.

M.A.R.S.

Army-Air Force Observe MARS Sixth Anniversary

The Military Affiliate Radio System has entered upon its seventh year of operation. MARS will continue to emphasize the training of amateur radio operators who want to learn more about military radio practices and procedures.

Efforts are being made to establish an effective in-place system which can be made available

Maj. General Back

Maj. General Blake

to military commanders for planned use in the event of peacetime disaster or national emergency.

The Chief Signal Officer, U. S. Army, and the Director of Communications, U. S. Air Force, sent the following message to all MARS members on the anniversary date:

SPECIAL BROADCAST — 26 NOVEMBER 1954

To All MARS Members

The Sixth Anniversary of the Military Affiliate Radio System, 26 November 1954, marks another year of integrated radio operation and training between Army and Air Force communications and United States licensed amateur radio operators. Events of the past year have proved that military unit stations at Army and Air Force Bases can be netted with personally-owned and operated amateur facilities to provide a reliable system for training and for MARS administrative traffic. Personal messages handled for Armed Forces personnel and their families and friends have contributed to the high morale of our servicemen everywhere. The Chief Signal Officer and the Director of Communications unite in extending sincere thanks for your loyalty and support. We urge you to continue to carry on the advancement of MARS. Sgd Major General George I. Back, Chief Signal Officer, United States Army; and Major General Gordon A. Blake, Director of Communications, United States Air Force.

Be *Sure* of Your Transmitter to Antenna Match with the new **CoAx Ratiometer** (S.W.R.)

Install a CoAx Ratiometer in the line between your transmitter and antenna (or tuner) and stop guessing at a proper match. In this new device, well-established principles are applied to produce a unique answer to the problem of measuring standing wave ratios. The result is a design of exceptional accuracy and simplicity.

There are no condensors to balance, no resistors in line to dissipate your power. The unit handles frequencies from 2 to 200 MCS, power loads from 10 to 1000 watts (so it can't be overloaded). Rugged construction, but so compact it can easily be permanently installed inside your transmitter. Free mounting bracket included with every unit.

Sensing unit may be purchased with or without the easy-to-read remote indicator. Complete instructions include how to make your own remote indicator. See your favorite distributor today. If he hasn't heard about the CoAx Ratiometer, send us his name and your check. We'll ship direct to you, postpaid. 73-W8IJ

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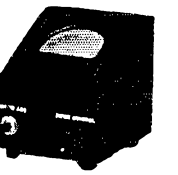

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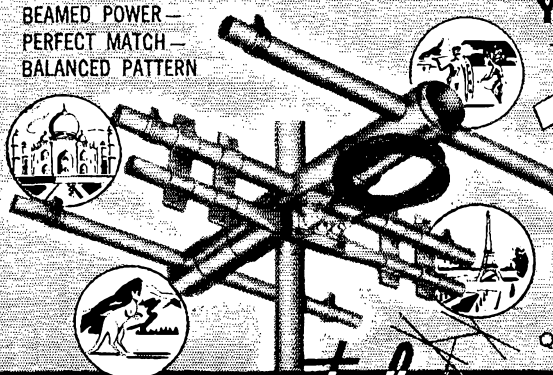

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HAM-ADS

(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.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. 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 noncommercial in nature, and is placed and signed by a member of the American Radio Relay League. 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, if by a member of the American Radio Relay League take the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him 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 signature and address be printed plainly. Typewritten copy preferred.

(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, 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 making piezo-electric crystals. Diamond Drill Carbon Co., 248 Madison Ave., New York City 16.

MOTOROLA used communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

SUBSCRIPTIONS. Radio publications. Latest Call Books, $3.50. Mrs. Earl Mead, Huntley, Montana.

WANTED: Cash or trade, fixed frequency receivers 28/42 Mc. W9YIY, Troy, Ill.

WANTED: All types of aircraft radios, receivers and transmitters. Absolutely top prices. Dames, W2KUW, 308 Hickory St., Arlington. N. J.

WANTED: Early wireless gear, books, magazines and catalogs, Send description and prices. W6GH, 1010 Monte Drive, Santa Barbara, Calif.

CODE slow? Try new method. Free particulars. Donald H. Rogers, Ivyland, Penna.

URGENTLY need AN/APR-4 items. New high prices. Littell, Far Hills Branch, Box 26, Dayton 9, Ohio.

WANTED: Cash paid for BC-610 xmttrs and BC-221 frequency meters. In addition we buy technical manuals. Also TCS sets, R5AØ ARN-7, ART-13, DY-17, others. Amber Company, 393 Greenwich St., New York 13, N. Y.

DON'T Fail! Check yourself with a time-tested Surecheck Test. Novice, $1.50; General, $1.75; Amateur Extra, $2. Amateur Radio Supply, 1013 Seventh Avenue, Worthington, Minn.

MICHIGAN HAMS! Amateur supplies, standard brands. Store hours 0800 to 1800 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 605 Church St., Ann Arbor, Michigan. Tel. 8-8696, No. 8-8262.

WANTED: Bargains in transmitters, receivers, laboratory and test equipment, also miscellaneous and unusual gear, etc. What have you? Please state price desired. Especially interested in husky power supplies, large filter chokes and condensers, etc. Also need plate transformers putting out about 4,000 V or more each side center. Harold Schonwald, W5ZZ, 718 North Broadway, Oklahoma City 2, Oklahoma.

HANDIEST gadget the c.w. man ever had. Variable speeds for your bug key. Whether QSO or traffic, you can change speeds instantly to suit the receiving operator. Chrome plated. Send $1.98 with make and model of key to J. A. Hills, 8165 Inwood Ave., Dayton 5, Ohio. W8EYO.

SURPLUS: RG-8/U cable 100 ft. $5.95; 250 ft., $13.25; 500 ft. $25.00. New connectors, PL-259 and SO-239, 5 for $2.00; new oil-filled condensers, 600 WVDC, 2 mfd, 09¢, 4 mfd, 90¢, 7 mfd, 95¢, dual 8 mfd, $1.95; 1000 WVDC, 1 mfd, 09¢, 2 mfd 90¢, 4 mfd, $1.59; 8 mfd, $3.25. AN/APS-13 420 MC transceiver with 17 tubes, $15.50. Postage extra. Request new bargain bulletin. Visit new store for thousands of unadvertised bargains. Wanted to purchase: Surplus radio equipment, Navy synchros. Lectronic Research Laboratories, 715–19 Arch St., Philadelphia 6, Penna.

COLLECTING War Dept. Technical Manuals, etc., in communications and electronics. What have you got? Write to: Bob Briody, 140 West 57th St. (1 RE), New York 19, N. Y.

FOR Sale: 2 BC-611F Handie-Talkies, in excellent condition. W4MFW, Robert J. Moore, 402 Edgewood Avenue, Rome, Georgia.

WANTED: A U.H.F. Resonator 3-element or Telrex 5-element 20-meter beam. Also, a 66 ft. whip. John Wilson, W8ZWX, Lawyer St Club, Ann Arbor, Michigan.

WANTED: ART-13 transmitters. Write James S. Spivey, Inc., 4908 Hampden Lane, Washington 14, D. C.

TOP Dollar paid for ART-13s, dynamotors, parts, racks and all other component parts. Write to Harjo Sales Co., 4109 Burbank Boulevard, Burbank, Calif.

QSLS? QSLS? Get America's finest and largest variety super-gloss QSL samples, 25¢ (refunded). Sakkers, W8DED, Holland, Michigan.

