

September 1955

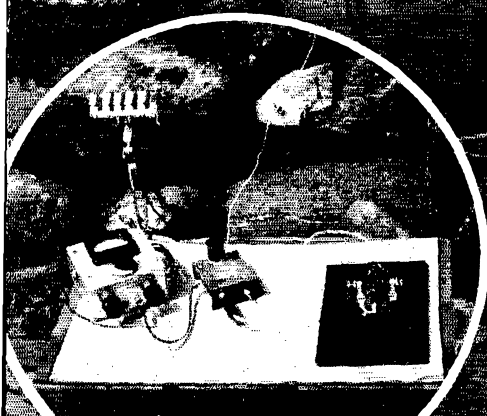
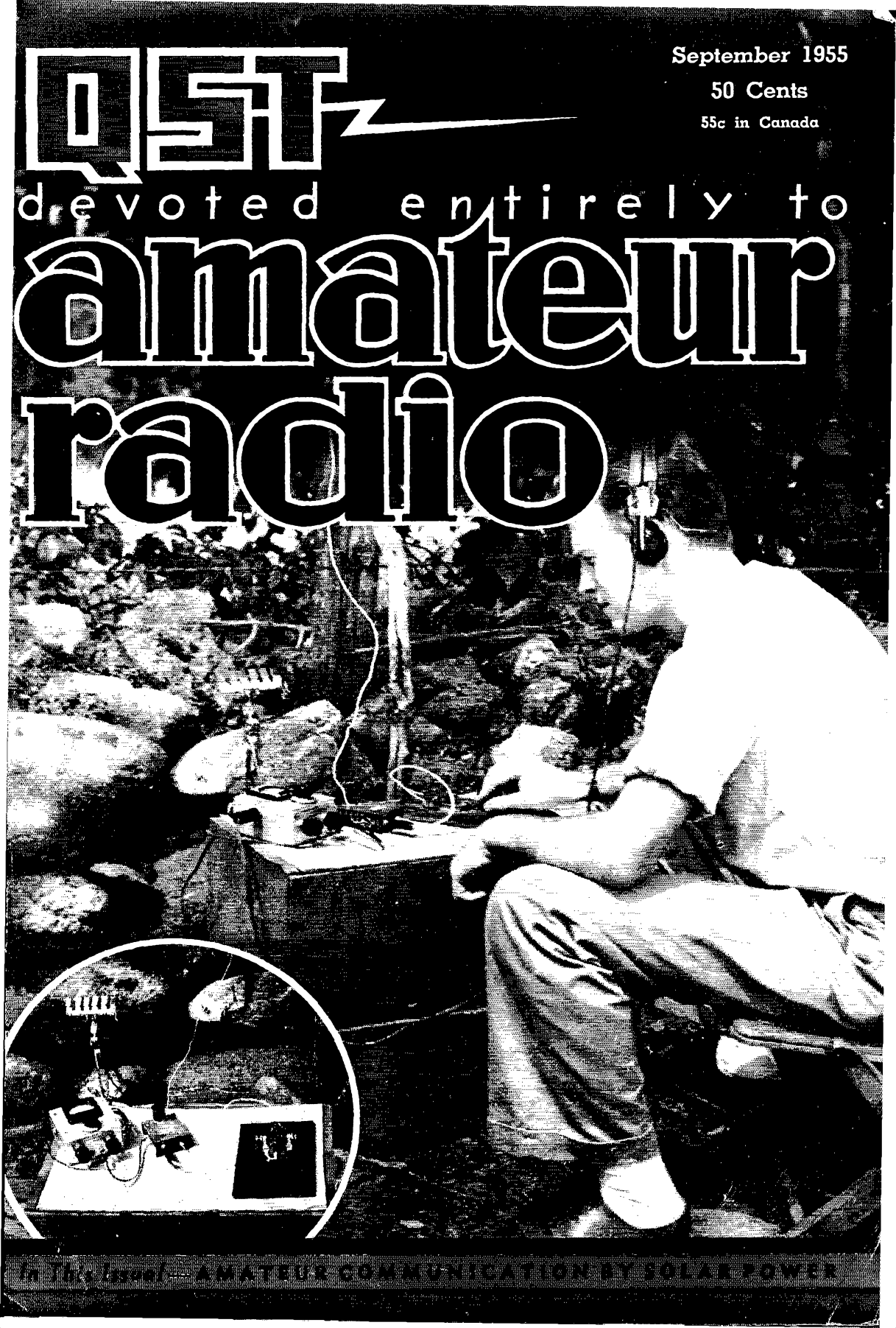
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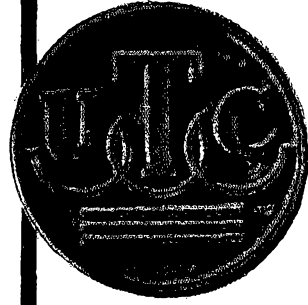


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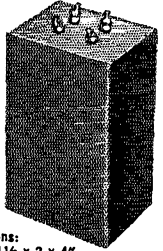
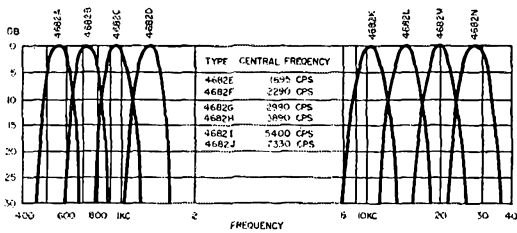
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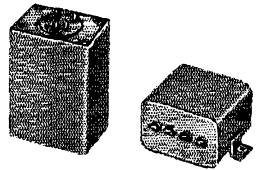
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UTC has produced the bulk of filters used in aircraft equipment for over a decade. The curve at the left is that of a miniaturized 11020 cycles range filter providing high attenuation between voice and range frequencies.

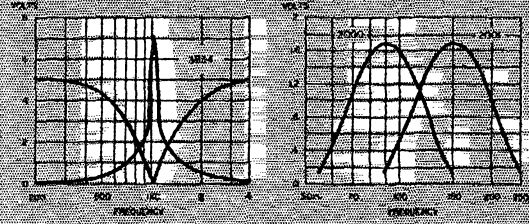
Curves at the right are that of our miniaturized 90 and 150 cycle filters for glide path systems.



Dimensions:
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Dimensions:
(3834) 1 1/4 x 1 3/4 x 2-3/16".
(2000, 1) 1 1/4 x 1 3/4 x 1 3/4".



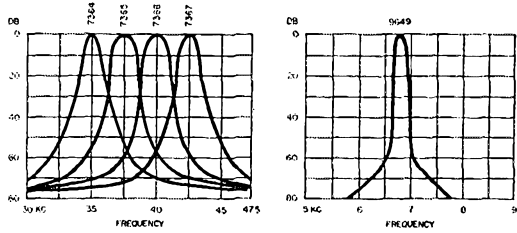
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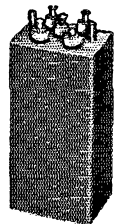
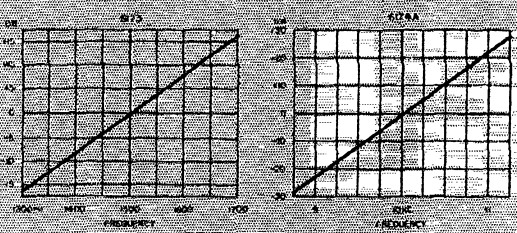
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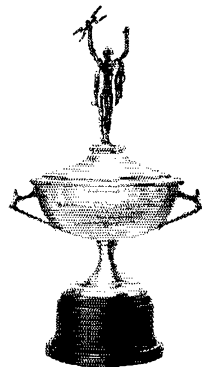
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RULES OF THE AWARD

WHO IS ELIGIBLE. Any man or woman holding a radio amateur's license issued by the F.C.C., Washington, D.C., who in 1955 performed a meritorious public service in behalf of an individual or group. The service must have been performed while the candidate was pursuing his hobby as an amateur within the continental limits of the United States.

WINNER OF THE AWARD will receive the Edison trophy in a public ceremony in a centrally located metropolitan city. Expenses of his trip to that city will be paid.

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HOW TO NOMINATE. Include in a letter the candidate's name, address, call letters, and a full description of the service performed. Your letter must be post-marked not later than January 2, 1956.

BASIS FOR JUDGING. All entries will be reviewed by a group of distinguished and impartial judges. Their decisions will be based on (1) the greatest benefit to an individual or group, (2) the amount of ingenuity and sacrifice displayed in performing the service. The judges will be:

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SEPTEMBER 1955

VOLUME XXXIX • NUMBER 9

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

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Subscription rate in United States and Possessions, \$4.00 per year, postpaid; \$4.25 in the Dominion of Canada, \$5.00 in all other countries. Single copies, 50 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1102, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1925, under the Act of February 28, 1925.

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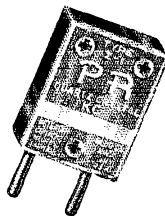
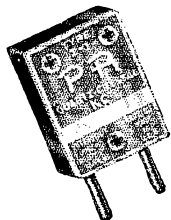
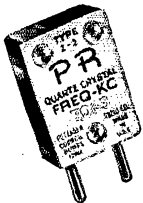
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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors.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

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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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Vice-Director: Reginald K. Town VE7AC
2879 Graveley St., Vancouver 6, B. C.

Atlantic Division

GILBERT L. CROSSLEY W3YA
Dept. of E. E., Penna. State University
State College, Pa.
Vice-Director: Charles O. Badgett W3LVF
725 Garden Road, Glenside, Pa.

Central Division

HARRY M. MATTHEWS W9UQT
702 So. 8th, Springfield, Ill.
Vice-Director: George F. Keith W9QLZ
RFD 2, Box 22-A, Utica, Ill.

Dakota Division

ALFRED M. GOWAN W0PHR
1012 South Willow Ave., Sioux Falls, S. D.
Vice-Director: Forrest Bryant W0FDS
6840 Harriet Ave., Minneapolis, Minn.

Delta Division

GEORGE H. STEED W5BUX
1912 Beech St., Pine Bluff, Ark.
Vice-Director: George S. Acton W5BMM
Plain Dealing, La.

Great Lakes Division

JOHN H. BRABB W8SPF
708 Ford Bldg., Detroit 26, Mich.
Vice-Director: Robert L. Davis W8EYE
247 Highland Ave., Salem, Ohio

Hudson Division

GEORGE V. COOKE, JR. W2OBU
88-31 239 St., Bellerose 26, N. Y.
Vice-Director: Thomas J. Ryan, Jr. W2NKD
2339 Redwood Rd., Scotch Plains, N. J.

Midwest Division

WILLIAM J. SCHMIDT W0OZN
306 S. Vassar, Wichita, Kansas
Vice-Director: James E. McKim W0MVG
1404 S. Tenth, Salina, Kansas

New England Division

PHILIP S. RAND W1DBM
Route 58, Redding Ridge, Conn.
Vice-Director: Clayton C. Gordon W1HRC
65 Emerson Ave., Pittsfield, Mass.

Northwestern Division

R. REX ROBERTS W7CFY
837 Park Hill Drive, Billings, Mont.
Vice-Director:

Pacific Division

HARRY M. ENGWICHT W6HIC
770 Chapman, San Jose 26, Calif.
Vice-Director:

Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
428 Maple Lane, Danville, Va.
Vice-Director: Theodore P. Mathewson W4FJ
110 N. Colonial Ave., Richmond, Va.

Rocky Mountain Division

CLAUDE M. MAER, JR. W0IC
740 Lafayette St., Denver, Colo.
Vice-Director: Walter M. Reed W0WRO
1355 E. Amherst Circle, Denver, Colo.

Southeastern Division

JAMES P. BORN, JR. W4ZD
25 First Ave., N.E., Atlanta, Ga.
Vice-Director: Randall E. Smith W4DQA
902 Plaza Court, Orlando, Fla.

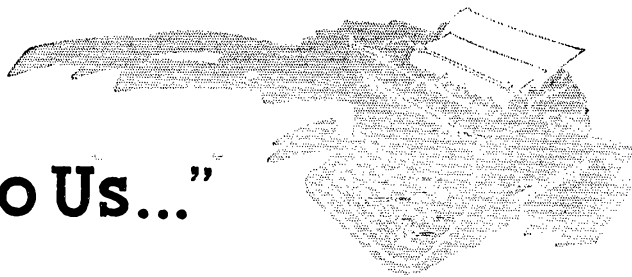
Southwestern Division

WALTER R. JOOS W6EKM
1315 N. Overhill Drive, Inglewood 3, Calif.
Vice-Director: Robert E. Hopper W6YXU
4327 Santa Cruz, San Diego 7, Calif.

West Gulf Division

ROBERT E. COWAN W5CF
3640 Encanto Drive, Fort Worth 9, Texas
Vice-Director: John F. Skelton W5MA
1001 Standish Dr., Irving, Texas

"It Seems to Us..."



HELPING NEWCOMERS

Here it is September again — our vacations are over, the ol' swimmin' hole has lost some of its grip on us, the summer QRN has started to fade away. Our thoughts turn once again to active hamming; the local club gets going again in full swing. It seems time for a reminder of a couple of related worth-while projects for the local gang to tackle.

Hams have long held out a helping hand to newcomers on an individual basis. In the past few years, more and more radio clubs have been offering formal courses in amateur radio for beginners, with club members sharing the teaching tasks. Prospective hams have been attracted to the courses by notices in the papers, in schools, and at Scout and civic club meetings. Now is a good time for your club to start laying plans for this year's course. If help is needed, the Communications Department of ARRL offers assistance in the form of code-practice schedules, course outlines, and training aids. Whether or not you ask for aid, however, the Communications Department would like to know about your course so that other newcomers in your area can be steered your way.

A closely-related project is the setting up of a committee to conduct examinations for Novice, Technician and Conditional Class aspirants. As earlier editorials pointed out, it is important that these "mail" examinations be conducted with uniform standards, to ensure that only qualified people obtain licenses, and to ensure that all applicants have equal opportunity. The objective can best be accomplished by appointing mature, qualified amateurs to serve on examination committees in every club throughout the country. This system has an advantage over the use of individual, uncoordinated examiners, however qualified they may be personally, in that prospective amateurs can be notified through the press, radio and other media mentioned above of the time and place of the tests.

FCC has expressed (*QST*, September, 1954, page 9) the hope that all clubs will establish such committees. The District Engineers are anxious to know when these groups go into operation and are always ready to assist in getting them started. It may be possible for committees to keep a supply of application

blanks and test papers on hand, speeding the licensing process considerably for anxious applicants.

Every activity needs new blood, and these two projects will help to assure the continuing flow of eager newcomers into amateur radio. Here's your chance to train new operators the way they should be trained, and build up the club at the same time.

WHICH CALL TO SIGN?

As we hams are a thoroughly fraternal bunch, it is hardly news that many new licensees quickly take up the pleasant custom of station-visiting. But our correspondence recently indicates a misunderstanding on one aspect — what call does W1AAA sign when he is visiting W1BBB?

There's only one answer. When operating another ham's station, you sign his station call, not your own personal station's call. You can indicate in the course of conversation that your own station is W1AAA, but that's pure conversation and not part of the signing procedure. The call you sign for the station's operation is W1BBB. And of course the data goes into the station's log, not your own back home.

We should perhaps remind you that a station may be operated only within the privileges available to both operator and station license. For example, Novice WN1AAA can visit General Class W1BBB and operate the latter station, but only in the Novice bands, using crystal-control, and 75 watts or less input. The call to be signed is W1BBB. The General Class operator can pay a return visit and operate WN1AAA, of course signing that call, but again only under Novice privileges. It would not be proper for the General Class operator to operate the Novice-licensed station by signing his personal station call in other than Novice bands. Nor can he use VFO or more than 75 watts input at the Novice station on the theory that he is licensed for such operation; surely he is, but the Novice's station isn't.

Keep up the visiting, OMs, but remember that you sign the call of the station being visited, and are limited by the scope of its station license and your operator license, whichever privileges are the lesser.

A.R.R.L. CONVENTIONS

SOUTH DAKOTA STATE CONVENTION

Yankton, So. Dak. — September 3rd and 4th

The Prairie Dog Amateur Radio Club is sponsoring, and will be host to, the 1955 ARRL South Dakota State Convention to be held in Yankton, So. Dak., September 3rd-4th. It will be held in the Msgr. Link Memorial Auditorium and banquet hall adjoining. Program starts at 1:00 P.M. CST Saturday, Sept. 3rd. Registration begins at 9:00 A.M., continues in afternoon as needed.

The program will include ARRL section net meetings, technical meetings, Novice c.w. QSO contest, informal mixer, musical code contest, "war whoop" breakfast, mobile judging, hidden-transmitter hunt on 75 meters, tours of state hospital and/or Gavans Point dam construction, and banquet with "family-style" meal, at which the Governor of So. Dak. is scheduled to speak.

Ample playground and parking facilities available. Golfing, etc., available for those not participating in convention activities.

Registration, including 1 banquet ticket, \$5.00; additional banquet tickets, \$2.25. Send advance registrations to Neal Edwards, 201 Locust St., Yankton, South Dakota.

SOUTHWESTERN DIVISION CONVENTION

San Diego, Calif. — October 1st and 2nd

The San Diego Council of Amateur Radio Organizations in sponsoring the 1955 ARRL Southwestern Division Convention to be held in San Diego, Calif., on October 1st and 2nd. It will be held in the famous exposition facilities of Balboa Park, commencing with registration at 9:00 A.M. Saturday, October 1st. Preconvention activities will be held at the Manor Hotel during Friday evening, September 30th.

The program will include mobile contests, transmitter hunts, miscellaneous contests, exhibits, ROWH ceremony, ARRL open forum, technical talks, v.h.f. round-up, YLRL activities, DX activities and a host of other events.

The banquet, entertainment and dance will be held on Saturday evening. Registration (including banquet, dance, etc.) is \$6.50 per person. For advance registration and information, write J. Roy Smith, W6WYA, General Chairman, 2052 Venice St., San Diego 7, Calif.

HAMFEST CALENDAR

CONNECTICUT — The Laurel Amateur Radio Assn. is sponsoring the first annual Conn. Hamfest Picnic on September 18th, all day, at MacLean's Grove, Granby, Conn. Admission one dollar for the entire family. Several contests for OMs and XYLs; also awards for best mobile installation. Bring your own food and drink. Guest speakers and other entertainment.

KENTUCKY — The Second Annual Lexington Hamfest will be held on Sunday, September 25th, at the Lexington Water Company's Reservoir (same place as last year) on U. S. 25, east, about 2 miles from Lexington. There will be a hidden-transmitter hunt and other activities for young and old. Box lunches will be available on advance notice and remittance of \$1.25 per lunch for either fish or chicken. All remittances for lunches and tickets should be sent to Dr. H. L. Echols, 2000 Nicholasville Rd., Lexington, Ky., on or before Sept. 23rd.

LOUISIANA — The Greater New Orleans Amateur Radio Club announces the second annual "Week End in Old New Orleans," Labor Day week end. Dance on Saturday, September 3rd, and ham picnic on Sunday, September 4th. Special events and contests for the ladies and children. Admission to dance, \$2.50; admission fee to picnic, \$1. Come and enjoy Labor Day in old New Orleans. Write "Week End in Old New Orleans," P. O. Box 13003, New Orleans, La.

NEW YORK — Saturday, September 24th, at the Masonic Temple Dining Room, 230 Main St., Oneida, N. Y., 11th Annual Hamfest and Ladies Night of the Oneida Area

COMING A.R.R.L. CONVENTIONS

September 3rd-4th — South Dakota State, Yankton, S. D.

September 30th-October 1st-2nd — Southwestern Division Convention, San Diego, Calif.

October 15th-16th — Central Division, South Bend, Ind.

October 22nd-23rd — Midwest Division, Omaha, Neb.

radio amateurs. Admittance at \$3.00 per person is by advance registration only and is limited to 150 persons, the capacity of the dining room. Registration will start at 5:00 P.M., banquet at 7:00 P.M. Make all reservations before September 22nd with Walter L. Babcock, W2RXW, 405 Sayles St., Oneida, N. Y.

OHIO — 18th Annual Stag Hamfest, Sunday, September 11th. Biggest bargain hamfest in U. S. A.; over 800 actual amateurs attended last year. Sponsored by the Greater Cincinnati Amateur Radio Association. The location is Koplring Grove on Winton Road two miles south of Greenhills, Ohio. Registration \$2.50 at the gate — here's what you get: hot dogs all day long, donuts and coffee served till noon, beer and pop served all day, full picnic dinner and supper (all you can eat), rain or shine. Lots of games, radio-controlled model airplane show, etc. For additional information, contact Elmer Schubert, W8ALW, 3965 Harmar Court, Cincinnati 11, Ohio.

OUR COVER

E. Laird Campbell, W1CUT, shown operating the first solar powered station. The transmitter consists of a 2N76 transistor, while the receiver is the "Little Gem" field-strength meter. For further details see page 11.

Strays

W7GND has come up with an easier way of modifying the 1625 tetodes used in the "200-Watt Linear amplifier," June QST.

He found that the cathode and suppressor leads are brought out to the tube pin in the National Union type 1625. By drilling a $\frac{3}{8}$ inch hole in the side of the tube above the cathode pin and one over an unused pin, the suppressor wire can be unsoldered from the cathode and connected to the unused pin.

In order to determine which lead is the cathode and which is the suppressor, the filament is lighted and the electron flow from each of the unknown wires to the plate is measured. The combination with the larger current determines the cathode lead, while the other is the suppressor.

ARE YOU LICENSED?

- When joining the League or renewing your membership, it is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.

Solarized QSO

Amateur Communication Using Solar Power

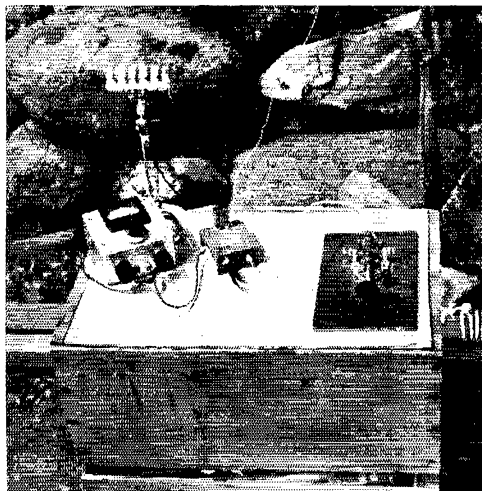
BY E. LAIRD CAMPBELL, WICUT

• Here is something to whet the imagination of the Buck Rogers and Dick Tracy sets: radio communication with the necessary electrical power derived directly from sunlight. We hesitate to predict an immediate switch by everyone to solar power only, but it isn't difficult to visualize a future of ultra-compact stations dependent upon the cloud conditions or even the phase of the moon ("moon power") for their S-meter readings. Imagine calling a rare piece of DX just as the sun goes behind a cloud, and the frantic scrambling for matches and burning material to keep the call going!

"Q RX ol' man, cloud approaching." These words were not unusual at North Granby, Conn., during the 1955 ARRL Field Day activities. Concern over the weather was quite reasonable considering that perhaps the first solar-powered amateur station was in operation. Both the transmitter and receiver incorporated transistors and were powered completely by energy from the sun.

Power Supply

Power for the transmitter and receiver was obtained from six self-generating selenium photoelectric cells. These were the International Rectifier Campbell, "Transistorized 'Little Gem'", QST, Aug., 1955.



Solar-powered amateur station. The solar battery can be seen clamped to the top left of the operating table. The transistor transmitter is in the center with the receiver to the left.

ifier type B2M, and had an output of 0.5 volts at 2 ma. each. The six cells were connected in series and mounted on a piece of lucite. This was then bolted to a bracket on a ball and socket clamp to aid in orienting the battery toward the sun. Under a load of 0.5 ma. the battery produced about 2.8 volts in direct sunlight and would drop to below 2 volts in diffused sunlight.

Transmitter

A transistor in a crystal-controlled oscillator circuit was used for a transmitter. As can be seen

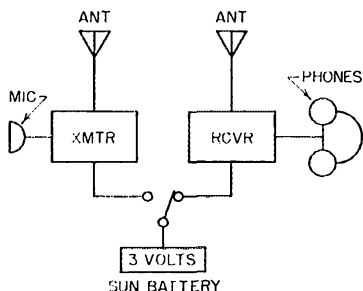


Fig. 1—A block diagram of the solar-powered station.

in Fig. 2, a minimum of components is required. The transistor is a General Electric type 2N76 and it oscillated easily at 1800 kc. By placing a carbon microphone or a key in series with the power supply, the transmitter could be operated

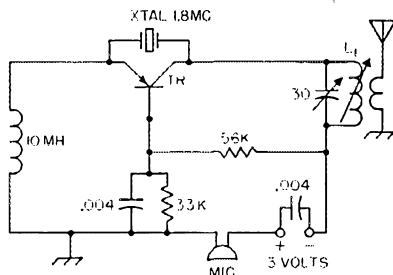


Fig. 2—Transistor transmitter. Tank inductance L_1 is a Vari-Loopstick with a link coil wound around the outside of the coil form.

on 'phone or c.w. A random length wire served as an antenna with good results.

Receiver

The receiver used was a Transistorized "Little Gem" in the field-strength meter position. The effective circuit can be seen in Fig. 3. The tuned signal is rectified by the crystal diode detector and amplified by the transistor (Hydro-Aire

(Continued on page 110)

The "2B3" Superheterodyne

A Simple "Minimum" Receiver for 80 and 40 Meters

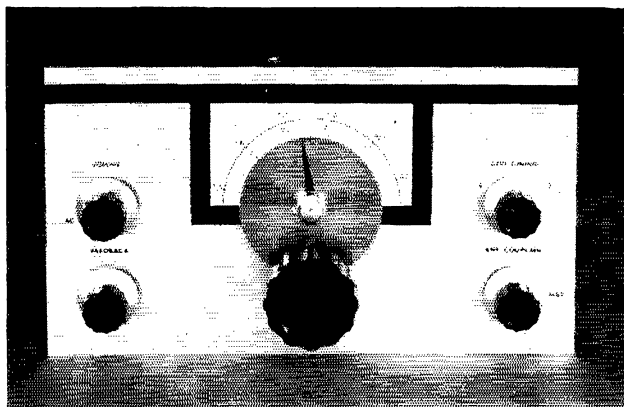
BY BYRON GOODMAN, WIDX

THE title of this article has no more justification than that it identifies a particular design and, if you know the code we just invented, it signifies a "2-band 3-tube" superheterodyne. It is the dull end result of looking around for a title to describe a little superheterodyne that will serve anyone quite well as his first ham-station receiver.

This receiver started out as an attempt to build a practical two-band receiver that would more than hold its own with anything selling for thirty dollars. No attempt was made to make it an "all-band" affair — we figured we were licked from the start in that department. But by confining the tuning range to two amateur bands, we knew it would be possible to build in operating features, such as adequate bandspread and

• The receiver described on these pages is called a "minimum" receiver by the author because, in his opinion, it represents the minimum in receiving equipment that will give a good account of itself under present band conditions. The simple construction makes it an easy matter to duplicate the receiver.

lating) state, hoping that the resultant selectivity would be sufficient for adequate single-signal c.w. reception. It wasn't, and it was also observed that the 6U8 pentode section used as the regenerative detector was a little more microphonic than we care to have such things, so a 6BD6



good stability, that are quite hard to come by in an inexpensive all-band commercial job. We started out with three dual triodes: one as a mixer-oscillator, one as a detector-b.f.o., and the third as a two-stage audio amplifier. Investigating selenium-rectifier vs. tube-rectifier power supplies, it was found that the latter was cheaper. The dual triodes were 6SN7s, because the sockets for these tubes are cheaper than those for the miniature tubes. But the performance of the finished product didn't come up to our expectations — the triode mixer was touchy and the detector-b.f.o. combination didn't behave as had been hoped. The original objective of absolute rock-bottom cost was scrapped, and we turned to the use of miniature tubes. Here a logical choice for mixer-oscillator and detector-b.f.o. seemed to be the 6U8 triode-pentode. A homemade 1700-kc. i.f. transformer was substituted for the commercial unit previously used, but again we weren't satisfied with the detector. We were using it in a regenerative (but nonoscil-

lating) state, hoping that the resultant selectivity would be sufficient for adequate single-signal c.w. reception. It wasn't, and it was also observed that the 6U8 pentode section used as the regenerative detector was a little more microphonic than we care to have such things, so a 6BD6

This two-band superheterodyne receiver uses an autodyne second detector and adjustable antenna coupling. The dial pointer and black trim strips are made of black Scotch Tape. The control marked "Feed-back" is the regeneration control.

The Circuit

While few will argue about the sensitivity of an autodyne detector, anyone who has worked with one knows that the loading is critical, and an antenna swinging in the breeze may "pull" the frequency. Then, too, the regeneration control setting may need changing as one tunes a band. Using an autodyne detector at a low fixed frequency obviates these shortcomings but dictates a superheterodyne type of receiver. By

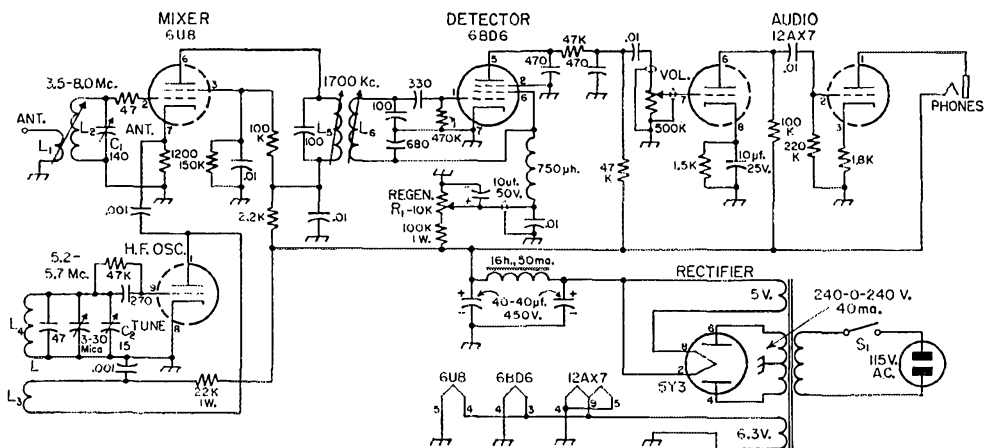


Fig. 1 — Schematic diagram of the two-band superheterodyne.

- C_1 — 140- $\mu\text{f.}$ midget variable (Hammarlund HF-140).
 C_2 — 15- $\mu\text{f.}$ midget variable (Hammarlund HF-15).
 R_1 — 10,000-ohm 2-watt wire-wound potentiometer (Clarostat A43-10K).
 L_1, L_2, L_3, L_4 — B & W No. 3016 Miniductor, 1-inch diam., 32 turns per inch, No. 22 wire.
 L_1 — 12 turns.
 L_2 — 26 turns.
 L_3 — 8 turns.
 L_4 — 21 turns, separated from L_3 by one (removed) turn.

Adjacent turns on L_3 and L_4 go to 0.001 $\mu\text{f.}$ and chassis respectively.

1.5, L_6 — Grayburne Vari-Loopstick. (80 $\mu\text{h.}$, approx.)
 S_1 — Mounted on 500K volume control.

All resistors $\frac{1}{2}$ -watt unless specified otherwise. All capacitances in $\mu\text{f.}$ unless otherwise noted. All fixed capacitors except two across L_6 , one across L_4 , and the electrolytics (polarity marked) are ceramic. Fixed capacitors across L_4 and L_6 are silver mica.

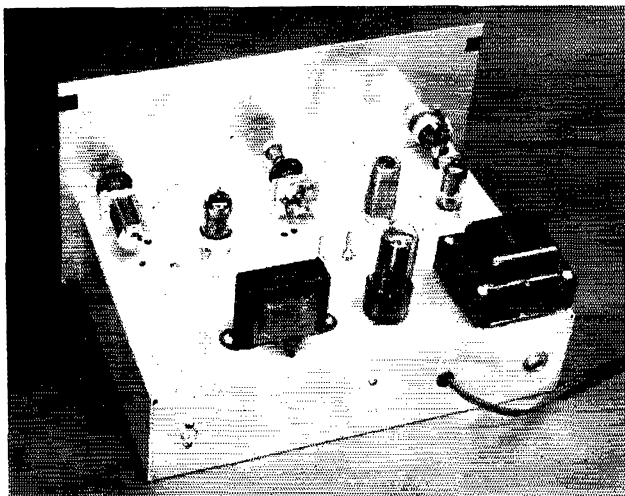
Power transformer is Knight (Allied Radio) 62-G-034, filter choke is Knight 62-G-137, filter capacitor is Mallory 2N-537.

limiting the frequency range of the receiver to two consecutive amateur bands and using an i.f. of half the frequency difference between the two bands, it is possible to "change bands" simply by tuning the input circuit to the one band or the other. For example, with the high-frequency oscillator tuned to 5.3 Mc., and the i.f. at 1700 kc., the receiver responds to either a 3.6-Mc. signal ($5.3 - 3.6 = 1.7$) or a 7.0-Mc. signal ($7.0 - 5.3 = 1.7$), depending upon the tuning of the mixer grid circuit. It is a convenient arrangement that permits building a bandspread two-band receiver with no bandswitching. To listen on higher frequencies, a crystal-controlled

converter can be used ahead of the set, working into it at 80 meters.

Referring to the circuit in Fig. 1, it can be seen that adjustable input coupling is provided (variable coupling between L_1 and L_2). While the signal level can be reduced by detuning the 140- $\mu\text{f.}$ ANT capacitor, C_1 , the adjustable coupling is easy to construct and permits reducing the input level without detuning. The high-frequency oscillator output is coupled to the cathode of the pentode mixer, to provide a low-noise mixer and a minimum of "pulling." Changing the setting of the ANT capacitor does not pull the oscillator frequency appreciably unless the

The miniature tubes, from left to right, are 6U8, 6BD6 (in shield) and 12AX7. The left-hand variable capacitor tunes the mixer input circuit, and the small one in the center tunes the high-frequency oscillator. Note the phono-jack antenna terminal and headphone output jack on the wall of the chassis. The tuning capacitor at rear center is mounted on an aluminum bracket.



mixer input circuit is tuned close to the oscillator frequency, a condition that is never used.

The 1700-kc. i.f. transformer (L_5 and L_6 and the associated shunt capacitors) uses two of the compact ferrite-cored b.c. antenna coils that have become popular recently. They have the twin virtues of low cost and quite adequate Q for this job. The regenerative detector uses the Colpitts circuit to eliminate the need for tapping the coil or adding a tickler winding. An electrolytic capacitor across the regeneration control eliminates the noise produced by varying the wire-wound potentiometer. This potentiometer was selected instead of a composition affair because of a personal preference for such controls wherever any significant current is involved.

The two-stage audio amplifier is conventional, except that we started out with no cathode bypass capacitors and found that the one shown on the first stage reduced some a.c. hum. The a.c. switch, S_1 , is mounted on the audio volume control.

Construction

An $8 \times 12 \times 3$ -inch aluminum chassis plus a 7×13 -inch panel provides enough metal for the receiver, with the single exception of the scrap of aluminum needed for the bracket that supports the $15\text{-}\mu\text{f}$. tuning capacitor, C_2 . The panel is held to the chassis by the two shaft bearings and the regeneration-control potentiometer, as can be seen in one of the photographs. It will pay off to take a little care in the location of the holes for the National type K dial, in the interests of a smooth-tuning receiver. We built the tuning-capacitor bracket first, lined up the capacitor shaft against the panel to mark the dial bushing hole, and then used the template that comes with the dial to locate the drive bushing hole. The small knob that comes with the Type K dial was replaced by a large one, and a couple of drops of oil were used to lubricate the drive bushing.

Practically everything else in the receiver can be located from the photographs, but we will touch on one or two points. The adjustable antenna-coupling coil was mounted on the end of a length of $\frac{1}{4}$ -inch diameter lucite rod by cutting the end of the rod at 45 degrees and cementing a small scrap of polystyrene sheet to this face. The scrap was then filed to fit inside the coil and secured with a few drops of Duco cement. Four small holes are drilled through the rod: two for the coil ends (which also serve as tie points for the flexible antenna and ground leads), one through which the antenna and ground leads are threaded and cemented, and the fourth through which a piece of No. 20 wire is pushed and bent back around the rod. This last wire serves as a shoulder that bears against a fiber (or metal) washer that in turn bears against a large rubber grommet with a $\frac{1}{4}$ -inch hole, as shown in Fig. 2. The other side of the grommet has another washer between it and the panel bushing. The rod is pushed through the bushing, two more washers are added, and then the knob is put on. By pushing the rod out

through the panel as the knob is tightened, the rubber grommet is left in compression, and it serves as a simple friction lock for the control. It almost takes longer to describe the gadget than it does to build it.

The two coils L_5 and L_6 are mounted on 1-inch separated centers. The "phones" jack is insulated from the chassis by fiber washers. Both C_2 and C_1 capacitors are insulated from the chassis — the former by mounting it with short bushings on the mounting bracket, and the latter

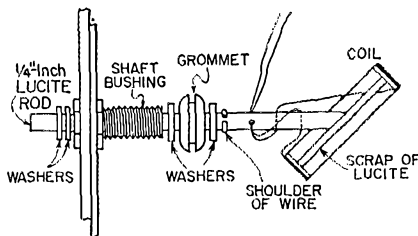


Fig. 2—Details of the adjustable antenna coupling coil. Part of the coil has been cut away to show the support.

by fastening it to the chassis with a machine screw through small extruded fiber washers. Clearance holes for leads from both stators and rotors of these capacitors were provided, as can be seen in the photographs. For those who question the author's sanity in going to this trouble to provide for rotor leads that could be made by simply anchoring the rotors to the chassis, we hasten to point out that one of our pet tricks is to provide short and *single* r.f. paths for circuits that are sometimes left to chance. In several instances it has apparently added considerably to the stability of oscillators, and we now do it as a matter of course.

The only other touch someone might argue with is the shielded leads to and from the volume control. These pass through a grommet in the chassis and make connection to the chassis only at the 12AX7 socket. This is a precaution that reduces hum in some cases where there are heavy a.c. chassis currents. The lead from the arm of the regeneration control was shielded also, in an effort to confine the 1700-kc. energy to the vicinity of the detector.

Alignment

Assuming that the wiring is correct, that the tube heaters light when you turn on the set, and that the power supply delivers 250 to 300 volts, the first step is to check the detector. This is conveniently done with the 6U8 out of its socket — then if something is wrong in the "front end" it won't confuse the detector checking. With headphones plugged in and the receiver (less 6U8) warmed up, advancing the volume control should give a hissing sound in the headphones. Advancing the regeneration control (increasing the voltage on the 6BD6 screen) you should find a point where the hiss increases appreciably and perhaps a very slight hum is

heard. This is the point where the detector "oscillates" — below this point you won't get a beat note with c.w. signals, and beyond it you will. The detector works — the next step is to get it on 1700 kc. (If it doesn't work, check your wiring and the voltages at the 6BD6 and 12AX7 pins.) If you can beg, borrow or steal a test generator, it is a cinch to put the detector on 1700 kc. by adjusting the slug in L_6 until the 1700-kc. signal is heard. The test signal need only be loosely coupled to L_6 — a wire placed a foot from the coil and connected to the test generator should suffice. Lacking the test generator, you may be able to use a b.c. receiver by tuning it to around 1245 kc. If the receiver has a 455-kc. i.f., the oscillator will be close to 1700 kc., and if the b.c. receiver is placed within a few feet of the receiver under test, there will be enough radiation from the b.c. receiver to act as the test signal. Don't go by the calibration on the b.c. receiver; make a new one from known local stations.

When the autodyne detector is working satisfactorily and you have acquainted yourself a little with its operation, plug in the 6U8 and let it warm up. Trim L_5 until you find a point where it pulls the detector out of oscillation, and detune it slightly until regeneration starts about 10 or 15 degrees farther along on the regeneration control, R_1 , than it did when L_5 was tuned well off the frequency. Check again to make sure that you are still on or close to 1700 kc.

Now connect an antenna (any wire 20 feet long or more) and swing the ANT capacitor, C_1 , across its range. The receiver noise should increase at two points — one near minimum on the capacitor (40 meters) and one around $\frac{3}{4}$ meshed (80 meters). The 3-30- μf . compression oscillator trimmer should be set at about $\frac{1}{2}$ turn back from its tightest setting. Leaving the ANT capacitor on 80 or 40 meters, tune around with the TUNE capacitor, C_2 , until you locate some amateur signals. If you lack a frequency standard or the ability to borrow one, you have no alternative but to identify the bands by the limits of 'phone or c.w. signals in the various subbands. In any event, once you have found the signals, you can move the bands on the TUNE scale by changing the setting of the mica compression trimmer. However, unless the i.f. is *exactly* on

1700 kc., the 7.0- and 3.6-Mc. points, 7.1 and 3.7 Mc., etc., won't coincide as they do on the homemade scale shown in the photograph. Observing the error, however, you can bring the i.f. to 1700 kc. easily. Incidentally, the homemade scale is simply a sheet of white paper held down with black Scotch Tape, with a sliver of tape on the dial to serve as a pointer. The pointer laps over the "O" end, and the 0-100 scale of the dial can still be used for logging by referring it to the upper edge of the lower horizontal black strip on the right-hand side.

Operation

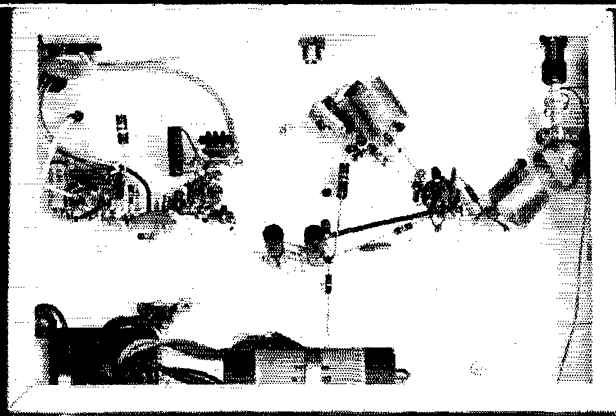
For the reception of c.w. signals, the regeneration control is advanced far enough for the detector to oscillate, as indicated by the sudden increase in hiss. It may be noticed that on strong signals it is impossible to tune in a signal at a low beat note (200 to 300 cycles). This indicates that the signal is too strong and is "pulling" or "blocking" the detector. To overcome this, increase the regeneration control or reduce the antenna coupling. After you have used the receiver for a while, you will get used to the "feel" of it and you will find the settings that work best for various QRM levels.