QSL's-SWL's Meade WØKXL, 1507 Central Avenue, Kansas City, Kans.

QSLS-SWLS. 100, $2.85 and up. Samples 10¢. Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

QSLS. Samples 10¢. Printer, Corwith, Iowa.

QSLS! Advanced Designs! Fast Delivery! Samples 10¢. Tooker Press, Lakehurst, New Jersey.

QSLS, SWLS. America's Finest!!! Samples 10¢. C. Fritz, 1213 Briargate, Joliet, Ill.

QSLS, SWLS. Samples free. Backus, 5318 Walker Ave., Richmond, Va.

QSLS. New — Different. Samples, 10¢. Graphic Crafts, Route 12, Fort Wayne, Ind.

QSL's, SWL's. Fair prices for excellent quality cards. Eleven styles for you to choose from. Samples, 10¢. Almar Printing Service, 423 Barker Bldg., Omaha, Nebraska.

DELUXE QSLS. Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢.

QSL-SWLS. Samples, free. Bartinoski, Houlton, Me.

QSLS. Samples free. Albertson, W4HUD, Box 322, High Point, N. C.

QSLS! Two colors, $2.00 hundred. Samples for stamp. Rosedale Press, Box 164, Asher Station, Little Rock, Ark.

QSLS "Brownie," W3CJI, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

QSLS! Taprint, Union, Mississippi.

QSLS: Beautiful blue, silver and gold on white glossy stock: $3.85 per 100. Two-day delivery. Satisfaction guaranteed. Rush order and get surprise of your life. The Constantine Press, Bladensburg, Md.

QSL-SWL cards. Sensational offer, Bristol stock 500 1 color $3.95. 2 color $4.95, 3 color $5.95. Super gloss $1.25 extra. Rainbow cards. Samples. QSL Press, Box 71, Passaic, N. J.

QSL samples. Dime, refunded. Roy Gale, W1BD, Waterford, Conn.

QSLS. Postcard brings samples. Fred Leyden, W1NZJ, 454 Proctor Ave., Revere 51, Mass.

QSLS Personalized. 150, $2.00. Samples, 10¢. Bob Garra, Lehighton, Penna.

QSLS-SWLS, as low as $1.50 per color. Samples dime. Stronberg, P.O. Box 151, Highland Station, Springfield, Mass.

WESTERN Hams, order your QSLS in the west. Save time, save money. Personal Prints. P.O. Box 64553, Los Angeles 64, Calif.

QSLS-SWLS, Samples 10¢. Malgo Press, 1937 Glendale Ave., Toledo 14, Ohio.

QSLS: Nice designs. Samples. Besesparis, W3QCC, 207 S. Ballict St., Frackville, Pa.

QSLS! Only the very best! Oscar Craig, P.O. Box 157, Newark, Arkansas.

W6HTN, Riesland, prints QSLS. $1.00 for 100.

QSLS! Want 'em fast? Reasonably priced? Cleanly printed "Super speed Specials" are the answer. Dozen samples, 10¢. Robinson, W9AYH, Dept. U, 12811 Sacramento, Blue Island, Ill.

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QSLS distinctively different. Postpaid. Samples free. Roland J. Dauphinee, W1KMP/6, Box 78374, Los Angeles 16, Calif.

BE Admired. Be recognized. Your call-letters on a beautifully finished Rhodium tie-bar, $2.00. Val's, 22 Brookshire Road, Hyannis, Mass.

GONSET Communicator converted to new power supply for 12 volt ignition. New 12/115 volt Communicator with warranty, $219.50 or your Gonset converted, $24.50. Pacific Engineering Co., 839 N. June St., Los Angeles 38, Calif.

FOR Sale: 1 base station transmitter, 2 car transmitters and a number of different types of receivers for base station and cars. The transmitters are set at 24.58 Kcs. For information on these please write or contact Mr. Grover C. Harrison, Police Commissioner, Electra, Texas.

REAL bargains: New and reconditioned Collins, National, Hallicrafters, Hammarlund, Johnson, Elmac, Gonset, Morrow, Babcock, RME, Barker & Williamson, Harvey-Wells, Millen, Meissner, Lysco, Eldico, Sonar, Central Electronics, others. Reconditioned S38, $29.00; S38C, $39.00; S40A, $69.00; S40B, $79.00; S76, $129.00; SX71, $159.00; NC57, $59.00; NC88, $79.00; NC98, $119.00; NC125, $129.00; NC173, $149.00; HROSTA1, $159.00; HRO60, $389.00; 32V1, $345.00; 32V2, $445.00; Meissner EX, $39.00; VHF152A, $49.00; RME45, $89.00; HQ129X, $169.00; SX62, $179.00; 75A1, $279.00; 75A2, $349.00; 75A3, $429.00; Viking I, Viking II, many others. Shipped on trial. Easy terms. Satisfaction guaranteed. List free. Henry Radio, Butler, Mo.

BARGAINS (with new guarantee): R-9-er, $14.95; Gonset Triband, $27.50; S-72, $59.50; S-38C, $35.00; S-40, $65.00; NC-57, $65.00; RME-45, $99.00; Lysco 600, $109.00; S-27, $99.00; SX-43, $129.00; S-76, $149.00; SX-71, $169.00; SX-42, $189.00; HRO-50, $275.00; HT-17, $32.50; EX Shifter, $39.00; Globe Trotter, $49.50; Harvey Wells, Sr., $69.00; DeLuxe, $89.00; Viking I, $209.50; New SS-75, $189.00; HT-9, $159.00; Globe King, $275.00; 32V1, $395.00; 32V2, $475.00; 32V3, $595.00. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

WANTED: ART-13, DY-12, CU-25, BC-610, BC-614, BC-939, BC-729, BC-348, BC-342, BC-312, ARC-1, ARC-3, ARN-7, RTA-1B, TCS, Teletype, keyboard perforators, Boehme equipment, BC-221, LM, TS test equipment, Technical manuals, Signal Corps catalogs, APR-4, APR-5. Any parts for these sets. Cash or trade (will take any amateur or surplus equipment in trade) for new Johnson Viking, Ranger, Barker & Williamson, Hallicrafters, Hammarlund, National, Gonset, Elmac, Telrex, Central Electronics, Harvey Wells, etc. Time payments. Alltronics, Box 19, Boston 1, Mass. Richmond 2-0048.

CENTRAL Electronics 10B, $139.95; Collins 32V1, modified, $475.00; 32V3, $595.00; Deltronic CD-144, $129.95; Eldico M-40P, $44.95, MT-2, $39.95, MR-2, $44.95; Elenco BSM-3, $50.00; Hallicrafters S-38B, $39.95; S-53A, $64.95; SX-62, $250.00; SX-71, $159.95; HT-17, $39.95; HT-18, $75.00; SR-75, $39.95; Heath AR-2, $24.95; AT-1, $24.95; Hickok 198, $30.00; 288X, $79.95; Harvey-Wells APS-50, $29.95; TBS-50A, $79.95; TBS-50C, $79.95; TBS-50D, $99.95; Millen 92101, $17.50; 90800 $19.95; National HFS, $99.95; HRO-M, $125.00; NC-46, $69.95; NC-183, $199.95; NC-183D, $299.95; SW-54, $34.95; RME DB-20, $29.95; Sonar MR-3, $39.95; other used items available. Free list from Carl, W1BFT, Evans Radio, P.O. Box 312, Concord, N. H.

OUTSTANDING ham list always. Our prices on trade-ins of all amateur brands are realistic and down to earth. We feature Johnson, National, Collins, Hallicrafters, Gonset, Elmac, Harvey-Wells, Morrow. Central Electronics and other leaders. We trade easy and offer our own time-payment plan tailored to fit you. All leading brands of new equipment always in stock. Write today for latest bulletin, Stan Burghardt, WØBJV, Burghardt Radio Supply, Inc., Box 41, Watertown, S. Dak.

FOR SALE: Transceiver No. 19 Mark II complete with manual; BC342-N 110V AC with speaker; T-20/ARC5 converted 80m set QST Nov. 51; Transformer 1700V ct 500 mils. K2GXA, 2 Knoll Road, Tenafly, N. J. Will take best offer.

SELL: QSTs in binders 1939 thru 1943 $1.50 per year. Unbound 1944 thru 1949, $1.00 per year. Surplus BC-406 best offer. W9DKW, 632 Pearl St. Ottawa, Illinois.

TRADE: Universal Lawn Mower Sharpener, made by Rogers Mfg. Co., takes 24" mowers, excellent cond. for good receiver, HQ 129 X, SX 71 or equivalent. Sell: Heathkit AR-2 and cabinet, $20; Tapemaster Pt-125 tape recorder, $60 or trade. H. N. Webster, 106 Nasturtium Ave., Sebring, Florida.

WE255A Polar Relays new, boxed, $6.50; #12 Teletypewriter with keyboard, Sync. motor, $70; 21A Printer, $30; Heath Signal Tracer, $14; Want Teletype equipment complete or parts. Andrew Stavros, W2AKE, 116-32 132 St., South Ozone Park, N. Y.

SELL: Heathkit Signal Generator SG-8, $13.00; Heathkit Audio Wattmeter, $19.00; Heathkit A.C.V.T.V.M., $19.00, all in brand new condition and assembled; Dumont Oscilloscope Type 274, $25.00; Hylite 20 meter Beam Type 3E20T, $30.00. James M. Hartshorne, 502 Veterans Place, Ithaca, New York.

FOR Sale: RME-45 receiver with matching speaker, $100.00; RME-DB22A Preselector, $50.00. Both in excellent condition. L. Wetzel, 910 Mt. Vernon Ave., Haddonfield, N. J.

ELDICO 60 Watt XMTR 40 and 80 meter coils. Hallicrafter S-77A Receiver, excellent condition. Best offer takes. A. Gantcher. 1973 81st Street, Brooklyn, N. Y.

SELL: Gonset Commander transmitter with tubes and mike, $65.00; Gonset 75-160 meter converter, $15.00; both for $75.00. Good condition. Gullberg, W5GGS, 405 Bluebonnet Drive, La Marque, Texas.

WANTED: BC-348R, R5/ARN-7, T-47A/ART-13, CU 25/ART-13, BC-653, CU-32/ART-13, DY-17. Send full list of what you have. Top dollar paid. Radalab, 87-17 124 Street, Richmond Hill 18, New York.

SELL: Hammarlund 4-20 xmitter, 35w 80 to 10 TVI'ED, coils included, with VFO, $50.00; 4-11 Mod, $35.00; S40 RCVR, $65.00; all band preselector, $8.00. Perf. Cond. V. P. Ternullo, 43 Robblee Ave., San Francisco, Cal. Va. 4-6569. Local Preferred??

SALE: Viking-I, VFO, de-TVI'D; 4D32 spares, 522 transmitter with supply, 10 meter mobile transmitter, bandswitching VFO 75 watt-transmitter-exciter, NC-100-ASD Receiver and speaker, R'9er, 100 kc std Gonset 10-11, TR-2 rotator, PE-103 complete, 10 m beam, VTVM, Sears Drillpress, Williamson HI-FI amplifier, mikes, parts, meters, test equipment etc. Send for list. Peter Rosenbaum, W2GAW, 41-26, 73rd Street, Jackson Heights, N. Y. Apt. 22D

NC 183, speaker, and NFM adapter, like new, $200. W5ISS, 3902 Park Lane, Dallas, Tex.

TRADE: Custom rifle .257 Remington, Gibson barrel, Waffenfabrick Mauser action, Weaver K4 scope, Litschert 8x attachment, sheepskin gun-carrying case. Very good condition, originally $240.00. Want good clean receiver in HRO class. All correspondence answered. W1VZB, Ed Chmielewski, 291 Dyer street, New Haven, Conn.

BRAND new 10B multiphase exciter. Aligned and tested. Never used. $149.50. Lots of parts and gear for sale and trade. Send for list. WØQFZ, 2318 Second Ave., Council Bluffs, Iowa.

SELL: Supreme 150 watt transmitter with coils for ten, twenty, forty and eighty meters. Instruction book. RME 69 receiver with DB 20 in one cabinet, with speaker. Both like new. Wind Turbine roof tower, with rotary mechanism. New, with prop pitch motor. Two Selsyn motors — matched. $300.00 takes all. Local only. Must pick up. W2NQN, 31-14 103rd Street, Corona, L. I., New York.

WEBSTER Model 81 wire recorder, $45.00; BC-348 S meter external power supply, $60.00; 3-100 mmf. 20KV vacuum condensers, $9.00 each; Prewar Super-Pro, $70.00; RCAF communications receiver 140Kc-21Mc with 12V dynamotor,$40.00; Navy MO-1 ship/shore transmitter/receiver 4 crystal controlled channels 40 watts 2-3 Mc, $75.00; 2.1-3Mc command transmitter, $12.00; 2 Setchall-Carlson BC-1206 receivers, $4.00 each; 5" Heathscope, $25.00; Telrad frequency standard, $14.00; UTC 300 watt modulation transformer with screen tap, $10.00; Kenyon commercial plate transformer (150 lb.) 220 volt primary with filament transformers for bridge rectifier 2500 V 800 MA DC, $40.00. Want 75A2 receiver. W2CFT, Box 483, Lake Ronkonkoma, L. I., N. Y.

FOR Sale, complete Delux Custom TVI proofed station. Includes Super Pro Receiver with 100kc frequency standard, CW monitor, speaker and power supply. 400 watt transmitter, pi network output with rotary final coil, completely bandswitching. Electronic key, bug, 24 hour clock, vertical ground plane antenna for 20 meters. Price $380. Photo on request. A. W. Speyers, W2CZA, 39 Lowell ave., Summit, New Jersey.

WILCOX-GAY Recordio, dual spd. disc recorder, good condx. First $50 or best offer. W9DSV, Box 261, Webster, Wisc.

SELL — G. E. Plate Voltage Transformer, 2400 each side of center tap, 1000 Mils., $20.00. 2 Taylor Tubes, T-124 B with new Sockets and Filament Trans., $10.00. Robbins & Myers MG set, 500 Volts D.C., like new, $25.00. Earl Brockway, 714 Clifford St., Flint, Mich.

SIGNAL Corps Frequency Meter BC221-K 125-20,000 KC. AC operated, modulated, complete with crystal and calibration charts, condition very good. Ack Radio Supply Company, 3101 4th Avenue S., Birmingham, Ala.