When receiving a.m. 'phone, the regeneration control is maintained just below the oscillation point. It will soon be noticed that this is the most sensitive point for 'phone reception, since the gain of the detector decreases as you back off the regeneration control still more. The selectivity of the receiver for 'phone reception is not as great as can be expected from a small superheterodyne using several tuned circuits in a 455-kc. i.f. amplifier. However, you can make up a lot of this selectivity by decreasing the antenna coupling and running the detector just under the oscillation point. A strong signal decreases the selectivity of the regenerative detector, hence the need for reducing the signal by decreasing the antenna coupling. S.s.b. 'phone is received the same as a c.w. signal, by advancing the regeneration control past the oscillation point and tuning carefully about the signal until it becomes intelligible. Overload is again your enemy here, so run the antenna coupling at a value consistent with good signal/noise ratio.

◆

The mixer input and high-frequency oscillator coils are mounted on tie points, as shown here. The antenna coil, L_1 , is mounted on the end of a piece of lucite rod, as shown here and in Fig. 2. The leads to it are wrapped several times around the rod, to provide a "pig tail" connection.

◆



Upper-Air Conditions for Two-Meter DX

Temperature and Water-Vapor Content Soundings for Some Famous Dates

BY JAMES S. COLLIER,* W2QBB

THE v.h.f. man is well aware that a "temperature inversion," "steep water vapor gradient" or some such thing is necessary for tropospheric propagation of his signals over extraordinary distances.

W2BAV in his article, "Painless Prediction of Two-Meter Band Openings" (*QST*, October, 1949), pointed out the correlation between surface weather conditions and some good 2-meter openings. Similarly, this article will show the vertical distribution of temperature and moisture for times of good 2-meter DX.

Consider first the variation of temperature and water vapor with height as shown in Fig. 1. There are no temperature inversions (that is, an

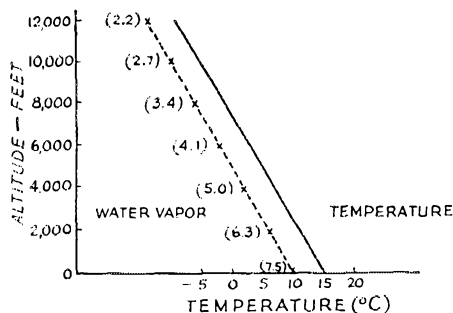


Fig. 1 — U. S. Standard Atmosphere temperature curve. The water-vapor curve is one that would result if the relative humidity were 70 per cent from the ground elevation to 12,000 feet. Figures in parentheses in this and following drawings are values of mixing ratio.

increase of temperature with height¹), and no sharp changes in the water vapor curve — just a steady decrease with altitude from a maximum at the earth's surface.

If a radio wave is to remain near the earth's surface and not be lost to outer space, some downward refraction is necessary. There would be no v.h.f. DX with the average sounding of Fig. 1, but the refraction under such conditions is sufficient to extend the v.h.f. range somewhat beyond the line of sight. A condition known as *superrefraction* (that is, more than ordinary refraction) is needed for real tropospheric DX.

* 57 Chapel Ave., Buffalo 25, N. Y.

¹ An inversion is sometimes considered to exist if the temperature lapse rate (decline in temperature with altitude) is less than 3 degrees Fahrenheit for 1000 feet of altitude. — Ed.

² H. G. Booker, *Compendium of Meteorology*, pages 1290 to 1295, published by the American Meteorological Society, Boston, Mass.

• Most v.h.f. operators develop weather consciousness before they have been in the game very long. They know that the daily weather maps can give indications of possible favorable propagation. Here W2QBB shows the actual upper-air conditions needed for 2-meter DX, and presents some soundings taken in areas where long-distance contacts were made.

Now that we have seen what won't produce 2-meter DX, let's look at a sounding that has a superrefracting layer in it. Fig. 2 is a plot of an actual upper-air sounding obtained at Joliet, Illinois, on September 6, 1950. The data were obtained from a radiosonde instrument released at 2200 EST. The moisture content of the air is shown by plotting the ratio: grams of water vapor per kilogram of dry air. This is called the *mixing ratio*. In this sounding and those to follow, the altitude scale shows the height above sea level of the significant points. Therefore, the first point on a curve is at the elevation above sea level of the station and not necessarily at zero

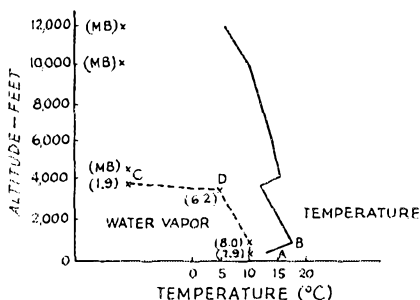


Fig. 2 — Upper-air sounding made at Joliet, Ill., September 6, 1950, at 2200 EST. Superrefraction resulted from the sharp decrease in water-vapor content (CD). Points marked (MB) indicate motorboating in the radiosonde unit at low relative humidity levels.

altitude. No water vapor scale is shown as it would be different at each altitude. At certain minimum values of relative humidity, the radiosonde instrument transmits only a very low audio frequency. Where this occurs, MB (motorboating) is shown on the water vapor curve.

Superrefraction occurs with either (1) a temperature inversion exceeding 2.8° centigrade per 100 feet or (2) a rate of decrease of water vapor exceeding 0.5 gram per kg. per 100 feet.²

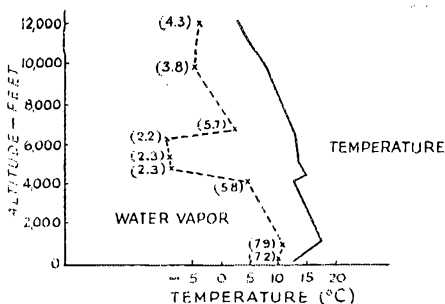


Fig. 3—Upper-air conditions at the eastern end of the W9EQC-W2NLY path are shown by this sounding made at Albany, N. Y., on September 6, 1950, at 2200 EST. Superrefraction at 4000 feet altitude is indicated by the water-vapor curve.

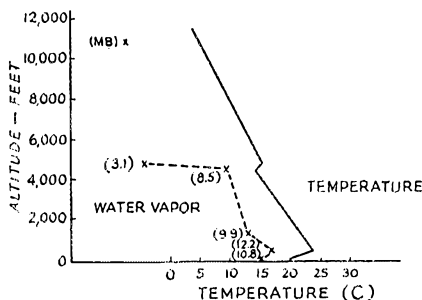


Fig. 4—Some idea of the upper-air conditions at Collierville, Tenn., can be gained from this upper-air sounding made at Nashville, Tenn., on October 30, 1950, at 2200 EST. The water-vapor gradient at 5000 feet was more than four times that necessary for superrefraction when W4HHK worked W3NKM, Pittsburgh, Penna.



In Fig. 2, the temperature at the inversion *AB* is seen to increase from 13°C to 18°C through an altitude difference of 800 feet. The gradient is therefore $(18-13)/8 = 0.6^{\circ}\text{C}$ per 100 feet and is insufficient for superrefraction. At *CD* on the water-vapor curve, there is a decrease from 6.2 grams per kilogram to 1.9 grams per kilogram through an altitude difference of 400 feet. The gradient is $(6.2-1.9)/4 = 1.1$ grams per kilogram per 100 feet, giving us a level of superrefraction.

Now let's see how some soundings check out with various 2-meter band openings.

On the evening of September 6, 1950, W2NLY, Oak Tree, New Jersey, worked W9EQC, Aurora, Illinois, a distance of nearly 750 miles. The nearest available sounding for the eastern end of this path is one made at Albany, New York. It is shown in Fig. 3. The sounding of Fig. 2, already discussed, is representative of conditions at the western end of the path.

On October 30, 1950, W4HHK, Collierville, Tennessee, contacted W3NKM, Pittsburgh, Pennsylvania, about 650 miles. The Pittsburgh sounding is plotted in Fig. 5, while the Nashville, Tennessee, sounding in Fig. 4 shows the probable conditions at Collierville.

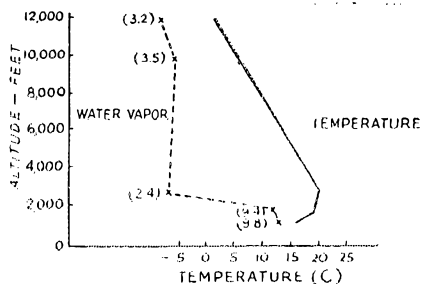


Fig. 5—Conditions at the eastern end of the W4HHK-W3NKM QSO are shown by this sounding made at Pittsburgh, Penna., on October 30, 1950, at 2200 EST. The rate of decrease of water vapor with height beginning around 2000 feet altitude is about 75 per cent greater than needed for superrefraction.

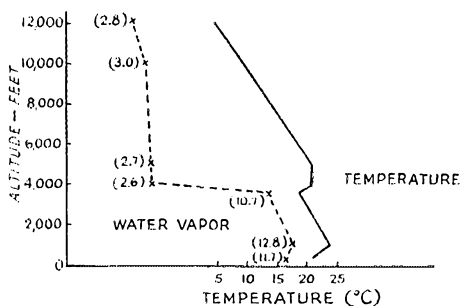


Fig. 6—Upper-air sounding made at Toledo, Ohio, on July 23, 1949, at 2200 EST. The water-vapor gradient between 3000 and 4000 feet is more than three times that needed for superrefraction.

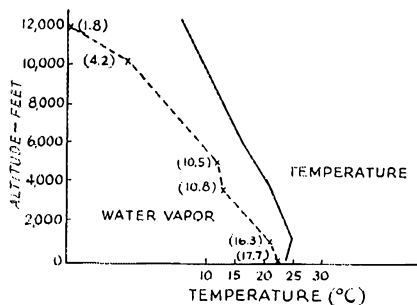


Fig. 7—This sounding made at Charleston, S. C., on July 23, 1949, at 2200 EST shows why a Michigan-South Carolina contact was not made in spite of good conditions in the northern states. Only weak temperature and water-vapor gradients are evident.



In none of these soundings do the temperature inversions meet the criterion for superrefraction, but in every case there is a superrefracting water-vapor gradient.

With only surface weather data available to him, W2BAV expressed the view that a South Carolina-Michigan contact was apparently missed for lack of activity on July 23, 1949. While Michigan conditions were favorable as

shown by the Toledo, Ohio, sounding in Fig. 6, conditions in South Carolina were something different. The Charleston sounding (Fig. 7) does not show any water-vapor gradient steep enough nor any temperature inversion strong enough to produce superrefraction.

From this it may be seen that upper-air sound-

ings are the only reliable source of information as to where and when tropospheric DX may be worked. The isobars (lines of common atmospheric pressure) shown on daily weather maps provide good clues, but they are not infallible, as any experienced and observant v.h.f. man will testify.

The Little Shack

A Neat Installation for the Living Room

BY LEN H. SMELTZER,* W4KZF

PROBABLY many XYLS have frowned on having the ham shack in the living room because it doesn't look much like normal home furnishings. We wanted to put a small transmitter and receiver in the living room so we wouldn't spend all our time in the basement, so the question of a suitable enclosure immediately presented

small speaker, and similar gadgets, when closed. Sufficient space (approximately one inch) was left on top and on each side of the transmitter compartment for air circulation, and the backs of both compartments were left open for the same reason. The panel under the transmitter, near the floor, has sufficient room on the rear for mounting



Cabinet fronts drop down to give access to equipment. They double as operating-table space when W4KZF is on the air.



Although simple in construction, the "little shack" fits in with its surroundings and conceals the appearances of the ham station.



itself. When the 16-year-old junior operator came up with a design for a modern cabinet that met with the approval of the XYL, he and yours truly went to work with some $\frac{3}{4}$ -inch plywood, glue, and nails. The result is shown in the photographs.

This cabinet was built to size for a Viking Ranger and BC-342N receiver, with additional space in the receiver compartment for the control panel and Q-5er, plus storage space for mike, key,

* Box 205, R.R. 2, Ludlow, Ky.

balun coils and an antenna relay out of sight.

Details of construction will not be given here because the sizes of the compartments will vary with each installation to accommodate the equipment in use. Also, the accessory equipment used with the receiver will help to determine the size of that compartment. Our purpose here is just to give an idea of what can be done with a little $\frac{3}{4}$ -inch plywood. If you can't build it yourself, maybe you have a friend or relative who likes to do a little woodworking.

The S-FS Indicator

A Signal/Field-Strength Meter for Mobile Use

BY C. VERNON CHAMBERS, WIJEQ

• The combination is a natural for mobile work. It will be found indispensable in the adjustment and servicing of receiving, transmitting and antenna systems. It is also most useful in transmitter hunting — a mobile activity that is enjoying widespread popularity.

SEPARATE UNITS for measuring signal and field strength were described by W8IWB and WØWLR in an earlier issue of *QST*.^{1, 2} Both of these used a 1-ma. meter as the visual indicator, and a 500-ohm potentiometer for adjustment. The S-FS Indicator combines the original circuits in a compact package permitting a single meter and potentiometer to do double duty. The cost of the dual-purpose unit is very little more than that of either instrument alone.

The unit is small enough for mounting either above or under the dashboard of a car, or it may be stored in the glove compartment when not in use. It is housed in a 4 × 5 × 3-inch gray hammertone box and, complete with a new meter, costs approximately \$17.00 to build.

A simple toggle switch changes from one function to the other. Power drawn from the broadcast receiver for the S-meter circuit is less than 2¼ watts. The field-strength circuit requires no external power.

The field-strength meter can be used installed in the car as an antenna-resonance indicator or as an output indicator for transmitter adjustments, as described by Abel, or it can easily be removed for antenna-pattern plotting, adjustment of other mobile installations or even for use in the home station. The sensitivity adjustment makes the indicator useful over a wide range of field strengths.

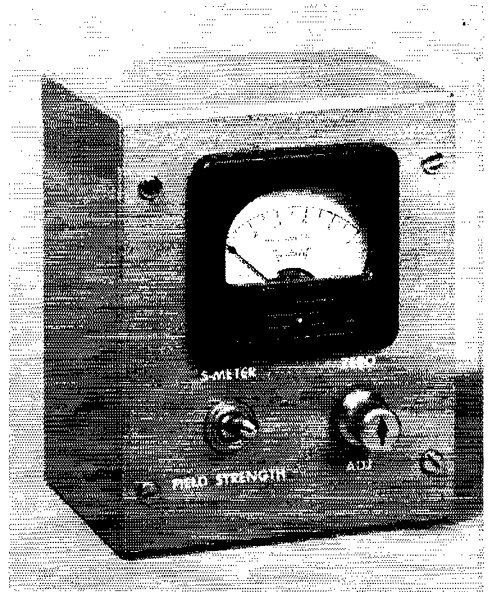
One handy feature of the S-meter arrangement is the sensitivity control. This control can be adjusted to prevent extremely strong signals from pinning the meter. When working with really weak signals, the sensitivity control may be adjusted to provide a noticeable meter deflection.

Aside from ordinary signal-strength work, the S-meter may be used to advantage when aligning converter or receiver circuits, and it is worth its weight in gold in adjusting antenna trap circuits to suppress QRM from b.c. signal feed-through in converters.³ Mobileers interested

in transmitter hunting will find the indicator indispensable when used in conjunction with a directional loop.

Circuit

The circuit of the S-FS Indicator is shown in Fig. 1. A 12AX7 is used in the S-meter section. One grid is returned directly to chassis and the second grid is connected to the sensitivity control, R_1 . The input end of R_1 is returned, via J_2 and a shielded cable, to the a.v.c. line in the b.c. receiver. The plates of the 12AX7 are con-



A front view of the S-FS Indicator. The zero-adjust control is to the right of the toggle switch, S_1 . The meter registers either signal or field strength, depending upon the setting of the toggle switch.

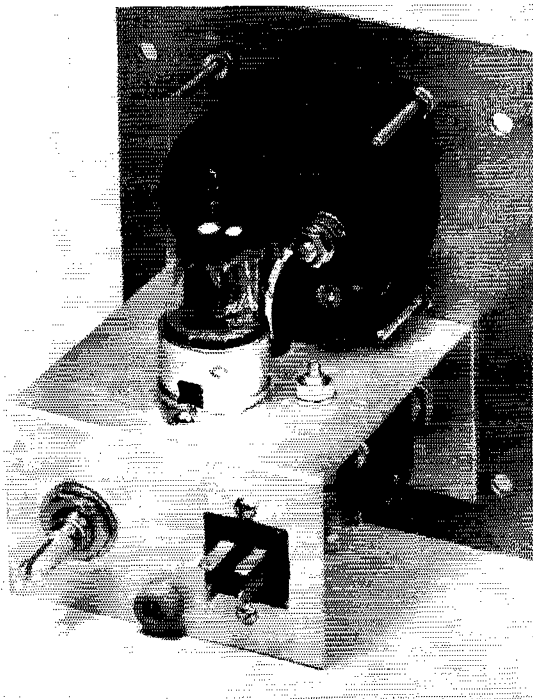
nected in parallel and then, through a single lead, to J_2 . Fig. 1 shows heater wiring for both 6- and 12-volt operation. Pin 9 of the tube is not used in the 12-volt circuit.

For S-meter operation, the meter and R_2 are switched across the cathode terminals of the tube by S_1 . The 500-ohm potentiometer, R_2 , becomes a zero-adjust control. Zero reading is obtained with R_2 adjusted for equal voltage at Pins 3 and 8 of the 12AX7. After an initial zero adjustment, the application of a.v.c. voltage through R_1 will drive the cathode of V_{1A} negative with respect to the cathode of V_{2B} , thus upsetting the meter balance and causing an upward deflection. For a given a.v.c. voltage,

¹ Amfahr, "Unidirectional Loops for Transmitter Hunting," *QST*, March, 1955.

² Abel, "The 'Hidden Gem,'" *QST*, March, 1955.

³ Chambers, "Bandswitching a Crystal-Controlled Mobile Converter," *QST*, January, 1955.



A rear view of signal-field-strength meter showing the homemade chassis, the 12AX7, and the rear of the panel-mounted meter. The tuning slug for L_1 , the sensitivity control and the power and antenna jacks are also visible.

the amplitude of the deflection will be controlled by R_1 .

The S-FS Indicator uses a Type 12AX7 in preference to the 6SN7 employed by WØWLR because it draws considerably less plate current. This saving is important if power for the S-meter, as well as the converter, is taken from the b.c. receiver. The 6SN7 and its prototype (12BH7) will work well in the circuit, but only at the expense of increased current drain.

The circuit of the field-strength section is electrically equivalent to the one described previously.² It is made active by switching the meter and R_2 into the circuit and by applying r.f. through J_1 . The amount of r.f. fed to the circuit may be controlled by adjusting the length of the pick-up antenna attached to J_1 . R_2 is a shunt to prevent off-scale readings when measuring strong r.f. fields.

Construction

As shown in the top view, the Triplett model 227-T meter is mounted on the front panel of the utility box. If the meter is centered with its top edge $1\frac{3}{8}$ inches down from the top of the panel, the barrel of the meter will not strike the folded-over lips at the front of the box when the unit is assembled. S_1 and R_2 are below the meter with a $1\frac{1}{2}$ -inch space between mounting centers. Each control is centered $1\frac{3}{8}$ inches up from the bottom of the panel.

The rear and the bottom views show the "U"-shaped chassis made from 1/16-inch thick aluminum stock. The width, depth and height of the chassis are $2\frac{7}{8}$, 3 and $1\frac{11}{16}$ inches, respectively. Panel-mounted controls (R_2 and S_1) clamp the chassis against the rear of the front panel as shown in the bottom view. A

$1\frac{1}{2}$ -inch space is left between the bottom edge of the chassis and the bottom of the panel to provide clearance for the lower front lip of the cabinet.

The socket for the 12AX7 is centered 1 inch in from the rear edge of the chassis. L_1 is located just to the right of the tube socket as seen in the rear view. L_1 is a North Hills type 120-II inductor having an inductance range of 105 to 200 μ h. However, any coil that will resonate around 3.9 Mc. (and still fit into the chassis) with the circuit capacitance may be used. A hole in the front of the socket, fitted with a rubber grommet, passes the leads between the meter and the toggle switch. R_1 , J_1 and J_2 are mounted on the rear wall of the chassis.

The bottom view shows the r.f. choke and the disk capacitors for the field-strength circuit mounted on a 2-terminal strip at the right side of the unit. The extra terminals on the

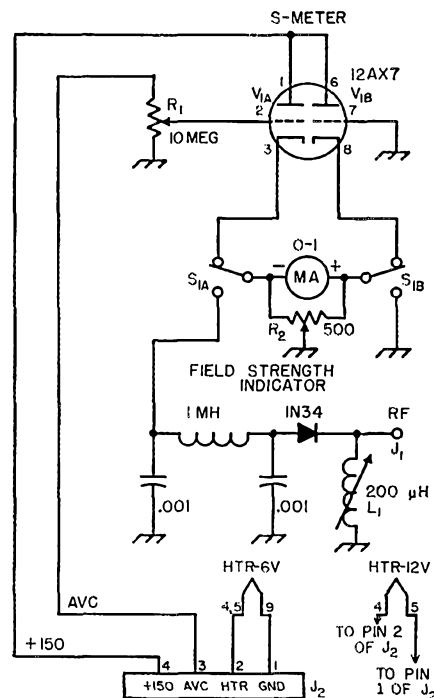


Fig. 1 — Circuit diagram of the S-FS Indicator.

slug-tuned coil are used for mounting the 1N34 crystal diode. Ordinary hook-up wire is used throughout.

Installation

Heater, plate and a.v.c. voltages for the S-meter are obtained from the car b.c. receiver and should be brought to the indicator through shielded leads. A suitable cable can be made from lengths of Belden No. 8885 shielded wire. The heater lead may be tapped onto the hot side of any receiver tube (it is a good idea to stay clear of the rectifier tube) close to a hole or receptacle provided for the output cable. The plate lead may be connected to the screen pin of an audio output tube socket, to a low-voltage tap on the power supply or to any other point delivering approximately 150 volts (higher voltages merely increase the current drain unnecessarily). A series resistor may also be used to drop the voltage. It should have a value of approximately 285 ohms for each volt in excess of 150.

Finding the a.v.c. line in a car b.c. receiver is not always an easy job unless you are lucky enough to have a circuit diagram and a layout plan. It is frequently possible to spot the line by tracing back from the control grid of either the r.f. amplifier tube or the converter. The grid of each tube is usually returned to the a.v.c. bus through a $\frac{1}{2}$ - to 1-megohm resistor. If you test a junction for a.v.c. voltage, just connect a high-resistance d.c. voltmeter between the point and ground and watch for a negative reading that increases with increased signal input. Local b.c. stations can supply the test signals.

After the interunit cabling has been completed, the receiver may be returned to the dash of the car. The performance of the S-meter may now be checked by tuning in signals—either amateur or b.c.—and observing the deflection of the meter. If b.c. station signals cause only a small

deflection, it indicates that R_1 is adjusted toward minimum sensitivity. In that case, readjust R_1 , zero the meter by means of R_2 , and try again. It is necessary to reset the zero-adjust control each time that the sensitivity control setting is altered. Of course, if signals tend to pin the meter, the sensitivity can be reduced by adjustment of R_1 .

With 150 volts applied to the plates of the 12AX7, with the grid of V_{1A} grounded (R_1 at minimum sensitivity position), and with the meter adjusted to zero, the tube should draw about 3.5 ma. The voltage at the two cathode terminals, Pins 3 and 8, should be 0.4 volts.

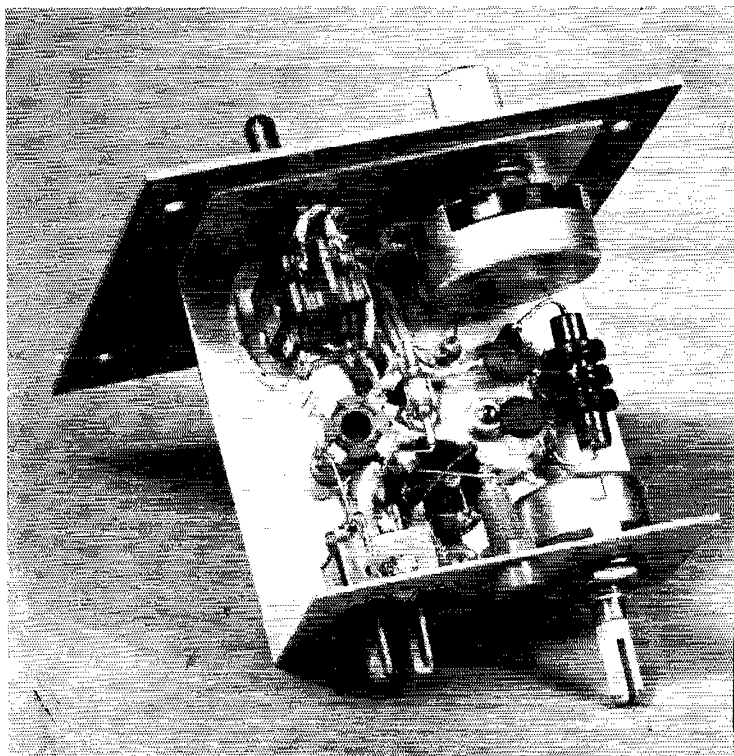
The field-strength meter can be most quickly tested by using the mobile transmitter as the source of signal. Either a short length of wire, the b.c. antenna, or an insulated fender guide² may be used as the r.f. pick-up. Just terminate the pick-up antenna at J_1 , throw S_1 to the proper position, adjust R_2 for maximum resistance across the milliammeter, turn on the transmitter and watch the needle. Lengthen the pick-up antenna if the meter deflection is not great enough, or regulate the shunt, R_2 , if the reading is too high. It is just as well to shorten the pick-up antenna a bit if the shunt resistance has to be lowered appreciably. Try and end up with an antenna length that serves the purpose as far as your own installation is concerned and also provides enough pick-up to permit making measurements of a more sensitive nature. The latter would include measuring the field strength from the mobile transmitter of a fellow ham who is parked alongside of your vehicle.

L_1 should ordinarily require adjustment only if the indicator is used for checking at 75 meters. In that case, it is advisable to increase the sensitivity to maximum by resonating the coil. Abel has explained why a tuned circuit is not required at the higher frequencies.

◆

The function switch is to the left of the zero-adjust control in this bottom view of the S-FS Indicator. R_1 is at the rear of the unit, just below the 1-mh. r.f. choke. J_1 , on the rear wall of the chassis, is a miniature nylon tip jack. The back cover for the metal box that normally encloses the meter is punched to clear the components mounted on the rear wall of the chassis.

◆



A Low-Cost Code-Practice Oscillator

A.C. Power with Safety Features

BY ROBERT E. FOLTZ,* W9GBT

IN looking for a good design for a code-practice oscillator, certain requirements were established: The unit must be powered from the a.c. line yet provide complete isolation for safety; there should be no shock hazard in the keying circuit; and in addition, speaker operation was desired without added cost or circuit complication.

Units have been described using a filament transformer for the tube heaters, with the plate voltage obtained from batteries or a rectifier supply. A study of transformers available disclosed a type used in TV boosters having a plate winding of 110 to 150 volts at 15 to 25 ma., in addition to a filament winding, at a cost of only fifteen cents more than a single filament transformer.

A selenium rectifier was first considered for ob-

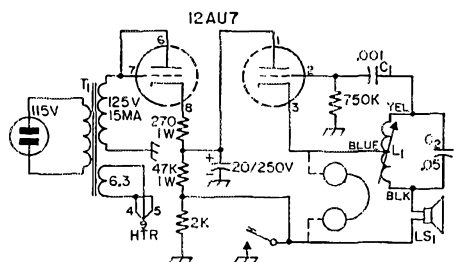


Fig. 1 — Circuit diagram of the low-cost code-practice oscillator.

C₁ — Disk ceramic.

C₂ — Paper.

L₁ — 100 mh., adjustable (TV horizontal oscillator coil, GE type RLC-091 or equivalent).

T₁ — Power transformer, 110-150 volts at 15-25 ma.; 6.3 v. at 0.3 amp. (Stancor P58415, Merit P3046, or equivalent).

LS₁ — 2-inch speaker, 3- to 4-ohm voice coil. Headset may be connected as shown by dotted lines. Resistors are $\frac{1}{2}$ watt unless noted otherwise. Capacitances are in μ f.

* 1214 Fourth Avenue, Sterling, Illinois.

• Using a TV horizontal-oscillator coil in the oscillator circuit makes it possible to drive a speaker voice coil without a matching transformer. Combined with a "booster" transformer, the result is an inexpensive self-contained code-practice oscillator.

taining the necessary d.c. plate voltage, but further study indicated that a dual-triode tube would be more economical in both cost and space, by using one section as a half-wave rectifier and the other as the audio oscillator.

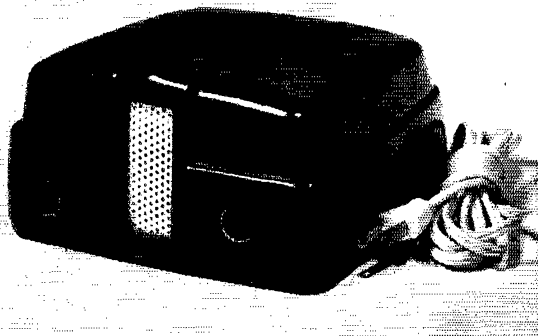
The ordinary audio-oscillator circuit calls for an audio interstage transformer, which accounts for a good portion of the total parts cost. In this design, a horizontal-oscillator coil, as employed in TV receivers, is used in the feed-back circuit. In addition to economy, the adjustable ferrite core provides the means for adjustment of tone without the added cost of the usual potentiometer.

The number of components in the circuit of Fig. 1 is small, as all frills were eliminated in the interests of simplicity and low cost. New parts as checked in a catalog total under \$6.00, not including the speaker or cabinet. Many of the parts can be found in special sale catalogs or at bargain counters at most of the larger supply houses. The parts for this particular unit, bargain-purchased, amounted to only \$4.03. An additional \$1.05 provided a 2-inch speaker.

The Circuit

Referring to the circuit, it will be noted one triode section of the 12AU7 functions with grid and plate tied together as a half-wave rectifier. The 270-ohm resistor in the cathode lead limits

(Continued on page 110)



The author's oscillator is built in a plastic cabinet taken from a surplus electric-blanket control. The knob on the left is the a.c. switch; the key plug is inserted through the hole at the right.

A 28-Mc. Civil Defense Package

Three-Channel Fixed-Portable-Mobile Station for Emergency Use

BY PHILIP S. RAND,* WIDBM

• The three basic units — transmitter, receiver, power supply — of an emergency station have to be coordinated electrically as a matter of practical operation. Here's a "package" that carries the coordination still further, putting three identical-size units into a compact station that can be picked up and carried anywhere in one piece, yet which can readily be separated into components for separate use or servicing. Utility and appearance are combined without excessive cost.

THE EQUIPMENT to be described is the result of the efforts of three amateurs who joined together to solve a civil defense communications problem in a small Connecticut town. This same problem probably exists in hundreds of other small communities all over the country.

Redding, a rural community with a population of only about 2500, is situated in the hills of Connecticut about sixty miles northeast of New York City and about twenty miles northwest of Bridgeport, Connecticut. The people live in a number of small villages scattered throughout the town limits. Redding is one of the twenty-two towns and cities which constitute "Area One" of the State of Connecticut Civil Defense system. Area One is one of the most active civil defense areas of Connecticut. Unfortunately for Redding there are only three amateurs in the town, two of whom are already up to their ears in c.d. work at Area Headquarters.

One of the problems was how to organize an

* Redding Ridge, Conn.

efficient RACES program with only one ham available locally. Another problem was that of obtaining appropriate station equipment without any funds, because it was found that although Redding had the nucleus of a c.d. organization it was not active and there was no money for radio gear. The third problem was how to make the c.d. organization in Redding more active so it would take part in the weekly training exercises. It was sort of like the old question of which came first, the chicken or the egg: No c.d. activity, no communications; no communications with the rest of the area, no activity locally. Past experience with other towns in Area One had shown conclusively that if radio communications could be set up and maintained between an inactive town and Area Headquarters, interest in all branches of the local c.d. set-up was stimulated enough to spark the whole operation into life.

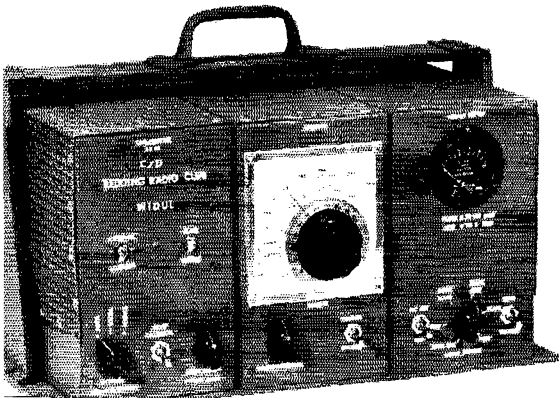
WIDBM, W1KGT and W1ODW held a meeting, procured an egg, and hatched out the following:

1) They formed a bona fide radio club with themselves and their XYLs as members and applied to FCC for a club radio station license. This station was to be the local c.d. station for contact with Area Headquarters and was to be located at c.d. headquarters in the Town Hall. FCC issued a station license, W1DUL.

2) Through notices in the newspapers, at the school and by word of mouth, they were able to get about ten new members for the radio club. All of the non-amateur members are obtaining Restricted Radiotelephone Permits from FCC, are being trained in RACES operating procedure, and will be used as operators.

3) W1ODW was appointed Redding Radio Officer by the local c.d. director, and he imme-

(Left): The three units assembled in their carrier. Transmitter, receiver, and power supply are included in the "package." The outfit can run either on regular a.c. or on a 6-volt battery supply. The carrier is made from a cut-down 1/2-inch aluminum relay rack panel as a base, with aluminum uprights and crosspiece supporting the handle. Individual units are fastened to the base with screws. (Right): Rear view of the assembled station shows the converter mounted in place on the back of the receiver.



diately made out the necessary RACES application forms tying Redding into the Area and State RACES plan. These forms were forwarded to the State Radio Officer.

4) Redding had previously been assigned to the Area ten-meter net. WIDBM, W1KGT and W1ODW pooled ideas and parts and divided up the actual work in designing, constructing and installing a complete ten-meter c.d. station for the town. The station will, of course, be owned and operated by the Redding Radio Club, with one of the amateur members as Trustee.

When planning a RACES station like this, it must be kept in mind that it will take more than just one radio operator to man it. A typical c.d. set-up would require:

- a) one Communications Officer with three assistants or alternates (in charge of all types of communications);
- b) one Radio Officer with three alternates (in charge of all radio communications);
- c) three dispatchers;
- d) one chief operator in charge of all operators;
- e) one technician in charge of all equipment;
- f) four radio operators for each transmitter in use;
- g) at least four messengers for delivering messages.

This makes a total of twenty-four people for a one-transmitter station, a rather imposing list; however, all RACES stations should be organ-

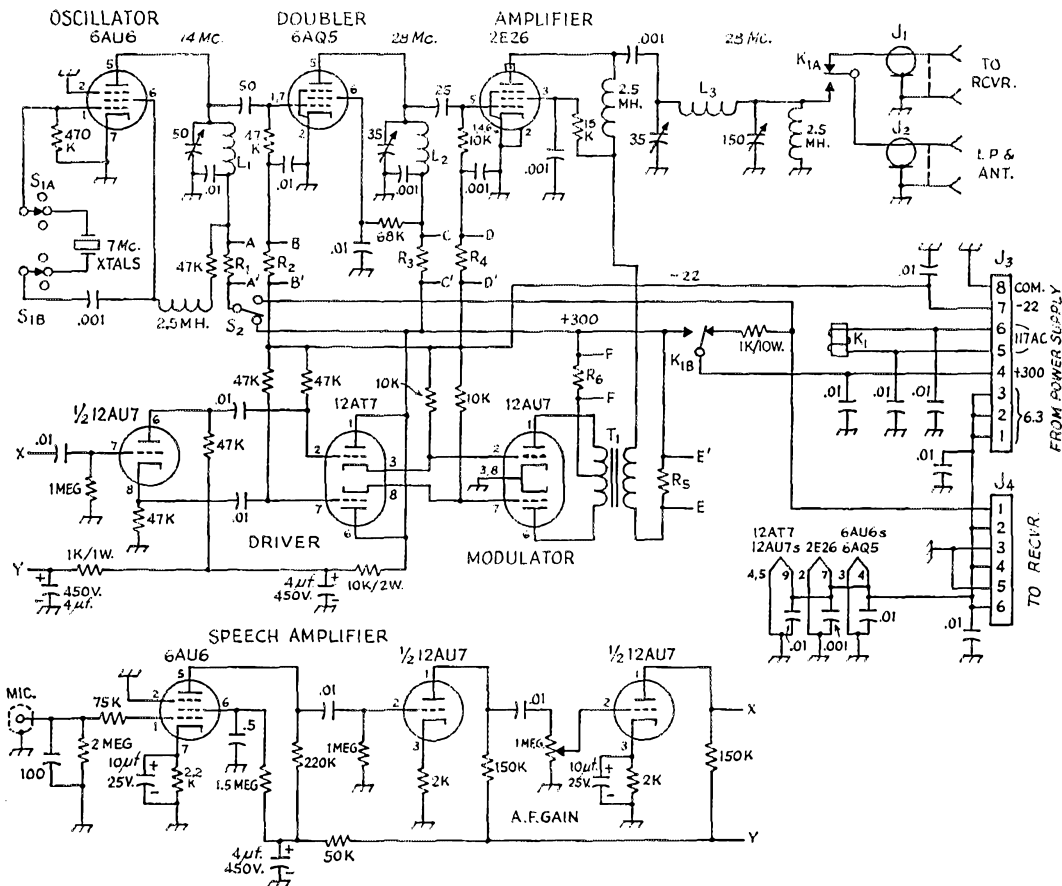


Fig. 1 — Circuit diagram of the transmitter and modulator. Capacitances below 0.001 μ f. are in μ f. Fixed capacitors up to and including 0.01 are ceramic. Resistors are $\frac{1}{2}$ watt unless otherwise indicated.

- R₁, R₃, R₅, R₆ — Meter shunt, for 100-ma. full scale (approximately 0.16 ohm, or approx. 5 ft. No. 24 enam. wound on 1-watt resistor).*
- R₂, R₄ — Meter shunt, for 5-ma. full scale (25 ohms).*
- L₁ — 4 μ h.; 20 turns No. 26 on $\frac{1}{2}$ -inch diam. form, winding length 1 inch, slug-tuned.
- L₂ — 1.5 μ h.; 11 turns No. 20 on $\frac{3}{8}$ -inch diam. form, winding length 1 inch, slug-tuned.
- L₃ — 1.3 μ h.; 9 turns No. 12, diameter $1\frac{1}{2}$ inches, length $1\frac{3}{4}$ inches, self-supporting.
- J₁, J₂ — Coaxial connectors, chassis type.
- J₃ — 8-contact connector, chassis-mounting (octal).
- J₄ — 6-contact connector, chassis-mounting (Jones).

- K₁ — D.p.d.t. relay, 117-volt a.c. coil (Advance type AM/2C/115VA).
- S₁ — Rotary switch, 2 poles, 3 positions.
- S₂ — S.p.d.t. toggle.
- T₁ — Modulation toggle, 10,000 ohms to 3000, 5000, or 8000 ohms (Triad type M-3X).
- * These values for a surplus meter taken from the r.f. indicator of ARC-5 equipment. Values should be adjusted to fit when other types of meters are used.
- NOTE: Connections indicated by A-F and A'-F' inclusive go to corresponding letters on meter switch (in power-supply unit) through a 12-wire cable. Plug-and-socket wiring for the meter cable is omitted from these diagrams for simplification.

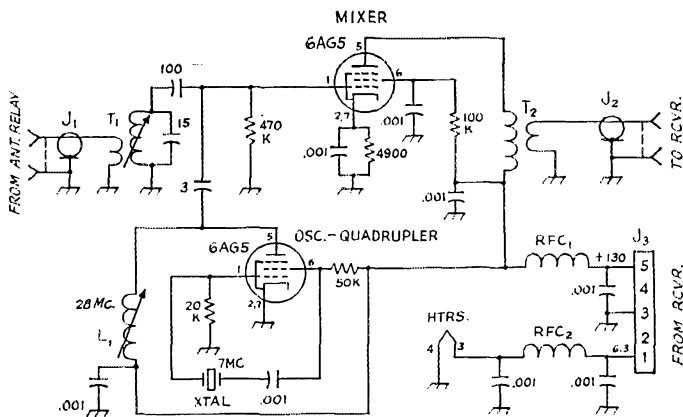


Fig. 2 — Crystal-controlled 28-Mc. converter. The 0.001- μ f. capacitors are disk ceramic; others may be either mica or ceramic. Capacitances below 0.001 μ f. are in μ f. Resistors are $\frac{1}{2}$ watt, carbon.

L₁ — 16 turns No. 24 enam. close-wound on $\frac{1}{2}$ -inch diam. slug-tuned form (National XR-50). Inductance adjusted to resonate with tube and stray capacitances at 4th harmonic of crystal.

J₁, J₂ — Coaxial connectors, chassis-mounting type.

J₃ — 5-contact connector, male, chassis-mounting (5-prong plug).

RFC₁ — 21 μ h. (Ohmite Z-28).

RFC₂ — 7 μ h. (Ohmite Z-50 or 2-watt resistor wound full with No. 20 enam.).

T₁ — Grid coil approx. 1.5 μ h.; 13 turns No. 24 enam. close-wound on $\frac{1}{2}$ -inch diam. slug-tuned form (National XR-50). Antenna coil 4 turns wound at ground end of grid coil.

T₂ — Untuned b.c.-band r.f. transformer (Miller 472-UA). Leads at ground ends of coils must be unsoldered and separated for making the connections shown above. See text for further modifications.

ized on this basis so they will be adequately staffed for continuous twenty-four-hour operation day after day. Also, bear in mind that if the time ever comes when c.d. communications are vitally needed, half of your personnel may be knocked out or otherwise unavailable, so you need plenty to start with. (Incidentally, all amateur stations not in RACES will be definitely off the air in the event of a national emergency resulting from enemy action.)

Fortunately for small towns with only a few hams, only the Radio Officer, his alternates and the technician need be licensed amateurs. The rest need only hold Restricted Radiotelephone Permits. RACES mobiles can be owned and operated by Restricted Permit holders, if need be.

Transmitter

In the actual design of the equipment, it was first determined by a mobile test that a 15-watt transmitter with a 10-meter ground-plane antenna would be adequate to span the twelve airline miles from the Redding Town Hall to Area One Control. With this as a basis, it was possible to build a rig with a combination 120-volt a.c./6-volt d.c. power supply so that the transmitter could be independent of power failures. By the addition of a carrying handle, it could also be used as a portable or a mobile if need be.

Going on from this point, a simple yet effective r.f. unit was built and tested using a 6AU6 crystal oscillator followed by a 6AQ5 doubler and a 2E26

final amplifier. The circuit is shown in Fig. 1, along with the 12AU7 Class B modulator. There are three crystal frequencies available, one for the Area channel, one for the local channel and one for the statewide mobile support frequency. In the interests of good audio quality (which cuts down on repeats and fills in handling messages), a crystal microphone was selected and the necessary audio amplification was built in. The 12AU7 Class B modulator was chosen because of its low static plate current. The use of a cathode follower for a driver eliminated the need for a Class B driver transformer.

For simplicity in tuning and antenna loading, a pi network was used in the final plate circuit. The plate tuning and antenna loading controls are the only ones brought out to the front panel. The crystal-oscillator plate and doubler plate are tuned with a screwdriver through suitable holes in the top of the cabinet.

In addition to the crystal switch and the audio gain control, there is a s.p.d.t. toggle switch on the front panel for turning on the crystal oscillator alone so that the transmitter can be spotted on the receiver. This is a big help to inexperienced operators in locating the net frequency.

A small d.p.d.t. 120-volt a.c. relay shifts both the antenna and B-plus from the receiver to the transmitter when the send-receive switch is thrown. This relay is connected to the 120-volt winding on the transformer so that it works regardless of whether a.c. or battery is being used for primary power.

Receiver

Many ideas on receivers were discussed and rejected, including using a BC-348, a 312, or an ARC-5 with a tunable converter, or rebuilding a junked ham receiver. The amount of work involved in designing and building a complete 10-meter receiver with a good noise limiter, adequate stability, sensitivity, bandspread, and so on, was a little frightening. A good solution finally came when some 144-Mc. technique was borrowed, resulting in a simple crystal-controlled converter ahead of a homemade broadcast receiver. Fig. 2 shows the circuit of the converter, which uses a 7-Mc. crystal and a pair of 6AG5s. Fig. 3 gives the circuit of the tunable i.f. amplifier (540 kc. to 1750 kc.). This has the useful feature that the homemade dial can be calibrated in both 10-meter frequencies and b.c.-band frequencies, and if the

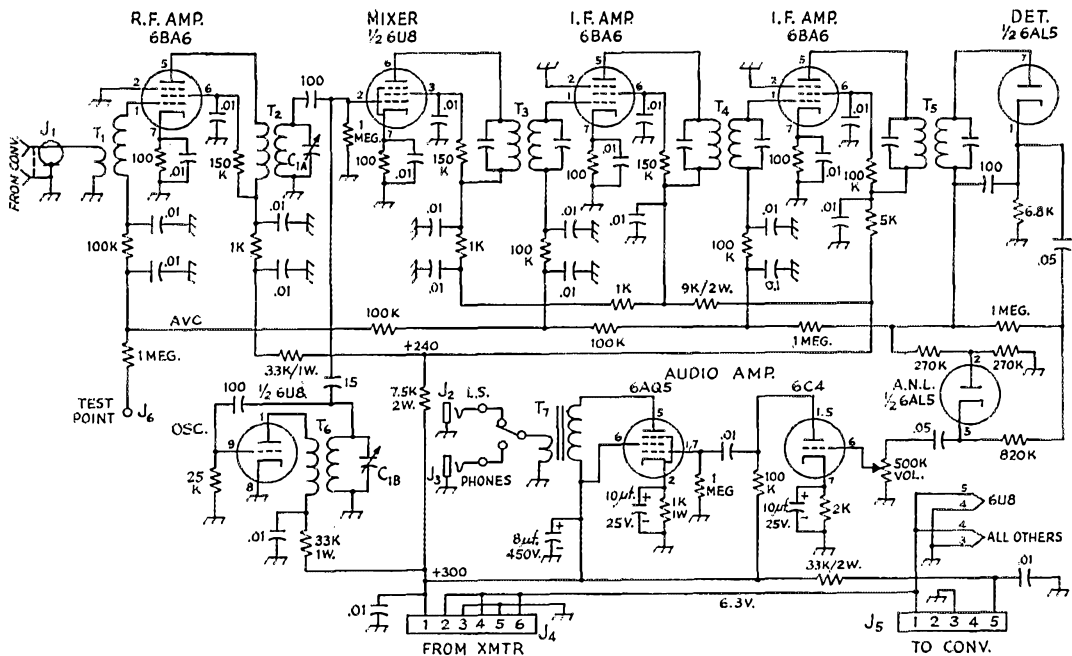


Fig. 3 — Circuit of b.c.-band receiver used with crystal-controlled 28-Mc. converter. Capacitances below 0.001 $\mu\text{f.}$ are in $\mu\text{mfd.}$ Fixed capacitors to 0.01 $\mu\text{f.}$ are ceramic. Resistors $\frac{1}{2}$ watt unless specified otherwise.

- C1 — Two-gang b.c.-receiver tuning capacitor.
- J1 — Coaxial connector, chassis-mounting type.
- J2, J3 — Single-circuit 'phone jack.
- J4 — 6-contact connector, chassis-mounting (Jones).
- J5 — 5-contact connector, chassis-mounting (5-prong socket).
- J6 — Pin jack.
- T1 — B.c. antenna coil, untuned (Miller 472-UA modified as described in text).
- T2 — B.c. r.f. coil assembly (Miller 242-RF).
- T3 — 455-kc. i.f. transformer, input type (Miller 012-C1).

- T4 — 455-kc. i.f. transformer, interstage type (Miller 012-C2).
- T5 — 455-kc. i.f. transformer, diode type (Miller 012-C4).
- T6 — B.c. oscillator coil assembly (Meisner 14-4243).
- T7 — Audio output, 4-watt universal type (Stancor A-3856).

NOTE: I.f. transformers, T3-T5, inclusive, tuned to following frequencies:

Trans.	Pri.	Sec.
T3	460 kc.	450 kc.
T4	445	465
T5	460	455

need arises the converter can be unplugged and the Conelrad channels, 640 kc. and 1240 kc., can be received. These are both marked on the paper dial. Also, other crystal converters, such as for 144 or 50 Mc., can be plugged in either for regular use or for monitoring purposes. The tuning range is about 1210 kc., or from approximately 28.5 to 29.7 Mc. This same range would apply on either 6 or 2 meters, so an appropriate crystal would have to be used in these converters to cover the desired 1.2-Mc. portion of the band.

The untuned r.f. stage used in the broadcast tuner was found necessary to prevent birdies resulting from the two oscillators beating together in the mixer grid circuit. It is recommended that anyone building a similar receiver use a tuned stage of r.f. with a three-gang capacitor instead of the two-gang unit we used. When we discovered the birdies it was too late to install the three-gang condenser, so we did the next best thing and isolated the two oscillators with the untuned stage.

A 6U8 was used as an oscillator-mixer because one was available. A 6BE6, or another type of converter, could have been used just as well.

Two stages of 455-kc. i.f. were used to provide enough gain so that the i.f. transformers could be stagger tuned for a broader passband, making tuning easier for inexperienced operators.

The second detector, a 6AL5, also provides a.v.c. and noise limiting. The audio is conventional, except that a s.p.d.t. toggle switch allows switching from 'phones to loudspeaker when needed. Normally all reception is with 'phones in c.d. work.

Power Supply

A schematic of the power supply is shown in Fig. 4. A combination a.c./vibrator transformer is used so that primary power can be either regular a.c. or 6 volts d.c. By using 12-contact power plugs, the selection between a.c. and d.c. is made simply by plugging in the proper plug. When the d.c. cable is plugged in the vibrator is automatically connected in the circuit.

The circuit is straightforward, except perhaps for the use of selenium rectifiers. These were used in order to save 2 amp. that would have been needed for heating the rectifier filaments if tube rectifiers had been used. Four 200-ma. selenium

units were used in each stack because they were available; three 75-ma. units could have been used just as well.

The fixed bias, -22 volts, for the r.f. and modulator is obtained from the drop across a 200-ohm 25-watt adjustable resistor in the transformer center tap. This robs 22 volts from the high voltage; however, the drop in plate voltage is not missed, and the system is better than replacing "C" batteries.

Construction

As can be seen from the photographs, the entire station is made up of three small units. This was done for ease of construction and servicing. In use, these units are all bolted to a common bottom or base plate which is equipped with a carrying handle. In the front-view photograph the transmitter unit is on the left, the receiver is in the center, and the power supply is on the right. The crystal-controlled 28-Mc. converter is attached to the rear of the main receiver and the low-pass filter is tucked in back of the transmitter.

In actual use in the Town Hall, the complete set-up is housed in a plywood cabinet with a hinged door that can be either locked when not in use or can be dropped down for use as an operating table. There are shelves and compartments for the microphone, headsets, logbook, message pads, and similar accessories.

The crystal converter is built in a 3 × 4 × 5-

inch utility box with the components mounted on one of the covers. This box is attached with small aluminum brackets to the top rear of the main receiver.

The transmitter, receiver and power supply are each constructed on a standard 3 × 5 × 10-inch aluminum chassis equipped with homemade front and rear panels 8 inches high. The panels have 1/2-inch lips folded over so that the perforated aluminum sheet (Reynolds "do-it-yourself" material now available in most hardware stores) for the shielding can be secured with sheet metal screws. In our case we completed all three cabinets (all holes drilled and punched) and then, after assembling them, sprayed them with grey wrinkle enamel. Baking under some infrared heat lamps finished the paint job. Next, Tekni-Label decals were applied and the result was a professional-looking job.

On the transmitter chassis the speech amplifier tubes are across the rear, separated by the modulation transformer from the r.f. The crystal oscillator is in the center of the chassis and the final amplifier is toward the front panel. The antenna relay is just behind the antenna loading condenser.

The two coax cables from the connectors on the rear panel run to a bracket just behind the relay. One of these goes to the antenna and one to the converter.

Because of lack of space in the r.f. unit, the

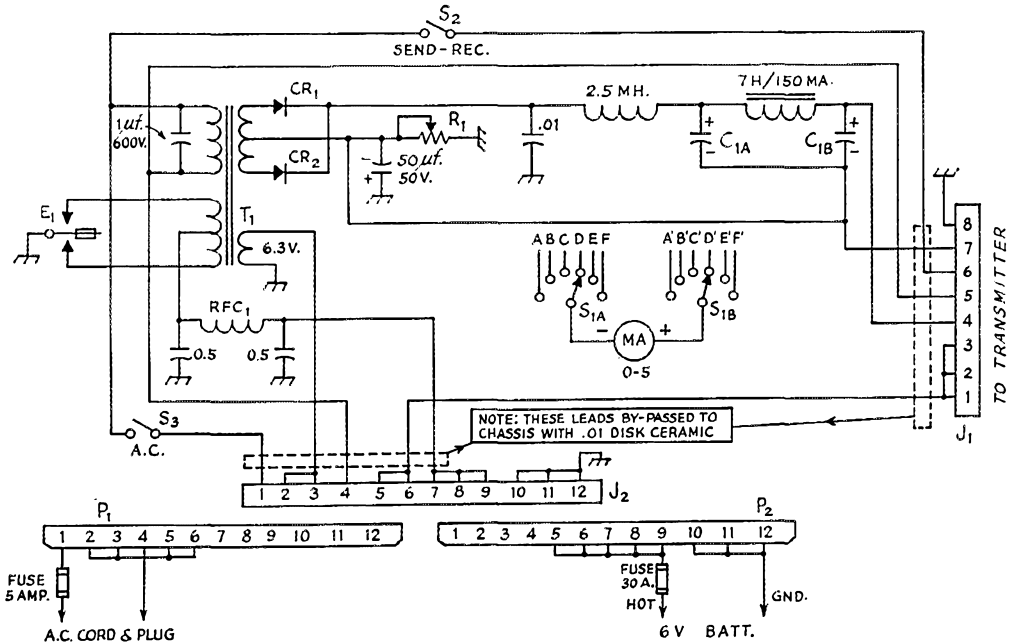


Fig. 4—Power-supply unit. Capacitances are in μf .

C_{1A} , C_{1B} —20- μf . 150-volt electrolytic (Mallory FP434, with 10- μf . units paralleled. Can must be insulated from chassis).

R_1 —200 ohms, 25 watts, adjustable; set to 166 ohms.

CR_1 , CR_2 —Selenium rectifiers; see text.

J_1 —8-contact connector, chassis-mounting (octal).

J_2 —12-contact connector, chassis-mounting (Jones).

P_1 , P_2 —12-contact connector, cable-mounting (Jones).

S_1 —2-pole 6-position wafer switch.

S_2 , S_3 —S.p.s.t. toggle.

T_1 —Combination a.c.-vibrator power transformer, 325 v. d.c. at 135 ma.; 6.3 v. at 4.7 amp.; 6-8 v. d.c. and 117 v. a.c. primaries (Thordarson T-22R24).

E_1 —Vibrator (Mallory type 294).

meter and the meter switch are both located in the power supply and a 12-wire cable interconnects these two units. The meter shunts, however, are in the transmitter. These must be tailored to fit the particular meter.

The vibrator and the filter condenser can are mounted along the rear edge of the power supply chassis. The power transformer occupies most of the space in the middle. The selenium rectifiers are mounted on two 5-inch 6-32 threaded rods between two aluminum end brackets, toward the front just behind the 2-inch milliammeter. The filter choke is mounted under the chassis in the center while the r.f. choke for the battery lead is just to the rear.

Note that all terminals of the output cable sockets are by-passed with 0.001 disk ceramic capacitors. In the transmitter unit this keeps TV harmonics from escaping, while in the power supply it keeps vibrator hash in its place. In the receiver it helps to keep the two oscillators from beating together. This by-passing also helps to keep broadcast signals from entering the receiver via the power leads. These precautions may not be needed in every installation, but since it was easier to put the by-passes on before installing the sockets we put them on "just in case." All 0.001 and 0.01 capacitors are of the disk ceramic type, including the audio coupling units. This makes for a very neat and compact wiring job.

In laying out the receiver chassis, the tuning capacitor had to be mounted slightly off center to allow room for the shield cans of the r.f., mixer and oscillator coils which line up on the left. The i.f. transformers and tubes are along the right side, with the two audio tubes on the rear edge. Miscellaneous components are grouped on terminal boards on either side under the chassis. The volume control is mounted on a small bracket toward the rear so as to be near the first audio stage. The audio output transformer is mounted near the output tube, with shielded leads running to the 'phones-speaker switch up front and thence back to the two jacks.

The dial was made by cutting and filing an

aluminum frame to mount over white cardboard on which the frequencies were lettered in India ink. The knob itself is one from the junk box with a celluloid pointer attached. A vernier action dial would be more suitable, if available.

The i.f. output coil of the converter is a broadcast-band untuned antenna coil hooked up in reverse. If the builder should use this same coil, it will be necessary to separate the two windings, the ground ends of which are both soldered to the same lug on the coil form, and connect the antenna-winding lead to the spare lug. This prevents B-plus from appearing on the output winding. It was found that this particular coil resonated near 600 kc., so about half the turns were removed from the "grid" winding and the output was much more uniform across the 10-meter band. These same modifications were made to the untuned r.f. stage in the receiver proper, to make the coil tune better and to avoid shorting out the a.v.c. Before removing turns it is well to check the receiver response to see if such modification will be necessary.

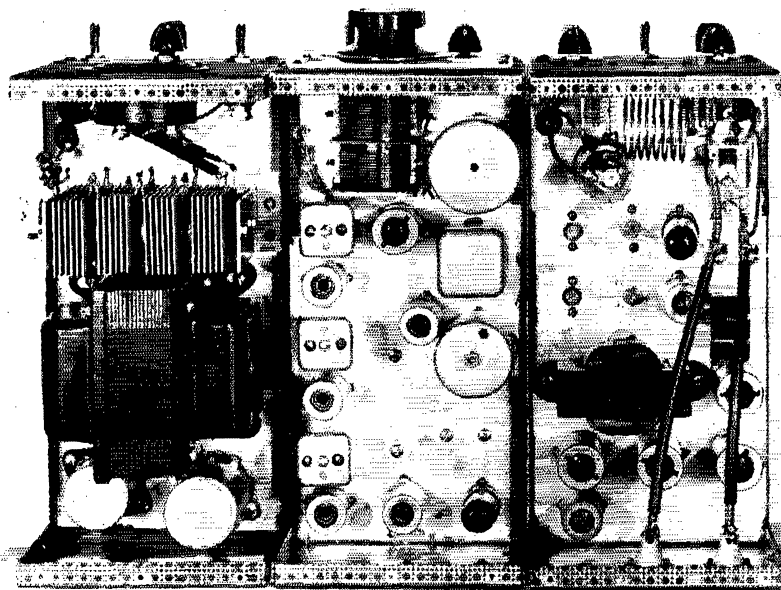
The interconnecting power and coax cables all connect to the rear of the chassis and are about 24 inches long so that the various units may be readily separated and turned upside down for testing and servicing.

Testing

After all four units are assembled and wired, the power supply should be tested first. Check the circuit over before turning on the power, to be sure there are no mistakes or shorts. Remember that the negative side of the filter capacitors goes to the -22 volts, not to ground; there will be a bad a.c. hum in the audio if the capacitors are grounded. With no load the B-plus voltage will run around 400 or higher, but with full load on transmitting it is down to about 300 volts.

The voltage during receiving runs about 350 volts but is reduced in the receiver by the rather high values of decoupling resistors used in addition to a series resistor in the transmitter unit.

Alignment of the receiver follows usual prac-



Top view of the three units with covers off; transmitter at right, receiver in center, and power supply at left. Layout details are discussed in the text.

The perforation pattern on the bent-over edges of the front and rear panels results from spray-painting the cases with the covers in place. This avoids necessity for subsequent scraping of paint to make good electrical contact with the perforated shields.

TABLE I
Voltage Measurements with V.T. Voltmeter at Tube Sockets

Receiver	Grid	Plate	Screen	Cathode	Grid Ma.	Plate Ma.
6AC5 mixer	0 v.	130 v.	110 v.	3.5 v.		
6AG5 crystal oscillator	- 5.	130	80	0		
6BA6 r.f.	- 3.5	200	75	.3		
6U8 { mixer oscillator	- 10.	175	75	.25		
	-38.	100	—	0		
6BA6 1st i.f.	- 3.5	170	70	.25		
6BA6 2nd i.f.	4.	230	105	.6		
6C4 1st a.f.	0	110	—	5.		
6AQ5 audio output	0	300	300	23.		
<i>Fully Loaded Transmitter</i>						
6AU6 crystal oscillator	-30. v.	300 v.	180 v.	0	—	
6AQ5 doubler	-45.	300	210	0	.5	
2E26 final amp.	-65.	275	150	0	3.5	
6AU6 1st speech amp.	0.	170	55	1.4 v.		
1/2 12AU7 2nd speech amp.	0	75	—	3.5		
12AU7 { 3rd speech amp. phase inverter	0	85	—	3.5		
	0	250	—	16.		
12AT7 { 1/2 driver 1/2 driver	-22.	300	—	-16.		
	-22.	300	—	-16.		
12AU7 { 1/2 modulator 1/2 modulator	-16.	300	—	0		2.4*
	-16.	300	—	0		
	Trans.	Rec.				
Trans. Bias Supply	-22 v.	-11 v.				
+HV at input to filter	+335	+375				

* Without speech input.

tice. Feed a signal from a signal generator at 455 kc. into the last i.f. grid and align T_5 first, then work toward the mixer one stage at a time, reducing the output of the signal generator each time so that nothing overloads. A vacuum-tube voltmeter plugged into the a.v.c. test jack makes both a good S-meter and an alignment indicator. The i.f. should be stagger-tuned according to the frequencies given in the caption for Fig. 3.

After aligning the i.f., proceed with the r.f. and mixer stages. When the receiver proper is lined up so that it works well on the broadcast band, the converter may be tested. Check the two r.f. coils with a grid-dip meter after they are wired, but with the tube filaments turned off. The crystal-oscillator plate coil should dip at around 28 Mc. while the mixer coil should show resonance at about 29 Mc.

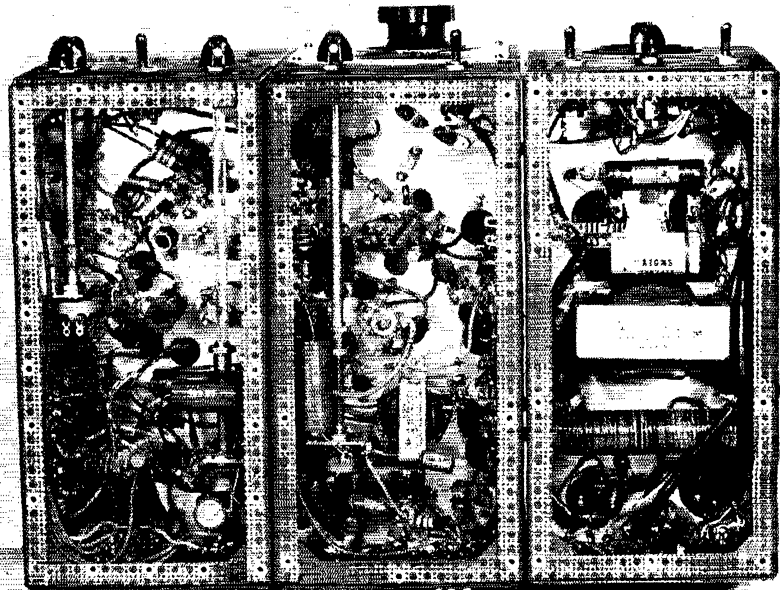
Cable connections all terminate at the rear of the chassis (bottom in this underside view). Audio controls are equipped with extension shafts so they can be mounted near the associated tubes and thus avoid undue hum pick-up on leads. If normal wiring and layout practices are observed, there are no critical points other than those mentioned in the text.

make sure that the voltages at each tube socket are near those given in Table I. If they differ appreciably, the appropriate resistors should be changed accordingly.

The transmitter coils should be checked with a grid-dip meter to be sure they tune to the right frequencies — the oscillator coil to 14.5 Mc., and the doubler and final coils to 29 Mc. — with their condensers about one-half capacitance. If the transmitter is tuned up on 29.5 Mc., 7-Mc. crystals giving output frequencies from 29.4 to 29.6 may be switched in without any retuning. If you plan to use widely separated frequencies it will be necessary to retune all stages when switching crystals.

No trouble was experienced in getting the transmitter on the air. However, there was a

(Continued on page 112)



A 500-Watt 144-Mc. Amplifier

High Efficiency at Moderate Cost with War-Surplus Triodes

BY LEONARD F. GARRETT,* W7JIP

THE idea of running high power is attractive to many 2-meter men, but the cost of the tubes and other components often proves to be a stumbling block. The amplifier described here doesn't quite make the kilowatt level, but it will handle 500 watts with ease, and with good efficiency. It is built around surplus HK-54s that were purchased for two dollars each, so the total cost is far below that for a tetrode amplifier of similar power level using new tubes.

Much of the "low-drive" advantage of tetrodes fades when they are used at frequencies near the maximum at which they are capable of operating with reasonable efficiency. A 9903 or an 829-B

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is customarily used to drive high-powered tetrode amplifiers on 144 Mc., and this triode amplifier will get along nicely with the same. The 9903 driver here runs at 105 watts input (700 volts at 150 ma.) and this furnishes 50 ma. grid current and 270 volts bias. The final stage will operate satisfactorily with grid current as low as 35 ma., so an 829-B should handle the job without exceeding its normal c.w. ratings.

Design Considerations

In laying out a high-powered amplifier that requires conventional cross-over neutralization, symmetry and short leads are mandatory. The top-view photograph shows how these ends are

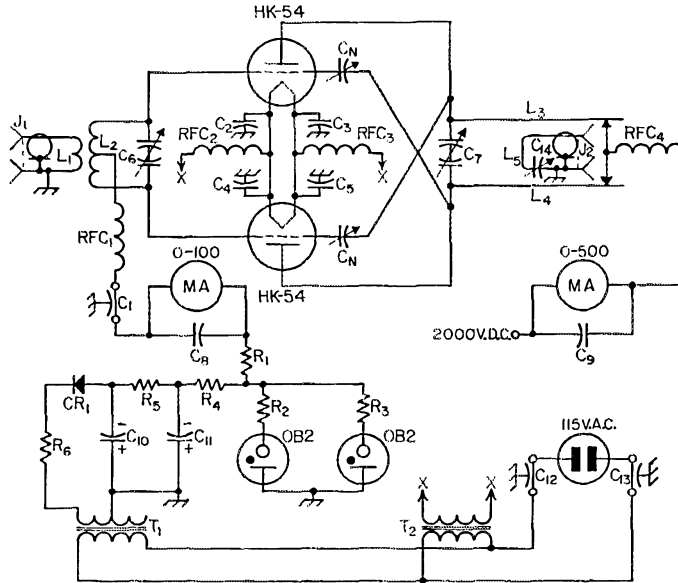


Fig. 1 — Schematic diagram of the 500-watt 2-meter amplifier.

- C₁ — 500- μ f. feed-through type.
- C₂, C₃, C₄, C₅ — 1000- μ f. button by-pass.
- C₆ — National VHF-1S with two inside stator and rotor plates removed from each section.
- C₇ — National TMK-35D, all plates removed except two stator and one rotor, spaced evenly in center of each section.
- C₈, C₉ — 0.01- μ f. mica.
- C₁₀, C₁₁ — 20- μ f. 150-volt electrolytic.
- C₁₂, C₁₃ — 0.1- μ f. 600-volt (Sprague 80P3).
- C₁₄ — 15- μ f. variable, double spaced (Bud LC-1641).
- C_N — Disk-type neutralizing capacitor (National NC-800A).
- R₁ — 3500 ohms, 10 watts.
- R₂, R₃ — 56 ohms, 1 watt.
- R₄ — 4700 ohms, 2 watts.
- R₅ — 270 ohms, 2 watts.
- R₆ — 25 ohms, 2 watts.

- L₁ — 1 turn No. 12 plastic-covered housewire. Loop inside L₂.
- L₂ — 2 turns $\frac{3}{8}$ -inch copper tubing, $\frac{1}{8}$ -inch i.d. Turns $\frac{1}{8}$ inch apart.
- L₃, L₄ — $\frac{3}{8}$ -inch brass tubing, 10 $\frac{1}{2}$ inches long, spaced 1 $\frac{3}{8}$ inches, center to center.
- L₅ — $\frac{3}{8}$ -inch copper tubing bent into a U 3 $\frac{3}{4}$ inches long and 1 $\frac{3}{8}$ inches wide.
- J₁, J₂ — Coaxial fitting, female (Amphenol 83-1R).
- RFC₁, RFC₄ — 24 turns No. 28 on $\frac{1}{8}$ -inch polystyrene rod, or Ohmite Z-144.
- RFC₂, RFC₃ — 5 turns No. 12 plastic housewire, $\frac{3}{8}$ -inch diam., close-wound.
- CR₁ — Selenium rectifier (Federal 403D2625).
- T₁ — Bias supply transformer, 150 v., 25 ma. (Merit P-3046).
- T₂ — 5-volt 10-amp. filament transformer (Stancor P-6135).

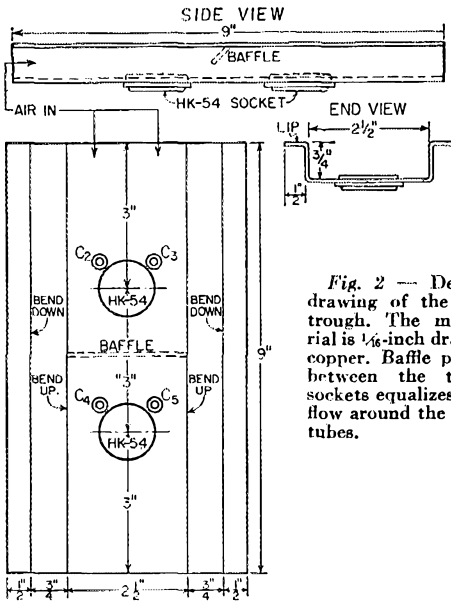


Fig. 2 — Detail drawing of the air trough. The material is $\frac{1}{16}$ -inch drawn copper. Baffle plate between the tube sockets equalizes air flow around the two tubes.

served. Standard components were used wherever possible, the only handmade items being the grid coil, the plate line, and the blower trough. The last item doubles as a submount for the tube sockets and furnishes a low-inductance return for the filament by-passes.

Considerable time was spent experimenting with various filament by-pass arrangements, with the result as shown in the view of the blower trough and the filament wiring. Silver-mica button by-passes were mounted close to each filament pin, and the leads to the filament transformer were wound up into r.f. chokes. Using a grid-dip meter as an r.f. indicator, very little r.f. can be found in the filament circuit, and achieving this end helped considerably with the grid-drive problem. With ineffective filament by-passing the final stage was harder to drive; that is, more driver output was needed for a given final stage grid current.

Similar thought was given to plate by-passing. Checks on all available high-voltage by-passes showed series resonance at 30 to

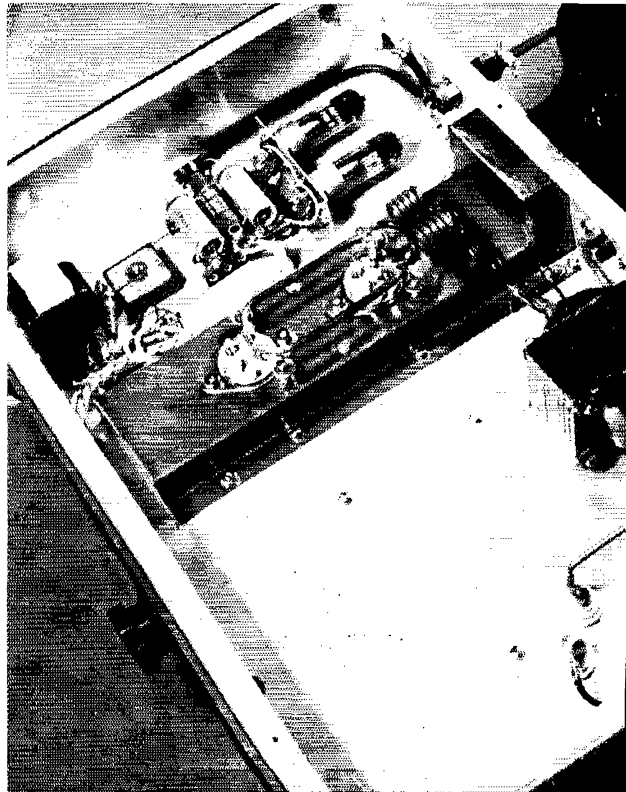
60 Mc., so their effectiveness at 144 Mc. is rather doubtful. The amplifier is operated without apparent r.f. return in the plate circuit, as the rotor of the tank capacitor is floating and there is an r.f. choke at the mid-point of the plate line. This is a satisfactory arrangement with push-pull amplifiers and RP^4C_4 does an adequate job of keeping r.f. energy out of the power leads.

Mechanical Work

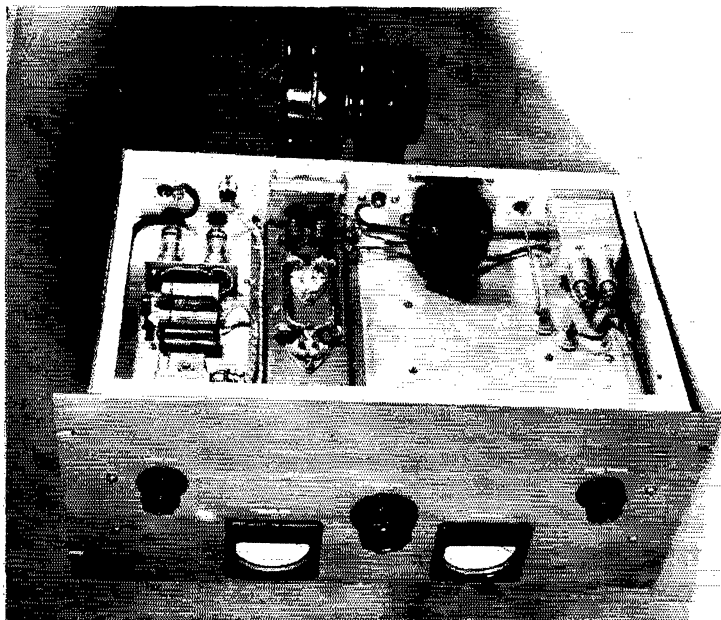
Details of the parts of the amplifier that must be made are best explained by the drawings and photographs. It will be seen that the cooling fan is mounted on the rear wall of the chassis. Its flow of air is directed around the tube bases by the copper trough, Fig. 2, the opposite end of which is closed off. Eight quarter-inch holes are drilled in the chassis around each tube, and a small baffle plate is inserted in the trough midway between the two sockets to equalize the flow of air to each tube. The fan is a Dayton type 1C180, supplying approximately 50 cubic feet per minute.

In making the plate tank circuit no soldering is done. The entire assembly is bolted together, and all components are silver-plated. The line is somewhat longer than necessary, and a shorting bar is provided so that its electrical length can be adjusted. Details of the shorting bar, the supports for the end of the line, and the contact straps that connect to the tuning capacitor are given in Fig. 3 (page 116).

The brass end fittings are mounted on ceramic stand-offs $3\frac{1}{2}$ inches high (Millen 31004). The output coupling link is supported on 3-inch lengths of polystyrene rod, $\frac{5}{8}$ inch in diameter. Tank capacitor supports are 3-inch ceramic standoffs. The neutralizing capacitors are held $\frac{3}{4}$



Close-up view of the air trough and filament-circuit components.



Looking under the chassis of the W7JJP 500-watt rig. Bias-supply components are at the left. The copper trough controls air flow and provides a low-inductance return for filament by-passing.

inch above the chassis on ceramic cone insulators. The chassis is 11 by 17 by 3 inches.

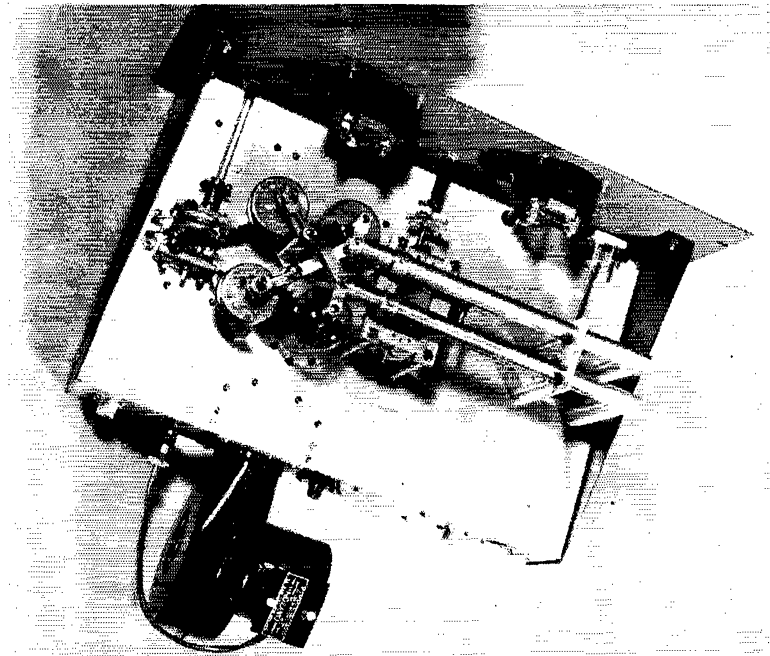
Operation

Neutralization of the amplifier is completely conventional, following procedure used on lower frequencies. It was found simpler to neutralize the rig when the lead from the high-voltage power supply was disconnected completely. Otherwise, self-rectification takes place in the tubes when grid drive is applied, and plate current will flow

in the final due to the d.c. return path through the power supply.

All the customary checks on neutralizing apply. If the layout is symmetrical, the gap in the neutralizing capacitors will be the same. Grid current dip, when the plate is tuned to resonance, will be one milliamperc or less. With plate voltage applied, plate and grid current will drop to zero if drive is removed, regardless of the setting of the grid or plate tuning capacitors. In operation

(Continued on page 116)



Top view of the 1-1-Mc. amplifier. Note complete symmetry, so important in achieving electrical balance and high efficiency at this frequency.

A Miniature Mobile Antenna

Using the B.C. Whip for Ham Work

BY ROBERT J. BONEBRAKE,* W9GCQ

THE reason often given for using an arrangement such as the one about to be described — “The XYL won’t allow holes drilled in the car” — would probably be sufficient in this case also. However, in this instance there were additional considerations. Originally, a permanent mobile rig was not installed in the family automobile because we contemplated buying a new one in the not-too-distant future. A few months ago we were building a small self-contained all-band battery- or a.c./d.c.-powered receiver and transmitter for portable use. Having always had the desire to operate mobile, the idea was conceived that it should be possible to use the portable rig in the car, using either its self-contained batteries or an inverter to produce 115 volts a.c. from the 6-volt car battery. This would make possible the use of the small rig as both a portable and mobile rig, except for one problem — what to use for a mobile antenna. Since the rig would not be in the car permanently, it did not seem worth while to mount a permanent center- or base-loaded antenna on the car. Yet to get any power into the antenna it must be resonant, and

* 3027 Memphis Street, El Paso, Texas.

• If there are objections to the mounting of the conventional 8-ft. transmitting antenna on the family car, W9GCQ tells here how to make use of the standard b.c. antenna for mobile operation.

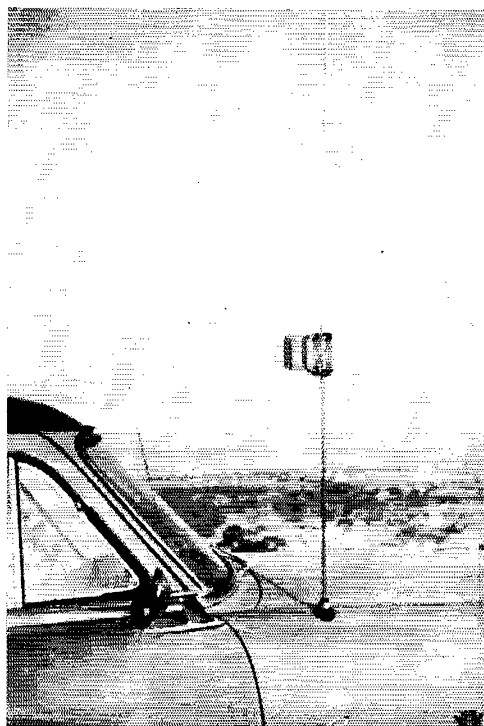
the ordinary auto antenna is not long enough to resonate at any frequency lower than the 50-Mc. band.

Thus it was decided to use the existing auto antenna, fully collapsed, as the bottom section of a center-loaded whip. The rest of the antenna consists of a center insulated section on which are mounted banana jacks for plug-in loading coils, and a top section made of a standard auto antenna. The center section is connected to the top and bottom antenna sections by two $\frac{5}{16}$ - to $\frac{1}{4}$ -inch copper-tubing reducer fittings. Thus the center insulated section and the top section can be quickly attached to or removed from the car antenna.

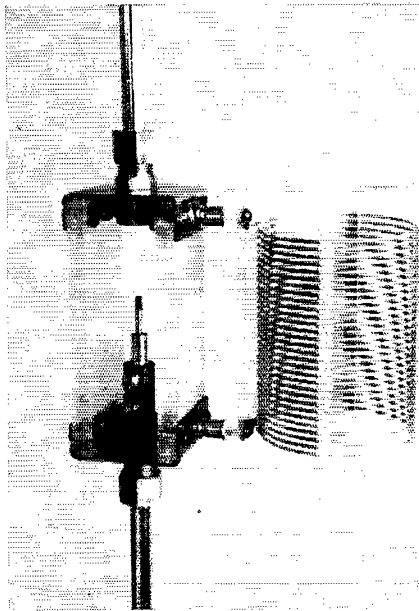
It might be pointed out at this time that in any mobile installation where it is desired to use the existing auto antenna on the converter, this loading-coil arrangement can be used to advantage. On 40 meters and 20 meters, signals which are unreadable using the standard auto antenna become S9-plus when the extension is attached and the proper loading coil plugged in. In our case, since the portable transmitter has a very low-power output, separate loading coils were made for each band in the interest of highest possible efficiency. However, if the antenna were to be used only for receiving, the coil could be made sufficiently large for use on the lowest-frequency band to be used, and tapped down for the higher-frequency bands.

Construction

The construction of the center insulated section is shown in the drawing and photographs. It was made entirely from readily available parts, since



◆
The miniature mobile antenna with the loading coil in place.
◆



The center loading section connected to the h.c. antenna, with the 40-meter coil in place. At the risk of somewhat lower efficiency, this single coil could be tapped for use on the higher-frequency bands.

we did not have tools or materials to do any machining of connectors, tapping of polystyrene, etc. Undoubtedly, anyone with proper equipment could produce a better center section from a mechanical standpoint.