FOR Sale: Garrard 3-speed RC-80 Record-Changer, both spindles, $37.50; Pickering 230-H Preamplifier with tubes, 132-E Record Compensator, S-120M Cartridge, $30; RCA-Victor 45EY2 Record-Changer, $22.50; Teletone AM-FM 8-tube Radio, $25; Cascade 2-speed Disc-Recorder-Radio-Phonograph, $50; Electro-Voice 950 "Cardax" Mike, $18; Elcor Tape Recorder, 7½" speed, 7" reels, $75. All excellent, priced FOB, sold on money-back guarantee. V. R. Hein, 418 Gregory, Rockford, Illinois.

FOR Sale: Viking I with 4D32. Factory wired with Johnson VFO. Ready to go. Going higher power. Price $195.00. Woodie, W1VYI, Main St., Topsfield, Mass. Phone TUcker 7-5555.

BAY Area Hams — Best offer takes 500 watt fone rig with 4-125s in final. Also 4 band ACR-5 set. LM-14. 1250 volt power supply plus other items. W6PYR.

FABULOUS K2CBO/20M "Short" Beam puts low power man on map, ask any Brooklyn ham. 10M dimensions, seven pounds, 1:1 SWR, front-back 28 db! Only $39.95. Specifications write Gellman, K2CBO, 1268 East 12, Brooklyn 30, N. Y.

RECEIVERS repaired and aligned by competent engineers, using factory standard instruments. Prompt service, at low cost. Our nineteenth year. Douglas Instrument Laboratory, 176 Norfolk Avenue, Boston 19, Mass.

VAN SICKLE has the new gear in stock. Alliance antenna rotators with control box, $20.00 prepaid in U. S. A. Bargain hunters ask for housecleaning list. W9KJF, 1320 Calhoun, Ft. Wayne, Indaina.

RECORDING Fans! Swap tapes everywhere. Details free. Box 1404-B, San Francisco 1, Calif.

SELL AR88 receiver, like new. Also VHF 152A, like new. Make an offer. W2MFS, D. W. Keefe, 37 Highridge Road, Hartsdale, N. Y.

FOR Sale: ATR battery eliminator, model 610MC — Elld. new, $25.00; low-pass filter B&W 426, $10; microphone, D-104 and stand $12.00; Chicago plate transformer 4700 volts c.t. at .500 amps, new, $30.00; transformer, 6.3 v. at 20 amp., new, $4.00. Gasoline generator "Home Lite," 28½ VDC, 2000 watts; carbon-pile regulator, like new, $100; Master Mobile Mount 75 m. "Hi-Q" coil, antenna, $12; dynamotors, 12VDC to 600 VDC at .200 amps, $12. New Westinghouse panel meters, 3", $5.00; 75-A2 with speaker, excellent, $320; Simpson "240" multimeter, new, $17.50. W5VRO. Capt. James Craig, jr., 3413 W. Roosevelt Dr., Lake Charles, La.

WANTED: Back in Ham Radio. Will buy good receiver and 500- to 1000 watt all-band transmitter. Send full details and price to H. G. Palin, P.O. Box 41, Carmel, Ind.

WANTED: Copy John Riders book "Cathode Ray Tube at Work." State condition and price. Walter Babcock, W2RXW, 405 Sayles St., Oneida, N. Y.

SELL: Thordarson Type 22R35 combination plate and fil. power xfrmer 800 VCT, 340 Ma. 5v-6a, 6.3v-7a and Thordarson choke 7hy 300 Ma., new, used 2 months. Both for $11.00. WØNUI, Box 171, Henderson, Minn.

ROYAL Air Force receiver 1155 powerpack, loudspeaker. A. Glass, 9401-64 Rd. New York 74, Illinois 9-0905.

SELL 61-foot Vesto tower, tilt head, complete 20-meter Gordon rotator and beam, control and coax cable, H.D. power supply parts, VM-5 modulation transformer for KW rig. W4KTZ, 377 Winton, Louisville, Ky.

LATE Hallicrafters S-76, $125.00. TV set suitable monitor, $30. W4API, 1420 South Randolph, Arlington, Va.

SWAP: antique magneto, 10-line telephone switchboard sold by Sears Roebuck & Co., in good shape, for multi-band transmitter and receiver for ham bands, complete. W. G. Horn, W5GSF, Bay Springs, Miss.

TR75TV, good shape, 40 and 80 mtr. coils, $49.00. Postpaid WØOSE, Bob Sleyster, 1032 N. 77th Ave., Omaha, Nebr.

SW-3 wanted. State model, condition, accessories, W2IXZ, 245 East 51, N. Y. 22, N. Y.

SELL: Instructograph with 16 tapes, $25.00. In excellent condition. Dick Werner, W8OEJ, 808 Lexington Ave., Terrace Park, Ohio.

SELL: Lettine Model 240 transmitter, $65.00; matching antenna tuner with R.F. meter, $15.00; both like new with coils for 40 and 80, $75. Spencer Lane, 3985 Gouverneur Ave., New York 63, N. Y.

FOR Sale: Hallicrafters S40 with manual. Good condition, $49. Leiber, W5VUE, 130 Langston, Hot Springs, Ark.

SELL: Beautiful commercial custom-built 200-watt phone transmitter completely enclosed in 6 ft. cabinet, quick shift 80-40 with single control. Cost about $2,800. Sale price: $278.00. Also complete power supply, 1000 VDC at 500 Ma or 2000 V at 300 Ma, plus AC filament and DC relay voltages, $78. 450TH tubes, $17.50 each or two for $30. All F.o.b. W7DI, Cheyenne, Wyoming. Write for details: Carl B. Hempel, Box 2098.

WANTED: National HFS 6 volt supply 680S. C. B. Thurston, 440 Rice St., Anoka, Minn.

FOR Sale: General Electric YRS-1 single sideband selector with instruction book, $60.00. E. Seiler, East Bloomfield, N. Y.

WHY shop for a deal? Write me: I will offer highest trade-in in the country for your used equipment. Uncle Dave, W2APF, Fort Orange Radio Distributing Co., 904 Broadway, Albany, N. Y.

SELL almost new RCA WO56A, $145.00. Simpson 260, $25.00. R. Guttentag, 828 Midwood Street, Brooklyn 3, N. Y. Tel: HI: 6-8989.

FOR Sale: Deluxe kilowatt rig, with 100 watt exciter which can be used as separate AM modulated transmitter, either available or both. NC183, S-72, 100 watt portable rig. Deluxe 3-band mobile rig, VFO and band switching from front seat while in motion. Wanted: Hickok 288X generator. Don M. Lidenton, 701 Poplar, Poplar Bluff, Mo.

SELL: Small prop pitch rotor system complete, except cable. Used very little, $40. W2GWT, Francis Orcutt, RFD 5, Penn Yan, N. Y.

BACK issues of QST, in good condition: 277 copies 1924-1949, with some years complete. Best offer in 30 days takes all. Ex-W3HR, 1010 Dale Dr., Silver Spring, Md.

FOR Sale: Lysco Model 6QO, 35 watt VFO/xtal TVI suppressed transmitter. Never used. Clamp modulator can easily be added. Have gone VHF. Price: $100. Les Murray, W8BKA, 19723 Frazier Dr., Cleveland 16, Ohio.

SELL: 2 power supplies 1750 and 1000 volts at 300 Ma. Also tubes, meters, etc. Send for list. W1HOU.

FOR Sale: All the equipment of W2NFU consisting of following: one transmitter running a Kw with pr. of 813s in final modulated by pr of 805s; the driver is Lysco Transmaster with own modulator. All are mounted in a 6-ft. deluxe rack. One 522 transmitter and revr with a W1 Rey front end for continuous tuning; an "S" meter circuit is built-in and it has a high gain xtal stage in transmitter; all built into a 3-ft. deluxe enclosed rack. One Collins 75A-1 modified to the A2 by Winters Lab (factory rep). Assortment of parts, tubes; all equipment should be seen to be appreciated. No reasonable offer will be refused. Reason for selling: moving to city apt. Sid Tritsch, 2 Center Dr., Flower Hill, Roslyn, L. I., N. Y.

FOR Sale: Moving! Transmitter, 1000 w. C.W. and F.M. 750 w. phone; shielded and de-TVI'd final, pair of RK65s tetrodes, complete band-switching 10–75. Pi-L network. Modulator 810s. Meissner signal shifter and FM unit mounted in Par-Metal rack; SX-25 receiver. Best offer. W2FOR, Merry, 3992 Clarke St., Seaford, N. Y. Tel. SUnset 1-4110.

WANTED: Collins 75A2 or 1 rcvr. Cash for best deal. Write to Fred W. Rudolph, Stryker, Ohio.

FOR Sale: BC221, original crystal, calibration chart with instruction book and built-in V.R., A.C. power, $65.00: Regen grid dipper (p. 473 of 1952 ARRL Handbook), coils, power and 3" 500 μμa meter, $15.00; Collins 310V-1 exciter for rack mounting with 5 band turret, plus extra speaker panel and speaker for side tone oscillator, $195.00; 350V (after filter) 100 Ma., new plate dfrmr, $3.00; dual 12 h., 100 Ma. chokes (two in one casing), $2.25; 2.5v 10A fil. xfrmr $2.50; Triplett mod. 3256 freq. meter, $10.00; unused National 697 (similar to 5886 but for 25/60 cycle) power supply, $8.00. W8NKK, Parker, 1240 Bedford, Detroit, 30, Mich.

WANTED: HRO-7 in tip-top condition, with coils, pwr supply and speaker. W. C. Johnson, W1FGO, Norwich, Vt.

SELL: Complete fixed and mobile ham station complete or in part: HQ129X receiver, Globe Champion transmitter coils for 10, 20, 75, antenna tuner, 10-meter Hy-Lite beam, rotator, 10 ft. tower. Babcock mobile DX-mitter mod. MT5A with PS4A power supply, LS-1 antenna tuner, Electro-Voice 208 mike, Morrow 5BR converter. Equipment in the very best condition. Must sell. Dick Giese, W9SGN, Withee, Wisconsin.

SALE: Underwood teletype, communications model, "mill." Good condition: $45.00. W6ODD, Wilkerson, Box 776, Camarillo, Calif.

LEICA: Focomat enlarger and complete dark room equipment. Want Viking I or II. W2JSM, 316 George St., Babylon, L.I., N. Y.

WANTED: An early model UV-203 RCA 50-watt tube to complete collection. Must be in good mechanical order, burned-out filament acceptable. Will buy for cash. Please advise your price. Paul Watson, 27 Price Street, West Chester, Pa.

SELLING out: 32V1 with spare final tube, $325.00; 75A1 for $225; Eldico Electronic bug, $20; all in very good condition. E. T. Pennington, 202 Chestnut St., Huntington, W. Va., W8WUH.

RECEIVERS repaired and aligned by competent engineers, using factory standard instruments. Prompt service, at low cost. Our nineteenth year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

VIKING I, local, $129. GF-12 transmitter, 4 sets coils, manual, $16.00. W1IKW.

DRAFTED! NC-98, speaker, never used, original packaging, $145.00. C.o.d. Grand Rapids, Mich. WN8QOS, 309 Briarwood.

FOR Sale: Collins 310B exciter, like new, $200. Unused Precision E-200-C AM signal generator, $50.00. Five amp. Variac, $9.00; Eico VTVM, $15.00; unused 75 meter Amphenol antenna, $5.00; Balun coils, mounted, $3.00; coax antenna relay, $5.00; Silver wavemeter, $8.00; RCA Image Orthicon, $7.00. George Kravitz, W2OTR, 7919 20th Ave., Brooklyn 14, N. Y.

FOR Sale: Johnson or Heath VFO, both wired for Viking II. Will sell either one. W9LQI, Boyd, Ashton, Ill.

FOR Sale: HRO-60, practically new, used less than 10 hours, perfect without a mark or fingerprint; includes coils for all the bands, xtal calibrator. Guaranteed perfect. Will ship anywhere. A steal at $393.00. Cooper, WØIOS, 901 S. 86th St., Omaha 3, Nebraska.

PRESERVE your operator's permit in Plastic! Billfold size, 25¢. Hualmar Perma-Seal Service, 303 No. Tillotson, Muncie, Ind.

SELL: Gardiner "Type S" Automatic sender, good as new, with 10 original tapes, $21.00 postpaid. John M. Scowcroft, W9HVK, 7739 Birch Drive, Hammond, Ind.

COLLINS 32V3, $500; Collins 75A3, $450. Both in original boxes, SS75, SSSB exciter with extra 807, 100 watts, $175.00. Good reason for selling. All splendid equipment. W4ODK, 480 Skain Street, Lexington, Ky.

EVANGELICAL Missionaries, EX-W3KJV, grateful for old equipment. TVI no problem. Write David Hartt, Bananier, Guadeloupe.

SELL: 750 volt at .75 amp, Variac controlled and 300 volt at .1 amp, plus 6.3, 12.6, 25.2 volts filament power-chassis mounted power supply, $29.95; WRL exciter 50 watts with one set of coils, $18.95; Bendix TA-12D 100 watt, $24.95; transmitter 160–40 meters, $24.95. Prices include tubes, postage collect. Henry H. Harris, Jr., W4VPU, P.O. Box 1187 Charlottesville, Va.

FOR Sale: Used Instructograph code machine. A-C operated with oscillator and 10 tapes. First $30 takes it. R. C. Cromer, 5673 Biscayne Avenue, Cincinnati 11, Ohio.

SELL: 750W. rig in 6 ft. closed relay rack, speech amp. 811s Cl. B, with 1500 v. supply, 2 RF units, 10 meters and 20–75, VFO, 807, 814 pp HF100s, 1500–2000 V supply; new tubes: three 304TL, two 866A, three 807, three VT127A, two 810, nine 826 and one 832A; one BC221AA. W. Asbury, 185 Soundview Road, Huntington, N. Y.

FOR Sale: Elmac AF67 xtrmttr, Elmac PNR 6A rcvr, home-built supply for rcvr (Vibrator) Master Mobile all bander, top and bottom whip sections, used less than 20 hrs. $250.00. W2PBC, RFD, Perry, N. Y.

IRE Proceedings 1953 and 1954 for sale. $15.00 per year. W2EC, Thiede, 169 Buckingham Rd., West Hemsptead, L. I., N. Y.

NEW Johnson Match-Box and S.W.R. bridge, $42.50. W9ET, 210 Van Buren, Terre Haute, Ind.

SELL: Two-meter receiver and transmitter, deluxe rack and panel, conversion of SCR-522, separate power supply, single-switch relay controlled, metered, xtals, mike, 8-element Hy-Lite beam, built-in speaker, schematic, spare xmitter for parts, complete station ready to operate, nothing else to buy. $95.00 takes all. W2NQR, 61 Henry St., Merrick, L. I., N. Y.