The bottom section of ordinary automobile antennas is approximately $\frac{5}{16}$ -inch in diameter, and makes a fairly close fit into the $\frac{5}{16}$ -inch end of the reducer fitting. The outside diameter of the $\frac{1}{4}$ -inch end of the fittings is smaller, thus providing a larger shoulder to bear against the end plate when the retaining nut is tightened.

In normal use of the copper-tubing fittings, the nut is tightened until the copper compression ring is compressed tightly against the tubing, thus producing a leakproof seal. In our application, the ring cannot be compressed enough because the antenna tubing is slightly smaller than ordinary $\frac{5}{16}$ -inch copper tubing. Even if it could be,

it would be impossible to remove it easily when taking the extension piece from the car antenna. Therefore, since the joint does not have to be leakproof, the compression rings can be split lengthwise on one side with a hacksaw. Then, when the nut is tightened, the ring can compress around the antenna, closing the slot made with the hacksaw, and clamping tightly to the antenna. The copper compression rings should not be used in the ends of the reducer fittings that fasten permanently to the end plates.

To provide more rigidity where the insulated center section clamps to the bottom antenna section, a $\frac{1}{4}$ -inch brass shaft coupling is soldered or brazed to the nut on the $\frac{1}{4}$ -inch side of the bottom reducer fitting. When connecting the insulated section to the auto antenna, the center section of the auto antenna is allowed to extend up through the shaft coupling, and the set screws are tightened down on it.

The side pieces are made from $\frac{1}{4}$ -inch polystyrene. Polystyrene makes a good insulator at radio frequencies, but it has a tendency to discolor when exposed to sunlight for long periods of time, and also may crack when subjected to high pressures. Therefore, it is suggested that other types of insulating materials may be better for this application. However, we have used this antenna for several months and no serious ill effects have been noted. We have found that if the polystyrene is heated slightly at the points where pressure is applied to it, the cracking will be minimized. For example, after the polystyrene pieces have been bolted to the end plates, the bolts can be heated slightly with a soldering iron. Too much heat, of course, will cause excessive melting of the polystyrene.

The end plates on which the reducer fittings are mounted are made of 16-gauge cadmium-plated sheet metal. Sheet brass, if available, would be better due to its increased conductivity and resistance to corrosion. If the dimensions given in the drawing are followed, the unit must be assembled in the following sequence after all holes have been drilled: First, solder the banana jacks to the end plate and bolt the polystyrene to that side of each plate. Then put the reducer fittings on and bolt the other piece of polystyrene in.

The top section of the antenna is a standard

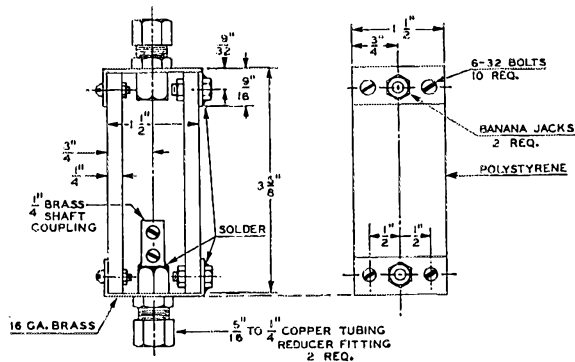
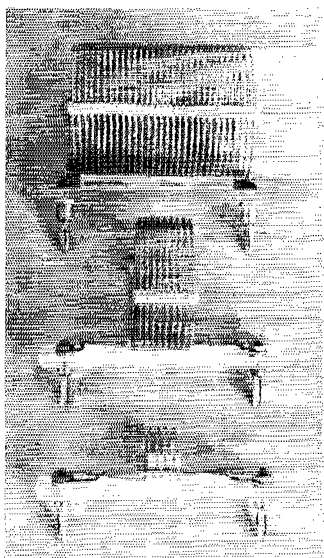


Fig. 1 — Sketch showing details of the loading-coil plug-in mounting.

64-inch 3-section telescoping side-cowl-mounting type auto antenna, available at most auto parts stores.

Loading Coils

To date, we have made loading coils for 40, 20, and 10 meters. (A small coil is necessary for 10 because the total length of the antenna is not quite $\frac{1}{4}$ wavelength.) The coils are made from B & W inductors, as shown in the table. After determining the proper number of turns for each coil, the coil was cut and mounted on a $3\frac{3}{4} \times \frac{3}{4}$ -inch piece of $\frac{3}{16}$ -inch polystyrene, using Polyweld 912 coil dope, and banana plugs. The type of construction can be seen in the photographs. The coils were adjusted by starting with too much inductance, and decreasing the size one turn at a time, tapping the coil with a small alligator clip. Indication of the proper inductance was obtained by observing the S meter of a receiver each time the tap was changed. The receiver was located



The loading coils are mounted on polystyrene strips fitted with banana plugs.

about 100 feet away, with the antenna terminals grounded. The size of the coils given in the table should be fairly accurate for any installation, provided the length of the two antenna sections is the same as ours — 64 inches above the coil, and 20 inches below. The length of antenna above the coil has the most effect on the required inductance, longer lengths requiring less inductance. The antenna in our installation is fed through $5\frac{1}{2}$ feet of coaxial cable by a link on the final tank coil. The cable consists of the regular auto antenna lead-in, plus a 3-foot extension made of RG-59/U.

Results

The over-all efficiency of the antenna seems to be quite good. Two-way checks have been made with a fixed station using a nondirectional an-

COIL TABLE		
Band	B & W Type	Turns
40	3907-1	30
20	3907-1	6
10	3010	4

Type 3907-1 is 2-inch diam., 10 turns per inch, No. 16.
Type 3010 is $\frac{3}{4}$ -inch diam., 8 turns per inch, No. 18.

tenna, and distances of 4 miles have been covered using $\frac{1}{2}$ -watt input to the final amplifier in the mobile rig.

Although it may seem that the added weight of the loading coil and antenna extension might cause undue strain on the auto antenna and its mount, we have used this arrangement for several months with no apparent damage. Since it takes but a matter of seconds to remove the extension from the auto antenna, or to telescope the top section down, it can easily be lowered when putting the car in a low garage or driving through low wooded areas. For even greater flexibility, if desired, the top extension could be connected to the center insulated section by means of a flexible mounting spring, similar to the type that is now on the market for that purpose.



September 1930

... Mr. Warner's editorial is centered around the idea that in spite of the passing of some phases of radio pioneering, the amateur has not lessened his value to the art but has risen to the position of a solid and respected settler within the communications field.

... Successful "phone work on 5 meters is the keynote of "Making Practical Use of the 56-Mc. Band," by J. J. Long, W8ABX.

... Rockbounders with a desire to move around a little can enlighten themselves with "QSY with Crystal Control," by Boyd Phelps, W2BP/W9BP.

... "On to Richmond!" is the cry of the Virginia Section of the Roanoke Division as they prepare for their first convention which will be held this month.

... "Experiments with Dynatron Oscillators," by O. P. Susmeyan, W1BLH, gives the inside story on how they work and their application to amateur apparatus. To illustrate one use, a heterodyne frequency meter using a negative-resistance tube as an oscillator is described.

... A receiver featuring push-pull r.f. and detector stages is included in this month's "Experimenters' Section."

... W1SZ and W1MK have been indulging in morning activity with Australian stations. Fine relaying has been rendered by YSIX (a ship plying between New York and Chile), VK5HG and VK5GR in this enterprise. Also, a regular schedule has been maintained with VK2EK.

... W9BAN, George P. Taylor operator, is station of the month. This station's transmitter is designed for 40-meter operation exclusively with a pair of Type '10s in a push-pull oscillator circuit. The receiver is patterned after a QST description. It uses a screen-grid antenna coupling tube, a regenerative triode detector, and two stages of transformer-coupled audio.

Simple Single-Band Preamplifiers

More Gain for the Receiver

BY W. W. DEANE, * W6RET

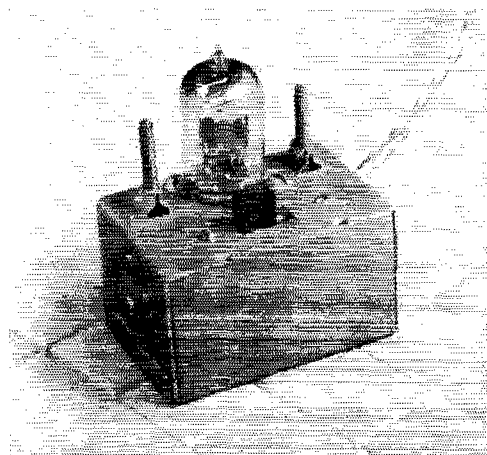
• The author found that this little fixed-tuned preamplifier helped a lot in pulling in State-side signals on his 75A-1 while he was in the South Pacific. It can be duplicated with a handful of parts and a couple of spare hours.

OCCASIONALLY we all wish we could get a little more gain out of the receiver, particularly one not employing an r.f. stage. A very satisfactory way to improve the gain is to add an r.f. preamplifier ahead of the receiver. The ultimate, of course, would be a bandswitching unit to cover all bands. However, the majority of hams seem to confine their operations to one or two bands, and the cost and complexity of constructing a switchable unit makes it desirable to utilize a simple preamplifier confined to a single band. Fig. 1 illustrates a preamplifier for any one band from 80 to 10 meters. It requires a minimum of parts, expenditure, or labor, and will pay big dividends in bringing in a lot of heretofore unheard signals.

Construction

In the model illustrated, a 6AK5 tube was used, but there are several different tubes that could be substituted, such as the 6AG5, 6CB6, 6BC5, 6BH6, or 6AU6. It should be noted that all of the above tubes are not direct replacements for the 6AK5, and a tube manual should be consulted

* 4524 Fountain Ave., Los Angeles, Calif.



A simple preamplifier built in a small Mini-Box. The two slug-tuned coils and tube are at the rear, with the slide switch in front.

for proper pin connections.

The unit is constructed in a $2\frac{1}{4} \times 1\frac{1}{2} \times 1\frac{3}{8}$ -inch Mini-Box. Provisions are made to switch the preamplifier in or out of the circuit with a d.p.d.t. slide switch. A phono jack is placed at either end of the box for the antenna input, and the output to the receiver. All coils are wound on $\frac{3}{8}$ -inch Cambridge LS-3 type coil forms which have iron slugs. A small shield may be placed

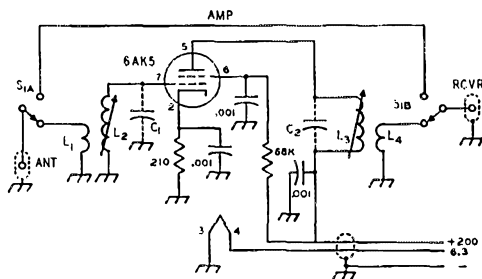


Fig. 1—Circuit of the miniature preamplifier. All 0,001- μ f. capacitors are disk ceramic. C_1 and C_2 , when used, are 20- μ f. low temp. mica or ceramic (see table).

across the tube socket to eliminate any interaction between the grid and plate coils. In the model illustrated the shield has been removed to allow better presentation of the parts lay-out.

A power source of 150 to 200 volts d.c. at 10 ma. and 6.3 volts at 0.3 amperes is required to

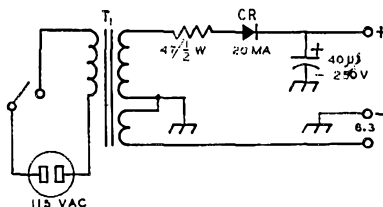


Fig. 2—Circuit of a simple power supply for the miniature preamplifier. T_1 is a small TV booster transformer delivering 125 volts at 15 ma., and 6.3 volts at 0.6 amp. (Stancor PS8415)

operate the unit. This can normally be taken from the receiver, except in cases where the tube filaments are wired in series to operate directly from 115 volts. In the latter case, a small power supply, similar to Fig. 2, may be constructed. If the d.c. voltage is in excess of 200 v., a resistor should be placed in series with the B-plus lead.

Alignment

After the unit has been assembled and wired, the coils may first be set to approximate fre-

(Continued on page 118)

807s in a 150-Watt Bandswitching Rig

Operating Convenience with Medium Power

BY GEORGE G. SYMES, JR.,* W3WXP/Ø

• This 150-watt transmitter has a number of attractive features. Provision is made for both crystal and VFO operation. The VFO and multiplier stages are gang-tuned, and a multiband tuner requiring no switching is used in the parallel 807 final. Other features include a metering system, excitation control, and a built-in power supply for the driver stages. The only external unit required is the power supply for the final.

Not long ago, after a shutdown of some 12 years, I moved into quarters that permitted resumption of ham activities. The old 6L6-807 band-switching rig, quite modern when it was built 15 years ago, was dusted off, fired up and put on the air. After replacing a few small parts (casualties of a 5-year storage in sea air), and refreshing my memory on its peculiarities, it gave a good account of itself. However, passage of time showed up two serious drawbacks. The yield of QSOs in proportion to the number of calls using crystal control was very disappointing, and TVI restricted operation to almost impossible hours.

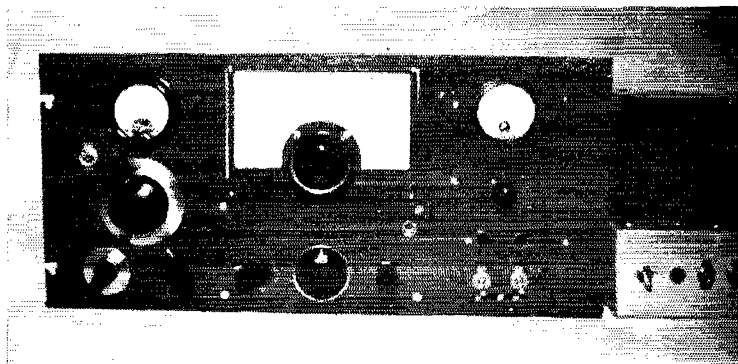
The quickest solution seemed at first to lie in an alteration of the old rig. But the more I thought about adding an external VFO, fitting shielding, installing by-passes, v.h.f. filters and shielded wiring in already restricted space, the more it seemed desirable to rebuild completely so that many ideas accumulated over later years could be included. Consequently, the rig shown in the photographs was born.

The circuit, shown in Fig. 1, is a result of browsing through the ARRL *Handbook* and issues of *QST* for the last few years. Either a 6AG7

*% A. G. T. Eng. Dept., Personnel and Planning Sec., Westinghouse Elec. Corp., Kansas City, Mo.

◆
The 150-watt band-switching transmitter and its high-voltage supply. The standard rack panel is 8¾ inches high (see text). Grouped to the left are MA_2 , S_5 (see text), the National AM dial for C_{10} , and controls for C_{17} and S_3 . Below the National ACN dial for the exciter gang are controls for R_1 , S_2 , and S_1 . To the right are MA_1 , S_4 , and the two low-voltage power-supply switches.

◆



Clapp VFO covering 1.6 to 2 Mc. (to include the 11-meter band), or an 80-meter Pierce crystal oscillator may be switched (S_{1A}) to feed a 6AG7 buffer doubler followed by a string of 6AQ5 frequency multipliers covering 80 through 10 meters. Each stage (excepting the one covering 14 and 21 Mc.) covers only one band and therefore is more easily stabilized and adjusted for optimum performance than a stage required to cover several bands. S_{1B} and S_{1C} remove screen and plate voltages from the idle oscillator. These voltages are held constant by VR tubes in the low-voltage power supply included in the assembly.

The output of any multiplier stage may be switched ($S_{2A} - S_{2D}$) to feed a final using a pair of 807s in parallel. (6146s could be substituted with a saving in space, although some details might have to be altered.) S_{2E} removes plate and screen voltages from the idle multiplier stages. The multiplier stages are tuned simultaneously with the VFO by ganging their tuning capacitors ($C_{1A} - C_{1E}$) to the VFO frequency control. Thus, the tuning controls are reduced to three, including the output coupling control.

The 6AG7 amplifier-doubler doubles frequency only when working from the 1.6-2-Mc. VFO Crystals in the 3.5-Mc. region are used in the crystal oscillator, although 160-meter crystals may be used if they are on hand. The 6AQ5 doubler-tripler is shifted from 14 to 21 Mc. by switching L_5 in parallel with the 14-Mc. inductor, L_4 , thus reducing the effective inductance for the higher-frequency band.

C_2 , C_6 , C_8 , C_{10} , C_{12} , and the adjustable slugs in the multiplier plate inductors provide convenience in adjusting the tracking of the multiplier circuits. C_7 , C_9 and C_{11} are included so that the circuit capacitances will remain the same whether a multiplier stage is working into the final amplifier or into the following multiplier

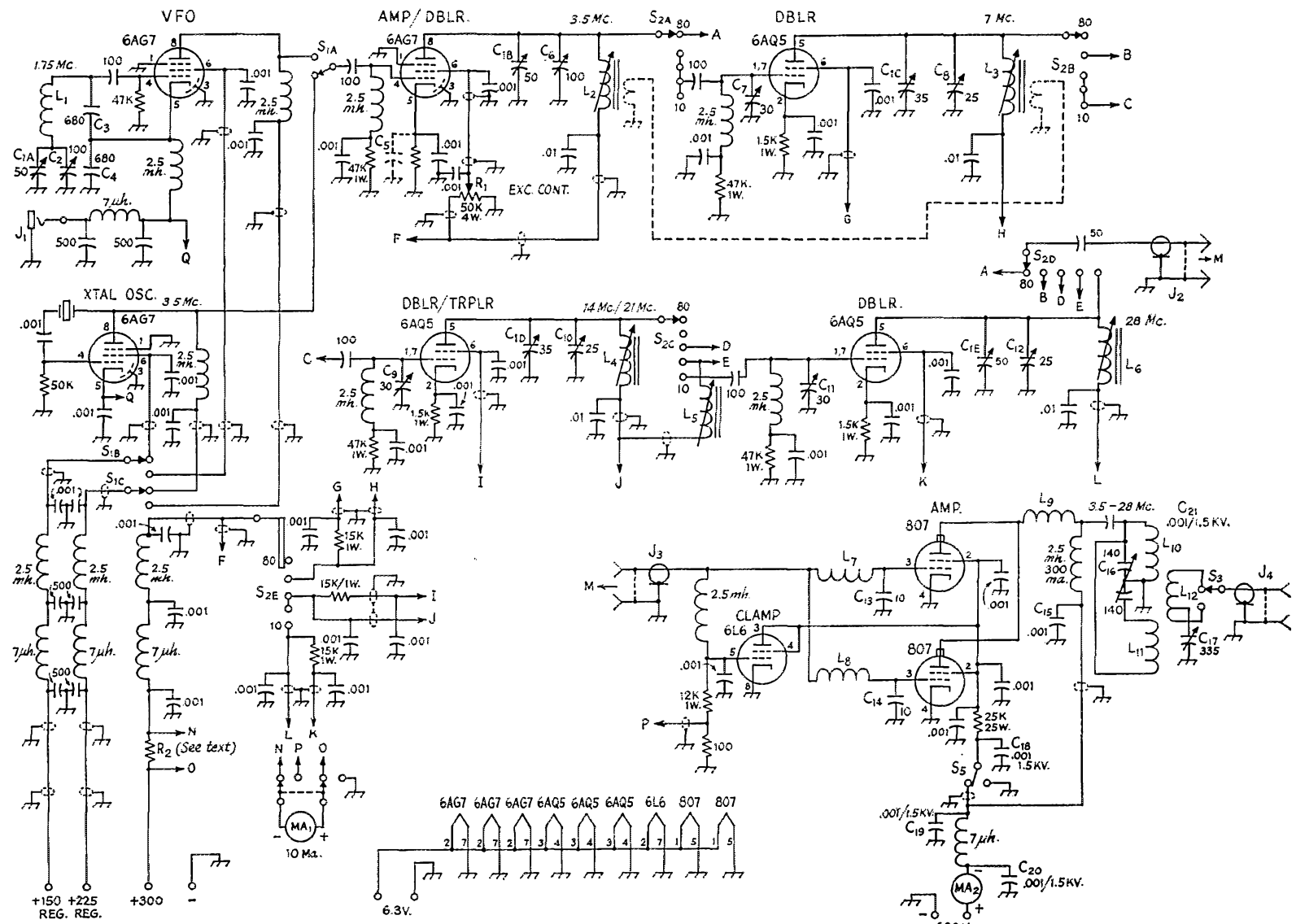


Fig. 1—Schematic of W3WXP's 150-watt band-switching transmitter.

- C₁, C₅— See text.
 C₂, C₆, C₇, C₈, C₉, C₁₀, C₁₁, C₁₂— Midget air trimmers (Johnson type J, Hammarlund type HF, Bud LC-2000 series, etc.)
 C₃, C₄, C₁₃, C₁₄— Silver mica.
 C₁₅, C₁₈, C₁₉, C₂₀— 1600-volt disk ceramic (Eric 1R5KV, etc.)
 C₁₆— Dual variable, plate spacing 0.03 inch minimum (Bud CE-2046).
 C₁₇— Midget variable (Bud MC-1860, Hammarlund MC-325-M, Johnson 140R12, etc.).
 All other capacitors disk ceramic.
 Note: 6AG7 buffer cathode resistor — 1.5K, 1W.
 J₁— Open-circuit 'phone jack.
 J₂, J₃— Shielded phono² type jack.
 J₄— Coaxial connector.
 S₁— 3 p.d.t. rotary (Centralab 2507, Mallory 174C, etc.).
 S₂— 5-wafer 5-position ceramic rotary switch (Centralab P-123 index assembly, 4 type X wafers [A, B, C, D]; 1 type P1S wafer [E]).
 S₃, S₅— S.p.s.t. rotary.
 S₄— D.p.d.t. rotary.
 Unless otherwise specified, all resistors ½ watt.
 All 7- μ h. v.h.f. chokes Ohmite Z-50.

stage. This is necessary to preserve tracking.¹ The potentiometer R_1 in the screen circuit of the 6AG7 buffer-doubler is used to adjust excitation and is a convenience no rig should be without.

When the rig was first fired up, the 6AG7 buffer-doubler oscillated. This instability was eliminated by connecting a second by-pass, C_5 , shown in dotted lines, at the cathode, and experimentally grounding it at various points on the chassis until the right spot was found. Slight differences in wiring or layout may make this unnecessary. Another oscillation showed up in the 40-meter 6AQ5 stage. This was cured by a 1-turn neutralizing link, also shown in dotted lines. This link may or may not be required in every case.

¹ At 10 meters, the reactance of the parasitic chokes used (1 μ h.) becomes appreciable relative to the reactance of C_{13} and C_{14} plus the tube input capacitance. This tends to increase considerably the apparent capacitance across the circuit, and this is probably the reason that the 50- μ mf. variable capacitor was found necessary to cover the 10-meter band. It should be possible to eliminate v.h.f. parasitic oscillation without the use of the grid chokes (see recent editions of *The Radio Amateur's Handbook*). With the chokes removed, capacitor values the same as those used in the 40- and 20-meter stages should be adequate with an appropriate increase in tank inductance. — Ed.

² See *QST*, July, 1954.

³ It is advisable to use a rotary switch at this point, since the switch must stand the full 807 plate voltage. — Ed.

To avoid switching in the final amplifier, a multiband tuner³ is used in the output tank circuit. S_3 selects a proper proportion of the output coupling inductor, L_{12} , depending on the output frequency. C_{17} is the output coupling control. L_7 , L_8 , L_9 , C_{13} and C_{14} were installed to suppress parasitic oscillation. The two capacitors are also an aid in reducing TVI. The 807s are protected by a 6L6 screen clamper. S_5 ³ grounds the screens while tuning up the exciter.

Two milliammeters are included. A 10-ma. unit, MA_1 , may be switched to read either final grid current or total exciter current. The resistor R_2 is a 20-times shunt to increase the full-scale reading to 200 ma. The shunt was made from copper wire as described in the measurements chapter of the ARRL *Handbook*. The second meter, a 300-ma. unit, reads combined plate and screen currents to the 807s.

All power leads are of shielded wire, and have filters for the operating frequency as well as for v.h.f. The low-frequency filtering may not be strictly necessary, but it does help to keep fundamental r.f. out of the power supply and off the a.c. line where rectification might take place, resulting in the generation of TVI.

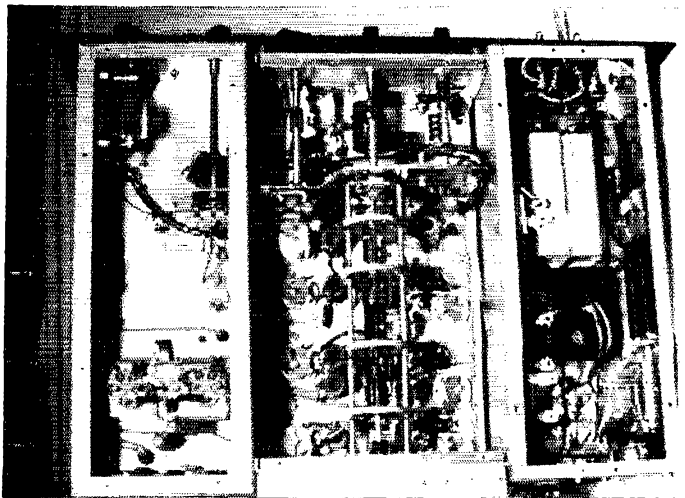
Construction

A system of permanent yet flexible construction was found in building the exciter, final amplifier and low-voltage power supply as separate units. Any of these may be quickly removed from the assembly for replacement, rebuilding or use elsewhere. A pair of 5 × 13 × 3-inch chassis takes care of the low-voltage power supply and the final amplifier. The exciter is assembled in a 12 × 7 × 4-inch ICA "Flexi-mount" box.

In the exciter unit, the VFO occupies the front end, with the tuning capacitor C_{1A} enclosed in an aluminum box on top, and the inductor L_1 mounted underneath on a small stand-off insulator fastened against the front wall. In the rear/top view, the crystal and crystal-oscillator tube are to the right of the tuning-capacitor box, and the VFO tube is to the left, followed by the string of multiplier tubes. The 10-meter stage is at the rear of the chassis.

Underneath, the four remaining units of the tuning gang, C_{1B} - C_{1C} , are lined up at the center of the chassis. They are driven by a brass gear

Bottom view showing components underneath the three chassis. In the exciter chassis at the center, the low-frequency circuits are toward the panel and the 10-meter circuit is at the rear of the chassis. Coils and trimmer capacitors are in groups around the associated bandswitch wafer.





Looking down into the final-amplifier box. The amplifier tubes are submounted. Also shown is the 6L6 clamper tube.

attached to the tail shaft of the VFO tuning capacitor, C_{1A} above, and another gear on the shaft of the first multiplier tuning capacitor, C_{1B} , below. The gears engage through a slot cut in the chassis. (I may say that this arrangement is not as satisfactory as it might be and if I were going to do the job again, I would mount the entire gang on top of the chassis, cover it with a long narrow box of aluminum, and feed the stator leads through holes to the switch sections below.)

The bandswitch, with the wafers spaced approximately according to the tube spacing, is mounted between a partition that shields the VFO from the rest of the exciter, and the rear wall of the box. The last wafer, S_{2E} , is mounted on the outside of the box. The partition shielding the VFO also serves as a mounting for the crystal-VFO switch, S_1 , and the excitation control, R_1 .

In the bottom view, the inductors for the multiplier stages and the padder capacitors, C_6 , C_8 , C_{10} and C_{12} , are to the right of the bandswitch. The tube sockets and the grid trimmer capacitors, C_7 , C_9 , and C_{11} , are to the left. The VFO trimmer, C_2 , is to the right, close to the front wall of the chassis. (Its control shaft is behind the crystal-oscillator tube in the rear view.)

A 1-inch extension of aluminum is attached to the rear of the exciter box to make its over-all length 13 inches to match the adjacent chassis. The r.f. filter components and the 6AQ5 screen

resistors (as well as the last section of the bandswitch, S_{2E}), are placed inside the enclosure, and the compartment is fitted with a cover plate of aluminum. A terminal strip is set in the upper edge.

Capacitor Gang

In building this unit, I made use of components on hand whenever possible. The condenser gang, C_1 , is made up of individual capacitors connected together with shaft couplers. Care must be used in selecting capacitors that will fit into the length of the "Flexi-mount" box. One inch must be allowed for the hub of the National ACN dial, leaving only 11 inches for the tuning gang. A suitable gang can be made up of Bud "Tiny-Mite" dual capacitors. A dual 25- μf . unit (LC-1661) with its sections connected in parallel will serve for C_{1A} . A dual 50- μf . unit (LC-1662) can be used for C_{1B} and C_{1C} . Five plates (3 rotor and 2 stator) should be removed from the C_{1C} section. Another dual 50- μf . unit can be used for C_{1D} and C_{1E} , removing plates, as above, for C_{1D} .

Amplifier

The amplifier is enclosed in a homemade aluminum box fastened to the top of the $5 \times 13 \times 3$ -inch chassis. The box is $4\frac{1}{2}$ inches high (limited by the height of the $8\frac{3}{4}$ -inch panel), the same width as the chassis, and long enough to include the 807s and the multi-band tank-circuit components, yet leave sufficient room for the 6L6 clamper tube in front and a terminal strip at the rear. The sides and top are perforated to provide ventilation. The tuning capacitor C_{14} and the output inductors L_{10} , L_{11} and L_{12} , are placed centrally in the box, and as far toward the front as possible. The capacitor is mounted directly on the front wall of the box, and rests against the chassis. In an effort to reduce the length of the path between the rotor of the capacitor and the 807 cathodes, short leads from each end of the rotor were brought through holes and fastened to the under side of the chassis. To allow room for the 300-ma. meter, which has a $2\frac{1}{2}$ -inch-diameter flange, the dial

Inductor Dimensions

- L_1 — 30 turns No. 30, close-wound.¹
- L_2 — 35 turns No. 26, close-wound.²
- L_3 — 18 turns No. 26, $\frac{3}{8}$ inch long.²
- L_4 — 8 turns No. 26, $\frac{1}{2}$ inch long.²
- L_5 — 5 turns No. 26, $\frac{1}{2}$ inch long.²
- L_6 — 3 turns No. 26, $\frac{1}{4}$ inch long.²
- L_7 , L_8 — 1 μh . (National R-33). See text.
- L_9 — 5 turns No. 14, $\frac{1}{2}$ -inch diam., $\frac{3}{8}$ inch long.
- L_{10} — 12 turns No. 16, 2-inch diam., 1 $\frac{1}{4}$ inches long (B & W 3907 strip inductor).
- L_{11} — 6 turns No. 14, 1 $\frac{1}{4}$ -inch diam., $\frac{3}{4}$ inch long (see text).
- L_{12} — 8 turns No. 16, 2-inch diam., $\frac{3}{4}$ inch long (B & W 3908 strip inductor).

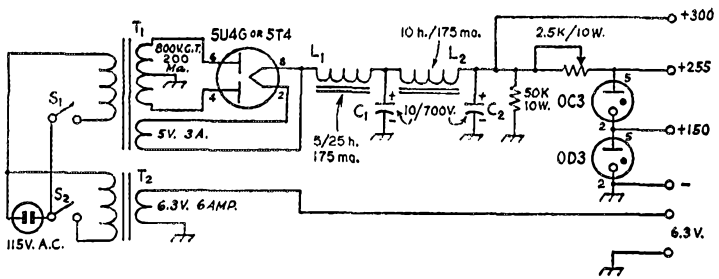
¹ Wound on Millen or National 1-inch diam. phenolic form.

² Wound on National XR-50 iron-slug form, $\frac{1}{2}$ -inch diameter.

Fig. 2 — Circuit of the low-voltage power supply.

C_1, C_2 — Mallory TC-92, C-D BRHV-710, Aerovox PRS, etc.

L_1 — UTC S-30.
 L_2 — UTC S-29.
 S_1, S_2 — Toggle.
 T_1 — UTC R-109.
 T_2 — UTC FT-8.



must be set so low on an 8 $\frac{3}{4}$ -inch panel that it is necessary to use a flexible shaft between the dial and the tuning-capacitor shaft. With a 10 $\frac{3}{4}$ -inch panel this would not be a problem, of course.

Holes to clear the bases of the 807s are cut in the top of the chassis, and the sockets are sub-mounted, on a U-shaped strip of aluminum, to a depth that brings the caps of the 807s clear of the top cover of the box. Here again, a 10 $\frac{3}{4}$ -inch panel might provide greater freedom in the method of mounting. Millen shield cans are used with the tubes.

Inductors

The inductors were originally all made from B & W 3907 strip inductor stock as shown in the top view, simply opening up the winding where necessary to provide the proper terminals. However, the high-frequency section, L_{11} , ran warm enough to soften the plastic supporting strips. This difficulty was solved later by making L_{11} a separate section, wound on a ceramic form. Similar forms may be hard to come by, but it should not be too difficult to make a self-supporting coil of the same inductance, since the dimensions are small. The output coupling inductor, L_{12} , should be placed between L_{10} and L_{11} .

The output-link switch, S_3 , and the link tuning capacitor, C_{17} , are mounted under the chassis, as shown in the bottom-view photograph.

Shielded phonograph jacks are mounted near the rear ends of the exciter and amplifier chassis

and are connected with a short length of RG-59/U coax fitted with phonograph plugs.

Power Supply

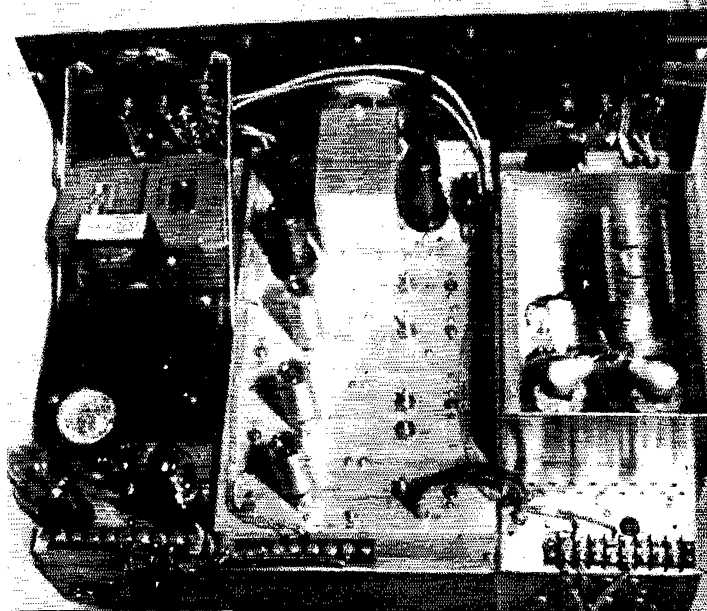
The low-voltage power supply is built on the second 5 × 13 × 3-inch chassis. The circuit is shown in Fig. 2. The arrangement of components is not critical so long as they are accommodated in the available space. This section includes the 10-ma. meter and its switch, indicator lights for filament and plate voltage, and a pair of toggle switches to control these supplies. The high-voltage supply is conventional, using choke input and a transformer rated at 600 or 750 v. d.c., 200 to 300 ma.

Adjustment

After checking the crystal oscillator to make sure that it is functioning properly, the VFO should be checked and its tuning range adjusted to cover the desired range of frequencies. Setting C_1 to minimum capacitance, C_2 should be adjusted until the oscillator is heard at 4000 kc., or a few kc. higher. Then, with the bandswitch in the 80-meter position, and the milliammeter reading grid current to the 807s, C_6 should be set at midscale (C_1 still at minimum capacitance) and the slug in L_2 adjusted for maximum 807 grid current. Then C_1 should be adjusted until the oscillator signal is heard at 3200 kc., and C_6 readjusted for maximum grid current. If this last adjustment requires an increase in the capacitance of C_6 , the tuning range of the 80-

(Continued on page 120)

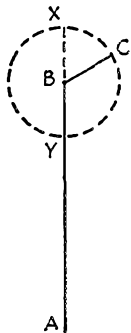
Rear view of the 150-watt transmitter, showing arrangement of components on top of the power-supply and exciter chassis (see text).



Ripple on the S.S.B. 'Scope Pattern

IT is well known that a perfect single-tone single-sideband signal consists of but a single radio frequency. When such a signal is displayed on the face of a 'scope being swept horizontally at an audio-frequency rate, the pattern is a horizontal band having perfectly smooth and straight upper and lower edges. It is identical with the pattern of any unmodulated carrier.

If the suppression of the other sideband or the carrier is not complete, the edges of the pattern show a ripple. Assuming that the carrier is completely suppressed, the relationship between the desired and undesired side frequencies can be represented by the phasor¹ diagram shown in Fig. 1. *AB* represents the amplitude



◆
 Fig. 1—The mechanism by which the undesired side frequency makes a "ripple" on the desired side frequency of an s.s.b. signal. Other possible spurious components are neglected in this drawing, but can be included if their relative amplitudes, phases, and frequency separation from the desired side frequency are known.
 ◆

of the desired side frequency and *BC* the amplitude of the undesired side frequency. The latter rotates with respect to *AB*, with *C* describing the dashed circle. The rate of rotation is equal to twice the audio modulation frequency since the two frequencies are separated in the spectrum by that number of cycles. At some instant during each such period of rotation point *C* will reach *X* and the total instantaneous amplitude will be the distance *AX*. A half-period later *C* will coincide with *Y* and the total instantaneous amplitude will be *AY*. As displayed on the face of the 'scope, this time variation is transformed into a ripple along the horizontal edges of the pattern, the maximum vertical excursions lying between *AY* and *AX*.

Since the relative amplitudes of the desired and undesired are *AB* and *BC*, respectively, the ratio of desired to undesired is AB/BC . This amplitude ratio is also equal to twice the length *AB* divided by the distance *XY*. In terms of the

¹ The term "phasor" is not used in an attempt to confuse the reader, but to conform with a recommendation of I.R.E. "Phasor" is preferred to "vector" because while the vector representation is convenient for showing relative phase and amplitude of a.c. currents and/or voltages, these quantities are not actually vectors — that is, there is no spatial direction associated with them.

'scope pattern, this means that the average height of the pattern divided by the vertical distance between a peak and valley of the ripple gives the ratio by which the undesired side frequency is suppressed.

Fig. 2 shows these quantities as they appear on the tube face, together with typical patterns for various ratios of spurious suppression. The latter are drawn as closely to scale as possible, and therefore can serve as a guide to estimating spurious suppression without actual measurement and calculation.

In examining such a pattern, it is necessary that the horizontal sweep in the 'scope be synchronized at some submultiple of the modulation frequency in order to get a stationary picture. Without such synchronization the ripple becomes merely a blur. Since the edge of the blur is a straight line, the unwary operator can lead himself to believe he has a "perfect" s.s.b. transmitter when in actuality it may be pretty poor.

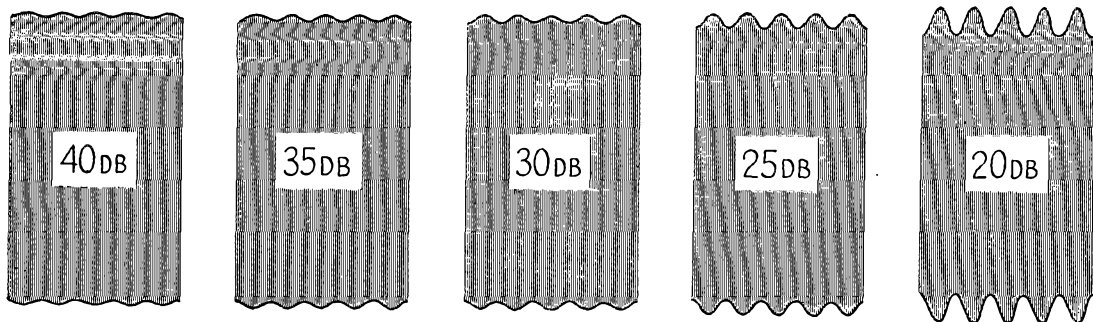
It is also necessary, although it should not be, to emphasize that the audio gain must be kept below the point where any stage in the transmitter tends to saturate. Saturation of an amplifier gives a beautiful pattern, but unfortunately, the actual output contains all sorts of spurious that the 'scope can't show.

Total Spurious

The actual situation in a practical transmitter is not quite so simple as it has been outlined above. The assumption that the transmitter output consists only of the desired side frequency and its undesired "image" can seldom be justified in practice. There are always other components present in the transmitted signal even when the audio input is ostensibly a single tone. These are (1) the residual carrier, if it is not balanced out to considerably better than 40 db. below the desired side frequency; (2) components resulting from harmonic distortion either in the audio input signal or added to the signal in the speech amplifier and modulator; (3) intermodulation components generated in r.f. stages.

These components have a definite frequency spacing in the spectrum, always appearing at some multiple of the audio modulation frequency on one side or the other — or on both sides — of the carrier frequency. The amplitudes of the last two, at least, can easily exceed the amplitude of the undesired side frequency in a well-designed single-sideband transmitter. What the 'scope shows, consequently, is the composite of all the spurious components present.

As a result, the actual shape of the ripple



$$\frac{\text{DESIRED}}{\text{SPURIOUS}} = 20 \text{ LOG } \frac{X+Y}{2(X-Y)} \text{ DB}$$

$$\text{FOR 40 DB } \frac{X+Y}{2(X-Y)} = 100$$

$$35 \text{ DB} = 56$$

$$30 \text{ DB} = 32$$

$$25 \text{ DB} = 18$$

$$20 \text{ DB} = 10$$

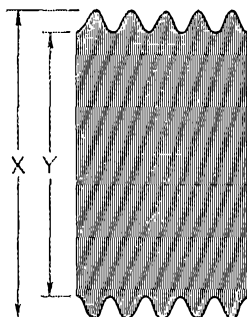


Fig. 2 — Examples of 'scope patterns for various desired/undesired ratios, and the method of calculating suppression of composite spurious from measurement of the 'scope pattern.

along the edge of the pattern is seldom as conventionally sinusoidal as the ripple in the drawings of Fig. 2. The ripple peaks are a measure of the total effect in about the same way that the corresponding peak-to-peak variations are a measure of the total effect of an ordinary a.m. signal displayed on a 'scope. That is, when the a.m. signal is tuned in in the normal way, with the beat oscillator off, using a receiving bandwidth large enough to accept the entire transmitted spectrum, the audio output is the total effect of the variations seen in the 'scope pattern. If the s.s.b. signal is tuned in similarly (using the desired side frequency as the carrier) the audio output from the signal is the total effect of the ripple.

No one component of the several always present in an actual signal can be separated readily from the others in the 'scope pattern. To do this requires a "spectrum analyzer" such as a receiver having sufficient selectivity for the purpose. Also, the peak-to-peak ripple as shown by the 'scope is usually less than the arithmetic sum of the individual components that make up the composite signal because of the non-uniform phase relationship between components. However, it is not likely that any *single* component would have an amplitude greater than that of the composite ripple. Hence the latter would appear to offer a reasonable basis for rating the desired/spurious ratio of the transmitter. As compared with other methods of rating that might be chosen, it has the advantage of being readily measured with the conventional 'scope set-up.

A desired/spurious ratio not exceeding 30 db. at any audio frequency within the nominal

a.f. band of the transmitter can be achieved if the transmitter is adjusted and operated with reasonable intelligence. On a pattern having an average height of 2 inches (typical of a 5-inch 'scope) the peak-to-peak ripple height is $\frac{1}{10}$ inch for a 30-db. ratio.

—G.G.

Silent Keys

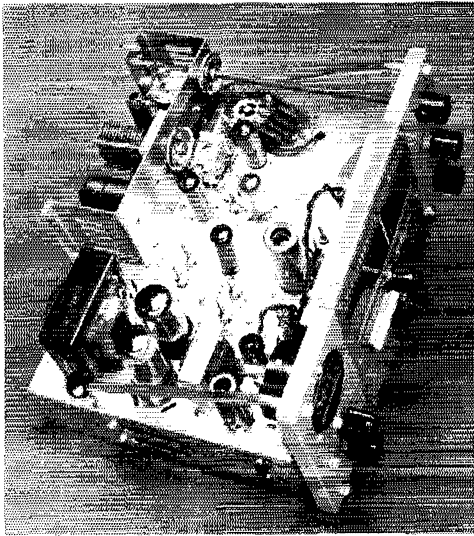
IT IS with deep regret that we record the passing of these amateurs:

- W1AHN, Richard E. Osgood, Windsor, Vt.
- W1QIT, Paul P. Simeone, Andover, Mass.
- W2GAU, Frederick H. Atkinson, New York, N. Y.
- W2OCI, Roy O. Woods, Brooklyn, N. Y.
- W2SDC, ex-W3HEV, Francis R. Richardson, Trenton, N. J.
- W3RH, ex-W8RH, Glenn C. Ornstine, Hyattsville, Md.
- W4FDX, Frank E. Courtney, jr., Augusta, Ga.
- ex-W5AWQ, ex-W5HFS, Ernest R. Brown, Electra, Texas
- W5FMA, Roy E. Duff, Tulsa, Okla.
- W5IHK, John C. Maguire, Austin, Texas
- K6ABE, Norman E. Leonard, San Francisco, Calif.
- W6ATS, Sylvester F. Giannetta, Santa Maria, Calif.
- W6KA, Thomas E. Nikirk, San Marino, Calif.
- W6YEH, ex-W5BYD, Earl W. Marshall, Jackson, La.
- W7VEM, Erling A. Mattsen, Seattle, Wash.
- W8DVP, William H. Corbett, Cleveland, Ohio
- W8MKX, William R. Shortridge, Big Bay, Mich.
- W8OCM, ex-W7MHQ, Homer P. Stenersen, Dayton, Ohio
- W0FWA, Leslie P. Slacks, Sac City, Ia.
- VE7ZZ, Earl C. Chang, Vancouver, B. C.
- 11ACU, Averardo De Donato, Napoli
- SM5ZS, Torsten Elmquist, Bromma
- ZS10, George Gray, Mowbray, C. P.

• Recent Equipment —

The T-90 Transmitter

ALTHOUGH the T-90 transmitter can be used in mobile, portable or fixed locations, it is apparent that mobile considerations were paramount when it was designed. The packaging and shape are such that it should fit easily under any dashboard, and the scheduled companion



The T-90 covers 80 through 10 meters with VFO or crystal control, 'phone or c.w. Here it is out of its case — the audio section is in the foreground and the 6146 output stage is at the upper left, behind the shield. The switch mounted above the chassis (upper center) selects the fixed capacitors in the output of the pi-tank circuit. The antenna relay can be seen right next to it.

receiver in the same sized package further confirms the viewpoint. However, it isn't fair to label this a "mobile" transmitter and give the impression that home-station operation has thus in some way been compromised, because the T-90 is a full station within its tube capabilities. A built-in antenna relay and the aforementioned packaging simply means that you don't have to add extra gadgets when you put this home station in your car.

The transmitter falls just under the 100-watt class, since the rated d.c. input to the output-stage 6146 is 90 watts on c.w. and 75 watts on 'phone. A glance at the block diagram in Fig. 1 will show a lot more than a mess of words, and you can see that the tube line-up is similar to other transmitters in this class. A 6AQ5 clamp tube is included to protect the 6146 by holding the screen voltage down when there is no excitation, and 6AQ5s are used in the two fixed-tuned amplifier/multiplier stages as well. The oscillator job (VFO or crystal) is delegated to a 6CL6, and its voltages are regulated by the 0B2 to minimize frequency changes with changes in line voltage. The r.f. section can be keyed in either the oscillator and first amplifier/multiplier stage cathodes or in the cathode of the first amplifier/multiplier alone, depending upon your preference and the setting of a function switch on the panel that also cuts in the modulator for 'phone work.

The audio portion starts with a 6AU6 speech amplifier, with a chassis-mounted switch that permits either carbon or high-impedance crystal or dynamic microphone to be used. This is followed by a 6AQ5 driver and a pair of 6AV5 modulators. A negative feed-back loop around

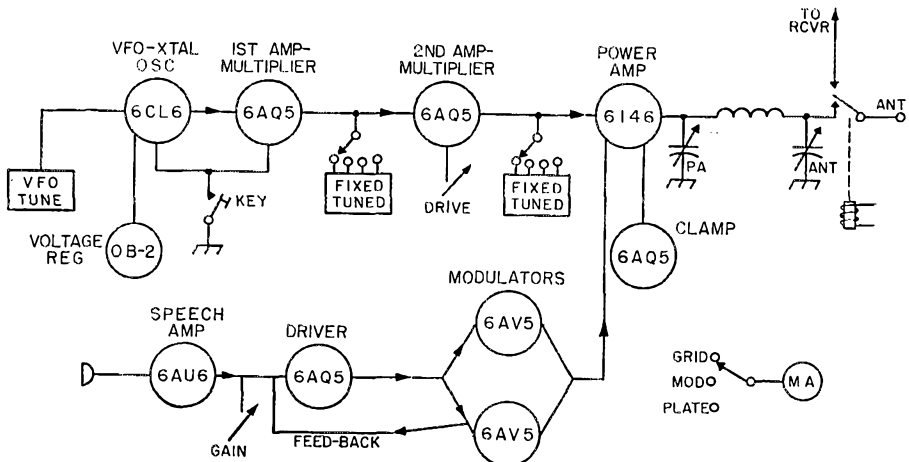
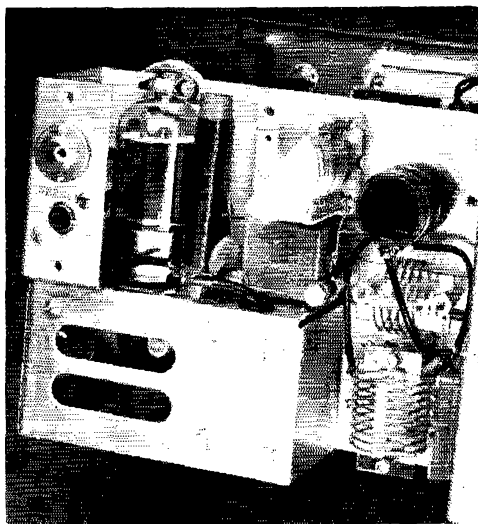


Fig. 1 — Block diagram of the T-90 transmitter. The antenna relay has another circuit (not shown) that turns on the transmitter. The relay is actuated by a panel switch or a push-to-talk switch on the microphone.

the driver stage is included, and it may account for the good quality we observed when the unit was checked on 'phone.

The front panel of this compact ($12\frac{3}{8}$ wide by $10\frac{1}{2}$ deep by $6\frac{3}{4}$ inches high) unit has a couple of departures from usual practice. The first that hits your eye is the apparent lack of a VFO tuning knob! You stop worrying about this when you discover that the VFO tuning and the bandswitch are concentric controls (à la TV), a dodge that makes for an uncrowded panel. The audio gain control, instead of a large knob matching the others in size, is a small knurled shaft that can hardly be seen. And why not? — the audio volume control on a transmitter doesn't get the steady handling that a receiver volume control does. The rest of the controls are what you would expect on a transmitter of this type: a meter switch for the r.f. grid and plate current and the modulator cathode current, a TUNE-CW-HET-PHONE switch (TUNE reduces power to the output stage and disables the modulator, and HET turns on the VFO for frequency spotting or amplifier-only keying), a DRIVE switch for varying excitation



This close-up view of the 6116 output stage shows the plate tuning capacitor and the three sections of the output inductor.

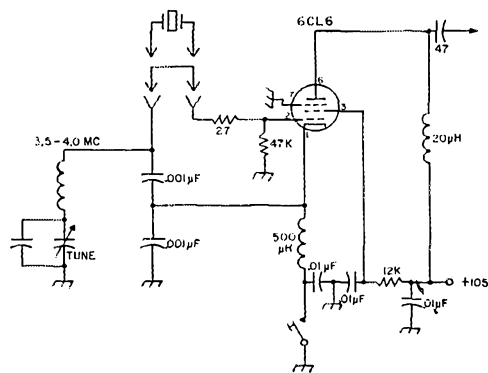


Fig. 2 — Simplified oscillator circuit of the T-90. When using VFO, the crystal socket requires a shorting plug. When crystal control is used, the VFO tuned circuit can be used to "pull" the crystal frequency slightly and thus "zero in" on a net frequency.

by changing the screen voltage to the driver stage, and PLATE and ANT tuning.

The ANT tuning control is more than meets the eye. Since a pi-network output circuit is used, there is the normal need for a wide variation in output capacitance. In the T-90, the control turns the rotor of a 150- μ f. variable capacitor. On the far end of the rotor shaft there is a pin that engages a spoke on a switch shaft.



An additional shield cover has been removed to show the VFO compartment (lower center). The hub and spokes at the center left drive the output-capacitor switch shown in another photograph. The spokes are driven by an arm on the shaft of the output tuning capacitor at the lower left.

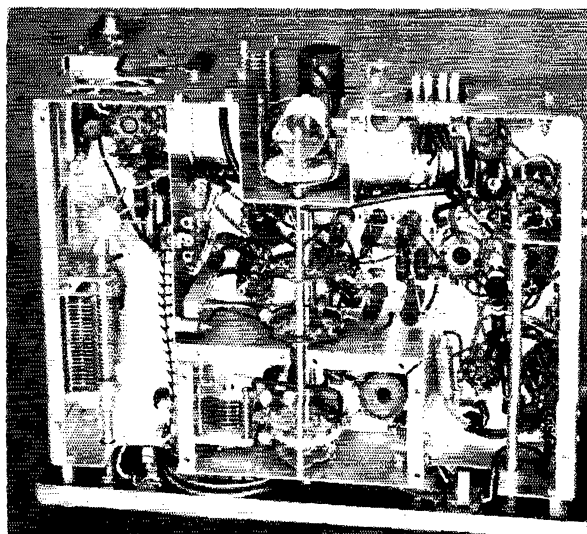
once every revolution. Thus each time the capacitor shaft makes a full revolution, more or less fixed capacitance is also thrown into the circuit via the switch. This tricky little device can be seen in one of the photographs.

When crystal-controlled operation is desired, the crystals can be changed from the front panel by removing the crystal access door on the panel and plugging in the desired crystal. When VFO operation is used, a shorting plug is required in the crystal socket. The oscillator circuit is shown in Fig. 2 — it is a little unusual in that the VFO tuned circuit is used to "rubber" the crystal and permit its frequency to be pulled slightly.

Two power supplies are available for use with the T-90. The APS-90 is for use in fixed-station operation and works from the 115-volt 60-cycle line, and the VPS-90 vibrator supply is designed to furnish the necessary power from either a 6.3- or 12.6-volt d.c. source.

The T-90 is a product of Harvey-Wells Electronics, Inc.

— B. G.



Happenings of the Month

ELECTION NOTICE

To All Full Members of the American Radio Relay League Residing in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions.

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1956-1957 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

Nomination is by petition, which must reach the Headquarters by noon of September 20th. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for vice-director therefrom. No person may simultaneously be a candidate for both offices; if petitions are received naming the same candidate for both offices, his nomination will be deemed for director only and his nomination for vice-director will be void. Inasmuch as all the powers of the director are transferred to the vice-director in the event of the director's resignation or death or inability to perform his duties, it is of great importance to name a candidate for vice-director as it is for director. The following form for nomination is suggested:

Executive Committee

*The American Radio Relay League
West Hartford 7, Conn.*

We, the undersigned Full Members of the ARRL residing in the Division, hereby nominate of as a candidate for director; and we also nominate of as a candidate for vice-director; from this division for the 1956-1957 term.

(Signatures and addresses)

The signers must be Full Members in good standing. The nominee must be a Full Member and the holder of an amateur license, and must have been a member of the League for a continuous term of at least four years at the time of his election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communications, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon EDST of the 20th day of September, 1955. There is no limit to the

number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

Voting by ballots mailed to each Full Member will take place between October 1st and November 20th, except that if on September 20th only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are as follows: *Atlantic:* Gilbert L. Crossley, W3YA, and Charles O. Badgett, W3LVF. *Canadian:* Alex Reid, VE2BE, and Reginald K. Town, VE7AC. *Dakota:* Alfred M. Gowau, W0PHR, and Forrest Bryant, W0FDS. *Delta:* George H. Steed, W5BUX, and George S. Acton, W5BAM. *Great Lakes:* John H. Brabb, W8SPF, and Robert L. Davis, W8EYE. *Midwest:* William J. Schmidt, W8OZN, and James E. McKim, W0MVG. *Pacific:* Harry M. Engwicht, W6HC, and (no vice-director), *Southeastern:* James P. Born, Jr., W4ZD, and Randall E. Smith, W4DQA.

Full Members are urged to take the initiative and to file nomination petitions immediately.

For the Board of Directors:

A. L. BUDLONG
Secretary

July 1, 1955

F.C.C. NOTES

Richard A. Mack, for some years a member of the Florida Railroad & Public Utilities Commission, has been appointed to the Federal Communications Commission. He replaces Miss Frieda Hennoek, whose term expired June 30th; she is returning to law practice.

Edwin L. White, W4AS, since its establishment in 1950 the Chief of FCC's Safety & Special Radio Services Bureau (parent bureau for the amateur service) retired July 31st from many years of government service. His successor is Curtis B. Plummer (ex-W3KRK), former head of the Broadcast Bureau.

"WT" PREFIX DENIED

A Texas amateur recently petitioned the Commission to include the letter "T" in the prefix of call signs issued to Technician Class amateurs "for the purpose of distinguishing this class of amateur radio station from other classes of amateur radio stations and discouraging unauthorized operation by Technician Class stations in frequency bands allocated for the exclusive use of higher class amateur radio stations."

FCC has denied it, saying that adoption "would require the modification of approximately 12,207 Technician Class Amateur Radio Stations, and with the ever increasing work load in the Commission and with the limited personnel available, the administrative difficulties created by the adoption thereof would not be justified by the benefits, if any, derived therefrom."

F.C.C. APPLICATIONS

Amateur applicants commonly suffer nervousness in taking the code test; they apparently are similarly afflicted when filling out application forms. FCC's licensing branch has recently had more trouble than usual with errors in application blanks, including renewals. Many applicants, undoubtedly through oversight or carelessness, fail to answer the question, "Are you a representative of an alien or of a foreign government?" Many fail to notarize. Many, in the case of renewals, omit necessary data such as place and date of birth, apparently figuring FCC already has this information (it does, but the info is usually required for positive identification of the application). And you'd be surprised how many fellows fill out "date of birth" with the proper month and date — but with the year 1955!

We can all help ourselves by helping FCC — be careful that *your* application is completely and accurately filled out so that processing will not be delayed.

LAOS OFF BANNED LIST

In mid-July FCC announced that the government of Laos has withdrawn its objection, earlier filed with the International Telecommunications Union, to communication between its amateurs and the rest of the world. The prefix is XW8, and work with these stations is now permissible.

THIRD-PARTY TRAFFIC

In the handling of third-party traffic internationally, aside from countries where special agreements exist (Canada, Chile, Cuba, Ecuador, Liberia, Peru) we have had a convenient rule-of-thumb that traffic is permissible with any amateur station possessing a one- or two-letter W or K prefix. There is now an exception: KA. The Japanese government has indicated that it wishes privileges available to all amateur stations in its country to be uniform; inasmuch as JAs of course have no third-party privileges, the KAs *in Japan* are now also restricted from such activity. Other prefixes, even in the same area, are not affected; e.g., Okinawa, with the prefix KR6, is still okay for traffic.

RTTY SHIFT

The ARRL Board of Directors at its May meeting instructed the General Manager to file, subject to an investigation as to its feasibility, a request with the Federal Communications Commission to amend the amateur rules so as to permit frequency shifts of less than the present

(Continued on page 128)

WHAT BANDS AVAILABLE?

Below is a summary of the U. S. amateur bands on which operation is permitted as of August 1st. Changes will, as usual, be announced by W1AW bulletins. Figures are megacycles. A0 means an unmodulated carrier; A1 means c.w. telegraphy; A2 is m.c.w.; A3 is a.m. 'phone; A4 is facsimile; A5 is television; F1 is frequency-shift keying; n.f.m. designates narrow-band frequency- or phase-modulated radiotelephony; and f.m. means frequency modulation, 'phone (including n.f.m.) or telegraphy.

3.500-4.000	— A1
3.500-3.800	— F1
3.800-4.000	— A3 and n.f.m.
7.000-7.300	— A1
7.000-7.200	— F1
7.200-7.300	— A3 and n.f.m.
14.000-14.350	— A1
14.000-14.200	— F1
14.200-14.300	— A3 and n.f.m.
14.300-14.350	— A1
21.000-21.450	— A1
21.000-21.250	— F1
21.250-21.450	— A3 and n.f.m.
26.960-27.230	— A0, A1, A2, A3, A4, f.m.
28.000-29.700	— A1
28.500-29.700	— A3 and n.f.m.
29.000-29.700	— f.m.
50-54	— A1, A2, A3, A4, n.f.m.
51-54	— A0
52.5-54	— f.m.
144-148	} A0, A1, A2, A3, A4, f.m.
220-225	
420-450 ¹	} A0, A1, A2, A3, A4, A5, f.m.
1,215-1,300	
2,300-2,450	} A0, A1, A2, A3, A4, A5, f.m., pulse
3,300-3,500	
5,650-5,925	
10,000-10,500	
21,000-22,000	
All above 30,000	

¹Peak antenna power must not exceed 50 watts.

In addition, A1 and A3 on portions of 1.800-2.000, as follows:

Area	Band, kc.	Power (watts)	
		Day	Night
Minn., Iowa, Mo.,	1800-1825	500	200
Ark., La. and east, including Puerto Rico and Virgin Is.	1875-1900		
N. and S. Dak., Neb.,	1900-1925	500*	200*
Colo., N. Mex., and west, including Hawaiian Is.,	1975-2000		
Texas, Okla., Kansas	1800-1825	200	75
	1875-1900		

* Except in State of Washington where daytime power limited to 200 watts and nighttime power to 50 watts.

Novice licenses may use the following frequencies, transmitters to be crystal-controlled with a maximum power input of 75 watts.

3.703-3.750	A1	21.100-21.250	A1
7.150-7.200	A1	145-147	A1, A3

Technician licenses are permitted all amateur privileges in 50-54 Mc. and in the bands 220 Mc. and above.



Hints and Kinks

For the Experimenter



DEBURRING TOOLS

JAGGED BURRS around screw, ventilation, bezel and socket holes are not only unsightly indicators of poor workmanship but also constitute a considerable hazard, as the burrs have and retain razor-sharp edges.

Deburring is an irritating and time-consuming job under most conditions because of lack of suitable tools. With soft metals, a knife blade is partially satisfactory, but may slip out of the hole being deburred, cutting a deep gouge in the panel, or a gash in the hand. Small hand grinders are somewhat more satisfactory, at a cost of about \$25.00 each, plus about one cent per hole for wheel replacement. Metal countersinks have been used, but these, having a 55- or 60-degree included angle, ream the hole almost as fast as they remove the burr.

Quite satisfactory deburring can be done with a carpenter's wood countersink having an included angle of approximately 90 degrees. These, which come in all sizes up to about $\frac{3}{4}$ inch in diameter, are supplied with a square shank. To convert a carpenter's wood countersink into a deburring tool, grind off the corners of the shank and drive the shank into a plastic screwdriver handle from which the blade has been pulled.

Performance will be most satisfactory if the axes of the handle and of the countersink coincide. Length of the finished tool should be approximately six inches, with a tolerance of about plus or minus one inch to suit the materials available and the user's personal taste.

Larger holes are easily deburred by use of an automotive valve-seat reamer. These come with four, five, and six blades and cost from \$2.00 up. No changes are needed in this tool, and those with a large number of blades, such as six, are preferable to the four-bladed type. When only steel is to be used, an abrasive valve seater, which is merely a conical grindstone with a large included angle, such as 105 degrees, is very effective. This cannot be used with soft metals, such as aluminum, as the abrasive will plug up after deburring only a few holes.

— Ronald L. Ives

STAND-BY SWITCH FOR THE HQ-129X

DURING week ends it was desired to leave my recently acquired HQ-129X on stand-by for long periods and this made desirable the removal of B+ from all tubes of the receiver. This meant the addition of a switch in the ground side of the plate-supply circuit, but the thought of any panel drilling that might adversely affect the resale

value of the receiver was deemed objectionable.

The solution arrived at was to remove the existing 5000-ohm sensitivity potentiometer and replace it with a type having an on-off switch mounted on the rear cover. The switch is, of course, used to break the negative plate-supply lead. With the revision, the receiver is turned on or off with the sensitivity control, the front panel remains intact, and the "relay control" function of the original stand-by switch (S_6) of the circuit for the HQ-129X is not impaired.

— Edwin A. Gilcher, W5NFCU

MORE ABOUT THE NOVEL VENTILATING SYSTEM FOR MOBILE UNITS

WHEN using the ventilating suggested by W9JX in *QST* for June, 1955, it is advisable to avoid connection to the vacuum line from the intake system. Otherwise, you may run into valve trouble caused by an improper air-gas mixture from the carburetor.

— Bill Norman, W5TXM

PERIODIC INSPECTION FOR COPPERCLAD WIRE ANTENNAS

HERE is a tip, learned from bitter experience, that should benefit any of the gang who use surplus copperclad wire for their sky hooks. Antennas made from this material require inspection once a year or so if deterioration in advance of actual breakdown is to be detected. In my own case, I had a nifty 340-footer about 50 feet high that was made with surplus aircraft-trail wire obtained from a bargain 3000-foot reel. After about four years of service — without inspection — trouble started. Wherever the wire came in contact with stand-offs, strain insulators or other supports, and at points where bends were necessary, the copper coating had worn through and rust had eaten into the core, thus creating about half a dozen high-resistance joints that finally broke down.

— Wm. Plimpton, W2IXH

SCORING ALUMINUM WITH A GLASS CUTTER

AN ordinary dime-store glass cutter (disk roller type) makes an excellent tool for cutting aluminum sheet. Just score each side of the sheet and then flex the aluminum until it parts at the score. If the sheet being worked with is fairly large, it pays to clamp the metal along the score lines by one means or another.

— Kenneth Cary, K2CAK



Correspondence From Members-

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

YOU'RE COVERED

705 Ninth Avenue
Brookings, So. Dak.

Editor, *QST*:

I have read with interest your article "Lightning Protection for the Transmitting Antenna (July *QST*)."

Inasmuch as I am in accord with the article and endorse all the ideas involved there is one thing that should be straightened out. There is no condition in any of the fire forms used for insurance purposes on a private dwelling that would invalidate an insurance policy insuring such private dwelling whether that antenna is a TV antenna or a 5-element beam for 10 meters.

There are too many people now who believe that insurance is a necessary evil and one of those articles that have to be paid for because of a loan on their dwelling. If you can find any of the so-called fine print excluding coverage in a private dwelling fire form because of an improperly-installed antenna, please send it out to this ham. It would be very interesting. I can assure you.

For further information I would suggest that you contact two of the best insurance companies in the world for further information, The Hartford Fire and The Travelers, both of whom we represent.

— Robert T. Bates, WØUDI

[EDITOR'S NOTE: Hartford Fire confirms nothing in the fine print invalidates a policy specifically because of an antenna installation.]

ET REPLY

P. O. Box 1636
Addis Ababa, Ethiopia

Editor, *QST*:

Many thanks to WØPDN for his understanding letter in the May issue. He is correct in his assumption that air mail stamps for every QSO is completely out for most Ethiopians. Especially those in the Armed Forces have an allowance not at all comparable with that of the U. S. Forces, and the civilian standard could be regarded much in the same way.

One of the most active ham stations is that of the Imperial Ethiopian Air Force, ET3Q and ET3R, which is worked entirely by A. F. personnel. I will admit that the promised QSLs from here, in many cases, have not been sent in the past. I enclose a QSL card from ET3Q which has been released for use only some weeks ago by His Imperial Majesty. I now hope the QSL cards from here will drop in more regularly at the stations of U. S. hams. Please, don't ask for air mail.

— Gunnar Ensjö, SM5AES/ET3Q
Imperial Ethiopian Air Force

SEVENTY-FIVE

P. O. Box 3093
Rochester 14, N. Y.

Editor, *QST*:

... Recently I came back to 75 because a fellow ham friend of mine vacationing in Canada asked me to keep morning skeds with him. . . .

I listened around and I found new voices and recognized some old ones. But what surprised me very much was a new mode of calling which must be peculiar to 75 because I have not heard that stuff on other bands. For example: "Calling CQ class A," and "Calling CQ no lids." Then I heard guys talking about guys and mentioning names and call letters openly. Intentional QRM galore. Traffic nets in bunches, where real traffic just is not it. I asked one old timer "How?" and he said "Oh, that's been going on for

years, where've ya been?" In that period of time I was absent from 75 I think I've come back a couple of times before, but did not stay as long as this time. I listened some more and I got disgusted with it.

My opinion of that particular brand of ham radio is that it is not genuine ham radio at all; one of the guys I heard is suffering from such an inferiority complex that he is making his friends and others who bother with it, act like foolish kids. As soon as my friend returns from his vacation, I'll go back to DX-c.w. for that band, 75, is for the birds as far as I'm concerned.

— Charles I. Otero, W2UPH

503 Sunset Road
W. Reading, Penna.

Editor, *QST*:

I am secretary of the Reading Radio Club, members of which have participated in many of the activities mentioned in your July editorial, "Public Relations." . . . Our latest effort was the Powder Puff Derby; we were asked to relay between the Reading Airport and the terminus of the Derby, Springfield, Mass. . . . Most of the boys on 75 are swell fellows; many of them cooperated with us 100%; however, two or three gave us a rough time. . . .

We fully realize that all amateur frequencies are open to everyone, and we also realize that the public in general resents being pushed around. . . . But when we politely requested W3 — to keep this particular channel clear he resented the request, called us Space Cadets, and flatly refused to stay off the frequency. . . . Several other stations also resented our request. For instance, W2—; every time we would sign he'd come on the frequency calling another station. We doubt that he actually was in contact with anyone because of the fact that whoever he might have been talking to surely could not have stopped transmitting at the exact time we did, so many times in succession. This same W2— would hook up with a powerful station elsewhere in the band, tell him he had QRM and that he should change frequency and move down on the frequency we were using. Then both would carry on a QSO.

What would the Old Man think about such tactics? What would happen in an emergency? Why can't we look at it in this way and realize that here are a bunch of hams doing something to publicize ham radio, giving of their time, gratis, trying to live up to the concept of your editorial, and give us a hand instead of a fist.

Before I close, we of the Reading Radio Club wish to thank again the fellows who cooperated with us in this venture.

— Stanton L. Bast, W3CCH

EXTRA CLASS PRIVILEGES

446 N. W. 8th St.
Homestead, Fla.

Editor, *QST*:

I've been thinking over the situation of the Amateur Extra Class license and have come up with an idea which might provide a little incentive for getting a ticket.

Some of the little used portions of the ham bands could be set aside exclusively for Amateur Extra ops. For example, 14,300-14,350 kc. could be used.

Another thing, which would probably bring a lot of argument, would be to allow only Amateur Extra operators to employ such advanced techniques as RTTY and s.s.b.

Let's hear from the fellows on this subject.

(Incidentally, I'm not Amateur Extra, but General Class, although I do intend to get it just as soon as I have had my ticket long enough.)

— Bob Payne, W4CWZ

Amateurs in Operation Alert, 1955

A Summary of Reports of Amateur/RACES Participation in FCDA's Nation-wide Civil Defense Test

BY GEORGE HART, WINJM

On June 15th, at 1600 GMT, Civil Defense organizations throughout the country swung into action to put to the test our nation-wide c.d. establishment. The entire nation was subjected to a thorough simulated plastering by nuclear weapons, from twenty kiloton (1x) to five megaton (250x) in size. As far as nuclear attack is concerned, FCDA was assuming the worst, except that all concerned were notified in advance.

Under date of June 1st, ARRL notified its entire contingent of Emergency Coordinators (some 1700 of them) of the coming exercise, urging them to activate their RACES or pending RACES plans in this exercise. Instead of requesting them to fill out another questionnaire form, we this time asked for a simple narrative of activities in their area. This report is a summary of such narratives, condensed or reduced as necessary to fit into available *QST* space. If the report of activities in your area is not, perchance, included, it is because up to copy time nothing was received indicating that you were active.

Arizona

In Tucson, the civil defense council dispersed to a fringe area (Marana Air Base) and depended on Al Steinbrecher, W7LVR (SCM), to maintain



W4CDA, Kentucky SEC, hands a message to Judge Gilbert White, Deputy Director of Kentucky Department of Civil Defense during Operation Alert. At left is Col. Thomas J. Quinn, Coordinator of State Mobile Support Groups. The Boy Scout runner in the center is Jimmy Richardson. Photo courtesy *The State Journal*, Frankfort, Ky.

contact with elements not present at this control center. Al did a good job and was relied on heavily.

California

The Lennox District of the Los Angeles County Disaster-Civil Defense Authority (RACES) operated as the Lennox Disaster-Civil Defense Net (AREC) extensively. Prepared messages were distributed by the ten-meter mobile stations, who reported the locations of messages left and the party to see the NCS. This was posted on a map. Then 2-meter stations were dispatched to pick up the messages and transmit them to the 2-meter NCS, where they were answered and relayed back to the originating station. RACES tactical calls were used by all authorized stations. RO and EC W6NHP states that there are now 52 members of the Lennox C.D. Net with RACES certifications. Forty-eight amateurs participated.

British Columbia

SEC VE7DH summarizes the operation in British Columbia. Nineteen stations participated, with sixteen monitoring and ready to help. A total of 322 messages were handled, including 87 by VE7QC, 118 by VE7KL (NCS) and 47 by VE7NO. VE7ASR acted as mobile net control. VE7AHJ monitored Alaska alert KL7TI. Frequencies used were 3505, 3740, 3755, 3995 and 147.33 Mc. VE7DH says only one thing bothers him: how did controls keep on operating at ground zero after a fifty kiloton bomb exploded?

Colorado

W0TVB, EC for Mutual Aid Area No. 10 in Northwestern Colorado, reports operation from the Moffat County Courthouse in Craig, using his transmitting equipment and call. Activity commenced at 0900 MST, with total operation of 15 hours before the test terminated. Contact was maintained sporadically with state control at Denver, handling nine outgoing and ten incoming messages. W0SJJ was active from Steamboat Springs, Colo. All amateurs taking part were AREC members. Operation was completely on auxiliary power for one hour. The EC gives full credit to members of the Yampa Valley Radio Club, all AREC members, for all equipment and improvements, including the installation of the civil defense director himself. He says, "We are proud of the accomplishments we have made — so far."

Connecticut

In Manchester, 18 operators were asked for but 24 signed up to keep the control station open for

◆

A partial shot of Connecticut's Area I RACES Control Station, located at the State Police Barracks in Ridgefield. At this location, six nets were manned by sixteen operators working in two shifts, six hours on and six hours off, during Operation Alert.

◆



the full twenty-six hour period of the drill. Traffic was handled both for the local area and relayed for stations not in good contact with Area Control in Rocky Hill. Civil defense officials were greatly pleased with the amateurs' response.

Connecticut's Area I RACES organization, consisting of 22 towns in Fairfield County, was active to the extent of 180 operators manning 65 stations throughout the 26 hours of the test. The message total was 2700. This is a considerable increase over the 2156 total for 1954, indicating both the increased efficiency and expansion of the organization. Traffic was handled at the rate of 104-per-hour or 1.7-per-minute throughout the entire test period. Area I Radio Officer W1DBM spent most of the time traveling from one local control to another to visit, inspect and take pictures. Many of the control centers had a full staff of service chiefs on duty, while others had only skeleton crews. W1DBM opines that although the performance in Area I was outstanding, it would be inadequate in the event of a real bombing, the 2700 messages being but a drop in the bucket compared with the actual need.

Delaware

For the first time, the Communications Division of Delaware Civil Defense functioned as expected and desired, reports W3DB, Deputy Chief of Communications. RACES operated on 3507.5 kc. and 3580, with local work on 10, 6 and 2 meters. The State control station at Delaware City, New Castle County control at New Castle, Kent County control at Dover and Sussex County control at Georgetown were all alerted and ready to go at the appointed time. The state control station alone handled more than 250 messages during the test. Over fifty amateurs took part.

Illinois

From DeKalb, Ill., we have a clipping quoting the DeKalb c.d. director as saying that "the mobile communications system set up by the Kishwaukee Radio Club made an excellent showing." Mobiles were organized to patrol various sections of the city, reporting conditions to a central location. W9WTF is the spark-plug.

Indiana

The Evansville gang was active. A rig on 147.3 Mc. f.m. was used at the control center, Dress Memorial Airport, to control a similar unit located in the "devastated" area. A unit on 29.6 Mc. was used to handle traffic to 20 mobiles be-

longing to RACES members. Ten-meter set-ups were also located at the National Guard Armory and the local taxicab dispatcher's office so that medical units and taxicabs could be dispatched as needed from the control point within the affected area. State-wide communication was conducted on 3910 kc.

Kentucky

SEC W4CDA reports that Kentucky civil defense was provided with c.w.- and 'phone-net communications for their five Mobile Support Group cities. W4CDA operated the c.w. net on 3600 kc., using equipment set up by State Radio Officer W4MGT. W4TFK, Frankfort EC, operated his own 'phone station. Each station handled approximately 30 test messages.

W4JSH, EC for Lexington, reported on Operation Alert for the Fifth Mobile Support Group. This group handled 65 messages, participation by nineteen stations on 3600, 3945 and 3960 kc. Operating time was from 1815 to 2215 EST. Representation was thus provided for seven of the 25 counties making up the Fifth Mobile Support Group.

Louisiana

SEC W5IUG reports that eight ECs reported participation, plus the SEC and SCM, and that 69 amateurs took part throughout the state.

Maryland

In Baltimore, 165 amateurs participated. Radio Officer W3NNX and his assistant, W3YYB, quickly alerted and activated all stations with such good effect that Col. Milani, c.d. director for the city, said, "This group, following amateur tradition, fulfilling a most important function, seriously, calmly and expeditiously carried out their duties in a professional manner."

St. Mary's County amateurs also report participation. W3BUD moved his 75-meter station to county c.d. headquarters at Leonardtown, maintaining a circuit to W3CBW at state c.d. headquarters during the alert. In addition, a county net of six stations on another frequency was established. W3AVL's kilowatt proved effective in relaying to state Hq. on occasions. W3ZZK/m located and delivered traffic to a c.d.

(Continued on page 130)

YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

Young Ladies' Radio League First International Convention

Judging from reports received, the YLs who attended the Young Ladies' Radio League's First International Convention will long remember the precedent-setting affair. The convention is reported here in considerable detail so that those YLs who were not able to be there in person may catch the spirit of the affair. Thanks are due to Mary Brandvig, W6LBO, Convention Publicity Co-Chairman, for furnishing most of the information.

On Friday afternoon, June 24th, the three-room suite engaged by the YLRL at the Miramar Hotel in Santa Monica, Calif., bulged with registrants. The club photograph albums and scrapbooks were on display and continuous rag-chewing was in order.

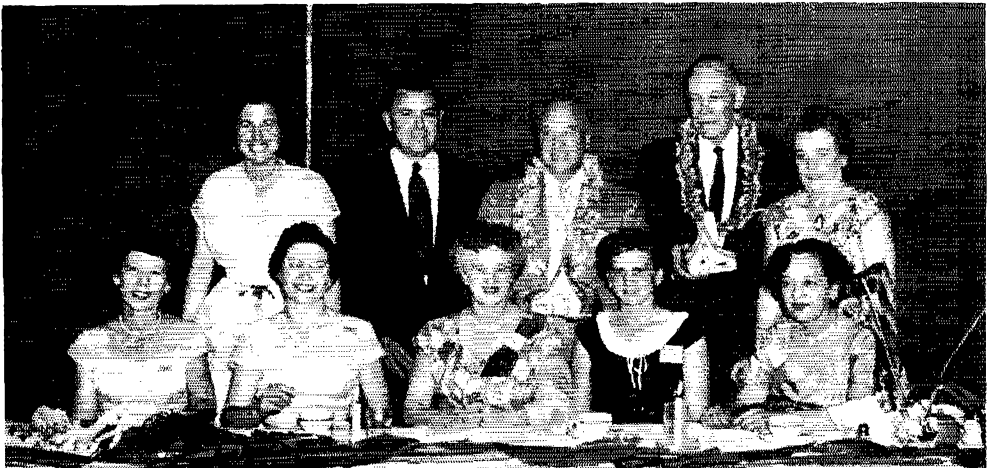
At the business meeting Saturday morning, Mildred Griffin, W6PJU, past-president of the Los Angeles YLRC, presided as official hostess. Each YL was given a bracelet of copper coiled links with YLRL insignia, on which Martha Edwards, W6QYL, and her committee — K6s EJE and GMX, and W6s DXI, PJU, and QGX — had worked since fall. Souvenir program booklets in the official club colors — silver and blue — were distributed.

General Convention Chairman Maxine Willis, W6UHA, opened the meeting with a welcome and introduction of

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

* All officers were in office at the time of the convention, which occurred only a few days before a new term began (July 1st). A new slate of officers now rules.

Seated at the banquet table with General Chairman of the Convention, Maxine Willis, W6UHA, and YLRL President, Vada Letcher, W6CEE (first two seated on left) are several honored guests. (Standing, l. to r.): Jeanne Collins, KL7RN, of Minchumina, Alaska; Walter Joos, W6EKM, ARRL Director of the Southwestern Division; John Reinartz, K6BJ, guest speaker; Bernard Linden of the Los Angeles office of the FCC; and veteran YL Elizabeth Zandonini, W3CDQ. (Seated, l. to r.): W6UHA; W6CEE; Mildred Griffin, W6PJU, past-president of the Los Angeles YLRC; Grace Dunlap, KZ5DG, visitor from the Canal Zone; and Gilda Shoblo, W6KER, YLRL Vice-President.



YLs from the following areas: W3, 5, 6, 7, 8, and 0, KZ5 and KL7.

The importance of communication in today's world was stressed in an address by the Mayor of Santa Monica, the Honorable Ben Bernard.

Business Meeting

President of the YLRL, Vada Letcher, W6CEE,* conducted a brief business meeting, which included the reading of reports from her officers. The report of Publicity Chairman, Gloria Matuska, W9YBC, was read in absentia by W6LBO. W3PVH, Betty Frederick, delegate from W3UUG, Miriam Blackburn, Secy.-Treas., read the financial report, which revealed a treasury balance on June 1, 1955, of \$964.35. Vice-President Gilda Shoblo, W6KER, reported on contest activity during the year and requested that suggestions regarding the conducting of contests and activities be forwarded to the new Vice-President, W9YBC. W6CEE thanked each member and officer for the cooperation extended to her and expressed the hope that the new President, Cris Bowlin, W9LOY, and all of the other officers would receive the same consideration.

The First and Second Vice-Presidents of the YLRL, Carol Witte, W6WSV, and Enid Aldwell, W6UXF, spoke of the history and development of the organization, from its beginnings in 1939 to the present day. Greetings were given by W5RZJ, W6NZP, W6AIWU, and W1QON (the last a written message read by W6KER).

Honorary membership for life in the YLRL was conferred on Ethel Smith, W3MSU, YLRL founder and first President. An acoustic, composed and hand-worked by Vi Grossman, W2JZX, was to be sent to Ethel.

The YLRL song, with words by Dorothy Willett, W8UDA, was sung in unison and led by Betty Wilson, W6REF. Betty also sang a new YLRL Convention song, with words and music by W6UHA.

Three convention tickets were awarded — one to W5RZJ, who won the Membership Contest, one to W6WSV, who was the member with the highest individual score in the Los Angeles YLRC, the club which had the greatest number of new members. The third ticket was awarded to KZ5DG, Grace Dunlap, as a representative of the area which had the greatest percentage of membership increase during the past year.

Five special gilt-trimmed YLRL certificates were awarded to W4JCR, Anita Bien, for outstanding work in revising the club Constitution and By-laws (see W4 YL photo elsewhere in this department); to W6NAZ, Lenore Conn, for her excellent work in editing and publishing the YLRL

Directory; to W6UHA for her efficient organization of the convention; and to W6LBO and W9YBC for their nationwide campaign of publicity for the YLRL.