GROUNDED-GRID 304th final amplifier as described in this issue. Complete equipment includes power supply (plate and bias) plus 150 watt 304TH bias shift modulator, all fully metered, with tubes, $350. WØVTP, 8506 Broadmoor, Omaha, Nebr.

FOR Sale: 400 W. 6AG7-2E26-813, pi network rig, no TVI, $75; BC453 converted with power supply, $20.00; BC459 converted, no TVI, $20. Ralph J. Roode, W8SNJ, Worthington, Ohio.

RADIO Diagrams $1.00. Television $2.00. Give make, model. Diagram Service, 672-St. Hartford 1, Conn.

FOR Sale: Power supply 2500 V. DC 900 KVA, $35.00. F.o.b.; Escanaba, Paul Eden, W8KZI, Escanaba, Mich.

FOR Sale: Eldico TR75TV xmitter, good working condx. K6BBD.

SELL or trade: Conservatively rated 350-watt Onan gasoline generator, 110V. 60 cps plus 12 VDC automatic start. Pulled Viking and receiver for field day. Want mobile gear or cash. WØPVV, 1908 Vermont, Lawrence, Kansas.

SELL or trade: Model 26 teleprinter with table, condition excellent; HRO Sr. receiver with coils and power supply, condition fair. J. W. Knoche, W4LCR, 118 N. Cove Terrace Dr., Panama City, Fla.

JOHNSON rotator complete with control box direction indicator, instruction book and 100 feet multiconductor operating cable. Best offer over $195.00 F.o.b. W5DA, 4425 Bordeaux, Dallas, Texas.

WANTED: Harvey-Wells Senior and VFO, current models. Give details and price. W1DY, Box 328, Norwell, Mass.

USED PE-75, 2500 watt, 120 volt, single phase, 60 cycle A.C., $195.00. F.o.b. San Antonio, Texas. W5EDX, 645 E. Woodlawn.

TUNGER Battery chargers wanted, 2 and 6 ampere sizes. W1BB.

FOR Sale: Complete GE diathermy, $25. Electrostatic tweeter, $4.00. Wanted: Mobile equipment, Oliver Nash, Sanford, Mich.

COLLINS 75A-2 in top condition with matching speaker, 8R-1 callibrator, 148-C-1 FM adapter and manual, $330. W2GAU, New York City. MO 6-2276. Purchaser pays any crating or shipping charges.

FOR Sale: SX-71 receiver, $150; Pentron 9T3 tape recorder, $75; Eico 425K 'scope, $35; Johnson Viking mobile VFO, $25; Crystaliner with 10 crystals, $15; Heathkit VTVM, $15; all in excellent condition. Philip Schwebler, Jr., W2ZHE, Alcove, N. Y.

FOR Sale: Collins 30K with 310 exciter completely TVI'd. Spare final tube and spare modulator tube, $1,000. F.o.b. Waco, Texas. W5KAU, 2323 N. 39th St.

STILL the biggest list of ham gear for a three-cent stamp. Receivers, transmitter, parts, meters, rotators, the accumulation of a lifetime. Want coax switches, relays, rotary inductors, Collins 75A3, cash or trade. W9ERU, 2511 Burrmont Road, Rockford, Ill.

WANTED: 250–300 watt modulator or parts. Paul Powell, 801 Matamoros, Laredo, Texas.

VIKING I Transmitter, in excellent condition, complete TVI, $150.00. Cannot pack or ship. Ernest L. Plant, W2GDL, 47–37 189th St., Flushing, N. Y. Flushing 7-7510.

SELL: Eldico TR75-TV transmitter with coils for 10 through 80 meters, $45.00; Eldico 40-watt modulator, $30.00; Meissner EX VFO all bands, $50.00. All equipment in excellent condition. Paul Juliff, W1SWO, Choate School, Wallingford, Conn.

COLLINS 32V-3, fine condition, $565. WØVTP, 8506 Broadmoor Dr., Omaha, Nebr.

NEW Crystals for all commercial services at economical prices; also regrinding or replacement crystals for broadcast, Link, Motorola, G. E. and other such types. Over 19 years of satisfaction and fast service. Send for L-7 catalog. Eidson Electronic Co. Temple, Texas.

MORROW SBR, newest, used a few hours, $63.00; S40A and SM40 "s" meter, gud condx, $63. Sylvan TR2-144, new 2-meter 100 watt trans., $25; Fada FM tuner, new, $15, same used, $12. Want SP44 Panadapter and mod. trans. for pr 811A or 5514. W2HDR, John A. Schwerbel, 111 W. Hoffman Ave., Lindenhurst, L. I., N. Y.

SELL: QSTS 1925–1939 inclusive except for 4 issues, in excellent condition, make offer; HRO B.C. coil, $5; four 240's, $1.00 each; pair ART-13 Mod. trans., 300W., $7.50; 5 Mc. xtal, $2.50. D. L. Robinson, 1609 Westview Drive, New Kensington, Pa.

FOR Sale: Collins 32V1 transmitter, $300. Approximate 500 watt final transmitter with modulator, best offer. Audio amplifier, 60 watt, $30; Elmac A54 transmitter with power supply, $100; Elmac PMR 6A receiver with power supplies, $100. Goldve Farrell, 912 Noyes Ave., Hamilton, Ohio. Phone 4-6780 or 3-6557.

PRINTED Circuits: Make your own etched wiring for transmitters, receivers, etc. Simple process. No silk screens or photographic plates. Kit contains all materials and illustrated instructions. Send $2.95 now. Felix Dutko, 2078 Vyse Ave., Bronx, N. Y.

SELL: Variacs, 5 amp, $5, 45 amp, $50; new BC-459A, BC457A, $5; Fil. trans. 11 volt 65 amp, $10; Mine detector SCR625, $30; ARC4 RX, TX, $20; 75 meter mobile station, $90; Thordarson 21M64 300W mod, xfrmr, $20; HQ129X, NC-173. Want 75A. W6WZD.

FOR Sale: Elmac AF-67, $145; Gonset Super Six, $42; both two weeks old, used only ½ hour. A steal. . . . Also PE103, $14; 666 all-bander coil, $11.00. W8NVA, Lafferty, 917 South Shore, Holland, Mich.

SELL: HQ129X, Gonset Communicator with squelch, Telrad frequency standard, unmodified BC522 receiver, modified BC522 receiver and transmitter, 1" National oscilloscope with internal sweep circuit. Best offers. W2DCQ.

SELL: Navy long wave receiver 600 to 15 Kc, $35.00. W40F.

FOR Sale: 450TH and 808 power tubes, new, never used. Other equipment also. Write Donald Pratt, Harpersville, N. Y.

CRYSTALS: FT-243's, 3500 to 8700 Kc± 2 Kc, $1.00 each. All C.A.P. frequencies this range like 4507.5, 4585, 4467.5, 8008.2, 8230, $2.50 each. .005% setting. Hundley Crystal Co., 2951 North 36th, Kansas City 4, Kans.

A.C. Instructograph, 10 tapes, built-in oscillator, instructions. Hardly used. Best offer over $35.00. K2GMA, Michael August, 10 Rahway Rd., Millburn, N. J.

SELL: ART-13, modified, 110v. power supply. Emission switch controls remote 24VDC, 24 VAC, 450V, 1500 V @ 500 mill supplies. Complete with spare 813, 1625, Tech. manual, schematic showing modifications, power supply, cable connections, de-TVI'd. On air. Best offer. SCR-522 with tubes, $35.00. BC-342, new paint, knobs, markings. Rear connections for speaker, converter, antenna, ground, send/receive. Modified per QST Sept. 46. Best offer. J. D. Rivers, Jr., W4JVM, Rt. 4, Chattanooga, Tenn.