Reception

After the business meeting, the group adjourned to the Palm Room of the hotel, where anthurium, orchids and ti leaves, flown from Hawaii by W6SHR's OM, provided a tropical background for the miniature ceramic ham shacks made by W6MFP. Agnes Langevin, Decorations Chairman. Jayne Dynes, K6GMX, had assembled and soldered a variety of antenna arrays which stood over the little ham shacks. One of the little shacks, with a three element 20 meter beam, duplicate of W6UHA's station beam, was wired for a lamp as a gift to Maxine from the Los Angeles YLRC.

Presentation of leis from members of the Honolulu YL club, flown from that city by arrangement of KH6AFN and W6SHR, was done in the Hawaiian manner with 88s from W6KER to W6CEE, W6UHA, and to each new district chairman or her proxy.

Fashions from a near-by clothing salon were modeled. While Martha Edwards, W6QYL, modeled the wedding gown she made of the silk brocade her recent bridegroom, W6DDQ, brought from Japan. Lenore Conn, W6NAZ, narrated the story of their courtship and wedding.

Elizabeth Zandonini, W3CDQ, and Evelyn Scott, W6NZP, recounted meetings with overseas YLs during recent travels abroad. KL7RN and KZ5DG spoke on YL activities in Alaska and in the Canal Zone.

Banquet

Hundreds of Hawaiian orchids, tall green tapers, and giner leis decorated the tables for the evening banquet. W6UHA was mistress of ceremonies. Each YL banquet guest was presented with a certificate designed by W6KER and W6MFP, making the recipient a charter member of all future YLRL Conventions.

A talk on the early days of amateur radio by John Reinartz, K6BJ, was one of the features of the evening. Mr. Reinartz declared that he was especially happy to speak on the occasion, for after thirty-five years of married life, his wife had recently become Novice KN6MJH.

Enid Aldwell, W6UXF, and her Bavarian Dance Group, entertained with colorful and authentic dances of Bavaria.

Bernard Linden, Engineer-in-Charge of the Los Angeles area office of the FCC, brought a message of congratulations and clippings of early-day YLs from his personal scrapbook.

Although many YLs had to leave after the main convention events on Saturday, a number remained in the area and visited the homes of Los Angeles YLs and attended a mobile caravan to CBS-TV City on Monday, arranged by Mary Kay, W6JMC.

And thus the first international convention of the YLRL came to an end.

The convention is significant not only of the progress of the YLRL—it reflects the interest in numbers and activity of YLs in general. A few years ago a convention of this sort could not have occurred. Now the question is when and where is the next one going to be? With the example of hard work and enthusiasm displayed by the YLs of the Los Angeles YLRC, the way points to bigger and better YL get-togethers in the future.

Twenty-three YLs registered at the first YLRL convention in the Fourth District, held in conjunction with the ARRL Southeastern Division Convention. This YLRL meeting was sponsored by the SPARCYLs (St. Petersburg Amateur Radio Club YLs). ARRL President Dosland, W0TSN, presented W4JCR, Anita, with a Certificate of Merit, sent to her from YLRL President W6CEE in recognition of outstanding work on the club constitution and her long years of service to the YLRL. Here are the 14 YLs who attended the YLRL breakfast: (standing, l. to r.): KN4CUY, W4s BAV, GNZ, AVA, Minnie Smith, W4s BIL and WPD. (Seated, l. to r.): W4s GJU, UNO, RLG, JCR, TDK, ZVW, HRC.

YLs in Attendance

A list of the eighty YLs who registered at the Convention follows:

W3s CDQ, PVH; W7s CGE, RZJ, SYL, WUR; JN7VWU, W7s GXI, KOY, LCS, PUV, SBX, SNP; ULK: W8UAP, WN8UAU K0VTV, ex-W3LSX; W7s ERR, PIK, TYB; KL7RN; KZ5DG.

K6s ACF, ANG, AYI, BUS, BXX, CYZ, DRS, EIA, EJE, EIA, EXV, GQW, HMP, JCL, KCI; K6s HIW, HRW, IHD, JRL, KEK, LPM, MIH; W6s AKE, AVF, BDE, CEE, DPB, DXI, EHA, FEA, GAI, GMX, HEG, IWC, JCA, JMC, JZA, KER, KYZ, LBO, MFP, MWU, NAZ, NZP, PJU, QBK, QGX, QMO, QOC, QOO, QYL, REF, SGL, SHR, UHA, UXF, WRT, WSV.

Total attendance, which included NYLs, OMs, and invited guests, was one hundred forty-seven.

Convention Committee

Convention Chairman: Maxine Willis, W6UHA.

Official Hostess: Mildred Griffin, W6PJU.

Business Manager: Evelyn Scott, W6NZP; Helene Leonard, W6QOG.

Decorations: Agnes Langevin, W6MFP; Jayne Dynes, K6GMX, Lorraine Joslin, W6SHR.

Favors: Bracelets: Martha Edwards, W6QYL; Harryette Barker, W6QGX; Frances Staben, K6EJE; Jayne Dynes, K6GMX; Gladys Eastman, W6DXI.

Certificates: Gilda Shoblo, W6KER; Agnes Langevin, W6MFP.

OMs' Entertainment: Maxine Willis, W6UHA; Lenore Conn, W6NAZ; OM Lee Eastman; OM Ralph Blakesley.

Prizes: Ann Joyce, W6KYZ.

Program: Harryette Barker, W6QGX; Gladys Eastman, W6DXI; Vada Letcher, W6CEE.

Publicity: Mary Brandvig, W6LEO; Gloria Matuska, W9YBC.

Reception Transportation: Lorraine Frechberg, W6AKE.

Reservations: Elsa Wheeler, W6JZA; Billie Blakesley, K6ANG.

Sunday Entertainment: Carol Witte, W6WSV; Ruby Word, W6WRT; Ellen Garner, K6EIA.

Monday Entertainment: Mary K. Stewart, W6JMC.

Vocalist: Betty Wilson, W6REF.

Keeping Up with the Girls

W1VXC, June, has formed a ten-meter net to facilitate delivery of traffic in Rhode Island. . . . Along with her election as W4 YLRL chairman, W4BLR, Kay, made A-1 Operator Club and gave birth to her fourth child (she complained when she fell short of traffic totals required for her third straight BPLD). . . . W1VOS, Marge, noted W1s UQA, UBM, VVS, KN1E1W, and KN2KFB at the New London hamfest. . . . W1SVN, Millie, has joined the ranks of a number of YLs who are policewomen. . . . Four of the girls in W2IQP's training class have passed the Novice exam and are awaiting calls. . . . K2s AHG, DJN, IYP and W2NAI are regular members of the Second Regional Phone and Interstate Phone Nets. . . . The new address of the YLRL Sixth District chairman, Gertrude Cassidy, W6FEA, is 121 Altana St., San Rafael, Calif.



• On the TVI Front

TVI IN GREAT BRITAIN

The Engineering Department of the GPO (Government Post Office) of Great Britain has released recent figures on TVI and BCI in that country. The GPO is the British equivalent of our FCC. Figures shown were extracted mainly from an editorial appearing in the *R.S.G.B. Bulletin* and partly from *The Short Wave Magazine*, British amateur publications.

Interference Caused by Transmitters

Amateur	Others
BCI — 125	BCI — 142
TVI — 303	TVI — 476

Other TVI offenders were:

- 8956 sewing machines
- 7056 commutator-type motors
- 6954 hair dryers
- 1064 TV receiver local oscillators

The GPO classified 21,877 TVI cases under the all-embracing category "unknown." Also, 6805 instances of BCI were recorded as caused by TV receiver time-base circuits.

INTERFERENCE COMMITTEE DIRECTORY

The Southern California Electronics Interference Committee publishes "Coöperative Interference Committee Directory." This pamphlet, compiled under the supervision of Ray E. Myers, W6MLZ, contains valuable information for TVI committee members as well as other groups.

To be found in this booklet are three lists. The first is an index of those participating in the program. It gives addresses and also home and office telephone numbers where authorization to do so was received. The second shows the geographic location of the participants. The last is a compilation of the various interests of those taking part.

Also included is an investigation report form. Its purpose is to show sufficient data so as to indicate quickly causes and corrective measures on future reports called to the committee's attention.

LATEST TVI COMMITTEE LIST

The following is the latest FCC roster of TVI committees. It is interesting to note that since March 1, 1954, 95 new committees have been organized, bringing the total to 437. These committees now serve 412 cities as compared to 328 as of March 1, 1954. Such progress is indeed gratifying and statistics indicate that much credit should be given to those responsible for this accomplishment.

- Alaska:* Anchorage, Fairbanks.
- Alabama:* Anniston, Birmingham, Huntsville, Mobile, Montgomery.
- Arizona:* Phoenix, Tucson.
- Arkansas:* Fayetteville, Ft. Smith, Little Rock.
- California:* Alhambra, Arcadia (2), Bakersfield, Baldwin

Park, Burbank (2), Camarillo, Coronado, Covina, Downey, Dunsuir, East Bay, Edwards Air Force Base, Encino, Fresno, Fullerton, Glendale, Hayward/San Leandro, Hemet, Inglewood, Lakewood, Lancaster, Long Beach, Manhattan Beach, Marin County, Marysville/Yuba City, Merced, Modesto, Monrovia, Monterey Bay, Mt. Diablo, North Bay, North Hollywood, North Peninsula, Norwalk, Oakland, Orange County, Oxnard, Palo Alto, Pomono/Ontario, Richmond, Sacramento, San Bernardino, San Diego, San Fernando, San Francisco (5), San Mateo, San Pedro, Santa Ana, Santa Clara County, Sonoma County, South Pasadena, Stockton, Taft, Turlock, Ventura, Westchester (in City of Los Angeles), Whittier, Woodland.

Connecticut: Darien, New Haven, Norwalk, Norwich, Waterbury.

Colorado: Alamosa, Boulder, Colorado Springs, Denver, Grand Junction, Greeley, Pueblo.

Delaware: Wilmington.

District of Columbia: Washington.

Florida: Bradenton, Clearwater, Daytona Beach, Ft. Lauderdale, Ft. Walton Beach, Jacksonville, Key West, Lakeland, Miami, Orlando, Pensacola, Sarasota, St. Petersburg, Tampa, West Palm Beach.

Georgia: Albany, Atlanta, Augusta, Hapeville, Macon, Marietta, Savannah, Warner Robins.

Hawaii: Honolulu, Hilo, Lihue, Kauai, Wailuku, Maui.

Idaho: Boise, Kellogg, Nampa, Twin Falls.

Illinois: Alton, Belleville, Berwyn, Broadview, Chicago, Creve Coeur, Decatur, Des Plaines, East Moline, East Peoria, East St. Louis, Freeport, Galesburg, Granite City, Hollywood, Maywood, Moline, Morton, North Riverside, Pekin, Peoria, Princeton, Rock Island, Silvis, Villa Park, Western Springs, Wheaton.

Indiana: East Chicago, Elkhart, Evansville, Ft. Wayne, Gary, Hammond, Lafayette, South Bend, Vincennes.

Iowa: Davenport, Newton, Spencer, Waterloo.

Kansas: Kansas City, Lawrence, Leavenworth, Salina.

Kentucky: Lexington.

Louisiana: Baton Rouge, Bogalusa, Lake Charles, Monroe, New Orleans, New Orleans (Algiers).

Maine: Augusta.

Maryland: Annapolis, Baltimore (3), Cumberland, Hagerstown.

Massachusetts: Boston, Fitchburg, Framingham, Lowell, New Bedford, North Adams, Pittsfield, Quincy.

Michigan: Allegan, Battle Creek, Birmingham, Bloomfield Hills, Detroit, Ferndale, Flint, Grand Rapids, Grosse Pointe, Grosse Pointe Park, Hazel Park, Ishpeming, Lansing, Marquette, Menominee, Mt. Clemens, Mt. Pleasant, Muskegon, Pontiac, Royal Oak, Traverse City.

Minnesota: Fairmont, Minneapolis, Red Wood Falls, St. Paul (2).

Mississippi: Gulfport, Hattiesburg, Jackson, Keesler Air Force Base, Pascagoula.

Missouri: St. Louis.

Montana: Great Falls.

Nebraska: North Platte, Omaha, Scotts Bluff, Sydney.

Nevada: None.

New Hampshire: Concord.

New Jersey: Atlantic City, Camden, Denville, Livingston, Morristown, Parsippany, Vineland.

New Mexico: Albuquerque, Hobbs, Las Cruces, Roswell.

New York: Binghamton, Brooklyn, Buffalo, Corning, Elmira, Hornell, Jamestown, Lockport, New York (2), Niagara Falls, Penn Yan, Poughkeepsie, Rochester, Roxbury, Salamanca, Silver Creek, Syracuse, Watertown.

North Carolina: Asheville, Charlotte, Dunn, Greensboro, Lumberton, Spindale, Winston-Salem.

North Dakota: None.

Ohio: Bellaire, Canton, Chillicothe, Cincinnati, Cleveland (6), Columbus, Conneaut, Dayton, Greenville, Middletown, Newcomerstown, Springfield, Wadsworth, Zanesville.

Oklahoma: Clinton, Lawton-Fort Sill, McAlester, Ponca City, Tulsa, Wagoner.

(Continued on page 126)

Results - Armed Forces Day 1955

An Armed Forces Day message to amateur radio operators signed by the Honorable Charles E. Wilson, Secretary of Defense, was transmitted at 25 w.p.m. by military stations AIR, Air Force Radio Washington, D. C., NSS, Navy Radio Washington, D. C., and WAR, Army Radio Washington, D. C., at 1900 EST on May 21st. There were 305 individuals participating in this phase of the special activities of which 233 operators have been mailed certificates of merit in recognition of their making perfect copy.

Message from the Secretary of Defense

ARMED FORCES DAY IS THE ONE SPECIAL DAY OF THE YEAR DEVOTED TO PUBLIC DISPLAYS AND DEMONSTRATIONS OF THE TEAMWORK AND TECHNOLOGICAL ADVANCEMENTS OF THE ARMED FORCES OF THE UNITED STATES COMMUNAL INCLUDING NOT ONLY THE ARMY COMMUNAL NAVY COMMUNAL AIR FORCE COMMUNAL MARINE CORPS AND COAST GUARD COMMUNAL BUT ALSO THE RESERVE COMPONENTS AND AUXILIARY SERVICES PERIOD AMATEUR RADIO OPERATORS COMMUNAL WHO HAVE WORKED TOGETHER SO EFFECTIVELY IN PROVIDING AUXILIARY COMMUNICATIONS FOR DISASTER RELIEF AND IN OTHER EMERGENCY SITUATIONS COMMUNAL HAVE A PLACE IN OUR NATIONAL DEFENSE SYSTEM PERIOD ACCORDINGLY COMMUNAL ON BEHALF OF THE ARMED FORCES OF THE UNITED STATES COMMUNAL I CORDIALLY INVITE AMATEUR RADIO OPERATORS TO PARTICIPATE IN THE 1955 ARMED FORCES DAY PROGRAM PERIOD SIGNED C E WILSON

Entries were also received from radio operators aboard two ships at sea, French Morocco, Hawaii, Guam and Alaska. Certificate winners are as follows:

W1s OIG BIH AXZ RFC YGV AIJ MJE JVZ ONP UNC TUI BJP DWO IKE SDO UTH, W2s ALZ JOA MZB JRS WZO NRV DRV CDG JCA FXA ALD TUK QDY LYH CLQ LRW SSC SWC UAP VPH WFL ZMK, K2s WAS ECL DRY GTZ, W3s YWO ADE TSG ZTW JPW ID ZJ OKS QCB JEI BKE AXS ECP PFN PMG QLQ QOJ, W4s IYT KSW SDR KJ MPA RHZ ZPR OFM OXX YTT AQM HRD DEQ PVV CVO LYV PHL SR, K4s BTA/3 ASU, W5s NIY NW NDV HUC LB OFX YOK WNU GPB JPC TGV YMX BI CYE HBD JQU UPM, K5FR, W6s MBW ZLF DVD MWR OWP QIL CGJ MCY BXL FYW FYN CRT RYR AXV DTY AXQ NAZ ULL YY, K6s CME DSK CFC HSO EJZ NAA, W7s EBS FOS CZY NZP FIX WOK WHE BJY BVZ RML MCU PKX, WN7WYP, W8s ETB RLE QLJ KNX SZU DGI FLA HSW PYB, W9s ANB RA STZ UBW HAC AKP JAM DHJ BP CXY DPL HVP JUJ, W0s TKX CGY FEO EOT QVA UAT PIV YWV NHZ UQM NIY, KG6AFT, KH6s DG FX, KL6J, WL7BHC, VE3IA, A2QND, A7K0V, A9VYD, N3s NCF EAC.

Also C. P. Alexander, M. W. Anderson, Charles A. Armbrust, Wm. J. Beetham, Charles Blake, Richard B. Bradley, Earl L. Brouillette, James R. Burns, Cmdr. C. J. Corrigan, Richard G. Edwards, Maj. Allan C. Forbes, Thomas Galbreath, Lars Giertz, Jim Gilbreath, L. W. Guertin, Gaither M. Hilton, Robert C. Holland, Jack Howell, Dwane O. Howington, Wayne D. Hudson, June

D. Hurst, Edward A. Jones, James R. Manion, Robert H. McChargue, David E. Messiter, Myron L. Morford, Frank J. Moroney, George W. Nervo, John J. Newman, C. T. Nichols, Raymond D. Noren, Thomas A. Olson, Edward V. Phillips, George E. Reynolds, Reinman, Stanley E. Rivett, R. L. Simpson, Frederick W. Staff, I. I. Stokes, E. L. Stough, James G. Tibbetts, G. R. Turner, L. M. Vane, G. R. Walter, George F. Wanish, C. E. Watson, Bernard Weeks, Robert Wixon.

Military-to-Amateur Test

Operating on military frequencies, AIR, NSS and WAR worked amateurs on the 80-, 75-, 40-, and 20-meter bands. The three military stations made a total of 564 QSOs with amateurs during the six-hour test. Special Armed Forces Day QSL cards have been mailed to all stations worked. It was possible to receive three cards by working all three stations.

Radioteletypewriter Receiving Competition

There were fifty-two participants in radioteletypewriter competition this year and 27 of this number made perfect copy. A letter of acknowledgment has been mailed to each participant. All suggestions received for improving and creating interest in this phase of Armed Forces Day will be taken into consideration during the forthcoming year.

The Army, Navy and Air Force look forward to your participation in these activities next year on Armed Forces Day.

STAFF OPENING

We have a permanent opening for a young man to do general editorial and production work on the *QST* staff. Here is a chance to make amateur radio your career. The work requires the ability to express yourself both orally and on paper, and will later involve a modest amount of travel. Any applicant should be one with initiative and should be able to assume administrative responsibility readily.

We'd like someone about 25, preferably single, of pleasing personality, with at least a couple of years of ham experience under his belt; mostly someone who has had some publishing or writing experience. Salary will be commensurate with ability and background.

If you are interested, write to Box 80, ARRL Hq., West Hartford, Conn. State your age and marital status, and give a résumé of your educational and employment or military background; also your amateur experience.

June V.H.F. Party Summary

Scores and Activity Set Many New Records

PICK any category in which v.h.f. contests can be compared, and the chances are good that the June V.H.F. Party of 1955 will rate a record. The festivities of June 11th and 12th resulted in a new high in participation, with 455 valid entries, compared to a previous record of 370 for any of the spring-fall contests. There were many more portable and multiple-operator stations, as clubs more and more make use of the June Party as a test of Field Day facilities. The advent of Technician licensees on 50 Mc. brought a new surge of life to that band, and the number of operators using 6 was up 60 per cent over last June. More ARRL sections (55) were heard from than in any previous v.h.f. activity, and the scores of both individual operators and groups broke all records.

The highest total ever posted in a v.h.f. contest was turned in by the Waltham Amateur Radio Association, W1MHL/1. Operating from Pack Monadnock Mountain, near Peterboro, N. H., as they have in every party for years, the Watch City club made 97 contacts on 50 Mc., 243 on 144 Mc., 15 on 220 Mc., and 10 on 420 Mc. Their section multiplier, a staggering 43, netted them 16,770 points. Taking their single-band totals, we find them leading the country on 50, 220 and 420 Mc. The 2-meter job of W1PYM, who ran the 2-meter position throughout the contest, was second in the country for 2-meter work. His 3157 points (figured on the basis of 2-meter operation only) was exceeded in that category only by W3IBH.

The top single-operator score was made by W2FBZ, Montclair, N. J. Lee won the Northern New Jersey Section Award again with 233 contacts on 4 bands. Her section multiplier of 34 brought this to 8534 points, another record. Right behind Lee in the home-station category was W1RFU, Wilbraham, Mass., with 211 con-

tacts on 50, 144 and 220 Mc., for 7548 points. W3KKN, Willow Grove, Pa., made the most contacts of any single-operator station, 251 on 6 and 2 meters, for 5522 points. His neighbor, W3IBH, Philadelphia, worked 220 stations in 15 ARRL sections for 3300 points, the country's high one-band effort.

The San Bernardino Microwave Society, W6VIX/6, hung up three marks for groups to shoot at in future contests. Operating from Sierra Peak, near Corona, Calif., they made an even 400 contacts, 306 of which were on 144 Mc., for a new Western record of 6165 points. They used 50, 144, 220, 420, 2400 and 3300 Mc., but they say that this is only the beginning. Their u.h.f. and microwave gear is going to be much more effective for the September Party. Congratulations to operators W6VIX, W6JMY, K6GMV, and K6HXM for demonstrating that a West Coast station can be right up among the leaders, despite the handicap of geographically immense ARRL sections.

Dozens of other portable stations contributed mightily to the fun. K2CMB/2, Paterson, N. J., posted the next to the highest single-operator score, 7714 points, on 50, 144, and 220 Mc. with his trailer station. W3KX/3, the Electric City Radio Club, maintained their customary leadership in the Eastern Pennsylvania Section with 8103 points made on four bands. W1UIZ/1, Mt. Equinox, Vermont, put that hard-to-get section within the reach of many, working 50, 144, 220, 420, and 3300 Mc. His sole contact on 3300 was with W1IUN/1, who used gear built in 1947, with which he made what may have been the first amateur contacts on that band.

Scores of Technicians, using 50 Mc. for the first time in a contest, kept that band jumping with activity. Oddly enough, no Technician qualified for an award, however, as there were no

Members of the San Bernardino Microwave Society operating W6VIX/6 in the June V.H.F. Party made an even 400 contacts on 50, 144, 220, 420, 2400 and 3300 Mc. K6GMV, left, runs the 420-Mc. gear, while K6HXM supervises the 2400-Mc. tests being made by W6JMY. The W6VIX/6 score, 6165 points, was an all-time high for a station outside the small-section East, and their contact total was the highest in v.h.f. contest history.

QST for

instances where the necessary three entrants in that category were received from any one section. Note to Technicians: Be sure to show your class of license on future contest reports, and bear down on 6 in the September Party. W1ZW/1, Paxton, Mass., was the country's leading Technician, and the top 50-Mc. operator, as well, with 90 contacts in 13 sections, for 1170 points. This was done without benefit of sporadic-E skip, as the band remained closed throughout the contest, as far as the W1s were concerned.

The 50-Mc. band opened in other areas, however, and some nice scores were turned in as a result. W7OAY/7 knocked off 36 W6s in a 3-hour E₂ session Saturday. Their 1703-point total is believed to be the first 4-digit v.h.f. score ever turned in by a station in the Northwest. They made 129 contacts on 50, 144, and 420 Mc.

A study of the pile of logs brings out many facets of the contest that don't show in the score tabulation. W6OHQ/6, Mt. San Benito, 210 miles northwest of Los Angeles, worked all eight California sections on 144 Mc. K6GVB, Ukiah, Cal., worked 29 stations in four sections, all of which are more than 50 miles distant. Ukiah is in the northern part of California, with mountains in all directions. W2TKO handled emergency traffic for an hour following a CAP crash and breakdown of CAP communications facilities. W3TDF soldered the last connection on antenna systems on his new tower minutes before the start of the contest, and went on to make 203 contacts in 22 sections, for 4466 points. W2UK, taking his last fling at the 2-meter band before dismantling his station for shipment to the Hawaiian Islands, worked 127 stations in 19 sections on 144 Mc. We reported this last month, tentatively, as the best section total made on 144 Mc., but now we find that W2CXY was giving a new 50-element array the acid test in the party and duplicated Tommy's section total.

SCORES

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.; E, 1215 Mc. and above. Multiple-operator stations are shown at the end of each section tabulation.

ATLANTIC DIVISION

E. Pennsylvania

W3KKN.. 5522-251-22-AB
W3TDF.. 4466-203-22-AB
W3IBH.. 3300-220-15-B
W3UKT.. 2832-177-16-AB
W3ARW.. 754-56-13-ABCD
W3BNU.. 170-54-5-B
W3EDO/3 132-33-4-B
W3BRQ/ 120-40-3-B
W3TPR.. 90-30-3-B
W3UQJ.. 70-13-5-AC
W3GCLQ 46-32-2-B
W3IVM.. 48-16-3-B
W3WED.. 30-15-2-B
W3ZWE 8-8-1-B
W3RYO/3 5-5-1-B
W3RX/3⁴ (Electric City A.R.C.) 8103-202-37-ABCD
W3OLV/3 (W3a OLV USA) 1771-161-11-B
W3BYF/3 (W3a BYF HPL LXM) 1287-117-11-B
W3UCA/3 (5 ops.) 1200-120-10-B

Md.-Del.-D. C.

W3CVC/ 1564-89-17-ABCD
W8NRM/3 936-70-13-ABC
W3TOM.. 860-86-10-B
W3WOD.. 684-76-9-AB
W3GKP.. 592-74-8-AB
W3BNC.. 528-64-8-BC
W3MNV.. 498-51-8-AB
W3LZZ.. 300-60-5-B
W3BYG.. 265-53-5-B
W38SF.. 176-44-4-B
W3OTC.. 174-29-6-A
W3BBH/ 192-32-6-AB
W3BCIK 152-38-4-B
W3HQX.. 126-42-3-B
W3NAEP 120-30-4-B
W3NH.. 112-28-4-B
W3YFW 106-27-4-B
W3RGT.. 104-26-4-A
W3ZNB.. 51-17-3-B
W3RRT.. 22-11-2-B
W3LMC (W3a LMC RQP) 927-103-9-B
W3CIQ/3 (W3a CIQ RAH) 606-101-6-B

S. New Jersey

W2BVU/2 3098-125-24-ABD
W2UK.. 2413-127-19-R
W2REE.. 1126-94-11-10-B
W2CXY.. 1102-58-19-H
W2ORA.. 477-53-9-AB
W2BLV.. 320-32-10-A
W2AF/2.. 240-30-8-A
W2HAY.. 116-29-4-A
K2GZFJ
W2FCC/2 (W2a FCC YJC) 462-66-7-B
KN2ITP (KN2a ITP ITQ) 220-55-4-B

Western New York

W2ALR.. 1160-145-8-B
K2CEH.. 1056-94-11-ABCD
W2ERX.. 752-47-16-AB
W2ORI.. 728-104-7-B
W2WFB.. 612-68-9-AB
W2ZHI.. 520-52-10-AB
KN2LRT/ 396-93-4-B
W2FCR/2 378-8-8-B
W2PCR.. 332-83-4-B
W2ZRG.. 295-59-5-R
W2OWF.. 275-56-5-AB
W2UTH.. 270-54-5-AB
K2EPV.. 268-67-4-B
W2TKO.. 105-6-4-AB
W2ZOC.. 238-57-4-B
W2LXE.. 183-61-3-B
W2SHV.. 180-45-4-B
W2PZB.. 164-41-4-AB
K2CVX/2 156-26-6-AB
KN2JVN/2 156-52-3-B

KN2LRN 144-48-3-B
W2RHQ.. 105-19-5-ABCD
K2ECQ.. 136-34-4-AB
K2INO.. 78-39-2-R
W2QY.. 70-25-2-B
W2EQQ.. 56-14-4-H
K2GIG.. 50-25-2-B
W2CTA.. 48-24-2-B
K2EVP.. 48-24-2-B
W2ZS.. 46-23-2-B
KN2KMT 26-13-2-B
W2UXS.. 16-13-2-B
K2CIUQ 17-17-1-R
W2YIK/2 16-16-1-B
W1MVV/2 11-11-1-B
W2VYS.. 10-10-1-B
KN2IXB 7-7-1-B
K2EBC 2-2-1-B
W2UPT/2⁴ (4 ops.) 1854-103-18-AB
W2UPI (Syracuse V.H.F. Club) 1199-105-11-ABCD
K2DBB/2 (2 ops.) 595-55-5-AB
K2AVI (Northern Chautauqua Radio Club) 188-47-4-H
W2P8T (W2P8T, K2CWD) 111-37-3-AB

W. Pennsylvania

W3LNA.. 200-40-5-R
W3SUK.. 18-5-3-AC
W3KWH (Steel City A.R.C.) 416-52-8-AB

CENTRAL DIVISION

Illinois

W9QKM.. 1045-95-11-AB
W9UBI.. 390-78-5-AB
W9ULE.. 252-63-4-B
W9N9XI 213-71-3-B
W9FET.. 210-42-5-AB
W9NSKE 183-61-3-B
W9PEN.. 162-54-3-B
W9GLR.. 142-19-7-B
W9KLD.. 100-25-4-B
W9MAK.. 81-27-3-B
W9KCV.. 44-44-1-B
W9CX.. 99-33-3-B
W9PMN.. 42-21-2-B
W9HKA.. 4-3-3-B
W9N9BN (W9ns MHL NBN) 46-46-1-B

Indiana

W9KLR.. 1107-123-9-H
W9JIY.. 392-56-7-B
W9BUM.. 144-36-4-B
W9MHP.. 90-18-5-AB
W9CWG.. 30-15-2-B

Wisconsin

W9BTI.. 747-81-9-ABD
W9TQ.. 399-56-7-ABD
W9RXS.. 276-69-4-B
W9HFL.. 205-41-5-B
W9N9MQW/ 104-26-4-B
W9GJE.. 105-14-4-B
W9IJM.. 100-25-4-B
W9JCI/W9JCI 93-31-3-AB
W9AAX.. 45-15-3-B

W9IIR... 45-15-3-B
W9LEE... 45-15-3-B
W9J9JP/W9J9JP 34-17-2-AB
W9OZK.. 16-16-1-B
W9NMPZ 13-13-1-B
W9RNT.. 6-6-1-A
W9NMPY 6-6-1-B
W9GX9/9 (198 OPE QXP SER) 801-89-9-R

DAKOTA DIVISION

S. Dakota

W9RSP.. 56-14-4-B

Minnesota

W0TJF.. 84-12-7-AB
W0DXY.. 24-8-3-B

DELTA DIVISION

Louisiana

W5HEZ.. 184-23-8-AB

GREAT LAKES DIVISION

Kentucky

W4PCT.. 690-69-10-AB
W4VLA.. 205-41-5-AB
W4WHN.. 50-10-5-B
W4HQJ.. 40-8-5-B

Michigan

W8RMH 1534-116-13-ABCD
W8DX.. 1056-85-12-ABCD
W8NSH.. 688-86-8-B
W8ARR.. 320-64-5-B
W8NOH.. 294-49-6-B
W8GZY.. 255-51-5-AB
W8GYU.. 255-51-5-AB
W8DDO.. 240-48-5-AB
W8QGP.. 180-60-3-B
W8OKT.. 162-54-3-B
VE3AN/V3 160-32-5-AB

W8JXU.. 156-52-3-B
W8TGH.. 148-37-4-B
W8YJY.. 144-48-3-B
W8DVI.. 105-35-3-B
W8NTTK 93-31-3-B
W8DUR (4 ops.) 99-33-3-B

Ohio

W8LPD.. 2640-162-16-ABC
W8HOH.. 150-36-1-ABCD
W8SJI.. 968-121-8-B
W8SPC.. 891-81-11-B
W8HQB.. 720-80-9-AB
W8ILC.. 525-105-5-B
W8SDJ.. 525-75-7-AB
W8BVA.. 472-38-8-BC
W8NSVU/W8SVU/ 468-52-9-AB

W8BMO.. 456-70-6-ABCD
W8DRN.. 320-60-7-B
W8LAH.. 378-63-6-AB
W8WVA.. 328-1-3-B
W8J8W.. 348-58-6-AB
W8CEQ.. 330-55-6-AB
W8MIU.. 312-52-6-B
W8BBO.. 305-61-5-B
W8LUX.. 244-61-4-B
W8P.. 237-79-3-B
W8NAF.. 228-76-3-B
W8IA.. 204-51-4-B
W8N8UMF 204-51-4-B
W8PKP.. 192-32-6-AB
W8MIS.. 184-36-1-ABCD
W8INQ.. 168-23-6-AC
W8NTLJ 164-41-4-B
W8NEE.. 150-21-6-AC
W8NQL.. 148-37-4-B
W8KDW.. 125-32-4-B
W8MVA.. 105-36-3-B
W8WUP.. 105-35-3-B
W8MXS.. 87-29-3-B
W8USBM 82-26-2-B
W8MDK.. 49-49-1-B
W8HSY.. 46-23-2-B
W8PE.. 38-38-1-B
W8BOV.. 36-36-1-B
W8OET.. 34-34-1-B
W8OVG.. 28-28-1-B
W8IFZ.. 24-24-1-B

HUDSON DIVISION

Eastern New York

K2HPN/2 1332-111-12-B
K2GCH/2 924-76-12-BD
W2PHX.. 474-79-6-B
W2PNQ.. 350-30-7-B
K2GCVG 252-42-6-B
KN2KET/2 132-33-4-B
W2BLN.. 160-12-5-B

(Continued on page 122)

V.H.F. QSO Party

September 17th-18th

Another V.H.F. QSO Party, open to amateurs who can work any band or bands above 50 Mc., will be held from 2:00 P.M. Local Standard Time, Saturday, September 17th, to 11:00 P.M. Local Standard Time, September 18th.

Call "CQ Contest" or "CQ V.H.F. QSO Party" to get in touch with other contestants. During contact, operators must exchange names of their ARRL sections for full credit.

Work as many stations on as many v.h.f. bands as you can. Count 1 point for successfully confirmed exchanges of section information on 2 or 6 meters, 2 points for such QSOs on 220 or 420 Mc., and 3 points on 1215 Mc. or higher bands. To determine your final score, multiply this sum of contact points by your section multiplier, which increases by one when the same section is reworked on another band. A station may also be reworked for credit on additional v.h.f. bands.

A certificate will be awarded to the top scorer in each ARRL section. In addition, a certificate will go to the high-scoring Novice, Technician, and multioperator station in each section from which three or more valid entries in these three special categories are received.

Submit your results as soon as the competition is over. A simple tabulation of stations and sections worked, as shown on page 60 of June, 1953, *QST*, is all that is required. Convenient reporting forms are now available from ARRL.

Rules

1) The contest starts at 2:00 P.M. Local Standard Time, Saturday, September 17th, and ends at 11:00 P.M. Local Standard Time, Sunday, September 18th. All claimed contacts must fall within this period and must be on authorized amateur frequencies above 50 Mc., using permitted modes of operation.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2- or 3-point units.

3) Fixed-, portable- or mobile-station operation under one call, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently under more than one other call during the contest period.

4) Scoring: 1 point for completed two-way section exchanges on 50 or 144 Mc.; 2 points for such exchanges on 220 or 420 Mc.; 3 points for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of different ARRL sections worked per band; i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted. Cross-band work does not count. Contacts with aircraft mobile stations cannot be counted for section multipliers.

5) A contact per band may be counted for each station worked. Example: W2GLV (S.N.J.) works W1DBM (Conn.) on 50, 144 and 220 Mc. for complete exchanges. This gives W2GLV 4 points (1 + 1 + 2) and also 3 section-multiplier credits. (If W2GLV contacts other Connecticut stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.)

6) Each section multiplier requires completed exchanges with at least one station. The same section can provide another multiplier point only when contacted on a new v.h.f. band.

7) Awards: A certificate will be awarded to the high-scoring single-operator station in each ARRL section. In

addition, the high-scoring multiple-operator station will receive a certificate in each section from which three or more valid multiple-operator entries are received. Certificates will also be given to the top Novice and Technician in each section where three or more such licensees submit logs. Award Committee decisions will be final.

8) Reports must be postmarked no later than October 5, 1955, to be eligible for awards. See the box on page 60, June, 1953, *QST*, for correct form, or a message to Headquarters will bring a lithographed blank for your contest report.

W/VE Contest

September 24th-25th

The annual W/VE Contest, sponsored by the Montreal Amateur Radio Club, will be held from 6 P.M. EST, September 24th, to 11:59 P.M. EST, September 25th. The rules are the same as those of last year. Amateurs in the U. S. A. will be trying to trade contest exchanges with as many Canadians in as many provinces and territories as possible; VE/VO stations will



"Forwarded annually to the highest point scorer (in the W/VE Contest) to foster and promote increased radio communication activity between amateurs in the United States and Canada," is the inscription on this handsome trophy donated each year by Emerson Radio of Canada, Ltd. Winner in 1954 was VE6VK.

be searching for amateurs in the ARRL sections in the U. S. A. A sample message, as originated by a W6 in Los Angeles section, might appear as follows: NR 1 W6XXX 579 LA. VE2BB, MARC contest chairman, urges participants to read the rules carefully and maintain neat logs so that the results can be presented quickly and accurately.

Rules

1) Any station located in any ARRL section as listed in *QST* (page 6) is eligible to enter.

2) All contacts must be made during the contest period from 6:00 P.M. EST, September 24th, to 11:59 P.M. EST, September 25th, with a total of no more than 20 hours operating time for each entry. Times on and off the air must be clearly shown in the contest log.

3) Exchanges such as the following must be exchanged and be fully recorded in the log entered: (1) number of

(Continued on page 114)



CONDUCTED BY EDWARD P. TILTON, WHDQ

WHEN 2-meter DX beyond 1000 miles or so is worked, a discussion usually follows as to the mode of propagation. Was there a reflection from an ionospheric layer, 50 miles or more above the earth, or did the signal follow earth curvature throughout the route as the result of favorable conditions in the lower atmosphere? There seems little doubt that both modes have produced DX on 144 Mc., but the distances over which they make communication possible overlap to some extent.

For a time the possibility of ionospheric DX on 144 Mc. was questioned, but several examples of long-distance work seem to have been of this nature. One of the first was the 1200-mile contact between W8WXX and W5VY, in June, 1950. This came at a time when the 50-Mc. band was boiling with sporadic-E skip, and weather conditions along the path were not such as to encourage tropospheric propagation. In June a year later a whole string of Texas-California contacts were made. W6ZL and W5QNL set the 1400-mile record that still stands, but several other stations worked similar hops only a few miles shorter. Here again, the 6-meter band was going strong, and there was extensive thunderstorm turbulence along the route that would appear to rule out tropospheric propagation.

On the other hand, just about every September we have one or more 2-meter openings of major proportions when there is no evidence of sporadic-E skip on lower frequencies. The W2BAV-W0DSR contact of September, 1950, was in the 1200-mile range, and W2BAV was heard out to more than 1400 miles on that occasion. There have been contacts beyond 1000 miles under similar conditions every fall since. The question then arises, how to tell when favorable conditions for 2-meter DX exist, whether for E_s or tropospheric propagation?

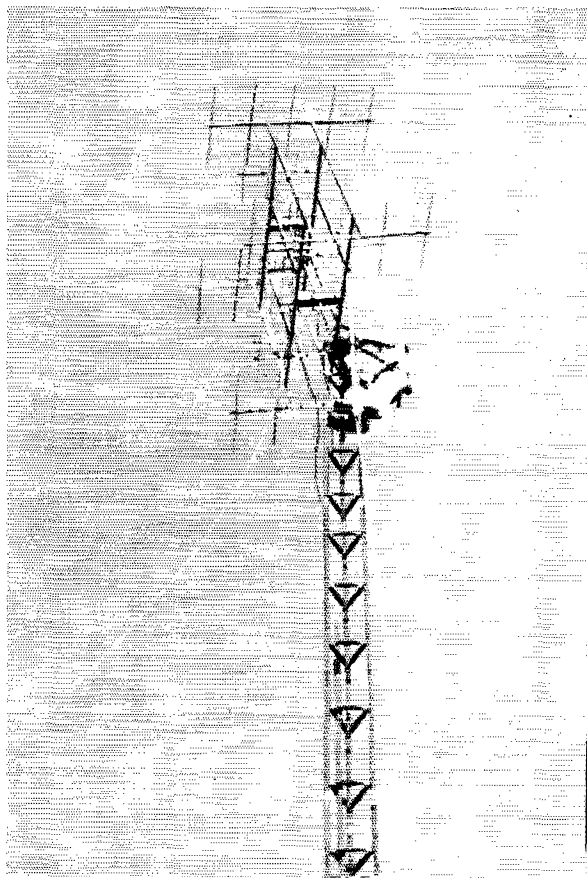
Often during the early summer DX season on 50 Mc. we hear 6-meter stations arranging checks on 2. Practically all of these fail, but once in a blue moon one pays off. Such a check by W5AJG, Dallas, Texas, started the 1951 session with

stations in the Los Angeles area. Leroy did it again on July 3rd of this year; this time with W7LEE, Parker, Ariz. They worked on 6 and then changed to 2 at 1242 CST, continuing the contact successfully on c.w. on the higher band. The 144-Mc. c.w. signal of W5AJG was heard by W7JU, Boulder City, Nev., at this time. W5AJG made similar checks with W5LFH, Sandia Park, N. Mex., and W4CVQ, Raleigh, N. C., without success. The following day W7LEE heard unidentified 2-meter signals from the East again.

The W5AJG-W7LEE path is about 1020 miles, which we suspect is near the minimum over which E_s work is likely to be done on 144 Mc. W5LFH, under 600 miles, was undoubtedly too close. W4CVQ is about the same distance as W7LEE, but ionization density was probably greater on the western path. W5LFH and W5SFW, Amarillo, Texas, worked on 50 Mc. that day, with both beams aimed west. As they are only 220 miles apart, a high-density cloud to the west is indicated.

In looking for 2-meter DX prospects on 6, we should not be fooled by extremely strong signals on the lower band at 500 to 1000 miles. A wavery signal on 6 at 1200 miles might be a

◆
New array on the way up at VE3DIR, Toronto. Two years of planning went into this "nest" of 20-element arrays for 144, 220 and 420 Mc. The steeplejack is W2ALR.
◆





W2QCY/7 in operation on 50 Mc.
near Wendover, Utah.

much better bet, especially if signals much closer in are heard at the same time. If 50-Mc. stations under 300 miles away are heard by the ionospheric route (that is, during a hot opening, with signals showing E_s characteristics) there may be a chance of 2-meter work over much longer hauls. But don't waste much time making tests with some big-signal 6-meter man 700 miles away under such circumstances; your best prospects will most likely be beyond 1100 miles distant. And they will be south of Winston-Salem, Nashville, Tulsa, the Grand Canyon, and San Francisco, if past experience in this department means anything.

The chances for sporadic-E DX on 144 Mc. will be slim until early next summer, but the full tropospheric DX season will be just getting under way by the time this issue is mailed. This kind of DX knows no geographical bounds, in the early fall, at least. A close watch of nationwide weather conditions and frequent monitoring of TV Channels 7 to 13 (with a good receiver and high-gain antenna system) will provide the best indications of the possibility of DX on 144, 220 and 420 Mc. during this season. The lower TV channels and the amateur 50- and 28-Mc. bands are of little help in establishing one's chances for v.h.f. DX during the fall months.

50-Mc. Expeditions Pay Off

A 6-meter haul session last February resulted in one of the most pretentious expeditions ever organized for the purpose of providing v.h.f. DX contacts. The laments of New Jersey 50-Mc. operators over the lack of Utah and Nevada contacts on 6 gave W2QCY an idea for a 1955 vacation trip. At least one East Coast 50-Mc. WAS resulted, and scores of calls all over the country were moved one or two more rungs up the WAS ladder.

Planning of the expedition began at once, and from February to June, W2QCY did little else but build and test equipment and scout prospects for driving and operating assistants for the 5000-mile jaunt. A new 50-Mc. home rig was in the planning stages, so the expedition set-up was built in de luxe form, to serve as a permanent home station later on. The result was a transmitter delivering 50 watts output on either c.w. or a.m. 'phone, equipped with gang-

tuned VFO and following stages, speech clipping and filtering, and all metering and operating features necessary for convenient and effective use; yet built in compact enough form to permit installation in Roy's panel truck.

A recruiting program that included mention of the advance plans for the trip in these pages, and much on-the-air talk, was launched early in the spring. It was not easy to find two men who could take the time to make a trip of this sort, though scores of fellows felt the urge. The first likely prospect turned up was Erret "Reb" Allen. His license had lapsed some time ago, but his interest in ham radio was rekindled by talk of the trip. In three weeks he had passed his General Class exam, and as K2ODA became a definite member of the Project Utah staff. The third member, George Whattam, W2CZE, was signed up almost at the last moment.

The cab of the 1949 Dodge panel truck was equipped with reflective-type insulation, and the roof given two coats of chrome paint, in anticipation of desert heat. An operating table was installed in the truck compartment, and all gear readied for use. Luggage carriers on the roof took care of the nine 10-foot TV mast sections and the Telrex 8-element array. Gear for use on 7, 14 and 21 Mc. was installed. Test runs were made, with all gear and operators, to determine their suitability for the job coming up. Letters had been written to several W7s for advice and assistance, and the approximate location was selected for the Nevada-Utah operating.

The expedition left Morristown, N. J., the night of July 17th, and by the morning of the 20th they were ready for a rendezvous with Andy Norgaard, W7UPS, Wendover, Utah! Sites were surveyed and Three-Mile Hill, a mountain just over the state line in Nevada, was selected for the first work. Between then and June 26th, 59 different stations were worked, winding up the Nevada stay with a fine double-hop opening Sunday, the 26th. Eastern stations worked included W3s PCB MQU HFY FPH, W2s MEU ZKE KNQ IDZ WCM UQQ, and K2s BDF and JNS. Contacts were made at the rate of one every 90 seconds through terrific QRM.

The scene of operation was shifted to a saddle between two peaks NNE of Wendover, Utah, on the 27th, from which point 26 stations were raised. Conditions were never so favorable during the three days left for Utah work, and only two eastern stations were worked: W1VNH and W2IDZ. The latter made possible the first 50-Mc. WAS award to a W2. W2IDZ's Certificate No. 11 is the second to be issued to an operator located east of W9. Special QSLs are being prepared and will be sent to all stations worked.

While W2QCY/7 was busy in Nevada, another Nevada expedition very similarly equipped was making hay in Las Vegas. The night of June 26th, W6ABN/7 worked some of the same stations as W2QCY/7, but in addition, many W1s, most of whom had never heard a Nevada signal before. Stan used 100 watts input to an 829B, and a 4-element array mounted about 10 feet above his panel truck. Though he spent most of a three-week vacation in Las Vegas, it was only between June 24th and July 4th that many contacts were made. In this time W6ABN/7 worked 115 different stations in 27 states, all call areas, and VE3. VE3AET, the sole Canadian worked by W6ABN/7, reports that he also worked W6COH/7, near Jean, Nev., on June 25th.

The work of these stations demonstrates that only activity is needed to make any state in the country available to any other on 50 Mc. This is supported by the work of W7JPN, Salt Lake City, and W7QDJ, Clearfield, Utah, who worked many stations throughout the East during July openings. These two are the first Utah home stations to work double-hop sporadic-E DX, and as such they pro-

50 WAS Mc.

W0ZJB	48	W5VY	48	W9ZHB	48
W0BJV	48	W5FW	47	W9QUV	48
W0CJS	18	W5GNQ	46	W9HGE	47
W5AJC	48	W50NS	45	W9PK	47
W9ZHL	48	W5JPI	44	W9VZP	47
W90CA	48	W5ML	44	W9RQM	47
W60B	48	W5PSC	44	W9ALU	47
W0INI	48	W5JLY	43	W9QKM	46
W1HDO	48	W5JALB	43	W9UIA	45
W5MJD	48	W5VV	42	W9UNS	45
W2IDZ	48	W5FAL	41	W9MPH	36
W1LLL	48	W5HEZ	41		
		W5HLD	40	W0DZM	48
W1GJO	47	W5FXN	38	W0QIN	47
W1CLS	46	W5L1U	37	W0NEM	47
W1CGY	46			W0TKX	47
W118N	45	W6WNN	48	W0KYF	47
W1DJ	41	W6ANN	45	W0HFW	47
W1RFU	41	W6TMI	45	W0WKB	47
W1FOS	32	W61WS	41	W0JOL	46
		W6ABN	35	W0MVG	46
W2MEU	47	W6GCG	35	W0TJF	44
W2AMJ	46	W6BWG	30	W0URQ	44
W2BYM	46			W0JHS	43
W2RLV	45	W7HEA	47	W0PKD	43
W2FJH	44	W7ERA	47	W01PL	41
W2QYV	40	W7BQX	47	W0ORE	37
W2QVH	38	W7FDJ	46	W0FKY	32
W2ZUW	36	W7DYD	45	W0USQ	30
		W7JRG	44		
W3OJU	46	W7ACD	43	VE3AT	44
W3NKM	41	W7BOC	42	VE3AN	42
W3TIF	39	W7JPA	42	VE1QZ	34
W3MQU	39	W7FIV	41	VE3AIB	32
W3OTC	38	W7CAM	40	VE1QY	31
W3KMY	38			VE3DER	27
W3RUE	37	W8NSS	46	N41GE	25
W3PPH	35	W8NQD	45	CO6WW	21
		W8UZ	45		
W4FBH	46	W8RFV	45		
W4EQM	44	W8CMS	45		
W4QN	44	W8GDU	43		
W4CFZ	42	W8LPI	42		
W4FLW	42	W8YLS	41		
W4OXC	41	W8OJN	40		
W4MS	40				
W4NFR	39				
W41UJ	38				
W4B8N	35				

Calls in bold face are holders of special 50-Mc WA# certificates listed in order of award numbers. Others are based on unverified reports.

has also been used by W2QCY/2, Greenwood Lake, N. J., to work 40 miles on 6-meter ground wave.

It pays to check 6 noontimes if you can. W1VNH, Agawam, Mass., worked W2QCY/7, Utah, during a noon opening when no other signals were audible. He was the only W1 worked during the entire W2QCY expedition.

The trip to Utah and Nevada was so much fun that a Labor Day trip to West Virginia is being planned by the same W2QCY crew. Advance surveys were made, so that the whole week end can be put to best use in providing 50-Mc. contacts with that hard-to-get state. W2QCY/8 will be on about 50.2 Mc. from a high point near Martinsburg, about 20 miles southwest of Hagerstown, Md.

Examples of the big pick-up in 50-Mc. activity: Tennessee stations are heard whenever the band is open in that direction. W4ZHQ says that there are 27 stations on 50 Mc. in the Knoxville area alone. W5IIEZ, Baton Rouge, La., worked 85 different stations in one day recently. W1VNH counted 27 Ohio W8s during a July session. W6s by the score have been heard in the East during the better double-hop openings. W8CMS worked 20 states, S call areas, July 9th. VE3AET heard or worked 56 stations in 16 states, June 26th. Fifteen-minute tape recording made by W1HDQ on June 26th has 35 different calls in 17 states in evidence. W7OAY/7 worked 36 W6s in the June V.H.F. Party. W0ZJB worked 44 stations in 24 states and all call areas, July 8th.

This brings on a considerable QRM problem, with everyone trying to use the low end of the band. With sparse occupancy of the band, concentration on the first 100 kc. did no great harm, but there just isn't room for everyone there any more. Stations in Channel 2 areas need to work as low in the band as possible, to minimize TVI. W2IDZ suggests that where Channel 2 TVI is not a problem, 6-meter men take it upon themselves to move up in the band, at least during widespread openings. And all of us should tune more of the band than we do. Your conductor, using 50.57 Mc. for mobile work of late, has lost plenty of calls because fellows don't tune that high, even when the band is dead. Too many operators run up to about 50.4 Mc. and give up. Let's use more of it, boys!

That last state for W0DZM, Robbinsdale, Minn., was not Nevada or Utah, but Montana. He nailed this one down with W7JRG, Billings, Mont., July 15th. When that last card comes through, Shorty will be in line for Award No. 13. All 48 were worked with 30 watts input to an 815, which may be the low-power record for 50-Mc. WAS. Two near-misses: W0TKX, who missed the shot at W2QCY/7 and W6ABN/7 by being out on Field Day, and W9VZP, who raised W6ABN/7 just as Stan developed transmitter trouble and couldn't reply.

Six-meter oddity: W8WVP finished his rig and installed his antenna system on July 9th. His first CQ on 6 raised W5ZVF, who had also just finished erecting a beam and putting his station in order in a new location, making his first transmission in calling W8WVP. It was the first Michigan contact for W5ZVF, and the first Arkansas contact for W8WVP.

W0ZJB, Wichita, Kan., suggests the possibility of an out-of-this-world 2-meter net that could be put into service

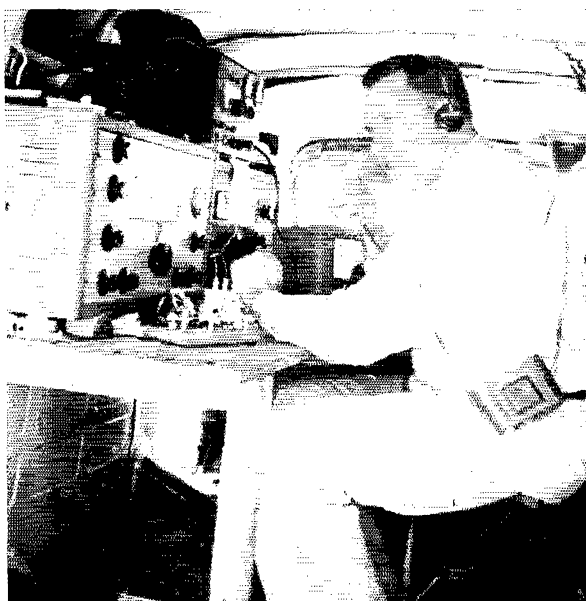
vided many operators with their first Utah contacts. Among the beneficiaries was W1LLL, Windsor, Conn., who worked both for No. 48 on July 16th. One of the country's most consistent 50-Mc. DX hounds, Brownie had been watching for Nevada and Utah constantly for several years. He now holds 50-Mc. WAS Award No. 12.

Here and There on the V.H.F. Bands

As frequently happens in peak v.h.f. months, a tremendous volume of mail reached your conductor's desk during July. We'll sift it carefully and report interesting tidbits in briefest possible form.

Miles-per-watt record on 50 Mc? On July 10th W2IDZ asked a W4 to look for his transistor oscillator rig, announcing the frequency. The station with whom the test was made did not hear the flea-power signal, but W4QN, Orlando, and W4AYV, Umatilla, Fla., did. Both called Ed to let him know that the 3.6 milliwatts of output had produced readable c.w. signals. Ed figures this as something around 263,000 miles per watt. The rig, built by W2JEP,

W7UPS at the operating position of W2ACY/7. Complete station was designed for the trip from Morristown, N. J., to Utah and Nevada.



by using high TV towers during the station's off-the-air hours. TV transmitting arrays are broadband affairs. They are several hundred feet higher than any ham is likely to get his antenna, and they're fed with low-loss lines. They may not have the best match in the world for 144 Mc., but even with a high s.w.r. (who's worrying, at amateur power levels?) they still do quite a job on 2. W5DFU and W5VKH have used a 600-foot tower for Channel 8 at Muskogee, Okla., on several occasions. W5IOW has worked Mississippi, Oklahoma, Texas and Kansas with fine signs on the Channel 10 array at Ada, Okla. Vince now plans to use the Channel 10 array of KAKE, Wichita, the night of Sept. 10th, and the following morning. He will be on 144.32, and would like to have as many fellows as possible keep a sharp lookout for WØZJB/Ø at that time.

This should be something for some of the members of the "Flashlight Net" reported by W3KCA, Greenmount, Md. These are hams who work at radio and TV stations, and consequently cannot be on the air during the popular evening hours. W3s HFG OWW QFM OLR YPL BJG SST KCA and YQO cannot be on the air before 0100. They hold forth each morning until 0300 or later, and invite others to join in. They use 145.62 Mc. for a net frequency, but look for other callers regularly.

VE3DIR, Toronto, is another all-nighter. Tony gets home late and has a tough time making contacts on 144 Mc. He calls CQ to the west at 0100, but usually finds it a lonely proposition.

A midnight watch is kept each Saturday on 50 Mc. by the Royal Order of Hootowls, of Seattle, Wash. W7YJE has a certificate available to any 6-meter operator who will join their hooting on 6 for one hour beginning any Saturday at midnight. Net frequency is 50.4 Mc., and charter members are W7s YJE TMIU VIC UFE and VMH.

South Carolina has been beyond the horizon for 2-meter men of the Eastern Seaboard, so it looked like a good place to spend a vacation to W2FBR and W2FBZ. Accordingly, they set out for two weeks at Myrtle Beach, S. C., in June. Using a 6146 rig and a 24-element portable array, Ralph and Lee operated on 2 from June 20th to July 1st, providing first South Carolina contacts for W4s in North Carolina and Virginia. No South Carolina stations were heard, though contacts were made regularly with W4CVQ, Raleigh, K4AMX, Winston-Salem, W4MDA, Wilmington, W4NTQ and W4SMA, Whiteville, and other North Carolina stations. On June 30th they worked W4s IKZ OLK VVE ZBU and SCJ in the area around Norfolk, Va., about 280 miles to the north. Skeds were kept each morning with W1HDQ and others, but there was no real band opening to the north during their stay, so no DX was worked. Just a few nights previous to the arrival of W2FBR/4, the North Carolina stations had a field day with W1s and 2s on 144 Mc!

A new mountainous path broken down on 144 Mc. W7UVH, Olympia, Wash., writes that he and W7PVZ, and W7LHL, Seattle, now work W7HEA, Toppenish, Wash. This is only about 130 miles in each case, but the Cascade Range intervenes. Big antennas (horizontal) and improved receivers seem to be major factors in breaking down this circuit. We showed W7LHL's 96-element array last month. W7UVH has a 24-element job composed of six 4-element Yagis.

VE7FJ, New Westminster, B. C., works into the Portland area, 260 miles to the south, when conditions are good. Using horizontal polarization he has connected with W7s SEZ, NNR and OKV. Art would like to see a "v.h.f. circuit of the month" in each issue of QST. So would your conductor. We'll be glad to run information on any novel ideas you fellows care to send in, as we have in the past. We need more material to make it a regular thing, however.

Anyone for Bermuda on 144 Mc.? VP9BM is all set and will keep schedules. He is on 144.35 Mc. VP9AY, who was making contacts on 50 Mc., has left Bermuda and is now on duty at Selfridge Field, near Detroit. VP9BM will keep skeds on 20, for checks on 2. Address: M/Sgt. J. W. Wenglar, 1934 AACs Sqdn., APO 856, New York, N. Y.

September V.H.F. Party Coming Up

Elsewhere you'll find the announcement of the regular fall v.h.f. contest. Note two minor changes in the rules for this and subsequent contests. Because of the difficulty in establishing the exact location, and the ease with which they move from one section to another, contacts with aircraft stations are ruled out henceforth for section credits. All

2-METER STANDINGS

Call	States	Areas	Miles	Call	States	Areas	Miles
W1RFU...	19	7	1150	W6DNG...	4	2	350
W1RDQ...	19	6	1020	W6ZL...	3	3	1400
W1CCH...	17	5	670	W6RAZ...	3	2	320
W1WZY...	16	6	750	W6NLZ...	3	2	360
W1UIZ...	16	6	680	W6MMU...	3	2	340
W1IEO...	16	5	175	W6CGG...	3	2	310
W1KCS...	16	5	600	W6QAC...	2	2	200
W1AZK...	14	5	650	W6EXH...	2	2	193
W1MNF...	14	5	600				
W1BCN...	14	5	650	W7LEE...	5	3	1020
W1DJK...	13	5	520	W7VMP...	5	3	417
W1MNM...	10	5	520	W7JTI...	4	2	247
				W7ZU...	3	2	240
W2ORI...	23	8	1000	W7JUU...	3	2	140
W2NLY...	23	7	1050	W7RAP...	2	1	165
W2AZL...	21	7	1050				
W2GED...	21	7	1020	W8WXY...	23	8	1200
W2BLV...	20	7	910	W8LFD...	23	8	—
W2OPQ...	19	6	632	W8SVI...	22	8	725
W2DWJ...	18	6	632	W8RMH...	22	8	690
W2AOC...	18	6	660	W8LX...	22	7	675
W2UTH...	16	7	880	W8SRW...	20	8	850
W2PAU...	16	6	740	W8WRN...	20	8	670
W2PCQ...	16	5	650	W8BAX...	20	8	695
W2LHG...	16	5	550	W8WV...	19	7	710
W2CET...	15	5	525	W8KPE...	18	7	800
W2DFV...	15	5	—	W8ZCV...	17	7	970
W2AMJ...	15	5	550	W8RWV...	17	7	630
W2BRW...	14	5	590	W8WSE...	16	7	800
W3RUE...	23	8	950	W9EHX...	24	7	725
W3KCA...	21	7	—	W9FVJ...	23	8	850
W3NKM...	19	7	660	W9RPV...	23	7	1000
W3IBH...	19	7	650	W9QCC...	22	8	820
W3BNC...	18	7	750	W9KLR...	21	7	690
W3FPH...	18	7	770	W9UCB...	21	7	750
W3TDF...	16	6	720	W9ZGH...	21	7	—
W3KWL...	16	7	720	W9KPS...	19	7	660
W3LNA...	16	7	720	W9MUD...	19	7	640
W3GEP...	15	6	800	W9REM...	19	6	—
				W9LFL...	19	—	—
W4HHK...	26	8	1020	W9ALU...	18	—	800
W4AO...	27	7	950	W9GAB...	18	7	750
W4PCT...	20	8	—	W9JGA...	18	6	720
W4JFV...	18	7	830	W9WOK...	17	6	600
W4MKJ...	16	7	665	W9MBI...	16	7	660
W4UMF...	15	6	600	W9HOV...	15	6	—
W4FPH...	15	6	720	W9BAX...	15	6	780
W4OXK...	14	5	500	W9DSP...	15	6	760
W4JHC...	14	5	720	W9JNZ...	15	6	560
W4WCB...	14	5	740	W9DDG...	14	6	700
W4TCR...	14	5	720	W9PAN...	14	7	680
W4UBV...	14	5	435	W9QKM...	14	6	620
W4IKZ...	13	5	720	W9JLN...	13	6	560
W4JFU...	13	5	720	W9UJA...	12	7	540
W4TLV...	13	5	700	W9ZAD...	11	5	700
W4UDQ...	11	5	850	W9GTA...	11	5	540
W4ZRU...	10	5	800	W9JBF...	10	5	760
W4WNH...	10	5	500				
W4IKQ...	10	4	500	W9RMS...	26	8	1175
W4MDA...	10	4	680	W9IHD...	24	7	870
				W9GUD...	22	7	1065
W5RCY...	21	7	925	W9ONQ...	17	6	1090
W5JTI...	19	7	1000	W9INT...	14	6	830
W5JIG...	12	4	1260	W9GAX...	14	5	725
W5SQN...	10	5	1400	W9TJF...	13	4	—
W5CVW...	10	5	1180	W9ZJB...	12	2	1097
W5ABN...	10	3	780	W9WGZ...	11	5	760
W5MWW...	9	4	570				
W5MLL...	9	3	700	VE3AIB...	20	8	890
W5FRD...	8	3	570	VE3DER...	20	7	790
W5FEK...	7	3	680	VE3RQN...	14	7	790
W5VX...	7	4	—	VE3DER...	13	7	800
W5VY...	7	3	1200	VE3BBP...	13	6	715
W5ONS...	7	2	950	VE2OK...	12	5	550
W5FSC...	7	2	500	VE3AQG...	11	7	800
				VE1QY...	11	9	900
W6WSQ...	5	3	1380	VE7FJ...	2	1	365

moving stations have been excluded from competition by the rules for some years, though many provide contacts for participants, and we hope that they'll continue to do so. But if you work an aircraft over a section you don't catch with a ground station, you can't count the section hereafter. Makes it fairer for everyone, we feel.

Another change has been made, to bring v.h.f. contest rules into conformity with the Field Day rules, and to prevent excessive numbers of contacts with a single piece of equipment. A rig used to make one or more contacts in the contest can be used thereafter under only one additional call. You work from home with a Communicator, say. Then you can go out and work from a portable location with the same rig. That's legal and logical so far. But your wife (or girl friend or anyone else who is licensed) cannot then take the rig and make more contacts under another call. This is designed to prevent "manufactured" contacts, and to make the contest results a more accurate indication of the extent of v.h.f. activity in any area.

And here's some advance information on events sched-

(Continued on page 122)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

However:

Amateurs who joined the countries race within the past four years find themselves at a certain disadvantage with respect to their OT competitors in DX ranks. The U.S.S.R. portions of their ARRL DXCC Countries List check-off sheets are bare as Mama Hubbard's celebrated cupboard. It's indeed difficult for the new school to visualize how plentiful and workable those U signals were during years immediately following World War II.

Anyway, around 1951 they stopped coming back. At the same time receipt of QSLs from Russian stations dwindled to zero. That is the situation generally maintaining today. Stations bearing U.S.S.R. amateur prefixes, while quite frequently heard, work only each other and satellite-country stations¹—except in curious and isolated instances. An increase in these rare exceptions to the rule is what prompts Jeeves to bring things up to date by recording here the status of 1955 DXing with respect to the Iron Curtain.

Beginning last year UB5s in the Odessa area began QSOing and QSLing on a modest world-wide basis. Other U stations now give scattered comebacks but deliver no QSLs. This may establish a trend but the pattern still is too vague to be much of a pattern. A spot-check of the "How's" mailbag turns up the following Russian call signs logged in North America on 20- and 40-meter c.w. during the past several weeks:

UA1s CF DH KAE KAI KAQ KFA KIA KJA RF TT, UA3s AF CR DH EG FE KAF KBD KET KMB KWA MP TV, UA4s HI KCE KEC KPA KV, UA6s KAB KOB, UA9s CM DH KOG KQB, UA0s KAD KCA KCI KKB KOA KOH SJ, UB5s BPC FC CI CR KAA KAB KAC KAD KAG KHE, UC2s KAB KAC KBC, UD6s KAB KAD, UF6KAF, UG6AL, UI8KBA, UJ8KAA, UM8KAA, UN1KAA, UO6s AA KAA, UP2s AA KBC, UO2s AN KAA, UR2KAA.

Some have swapped reports with stations outside the Curtain. A few have produced QSLs. These U stations, almost invariably multi-operator manned, usually are heard working each other in periodic organized activities. Their ripply signals are generated by gear which apparently is on a par with U. S. ham equipment of the 1930s. Their operating technique, however, is

* Please mail all reports of DX activity to DX Editor Newkirk at 4128 North Tripp Ave., Chicago 41, Illinois.

¹ Satellite-country stations bearing amateur prefixes—DM HA LZ OK SP YO, etc.—continue limited world-wide activity, QSOing both sides of the Curtain. In Albania and Red China ham radio in any form appears to be nil. See "Whence" for info on the licensing structure in a typical satellite country.

capable; fast break-in and 30-w.p.m. code speeds are common.

Beyond the preceding evidences Churchill's descriptive "riddle wrapped in a mystery inside an enigma" easily still includes Russian amateur radio. That think we now perceive in the radio Curtain is neither extensive nor is it necessarily permanent.

The DX contest season is upon us! Brazil's annual LABRE affair comes off early this month (see p. 126, August *QST*) and DARC of Germany throws its WAE Test (see "Whence") shortly thereafter. In October the VK/ZL show will take the stage. *Battle stations!* . . .

What:

A general call to quarters, too, for our yearly African DX hunting season. "Ye'll take the long path and I'll take the short path and the W6s will be in Kenya before us," as the (M)s oft lament to each other. Anyway, our DX bands will see the Dark Continent boiling through with excellent openings—even 10 meters is slated to join the party now and then.

20 c.w. bears the brunt of late summer activity, as usual. W9UKG bagged EA9AP (14,013 kc.) 23 GMT, FF8AC (22) 21 FY7YF (61) 1, GC3KAV (78) 0, GD3UB (12) 0, HA5BL (41) 22, KJ6BG (97) 6, OA4J (27) 3, OX3AY (12) 4, SP5AR (68) 4, VO3FN (82) 22, ZP5AY (65) 1, 9S4s AR (36) 21 and AX (7) 22. Doug still is after F9YP/FC (18) 21, OD5AF (74), SU1IC 0, a YJ1 and ZD9AA (58) 21. In the joker department W9UKG nominates PX1 F08 FC7 HZ2 and CU2 psychos.----- W6QPM climbed to 144 by way of FM7WF (45) 23, IS1AHK (10), Turks' VP5DC (75), XZ2AD (60).

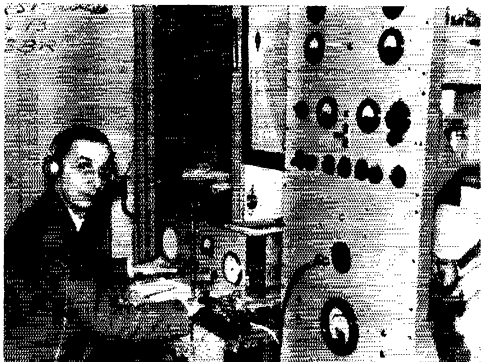


YJIDL (5-10) 7, YS10 (50), ZD6BX (55) 12-13 and 3V8AB (55) W10JR captured FARRJ (82) 6, IS1CXF (70) 3, LZs IKSP (71) 1-2, 2KSK (50) 9, OK1XIM (30) 10, UO2AN (25) 8, VQ6LQ (85) 9-10, W6OXN/VP2, ZD3A (70) 3 and ZP5GM (25) 1. Vic and others wonder what gives with this ZPGCR. RCP (Uruguay) says there ain't no such animal and yet he's been at it for years. K2GMO climbs aboard our Bandwagon with CR4AL (15) 20, FF8AJ (68) 21, JAs 1ACA 1KW 2BL 3AF 3BP 5AB 6AA 6AD 6AO 6HK 8AA 8AI 8AQ, KAs 2CR 2KS 5HM, KG6NAB (81) 10, KT1EXO (92) 19, LZ1KAB (21) 2, UB5KAA (54) 13, VO4FM (20) 4, a VQ6, a ZD3, ZP9AU, 4 X4s DR (96) 22, FK (18) 22, FQ (90) 22, IE (76) 22 and others. DM2ABL 20, FO8AC (70) 7, JAs 1KM 2AT, KA2NA 7, TF2WAF 20, VK9AU (25) 7-12 and YN1PM (5) 2 worked W7TML in good style. W5WZQ sends Texas QSLs to folk like CR9AI 13, DU1CV (80) 13, EA8BP (35) 0-3, FF8CG, FG7XB (64) 3, FK8s AE 6, AH (64) 8-15, AL 7, FM7WP (27) 23, FO8AK (64) 6, FY7YE (60) 13, GC2ASO, a GD3, HP1EH, 1Is BLF and BNU (25) 3 of Trieste, a KJ6, KR6s LJ (40) 13-14, MC OL, ST2NG 4, an SU1, VPIFL (70) 15, VP5BM of Turks (45) 18-19, a VQ6, VR2AR (9) 3-4, VSs 1FS (78) 13, IGL (36) 14, IGU 12-13, 6CO (50) 4, 6CT 13-14, 6CW 14, ZB1FF, ZC4IP (90) 17, a ZD6, and 3V8AN (15) 4. JAs and KAs are rather common stuff west of the Pecos but our down-east cousins eat 'em up. For their edification W5WZQ offers JAs 2BJ 2NX 6AR 8AT 9CW and 0BR, plus others already specified. Dave is dreaming up a 3-element array to boost his 117/75 tally. CT2BO (62) 0, HK6AI (70) 0-1 of San André, KC6CG (50) 14, KG6FT (80) 15, MP4QAL (63) 3, ST2BC (9) 23, UA4KPA (28) 22, VK9OQ (23) 13-14, VU2EJ (43) 2-3, 4 X4s CK (15) 21-22, FS (64) 22-23, FW (9) 20, 1I (92) 22 and other goodies clutter up W0QBA's log to the tune of 132/103. A Viking Ranger was responsible. A one-hour WAC befell W4BBP, thanks to G6TT, GX1FB, VK2PA, KA5HM, ZS6AJ and W4TO in that order. Ben also snagged JA9CA, KJ6AA, KC6 KR6 and ZD6 clients. A quick scanning of good 14-Mc. fortunes here and there, at W7AB: OY7ML, MP4JO (41) 3, VS2EL, W7VJ: raised ZL2AFZ with his 25-watter, leaned down to 3.5 watts and still got through. W7TAB: ZD6EF to reach a 230/201 14-Mc.-only total. W7ZBG: FR7ZA (30) 12, and notes long-path ZSs rolling through in the a.m. K2D8H: FY7 GD3 HK6 KA5 and VP5s on Turks Isles, K2GFQ: LX1DZ, OY2A, VK9RM

(18) and other nifties contacted K2BZT At the 100-worked mark, K6ENX collected DU1OR (45) 15, FF8 P08, HB4FE (80) 15, KC6, KG1AM (30) 6, LA6U (90) 7, TF6WAK (30) 14-15, Turks VP5, VR2CZ (60) 5, VSs 1FH (50) 15, 2CU (90) 15, 2DW (40) 16, 2ES (80) 16, VS6s, ZBLJRK (60) 5-6, ZS, 3V8, 4S7s GE (50) 15-16, WP (35) 15 and one 4X4EF (110) 5. DL4ZC chatted with AP2Y 15-16, CR9, GM3AIM 19 of the Hebrides, LX1JW 17 and ZD2HAI 17. JAGAD off with some choice ones: CN2AE, CR6s BX CS CZ, CR19AN, EA6AU, ET2AB, FB8s BE BR, 15s 1V REX, KT1UX, MP4BBE, TF2WAF, TI2s AIAR PZ, Sara-wacker VS4CT, XE1s CM MB, XW8AB (ex-DL5BS) now off the ban list, YK1AK, ZC2PJ (28) 13-14, ZD2s



Fortunately W1SET (ex-KA1MA-KA5MA), right, took a camera along when he visited the Macao ham-shack of CR9AH early this year. CR9AH now works 20 c.w. and looks forward to the return of favorable 10-meter 'phone conditions.



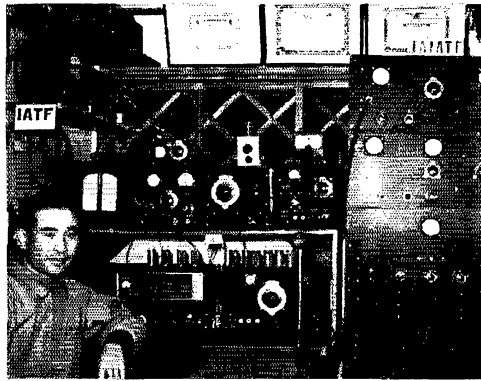
F3BR, long an outstanding French DXer, runs 100 watts to a 5-stage 813 rig on 80 through 10 meters, 'phone and c.w. Henri's receiver is homespun and he favors vertical antenna.

(45) 13, VR2BZ (70) 4, ZD8AA, W3TFF: HK6, JA2AT (71) 21, SP7KAN (47) 22, VO4FM (73) 20, W4GSJ: YU3CST, W7FFZ: HR1RL 15-16, PJ2AE 1, YV1AI 17, W807T: CT2 EA8 GD3, Trieste 1Is, JA3AB, an Oman MP4, VP2GW, ZB1AY, 3V8 9S4, W9BZII: 11DCO/M1, OX3UD, H0P/IN: Turks, TG9AG (he works A3 to A1), ZP5, GM3JDR: KH6s ER 1J, KG1s AA (85) 18, JB (60) 2, KL7BHK, Turks, XE2OK, ZD4BM. Milwaukee Amateur Radio Club DXers caught up with HZ1AB (57) 22, OD5DA (123) 21, OY2Z (15) 22, VSs 2CV (85) 16, 61D (14) 13, UA6KAB (50) 5-6, 4X4DF (11) 0 and others. W6UED raised himself CN8EB (80), PJ2BA (40) on Bonaire Isle, JZ6AG (60-80) of N.N.G., F08 KJ6 VK9 VS1 VS6 and F77 friends. Another Ronger fan, W4GUV rose to 67/43 with HA4TK 20, JA6AR 12, KC6, OK2GR 16, PJ2CF 20, TI2PZ 20, numerous VKs and a ZC4. CR6AI (58) 23, CR7MB (30) 3, F8F FK8, HA5KBK (63) 0-1, HE1JO (10) 2 of Liechtenstein, LB8YB (39) 4 of Greenland, LZ1, OD5s LJ (62) 6, LX (62) 6, SPs 2GS (26) 23, 6WV (49) 0, VR3A (75) 6, YOs 2KAB (55) 0, 3RF (50) 6, 6AW (52) 8, 4X4GS

DCP (75) 21, WAF and ZE1JS. A 200-watter, SP-600JX and 4-element rotary do well by Hiro. HA5BL (5) 3, SP8KAF (50) 0, VOs 3FO 4RF 8AG (13) 5, YOs 2VM 3RA, ZC4CF, ZE3JJ, 4X4AU and sundry other rarities raised W2ZVS, Dixie finds VK9RM and ZL2AI seeking N. H. and Vt. to complete AKRL WAsS, and learns that MP4QAJ hunts 14,080 kc. around 1700 GMT. W5HIS's B&W-5100, SX-28 and 32-ft. vertical scored with JAs 5DF 0AA, KC6AI, KA2s GE USA, KL7s AKE WAF, KV4AA (80) 20-22, VP7NJ 3, VS6CQ 12 and many Europeans. West Gulf DX Club's *DX Bulletin*, abetted by the No. Calif. DX Club's *Dxer*, gives the lowdown on AC5SQ (114) 14, CR7CO (60) 13, DU7SV (93) 7, EA8BE (40) 0, F18AP (82) 13 and too bad, FK8AJ (60) 5, FO8AM (5) 4, JA7AD (60) 13, JZ9KS (75) 12, KC6s AJ (40) 7, UZ (60) 13, KT1CM (62) 22, LU8 3ZF 5ZF (70) 14, LZ1KAA (70) 0, MIC (38) 21, SPs 1KAS 17, 3KAU (55) 23, SVs 1SP (16) 12, 0WU (80) 4 of Rhodes, UAs 1KAE (60) 14, 4H (28) 4, 0KCI 0KI (28) 6, UGZKAB (30) 15, VK9s LB (15) 5, GB (52) 14, RH (53) 6, WP, VOs 3CC (65) 13, BAX (51) 0, 8CB (58) 3-4, VSs 1GJ (40) 14, 2ET (57) 16-17, 6BG (35) 13, VU2EJ (50) 1, Y13WV, YJ1AA, Y03FT (40) 6, ZAIKAD (50) 3 ZBs 1GBF (77) 23, 2A (68) 0, ZC4PB (15) 4, ZM6AS (78) 4-11, ZS1PD/ZS8, 4X4II (50) 22, 5A4TK (75) 23 and 9S4BS (30) 22-23.

20 'phone and its panoply of adamant adherents apprise us of adequate 14-Mc. A3 activity. For example, W9WHM vocalized with DU7SV (198), KC6UZ (111) 13, KJ6s BG (240), FAA (240) 12, KW6BD (222), VS1CZ (170) 14 and Y03GM (133). HR1OS, KA2SL and KM6AX returned the compliments of W5HIS (198). Sixty-five watts at W4GUV punched through to KA2JW, KC6CZ (200-230) 8-11, KX6BU, VPs 2DN 16, 7NG 17 and 5A2TZ 21. ZD6EF brought W2TXB's n.f.m. 14-Mc. total to 120/117. FB8BZ, a new Madagascar candidate, (190) 13, runs 50 watts of A3 and speaks scant English. W4HA was one of his first U. S. contacts. VS2DB reports consistent 20-meter 'phone signals from the following Yanks at his Kuala Lumpur QTH: Ws 4DQH 8DAW SFYR 9BVX 9JJS 0CPM 0CUL 0DPD 0DSD 0DYG 0EOE and 0VUE. These, of course, are in addition to the usual barrage of W5s W6s and W7s that continually rolls into Malaya. A 3-element whirler and 120 watts annexed KA KC6 KX6 KW6, Kgs 1AA 6NAA, KJ6FAA (217) 12, KR6AF, HZ1AB and TA8US to K2CJN's 116/108 total. Steve is another DXer making ready for the autumnal 15- and 10-meter rush. W1YOU's Globe King came

through with HI6EC (182), the previously mentioned HZ1, KA2CY (190), KG1BO, OE13USA, a Leewards VP2, YU1GGM (105) and ZP5IB (280). In case you missed earlier QST cues, KG1s are Greenland-stationed (13). W4NYN made it 127/122 with an HZ1. Two Jima's KA0JJ (165) 14, a KQ1 and K6NAB (270) 12. HC4BH 18, KG1FR 17 and a 5A2 answered W9UKG but YS1MS 7 and ZP5CG 20 play hard to get. Six hundred watts promptly produced Formosa BV1US (290) 12, VS5CT (lately VS4CT), JAs 1ACG 3BK 3FP 3DM GAD (6A 0AA, KAs 2AK 2EB 2MA 2WA 2SK 2NM 2WV 3JN 5WV 7GB 7LJ 7SL 8AB 8SD 8WK 9EW, KC6 KM6 KX6, TG9MB, SV0WS, VK9BS (174) 14, VS1s CZ (143) 14, GL GT, VR2AP, VS6s CG CL CW (196) 14,



JAIATF, known to the old school as prewar J2PS, J7CG, MX3H and AC4TF, is back in the game and already has become one of the regulars who lead the breakthroughs to W/K/VE/VO areas when 7- and 14-Mc. Asian openings occur.

VS2s BS CU DQ, DU5 1VVS and 7SV for Washington Stater W7UYZ. . . . MRAC A3 specialists tripped 20 for ET2XX (182) 4, Kerkuelen's FB8XX (80) 3, Trieste's I1BNU (120) 5, VK9DB (140) 13, VO5FS (135) 20, VS1EW (120) 14, Sarawak's VS4CT (164) 14, Pitcairn's VR6AC (143) 3, YO3GM (115) 21, ZD4BT (139) 23, 4 X4AS (160) 23 and 9S4AD (135) 22. . . . NCDXC specifies VK9OK of Norfolk Isle, VP2DL, VU2s ET (175) 15, LL (186) 15, 4S7SW (192) 15 and CS3AC of the Azores. . . . WGDXC swings the 20-phone spotlight on ACs 3PT (114-163), 58Q (114-163), C3WV (190) of Formosa, FF8AP (135) 18, FO8AK (180) 4, HC8GI (166) 5, IS1s BFJ (131) 3, BZ (166) 5, KJ6BH (201) 2-3, MP4s BBL (128-169) 2-3, BBV (120-140) 2-4, OD5DA (126) 22, OYs 3CM (155-200), 7ML (155-200), ST2DB, SV0WU of Rhodes, SV0WU in Greece proper, TF2WAG (138) 20, VRs 2CW (195) 3, 3C (160) 3, XZ2KN (186) 15-16, YIs 2AM (110-140), 3WV (107) 17-22 who has 100 watts and a ground-plane, YJ1AA (230) and questionable, ZS2MI (175) 12-13 of Marion Island, 3V8s AN (106) 6, AS (100) 2-3, BA (140) 4-5, 4 X4s BO (120) 22 and FV (150) 0.