SELL: Johnson Viking II factory-wired and VFO 1½ year old. In A-1 condition, $310. Ernest Nettum, WØFVG, Kindred, No. Dakota.

FOR Sale: TR-75TV, coils 10, 20, 40, extra grid coil, $40; MB-40L, unused tuner, $9; JCX50E, $5; DM-36B, 6–10 converter, $13; 814's, $2; 35Ts, $1.50; W8JRB, Scyler, 3286 Rinda Lane, Cincinnati 24, Ohio.

REFLECTORIZED aluminum call sign. Regular $1.50, Jumbo, $2.00. Lawn stake, $2.75. Overnight shipment. Whitley, W2LPG, 133 Airsdale Ave., Long Branch, N. J.

NC-125 receiver, LYSCO 600 xmitter (no TVI), Clampmaster modulator and antenna coupler for highest bidder over $200. W1BML, LeRoy Flatt, 19 Vernon Rd., Natick, Mass. Phone OL-38891.

SELL: 400-watt complete transmitter, 35Ts P.P., 6-ft. rack, $150. R. Julien, Maryknoll P.O., N. Y.

VIBRAPACKS: Navy surplus, 6V input, 250v at 165 Ma. output. Filtered, fused and with control relay. New, $15.95. Kit of basic components to built above unit, less chassis with diagram, $6.95. Drillick Electronic Sales Co., 5279 W. Pico Blvd. Los Angeles 19, Calif. Tel. WEbster 1-9202.

NOVICES: Hallicrafters S-38B. Good condition, $25. Dave Lifton, 140 Beach 135th St., Rockaway Beach, L. I. N. Y.

DANGER! High Voltage! embossed metal signs, 3" x 12", baked enamel colors, $1.00 each. W9WFT, Lackner, 2029C Bradley, Chicago 18, Ill.

TRANSMITTER 300 watts PP35Ts spares, relay rack enclosed cabinet, coils for 40, 20 and 10 Class B modulator, separate preamp, $100. Make an offer local. Meck T60 xmitter, 60 watts, 10-meter coils. Phone or c.w., $50. Val Brgynak, W8VDF, 668 E. 130th St., Cleveland 8, Ohio.

FOR Sale: NC98 rcvr, in original carton. First $100 takes it. Dom Garofano, W3VMJ, 4332 Germantown Ave., Phila. 40, Pa.

LONG Island Hams! We have moved to a larger store! It's easy to get to. Plenty of parking space. Lots of bargains. Trade-ins taken. Algeradio Electronics Co., 236 N. Franklin St., Hempstead, L. I., N. Y.

TAPE Recorders accessories. Hi-Fi phonographs. Exceptional values. Cerston, 215 East 88th NYC 28.

FOR Sale: HT-9 with VFO, $150; BC348 MOD for 110V, $90; 851 vac tube, $30; 67" black enclosed xmitter cabinet, $25; 1 KW 11 v. hl. xformer, $20; Gonset 10/11 converter, $20; list of other old-style xmitter parts, meters, cords, xfrmrs, ckt bkrs and Inst. Bks available. Want SSB equip. Lt. Col. Hiler, W2SQ/4, 280 Coral Drive, Eau Gallie, Fla.

FOR Sale or trade: Globe Scout 50-watt phone/c.w. transmitter. Used less than one year and complete with Balun coils and microphone. Completely bandswitching 160-10 M, $85; T-69-20A Motorola 10M mobile transmitter including power-supply, control box and microphone, $35.00. Gonset 10M convertor, $12.00. R. Hanson, 4609 Drew Ave., So., Minneapolis 10, Minn.

FOR Sale: NC-125, brand new, with spkr, $130; Viking Ranger, complete with tubes, ready to operate, $265; both for $375. Eicor 5.8 volt 425 volt 375 Ma. dynamotor, new, $20; five (5) 4μfd. 6000-volt filter condensers, $12, each five, $50. Neill A. Jennings, W4NWW, 1714 Friendly Road, Greensboro, N. C.

WANTED: Johnson or Mims rotator, complete. Panoramic adaptor. 3000/4000 volt filter condensers. Sell or swap: 450TLs, Eico VTVM DuMont 3" 'scope, LM, VHF152A, BC348, 805s, 4D32, 4-125A, 813s, Collins MBF, King, W7NRB, Box 488, Kirkland, Washington.

VIKING Ranger, like new, $175. Will not ship. John Warner, W8GPT, West Unity, Ohio.

BC221 with chart, excellent, $125. Meissner shifter, Model EXI clean and stable, $45. RME 10 and 5 converter, unmodified Mode DM36 like new, $25. BC312, fair condition, $25. Prices F.o.b. P.O. Box 691, Woodcliff Lake, New Jersey, or phone Parkridge 6-0591M.

SELL: BC-654, $25; NC-183-R, $185; 21A Teletype midget tape printer with wiring diagram, $45; Dumont #241 'scope, $75; Collins 30-J, 600 watt input phone and c.w., crystal controlled; 2-60 Mc., $375; NC-125, $145; NC-100X, $95; RBM 12 000 ohm relays, $1.75. Want: ART-13, ARC-1, DY-12, BC-221, BC-342, APR-4 tuning units, technical manuals. Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. Tel. RIchmond 2-0916.

WANTED: Late model Gonset or Elmac mobile transmitter and receiver. Dr. Roger West, W4CPQ, P.O. Box 2423, Norfolk 1, Va.

HARVEY-WELLS DeLuxe TBS-50D with Bandmaster VFO, HB. power supply, Astatic JT-30 mike, Hallicrafters S40A, 75-watt antenna tuner w/10, 20, 40 and 80 JCL coils and changeover relay. All excellent condition. Best offer over $200 or will trade on Viking II. Wm. C. Harnsberger, W4ZNT, 126 Shamrock Rd., Charlottesville, Va.

VIKING II, factory-wired, new in appearance and in first class condition, $275. Fred E. Norton, 1450 Winchester Dr., Muskegon, Michigan.

Q5'ER, McMurdo-Silver, with power supply, $18.00; Gonset Tri-Band, perfect, no holes, $30; Stancor P-4086 transformer, 5 volts, 14 amperes, 10,000 volt insulation, $11.00; unused 813s, $7 or trade for 304TL's. W. T. Curtis, W2IWS, R.D. #1, Jamesville, N. Y.

ALL models Elmac receivers, transmitters, power supplies in stock. Dow Co-ax relays, beams, 6 and 12 volt dynamotors, $29.50. Bob Wolfe, W3HDT, Bob Wolfe Electronics, 2506 Hoffman St., Baltimore 13, Md.

CLEANING house! Mobile equipment, NRI xmitter, BC454B with 110v. supply, components, etc. Write for list. WØFXD, Van Vickie, Box 25, Mount City, Mo.

SELL: Hallicrafters S-76 receiver with R-46 matching speaker, new, in perfect condition. Make an offer. Allan Turpin, W4ZXU/6, Deep Springs College, via Dyer, Nevada.

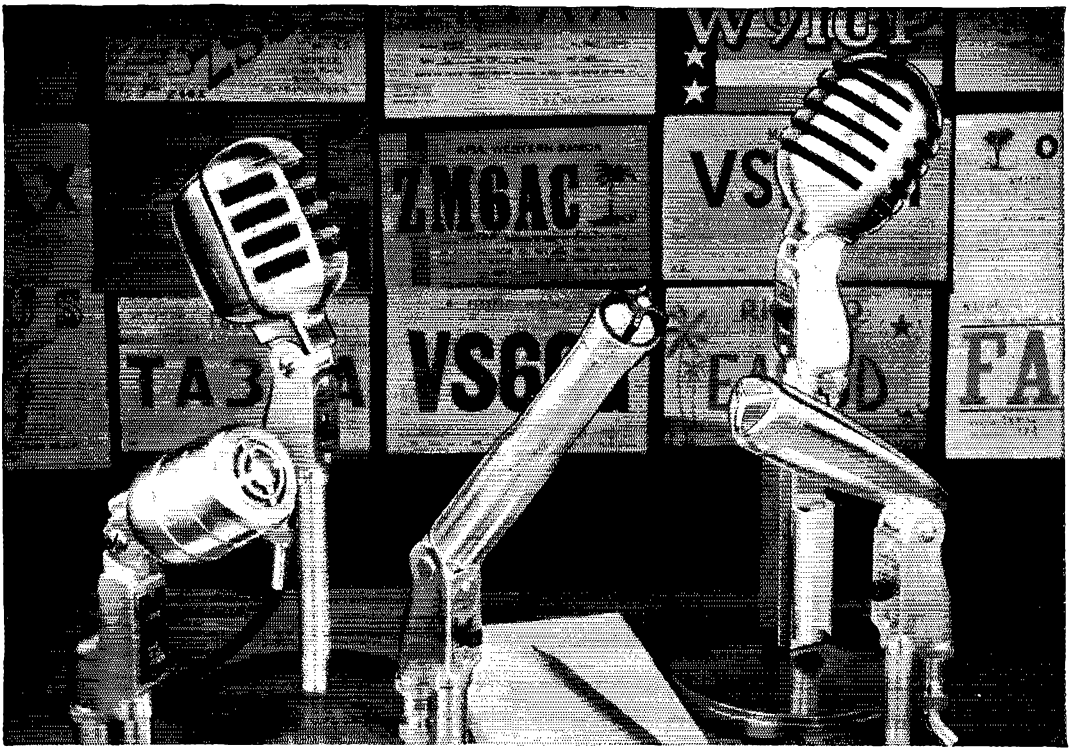
WANTED: All tubes, receiving, transmitting and industrial. Lab test and TS equipment and Selsyns. Carrier equipment CF-1A, CF-4, repeater CF-5, ARC3, BC221, BC610, BC611, BC614, BC729, BC939, BC739, BC191, BC375, BC151 and all tuning units. "TAB" 111 Liberty St., New York City.

BC-458 converted for 75-80 or 40 meters with modulator, power supply, either rig, $50. New pair 813's, $15.00; new 4D22, $10; parts for pair of 811 modulators, includes AN/ART-13 transformers; misc. parts, power supplies, etc. Cleaning out at give-away prices. Seidman, W2GNZ, 1535 Longfellow, Bronx, N. Y.

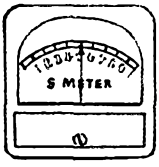
FOR Sale: Signal slicer, $37.50, Eico VTVM, $22.50, HS33 headsets, no plugs, $1.25 each. Send for list of other parts. Want National ML40BS. W3PKI, E. Aicher, 737 Pine, Steelton, Penna.

SALE: 32V3, in tip-top condx. Little used, $595. W3WPM, Col. F. L. Moore, Hq. AACS, DCS/O, Andrews AFB, Washington 25, D. C.

Index of Advertisers



A good microphone can improve your results as much as a high gain antenna



Ever notice that two signals of the same "S meter" intensity sound differently? One is muddy, dull, a little hard to read—the sibilant letters like S and F almost alike. The other signal is sharp, clean and readable even in QRM and QRN—because there's usable intelligence. No mistake about the call or comments.

The greatest variation is in the microphone. A sharp peak adds no intelligibility but limits the modulation to that value. A peak of, say 6 db, which is usual in many ordinary microphones, will reduce voice power by HALF. Don't be fooled by a microphone that sounds "louder"—loudness by itself is not a criterion of performance; quite the contrary since it may indicate undesirable peaks.

An E-V microphone with smooth, peak-free response, replacing an inferior instrument, often will do more for a phone signal than a new antenna or increased power. As a further *plus*, of course, you get well-known E-V durability, style and performance. An E-V microphone, to raise stations, to carry through a QSO, is your best station investment.

Shown above are a few of the E-V microphones designed for effective communications. Amateur discount applies.

(upper left) **Model 611** high output dynamic and **Model 911** crystal. On-Off switch. **List from $25.50 to $37.50**

(upper right) **Model 950** Cardax high-level crystal cardioid, with dual frequency response. On-Off switch. **List, $42.50**

(lower left) **Model 630** wide range, high output dynamic, with exclusive Acoustalloy diaphragm. On-Off switch. **List, $47.00**

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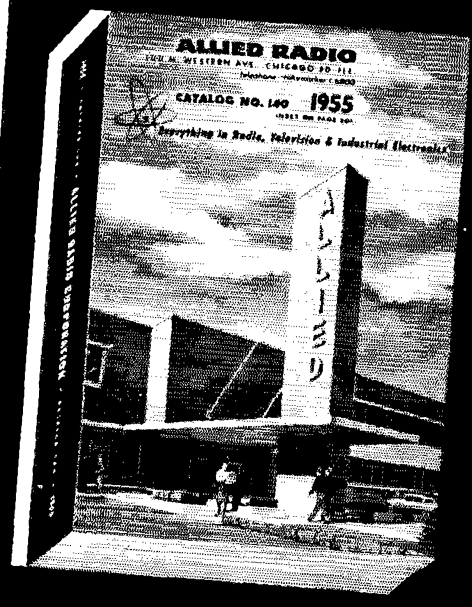

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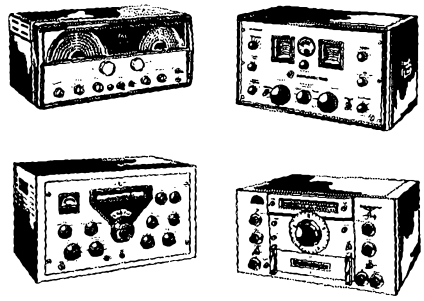

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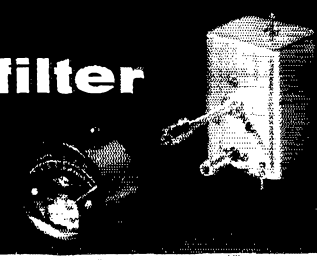

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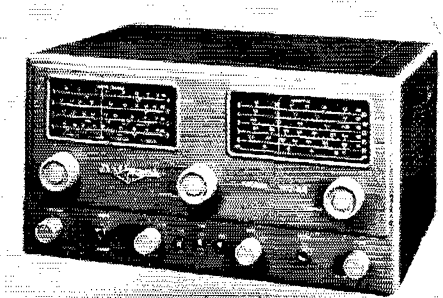

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	220-225	44	370
	420-450	31	300
Telegraphy (CW)	144-148	78	540
	220-225	68	460
	420-450	47	380
Frequency Tripler	144-148	46	380
	220-225	40	370
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