40 c.w. struggled through its low summer ebb in creditable style. K2DSW squeaked through the static to East German DM2AGO, HH3DL, HRIJZ, I1BNU/Trieste, OK1KTI, LU5 and PYs, TI2CR, YU5 1BK1 3CST 3DDE 4BAB 4DND and 4DOP. Those Yugoslavs really hit 40 with a lead pipe! . . . Skimming the cream, W2s ESO and FA mention VQ5EL (12) 2 and ZD9AC (38) 8, as well as YO5 2VM (47, 10) 2 and 6AW (20) 3. . . . DM2ABE, OKs 1KB 3KHM, KTIW, YUs 1KD 2IS 3ABC 4TT 5CX 5CXy and about a dozen other European countries were raised by W4EUH's 100 watts and folded dipe. This was John's initial DX foray and he states, "You'll be hearing from me again!" . . . K2s HZR IJN and JKC have the goods on CR7CO, GT3AB, HBIHT, HK1s DG TH, OX3AY, TI2PZ, VS2CO and other goodies. . . . K2DSW's Novice friend KN4CXa snapped up WP4AC in midband. . . . Here and there, W4GUV hooked: PJ2AE, VKs KH6a, W9ZVJ: VKs in number, W0VBS: VP3s 4LZ 9BL, several Oceanians. DL4ZC: a curious PX1 and OY7ML.

80 c.w. gets a bold-faced heading this month mainly through the persistence of W6ZOL. Roger made the best of an atrocious atmospheric level to work CE4AD (10) 7, VKs 2QL (18) 11, 3NR (10) 12 and ZL1CI (20) 10-11. This month officially marks the beginning of the end of the static season in northern latitudes—look to those folded dipoles, zepps and ground-planes, men. And look alive! . . . Rare 3.5-Mc. DX is just over the horizon

in most European QTHs. DL4ZC contacted TF5TP 23 and OY7ML 23 from APO 403. That OY7 certainly is building himself an excellent all-band reputation.

15 phone is a band to watch closely at this time. As the autumnal equinox sets in you'd better brace yourself for a logical of DXceptional entries. An example of just how good 21 Mc. is right now: W4NQM checks his bookkeeping and finds he has worked over 100 ARRL DXCC Countries. List items on fifteen phone in just four months and two weeks of routine noncontest DXing. Recent additions to Sparky's list include CN8MT, CS3AC, CT1OR, I1BLE/Trieste, KTIWX, VO4FO, V13WV and ZB1GBF. . . . W4WVM uses a 2E26 final and 3-element rotary beam to roll up Trieste, OE5HE, OQ5VD, VP2GG, VO4RF and ZB1AJX for a 70-country total. W4s NQM and W4M report European openings on eleven days out of a 26-day midsummer period. EL12A 20, FM7WQ 23, HK2GO 20, PZ1RM 21, VP5BM of Turks I, VO4EU 21, ZP5s GM 3 and IB 17 are specified by W4GUV of Birmingham. . . . W5HIS collected HC1s ER BS FK, TI2EA, and VP1GG who QRTs for VR2 climes. . . . K1IGARE, TI2BX, ZL1BY and ZP5HX wound up in W6ZZ's assortment. . . . At W8KBT we find CX2CN, OE6DK, a Turks VP5, YN4CB and YS1RA on record.

15 c.w. is perking up. CR7CK, IS1FIC 19, OY7ML 20, YK1AK 12, ZD6RM 14 and ZS6s come back to DL4ZC. . . . W1CTW nabbed that ZD6, plus OK1LM and ZB1GBF to raise his 21-Mc. code tally to 72 countries. ZD6RM tells Cal that Europeans consistently roll into Nyasaland on the 28-Mc. north-south path. . . . W4GUV found VO4s AQ and RF workable around 20 GMT. . . . FASRJ, PYs Gs and VP9BL telegraphed with K2DSW. . . . On the Novice front, K2DSW says KN4CXa has been working DL HK LU and KV4 with easy grace. KN2KHZ did well with several GA GWs LU and KP4. . . . WN4GSM made good with DJ1VL, G2YK, GW3YR, HB9MU, PJ2AR and YN1AA. Say, no Novice yet has joined the DX Century Club—any likely candidates?

10 phone holds the interest of W1WXC. John has OE2HD, CN8s CS MM (heard), CXs 2BP 2GM 4AB 4CS 5CV, HC1s 1KV 4MK, HR4WH, OA4CL, PJ2AP and YV3BD sneaking through. Argentinians LU5 1CM 1DCH 4AR 4DJT 5AE 5DC 7QB 8BF 8DEG 9CX 9DDA and 9EU also were bagged. Traces of Europe have



VR3A keeps on good terms with the native Fanning Island police chief at right. Ray returns to Australia soon, after making a tremendous DX hit with countries chasers throughout the world. (Photo via W6MUR)

been tantalizing W1WXC and he regularly points his 65-ft.-high 3-element twirler at the Continent and calls "CQ Europe" on 28,525 kc. around 14-15 GMT. . . . W1ZIW's 35-watter picked off CN8CS, CXs 3AA 5CV, LU5 1CM 1QG 7QB 8FX, VP3s 2GX and 9AY. Europeans have been heard. . . . GM3JDR detects signs of 28-Mc. life and dropped down to 10 for a chat with LU9EV.

160 c.w. created quite a stir in July and August much to everyone's surprise. W1BB reports that G3s ERN GGN JOJ and JVI started things off by writing several Ws for summer schedules. Among those who said "Sure!" were K2BWR, Ws 1BB 3RGQ 9NH and 9PNE. So what do these inveterate static-hounds do but pull off some nice transatlantic contacts beginning in early July! . . . K2BWR evidently turned the trick first with G8GGN (1828 kc.). W3HCQ followed suit with a G3GNN QSO next evening, all this two-way work occurring between 10 and 11 P.M. EDT. Other unidentified signals were creeping across the pond at the same time but no other two-ways were reported. Gosh, what next?



Few North American amateurs have QSO'd the Finnish department (state) of Ahvenanmaa, the Aaland Islands, in the Gulf of Bothnia. OH1s NK PI ST, standing l. to r.; OH1RX, seated; and OH1SS, who snapped this photo, gave opportunity for such OH0 contacts during the week end of May 21st-22nd. Their DXpeditionary force accomplished 214 QSOs on 14 Mc. and 60 on 3.5 Mc., all c.w. save one. Seventy U.S.A. contacts were recorded. The 200-watt transmitter belongs to OH1ST, the receiver to OH1RX. Ground-plane and long-wire antennas were used.

(Photo via KN2KHZ)

Where:

Rather light trading indicated by our QTH tickertape this month. On the bearish side, W5FGE knows nothing about ZC6AA — save your QSLs PA0XD, who works seas of W/Ks, lost his QSL check-off list for QSOs up through May 30th. Really if yours hasn't shown NCDCX suggests that W6OME may be able to assist you re tardy TA3AA QSLs. But, all in all, the entire TA3AA crew did a commendable job in the verification department W1OJR stresses that the Panama QSL Bureau answers to LPRA, P.O. Box 1822, Panama, R.P., not Box 1812 W1a QJR UED WFO ZDF, K2s B/T EUH, W3TYW, W4s GUV HA, W6ZOL, W7PHO, W8OTL, W9s FGX UKG WHM, W0VFM, DL4ZC, NCDCX, SCDCX and WGDXC took time out from summer vacations and rebuilding projects to tip you off on CM2PX, J. M. Campo, 12 No. 8 Paraiso Cotorro, Habana, Cuba CN8EB (QSL via W3WDD) CN8EM, L. J. Shaw, Navy 214, Box 60, FPO, New York, N. Y. GR18AN, Box 24, Dili, Portuguese Timor DL4EL (QSL via W1WOK) EI4AB, C. Connolly, 22 Michael St., Waterford, Eire EI6AB, Naval Radio Club, Waterford, Eire F3BR, Henri Gadoin, 3 rue Jacques Coeur, Bourges (Cher.), France FB8BZ, P.O. Box 1171, Tananarive, Madagascar FF8BK, A. Grolmund, B.P. 38, Seguela, Ivory Coast, French West Africa FF8BL, J. Bonnafous, B.P. 971, Dakar, French West Africa FF8BM, H. Peltier, B.P. 971, Dakar, French West Africa HE1JO-HB1JO (QSL via USKA) HC4BH, P.O. Box 313, Guayaquil, Ecuador HI7W (QSL via W60XS) HI8W (QSL via W60XS) I1BRN/MI, Box 20, Ferrara, Italy IIDCO/MI, Box 20, Ferrara, Italy IS1AHK, A. F. Ravenna, via P. Amedeo, 35, Cagliari, Sardinia, Italy IS1EIM, Maria Marras, via Regina Elena 17, Cagliari, Sardinia, Italy KG1AW (QSL via W5GKX) KG6AGB, R. See, Navy 943, Box 3, FPO, San Francisco, Calif. MP4BBT, W. H. Parker (W5EVW), % Albert Mussa, Box 26, Tewfa, Egypt MP4BBV, % RAF, Bahrain Island, Persian Gulf OH1s NK/ØPI/ØRX/Ø SS/Ø ST/Ø (QSL via KN2KHZ) ex-TA2EFA (QSL to W4PAZ) UB5KAB, Box 27, Stalingrad, Ukraine, U.S.S.R. ex-VK1HM, C. W. R. Holman, % Radio 4NA, Narrogin, W.A., Australia VK9RO, R. M. Ellison, SDA Mission, P.O. Box 21, Wau, T.N.G. VPIEK, Dr. E. K. Kreder, Hospital El Cayo, British Honduras, C.A. VP6DS, C. D. Seale, Kingsley, 2nd Ave., Belleville, St. Michael, Barbados VP6FR, F. A. Rock, Green Hill, St. Michael, Barbados VP6GC, G. S. Corbin, Roehuck St., St. Michael, Barbados VP6SS, C. E. Stoute, South End, Brighton, St. Michael, Barbados VP6UN, J. M. Richardson, Piquesburg, Kent, Christ Church, Barbados VP7NN (QSL via W4VBI) VQ5EL, Box 89, Kampala, Uganda ex-VS9AW (QSL to VS1GO) Y3WW, P.O. Box 293, Baghdad, Iraq ZA1KAD (QSL via AR1) ZB1AY (QSL via ZB1E) 3A2AW (QSL to SM5ARP)

Whence:

Asia — The Nicobar Islands have been inconspicuous by their ham-band absence since VU5AB shut down a couple of years ago. VS2DQ observes: "A recent VU5AB definitely is a pirate. There are VS1 amateurs who visit there regularly

and sometimes stay there a considerable time. But licenses are issued by the government of India and, alas, it seems impossible for any of the VS1 boys to get one." VS1GO allirms this in penning W1WPO: "Haven't heard any further about the VU5 deal — guess that's fallen through. I return to the U.K. in the fall, anyway." VS1GO (ex-VS9AW) has been working 160, 80 and 40 meters but hopes to get in some sessions on 20, 15 and 10 before moving Europeward. Reliable power components, he says, are extremely difficult to come by over there AC4NC, on leave in Calcutta of late, is expected to be back in action at the Tibet Indian Mission before long W5EVW, trying his luck as MP4BBT, verifies that MP4s QAG and QAH have left the Middle East for leave and reassignment JA1FM, one of the first Japanese V/Ls licensed postwar, mainly enjoys transpacific work on 7-Mc. phone. The International DX League, Box 56, Kyoto Central P.O. Japan, now issues an ambitious DX newsletter titled Q4V Thailand evidently has authorized a few legitimate ham licenses but HSI authorities still haven't bothered to remove their country from the International Telecommunications Union's taboo list (see p. 61, last month's QST). W6ZOL ran across one HS1BC on 40 c.w. and copied his QTH as Choon Sasmavai, 46 Manerok, Raja Damnven Ave., Bangkok. The fellow QRM's himself with a terrific backwave W9KOK heard from ex-AC4RF shortly after the latter's release from a 6-year Red China imprisonment. Bob hopes to be back on the air with a G call soon and possibly from other rarer spots in the future. At present ex-AC4RF's time is fully occupied in writing and lecturing on his harrowing Asian experiences. A cheery welcome to the country of Laos (XW8) which now is back in the good graces of international amateur radio. Laos removed itself from the ITU ban list as of July 20th and FCC-licensed amateurs now are free to work XW8s. XW8s A and AB already are available on 14 Mc. phone and c.w.

Oceania — ZC3AC was plagued by transformer burn-out troubles throughout the summer — winter on Christmas — but VS2DQ finds him still hopeful of a full-scale 14-Mc. onslaught before 1956 sets in. Christmas Island has no airstrip, receiving mail but once monthly by sea from Malaya or Australia. High humidity remains the curse of tropical electronics; FW8AB of Wallis also fights continual power-component failings VK9OK has another year or so left on Norfolk Island, according to E. G. Riggle. Len most of all desires consistent contact with the United Kingdom but the G paths are rarely open for him on 20 According to Amateur Radio of WIA, W2CPN (ex-W9RCQ) is making quite a hit during his Down Under visit. Also, shipboarders X1NE and X1NP again are hammering on 14 Mc. in Australian waters. VK3XU takes over as WIA awards manager and has been an outstanding DXer for years W4GUV learns that KC6CG brought his QSLs backlog under control by dispatching a spanking batch Statesward, all via bureaus We welcome the Kermadec Islands as a new member of the ARRL DXCC Countries List family. This group, annexed by New Zealand in 1887, normally is uninhabited. That means the Kermadecs will be a prime target for DXpeditionary efforts by ZLs and other itinerant DXers WGDXC addenda from Pacific areas: KH6AIW plans a visit to KM6 K56 and KX6 haunts. . . . KG6SR mentions a new KG6S club station upcoming on Saipan. . . . FK8AO (ex-FQ8AE) runs 75 watts to an MD2AC multiband skywire with a rhombic in the works. He's active mostly on weak ends, 0200-0900 GMT, 20 meter c.w. . . . W6SAC is mentioned

in connection with a possible Wallis isles DXcursion. . . VR6AC has a diesel power outfit and a three-element beam on Stateside order. . . KC6CG has worked over 50 WGDXC votaries and is found regularly between 14,200 and 14,220 kc. at 1200 GMT.

Europe — DARC (Germany) invites world-wide participation in its WAEDC contest, an interesting new affair scheduled for (c.w.) 0000 (GMT Sept. 17th to 2400 on the 18th, and (phone) the same hours Sept. 24th-25th. European stations will QSO non-European stations on all bands 3.5 through 28 Mc. The serial exchange is the usual five-digit (phone) and six-digit (c.w.) numeral — RST001, RST002, etc. **SCORING** (for non-European entries): Each completed QSO counts one point and each station can be worked but once per band. **Additional points** can be earned by transmitting "QSO reports" to European stations, these designated as "QTC" at one point each. Each QTC consists of three parts — (1) time in GMT, (2) station call, and (3) QSO number, of any previous WAE Test QSO. For instance,



SVs ØWO ØWN ØWK, front, l. to r.: 1SP 1AB, an SWL, middle; ØWL, another SWL, ØWQ and ØWT, rear, make up the majority of the Athens, Greece, ham gang. Other Athenians not available for this picture: SVØs WI WN WP WR and WU, the latter active on Rhodes almost daily, 0500-0730 GMT, using 14 Mc. (Photo via SFØWFO)

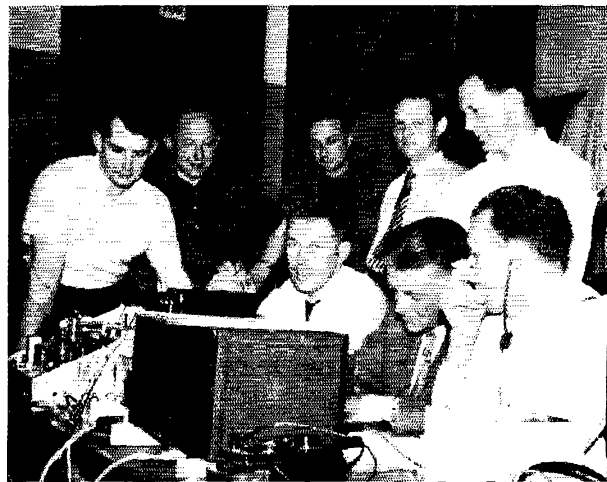
W5XXX raises DL7AA and thereby garners a QSO point; W5XXX previously worked G6ZO at 1207 for G6ZO's 113th Test QSO. So, in addition to the QSO point for his DL7AA contact, W5XXX gains another point if he sends "1207/G6ZO/113" to DL7AA. As many as ten QTCs can be sent per QSO but each QTC can be sent but once. Ergo, the more QSOs you rack up, the more QTCs you have available to parlay into additional points. **More additional points**, termed bonus points, are gained by working a station on three different bands (2 points), four bands (3 points) and five bands (4 points). **Multipliers** are derived from a modified version of DARC's WAE Award countries list, as follows. CT1 CT2 DL-DJ EA EA6 EI F FC G GC GD GI GM GW HA HB HE HV I IS IT M1 LA LX LZ OE OH OK ON OY OZ PX SM SP SV TA TF YO YU ZA ZB1 ZB2 3A2 9S4 plus Trieste (11), Jan Mayen (LB), Spitzbergen (LB), Rhodes (SV), Crete (SV), Aaland Islands (OHØ), Shetlands (GM), Orkneys-Hebrides (GM), arctic Norway (LA), arctic Finland (OH9), arctic Sweden (SM2), Bornholm Island (OZ), West Berlin (DL7), German East Zone (DM) and Gotland (SM1). **For final score**, multiply combined QSO points, QTC points and bonus points accumulated on all bands by the combined numbers of multi-

pliers collected on each band. Certificate awards will be available for highest scorer per country and presumably per U. S. and Canadian call area, in separate single-op and multiop categories. Such winners will be deducted from logs submitted to DARC's DX Bureau, Fichtenweg 51, Berlin-Rudow, Germany, postmarked before November 20, 1955. See you on the north Atlantic paths, DRØMs. . . . Two unsolicited bouquets from the Continent for often-maligned W DX chasers SM5ARP, reference his recent summer idyl in Monaco: "Had much trouble with the 3A2AW rig this time, lots of troubleshooting, W manners were excellent and permitted speedy operation." And from HB9HT of Swiss FD set-up HB1HT: "I would like to express our thanks to all the many W stations who, with their snappy operating, were a great deal responsible for . . . our high score." "Had much trouble with the 3A2AW rig this time, lots of troubleshooting, W manners were excellent and permitted speedy operation." And from HB9HT of Swiss FD set-up HB1HT: "I would like to express our thanks to all the many W stations who, with their snappy operating, were a great deal responsible for . . . our high score."

His BKN and DCO gave the gang some good shots at San Marino in early July. K2BZT got in on the spoils early, noting that most of the W crowd was caught napping on this quickie. Hayden is among the many W/K brethren on the watch for an HB1 or HB9 in Valais canton, a real rare for Helvetia-22 sheepskins. . . . GM3JDR, with 111 countries to his 150-watt's credit, states that his is the most northern ham station in Scotland. Furthermore, he and GM3BZJ are the only amateurs in County Cuthness. GM3JDR still needs Miss. Nev. N. Mex., S. Dak. and Utah for WAS and guarantees 100 per cent QSL supplementing this month's introductory remarks. WØUKG passes along info on the Hungarian ham set-up. There are about 60 HA licenses active, about half of which operate collective (multiop) layouts. The remainder stick to v.h.f. bands. License classifications go like this: **Ultrahigh**, 10 watts input from 144 to 10,500 Mc.; **Class A**, 10 watts on 3500-3850 kc., c.w. only, for one year; **Class B**, 50 watts on "all bands" with all permitted emissions; and **Class C**, 200 watts, same as Class B otherwise. HA5KBA, the Hungarian "headquarters station," appears to be in a class by itself with a flock of operators, 750 watts input and much American-made equipment. . . . DM2ABK informs WØUKG that three East German prefixes now are in use: DM2 for "private" amateur stations, DM3K for collective stations, with DMØK calls representing individual operators of collective stations.

Hereabouts — "The W9-DXCC annual meeting will be held at the Sheraton Hotel, Chicago, Saturday, September 17th, from 2:00 p.m. on, with a dinner being served at 6:00 p.m. The meeting is open to any and all holders of DXCC certificates. Interested parties should write W9s FID FK NN or QLY for details." This from W9FID. Get in touch with the boys immediately concerning this on-clave because guys are still raving about the last one. . . . W7CSW is doing some slant-7 operating in Idaho this summer. Overseas 14-Mc. WAS aspirants take note. . . . VP1EK, one of the newer British Honduras actives on 14 and 21 Mc., is a good bet for a fast VP1 pasteboard. . . . F7ER/K2JCS hears that VP2GG is making plans for heavy Windward Islands activity on 21 Mc. after a few years on 40 meters. Friend VP2DL normally sticks to 20. . . . W2TXB chased ZD6BX all over the place for two months and then clicked abruptly with ZD6EF. Naturally, with the pressure off, ZD6BX came back shortly afterward. Al is a charter member of the "Never Give Up!" QSL club, too. ZK1AH's confirmation came through after six years; PK6VK, four years; CR5UP and VK9FM, three years apiece. . . . WØPWN and W6VUP verify that French St. Martin and Dutch St. Marten licenses are difficult, if not at present impossible, to obtain. . . . KH6AR personally visited W6ZZ after a series of 100 QSOs beginning in 1936 when they were K6MNV and W1WV, respectively. Veterans of old 10-meter days will recall that K6MNV's Hawaiian phone was among the first to bombard the East Coast in the mid-1930s. W6ZZ's new RSGB Empire DX Award, incidentally, is signed by the mayor of Southgate, England (G6CL).

Perennially a feature in DX doings is the sudden appearance of HB1 portables on DX hands during the Swiss National Field Day sponsored by USKA. Here is the 1955 affair's top-scoring layout, HB1HT, with (standing, l. to r.) G3EIO, HB9s LD EL, an SWL, HB9HS; (seated) HB9s HT LO and PW in attendance. This group, representing the Zurich Ham Gang in the activity, used a 50-watt gang-tuned bandswitching rig and a 70-foot-high 80-meter zepp with main lobes on Great Britain and U.S.A. Swiss, British, Belgian and German amateurs usually arrange coinciding FD dates to boom participation into one of Europe's outstanding annual ham events.





Operating News



F. E. HANDY, WIBDI, Communications Mgr.
R. L. WHITE, WIWFO, Asst. Comm. Mgr., C.W.
PHIL SIMMONS, WIZDP, Communications Asst.

GEORGE HART, WINJM, Natl. Emerg. Coördinator
ELLEN WHITE, WIYYM, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, WIZJE, Administrative Aide

New Season Ahead. September marks the beginning of another operating season! The old sunspot cycle has definitely turned the corner, is over a year on its way, and such bands as 10 and 15 meters will be open for longer periods with more DX offered up for those alert to work it. Net activity and traffic will continue to be well supported as the nets "up" their number of sessions and the amateurs returning from vacation get back in the swim. The v.h.f. activities this September (and at other periods in the season schedule) should be the best ever; there were new highs in accomplishments and participation in the '54-'55 season. Don't overlook the chance to get into the FMT (Frequency Measuring Test) on the evening of September 15th . . . see announcement elsewhere in these columns.

Individual report of FMT results is sent you, if you report, and with an information copy to the appropriate SCM. This is so that if you do well enough this can document your application to the SCM for an Observer post in the frequency measuring classes. But more amateurs are needed in OO operations to send "coöperative mail notices" to fellow amateurs to help them avoid FCC citations, also "for better operating." Whether or not appointed in a frequency measuring classification you can get lined up for c.w. or 'phone observing posts aside from frequency measuring.

For RMs, PAMs and NCSs who have not already done so, this is a reminder that it is time to reregister the frequency and operating periods of all nets to get them included in the annual Net Directory.

On the Correct Handling of Messages. During the vacation season, the undersigned was shocked to get the radio suggestion from one member of a 'phone net to whom a message was being relayed that he would change the text; he thought it more clear if the text were worded a different way! Let it be clear to everyone, once and for all, that it is a standing communications principle in all communications systems worthy of the name that *the text of the message cannot be changed except by the originator.* To do so would result in distortions of meanings, and lack of confidence in any such undependable service that turned out messages with modified texts. Besides watching such things that by observance spell out sound communication practices, every new and old traffic handler is urged to require "place" and "date" given with the other vital information preambles should include. The check is helpful and important.

Our young friend who volunteered to add a word to the text had apparently no thought that this would not be compatible with the group count that the message already carried!

It should in fairness be said that the over-all picture of vacation message service was impressively good and co-operation high in all directions. Many functioning nets were observed.

FD Post-Mortems. W8ENS (Springfield, Ohio, Amateur Radio Club) compares the exigencies of the Field Day to those of civil defense or emergency operations. He says planning should involve tents painted with a broad stripe to identify them, stakes the same color (80-meter tent with red poles and stakes, for example). A 100-foot rope to attach to the power unit to prescribe the exact distance to set up the different tents would have helped. W8ENS notes the contrast between loud emergency talkers and joiners and the "amazing few that show up when the real shake is on." As he puts it, where would we stand if members of an emergency group had never put up a wire in rain, sleet or ice or didn't own a pair of boots or raincoat, nor had a gallon of gasoline stashed away for use in emergency? One objective of Field Day is to learn these things. (We gather there *was* rain in Ohio and some missing items for coping with these offenders speedily and with highest efficiency!)

W7RGL in the wee Sunday morning hours of FD heard many calls sent poorly and too fast. He reduced *his* 17-w.p.m. speed to set a striking example of change in technique and reports the results worthy of duplication. He says, "Changing to 8 w.p.m. I called CQ FD. The result was immediate, four slow but clean replies. In the next hour sticking to 8 w.p.m. I *doubled* the number of contacts per hour."

The Joliet Amateur Radio Society in "Ground-Waves" reviews its performance and for the record lists six points it will take up for next year. Other groups may have a different list but some points are sure to be generally applicable: (a) have not less than four operators for each position; (b) each operator to be given a chance to practice with transmitter and receiver before FD to minimize fumbling-time; (c) plan beams; (d) use speech compression; (e) arrange *training* Novices to improve logging and assist checking, several advance one-hour sessions.

All early reports indicate that *several groups* topped last year's showing. It's amazing to us that eyes are so soon focused on '56 plans. *QST* will have more on preliminary results for this year soon.

A.R.R.L. ACTIVITIES CALENDAR

Sept. 3rd: CP Qualifying Run — W6OWP
 Sept. 14th: CP Qualifying Run — W1AW
 Sept. 15th: Frequency Measuring Test
 Sept. 17th-18th: V.H.F. QSO Party
 Oct. 7th: CP Qualifying Run — W6OWP
 Oct. 8th-9th: Simulated Emergency Test
 Oct. 13th: CP Qualifying Run — W1AW
 Oct. 15th-16th: CD QSO Party (c.w.)
 Oct. 22nd-23rd: CD QSO Party (*phone)
 Nov. 5th: CP Qualifying Run — W6OWP
 Nov. 12th-13th, 19th-20th: Sweepstakes
 Nov. 18th: CP Qualifying Run — W1AW
 Dec. 2nd: CP Qualifying Run — W6OWP
 Dec. 12th: CP Qualifying Run — W1AW

For Enjoyable Operating. The quarterly (summer) CD Party in July was the day-off or "chance to live it up" for the whole family of ARRL appointees. Sometimes the newer amateurs write in to ask about these things and we are only too glad to tell all readers about the set-up.

The operating highlights for appointees known as CD Parties are scheduled four times a year, usually in the later weeks of January, April, July and October. Such radio get-togethers promote fraternalism. One meets fine operators and has QSOs "all over" wherever the equipment used is flexible enough to permit changing easily from band to band. There can be long chats or fast contacts and an unparalleled opportunity to test station range and consistency.

To be an ARRL appointee one has to agree to send consistent activity reports monthly to his SCM (address page 6, *QST*). The activity in a selected SCM-appointment status that assists fellow amateurs earns the right to participate in the quarterly radio activities as they come along. The idea is that appointees do more for each other and fellow amateurs than in casual work, each appointment being dedicated to particular aims. Send a radiogram or a postal card for a copy of "Operating an Amateur Radio Station" for detailed information on each appointment post. If you are more than a casual amateur and have some time to dedicate to definite objectives, get your SCM to accept your application for appropriate station or leadership appointments along the lines of your natural interest.

— F. E. H.

BRIEF

The "Worked All VE" award is now being issued by the Nortown Amateur Radio Club on behalf of the Canadian Amateur Radio Operators' Association. All amateurs are invited to try for WAVE. Here are the rules:

(1) Obtain two cards for QSOs with amateurs in each of these Provinces: Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia.

(2) Each of the two cards must be from a *different station* and for work on a *different band*, for a total of 18 cards.

(3) Yukon and N.W.T. cards may be submitted in place of VE7 cards.

(4) All contacts must have been made after January 1, 1955.

(5) Mail confirmations, with 50 cents to finance their return, to Nortown Amateur Radio Club, P.O. Box 356, Adelaide Street Postal Station, Toronto, Ontario, Canada.

DXCC NOTES

Announcement is hereby made of one addition to the ARRL Postwar Countries List. The addition will be the Kermadec Islands. These islands are located approximately 600 miles NNE of North Cape, New Zealand, and are administered by New Zealand.

DXCC credit will be given starting November 1, 1955, for creditable confirmations dated on or after November 15, 1945. This will permit foreign amateurs to start receiving credits at the same time as those in U. S. A. Confirmations received prior to November 1, 1955, for this country will be returned without credit.

In future ARRL DX Competitions, those making contact with amateur stations located in the Kermadec Islands may claim credit for a separate country in accordance with DXCC rules.

DX CENTURY CLUB AWARDS

HONOR ROLL		
W1FH 259	W8NBNK 250	G2PL 248
W6VFR 254	W0YXO 250	W2BXA 247
W6AM 253	W3GHD 249	W3KT 247
W6ENV 251	W68N 249	W6MX 247
W8HGW 251	W68YG 249	W5MIS 246
PY2CK 251	W2AGW 248	W6MEK 246
W3BES 250	W3JTC 248	W7AMX 244

Radiotelephone		
PY2CK 243	W1JCX 219	N6IAC 215
W1FH 231	W1MGW 218	W8HGW 214
VQ4ERR 231	W1NWO 217	W3JNN 213
ZS6BW 227		W9RBI 210

From June 15, to July 15, 1955, 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

W6HX 210	W1OJR 104	W2FCT 101
W3VKD 141	W1WAL 103	W2FJH 101
W4FFV 121	W2BPA 103	W3RBW 101
F8LF 115	W5BABY 103	W6HJ 101
O65PP 108	OH5OU 103	W8MQR 101
OH2VZ 107	W0QBA 102	OH1PI 101
W5LAK 106	W5TPC 102	W1DBM 100
HR1AT 105	K34TF 102	W6YMH 100
O62SP 105	SM7AOO 102	G3HJJ 100
SM7BHF 105	W1BRX 101	4X4DR 100

Radiotelephone

G4JW 109	W3VKD 103	W3OGR 101
W2DCO 107	PY1ANU 103	KL7AON 101
W1QJG 105	W2WCY 102	W9L7R 100
LU4ES 104		11BXX 100

ENDORSEMENTS

W8KTA 241	W0NLY 160	W7HQC 140
W3JNN 240	HP1BR 160	W8DUS 140
W8SYC 220	W8MFB 155	YV5BZ 140
W5FFW 214	W0QVZ 155	W6ALQ 137
W6LW 203	W1ZD 153	W6SWG 133
W6NTR 203	W3MPW 152	W2KMZ 131
CM9AA 201	W0DJE 152	W6POZ 131
W3CGS 192	W2GTL 151	W2ZGB 130
KP4CC 192	W4AAW 151	W8HAM 128
W2GFV 184	G3AAE 151	PY1ANR 127
W8LKH 183	W6ID 150	SM7VX 123
W2GVZ 180	HB9ET 150	W3NCF 122
W3ECR 175	11CJW 150	W7PEY 121
W6JK 171	W2ICO 143	W4TKI 112
W6CTL 170	OY3Z 143	VE3XJ 112
W8TJM 170	W5AWT 141	W1WLW 111
W6TXL 163	W8MWL 141	YV5FK 111
YV5AE 162	W4HRR 140	W2MUM 110
G14RY 161	W4QCW 140	P40FAB 110

Radiotelephone

ZS6Q 202	W4AAW 151	W2FNE 131
E42CQ 200	W6QVM 151	W8MVL 130
PY2AHS 176	W3ECR 141	W3PDS 128
W1CLX 151	W8QJR 141	W7PEY 118
	W1PST 140	

W/VE/VO Call Area and Continental Leaders

W4BPD 241	VE3QD 210	VO6EP 190
W9NDA 243	VE5OZ 140	4X4RE 214
VE1HG 150	VE6GD 108	ZS6WV 230
VE2WW 181	W7HCO 249	ZL1HY 238
	VE8AW 160	

Radiotelephone

W2APU 202	W6DI 205	VE2WW 102
W2BXA 202	W7HIA 181	VE3KF 163
W4HA 184	W0AIV 179	4X4RE 140
W5BCP 207	VE1CR 120	OD5AB 170
W6AM 205		ZL1HY 196

FREQUENCY MEASURING TEST, SEPTEMBER 15TH

All amateurs are invited to try their hand at frequency measuring. W1AW will transmit signals for the purpose of frequency measurement starting at 9:30 P.M. EDST (6:30 P.M. PDST), Thursday, September 15th. The signals will consist of dashes interspersed with station identification. These will follow a general message sent to help listeners to locate the signals before the measurement transmission starts. The approximate frequencies used will be 3622, 7054 and 14,078 kc. About 4½ minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 9:36 P.M. It is suggested that frequencies be measured in the order listed. Transmissions will be found within 5 or 10 kc. of the suggested frequencies.

At 12:30 A.M. EDST, September 16th (9:30 P.M. PDST, September 15th), W1AW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies used will be 3675, 7046 and 14,125 kc.

Individual reports on results will be sent to all amateurs who take part and submit entries. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between 71.43 and 357.15 parts per million, participants will become eligible for appointment by SCMs as Class I or Class II OOs respectively.

This ARRL Frequency Measuring Test will be used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified appropriately until they demonstrate the above-stated minimum required accuracy. Class I and Class II OOs must participate in at least two FMTs each year to hold appointments. SCMs (see listing, page 6) invite applications for Class III and IV observer posts, good receiving equipment being the main requirement. All observers must make use of the cooperative notices (mail forms provided by ARRL) reporting activity monthly through SCMs, to warrant continued holding of appointment.

Any amateur may submit measurements on one or all frequencies listed above. No entry consisting of a single measurement will be eligible for QST listing of top results; at least two readings should be submitted to warrant QST mention. Listing will be based on over-all average accuracy, as compared with readings made by a professional frequency-measuring lab.

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

C. W.		'PHONE	
3550	14,050	3875	14,225
7100	21,050	7250	21,040
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.

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 September 14th at 2130 EDST. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7125, 14,100, 21,010, 52,000 and 145,600 kc. The next qualifying run from W6QWP only will be transmitted on September 3rd at 2100 PDST 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 EDST. 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.

Date	Subject of Practice Text from July QST
Sept. 1st:	A Four-Band S.S.B. VFO, p. 11
Sept. 7th:	Versatilize Your Oscilloscope, p. 13
Sept. 9th:	Band-Scanning — The Easy Way, p. 18
Sept. 12th:	A Tripler for the 1215-Mc. Band, p. 20
Sept. 20th:	Subinterval Markers . . . p. 22
Sept. 22nd:	Selenium Break-In Keying, p. 28
Sept. 26th:	Hints & Snarls — GVZ Style, p. 45
Sept. 28th:	With the AREC, p. 70

W1AW OPERATING SCHEDULE

All times given are Eastern Daylight Saving Time)
Operating-Visiting Hours:

Monday through Friday: 1300-0100 (following day).

Saturday: 1900-0230 (Sunday).

Sunday: 1500-2230.

Note: W1AW will be closed from 2230 Sept. 4th to 1300 Sept. 6th in observance of Labor Day.

A mimeographed local map showing how to get from main highways (or from HQ. office) to W1AW will be sent to amateurs advising their intention to visit the station.

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

Frequencies:

C.w.: 1885, 3555, 7125, 14,100, 21,010, 52,000, 145,600 kc.
'Phone: 1885, 3045, 7255, 14,280, 21,350 kc.; 52 and 145.6 Mc.

Times:

Sunday through Friday, 2000 by c.w., 2100 by 'phone.

Monday through Saturday, 2330 by 'phone, 2400 by c.w.

General Operation: Use the chart on page 70, May QST, for determining times and frequencies for W1AW general contact with any amateur. Note that since the schedule is organized in EDST, the operation between 0000 and 0100 each day will fall in the evening of the previous day in western time zones. See also the note on page 65, August QST.

Code-Proficiency Program: Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and at 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday are made on the above-listed frequencies. Code practice starts at 2130 each day. Approximately 10 minutes' practice is given at each speed. On Sept. 14th, Sept. 15th and Oct. 13th instead of the regular code practice, W1AW will transmit certificate qualifying runs and a frequency measuring test.

TRAINING-AID NOTES

Affiliated clubs will want to note the addition of two films to the League's visual aids library. The General Electric Company has placed two films on deposit for use by affiliated-club groups, whose secretaries are invited to write in to the ARRL Communications Department for booking information.

1) "And a Voice Shall Be Heard," 22 minutes, black and white sound. The importance of communications in coordinating the relief activities of a disaster-stricken city is demonstrated with emphasis on the part played by the radio amateur.

2) "Principles of Electricity," 20 minutes, color sound. This animated film gives individual treatment to the volt, ampere, ohm, etc. The latter portion explains the essence of magnetism and magnetic fields.

Note too the new addition of a slide collection, produced by the Rochester Antique Wireless Association, the object of wide acclaim throughout the country. Titled "The First Thirty Years of Amateur Radio," the slides and accompanying tape-recorded lecture are sure to please old and new club members alike. Affiliated club officers are urged to follow standard booking procedure, allowing ample notice and choice of dates. Address all correspondence to the League's Communications Department.



The dates for this year's Simulated Emergency Test have been set as October 8th-9th (see Activities Calendar, June and subsequent issues of *QST*). Now don't say you weren't given advance notice. The customary bulletin will be in the hands of ECs by the end of this month.

We've been doing some thinking about the SET. Wish you would, too. In past years, we have been most liberal with dates on each side of the designated week end, and this has resulted in ability of ECs to combine SET with local civil defense or Red Cross activities, or pick a date or week end more convenient for AREC registrants. It has had the disadvantage of detracting from the nation-wide demonstration aspect of our SET, about which we are usually called by newspapers and press associations.

The SET is the ARRL's and the amateur's own exercise. It has been conducted every year since 1947, in conjunction with whatever agencies the AREC is serving. Naturally, since the Red Cross is and always has been one of the primary agencies to be served, it played a key part in the exercise, to the extent that many amateurs got the impression that the SET was a Red Cross test. In these cold-war days, civil defense has become more important, and inevitably c.d. has played a bigger part each year in the SET. Such participation has not necessarily been at the expense of Red Cross participation, although in some places where the emphasis has shifted, this has been the net effect.

We would like to request that ECs, if at all possible, this year plan their SET for the designated week end. We expect to continue the liberal policy regarding dates, and any participation within a week or more of the October 8th-9th week end will be considered eligible for inclusion in the SET data. But it makes a better national impression if we all conduct our tests at the same time, or at least on the same week end, particularly since many stations operate on the National Calling and Emergency Frequencies during that week end for the specific purpose of assisting in the handling of traffic.

Only a few stations copied the Test Emergency Alert last year. It was sent only once, by W1AW. This year, we hope to have W1AW repeat it several times, and perhaps have stations in the Midwest and Far West send it at unspecified times also. In any event, we'll have TEA in this year's SET. Watch for the details in the announcement, October *QST*.

W6PKI reports that on May 7th the only medical man on Palap Island, a pharmacist's mate, was seriously injured when struck by a military vehicle, and aid was summoned by amateur radio. Ed Pitta, operator of KC6CG, made contact with KA3MD in Japan who immediately got advice from military doctors which enabled him, with the aid of a native girl nurse, to do the things necessary to save the victim's life. KA3MD then contacted KG6AA, operated by Capt. Comstock on Guam, who instigated an emergency air flight to Palap to evacuate the injured man. Military doctors credit Ed Pitta, KC6CG, with saving the man's life by his prompt action in getting medical advice.

The AREC 10 Meter Net of Nassau County, L. I., held their first hidden-transmitter hunt on January 6th. W2KCW/m was the hidden transmitter at a spot where Hewlett Bay almost surrounded him. Four fixed stations,

Some local brass inspect the new emergency generator donated to Kerr County, Texas, and the City of Kerrville by the Kerrville Radio Club. Left to right in the picture are W5UNE, W5BEO (EC), County Judge J. R. Leavell and Kerrville Mayor Dr. J. L. Bullard.

with the help of beams and W2ZJB with a loop, made a fix, plotted it on a map and directed the twelve mobiles to the location. Within the "fix" area of one square mile the gang had to drive up and down the various canal roads until the correct one was found. K2AMN's mobile loop proved so good that most of the mobiles are planning to install one. — W2ZAI, SEC N. Y. C.-L. I.

An emergency drill called the "Hia-Springs" drill was conducted by the Dade County AREC starting at 1400 EST on Feb. 27th. EC W4IYT alerted the AREC and Dade Emergency Net. Emergency net control stations were set up at the Hialeah Fire Department and at City Hall in Miami Springs. Mobile roll call began at 1405, and twelve mobiles responded, nine of which were dispatched to "bombed" bridges, others kept on stand-by. Each mobile, upon arriving at destination, dispatched a damage report in standard ARRL form, after which they were redispached to specified councilmen in Miami Springs, many of whom rode along in mobiles during much of the drill. After disaster traffic had been cleared, W4NVU took net control to contact all fixed stations wishing to take part throughout the country, and five additional stations did so.

A recording was made of the whole operation, to be played back later and checked for mistakes in procedure. Publicity was given by both the *Miami Herald* and the *Miami Daily News*. The drill was secured at 1600 EST. — W4IYT, EC Dade Co., Fla.

The Tennessee SEC, W4RRV, conducted a sectionwide surprise drill on April 21st, to determine how quickly the state-wide AREC could mobilize if necessary. The drill was opened at 1800 EST and terminated at 1924. W4RRV says that cooperation was wonderful, and that when the boys called in, they stood by. The drill was conducted on 3980 and

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

3635 kc., and some local activities were reported on both ten and two meters. A total of 65 stations checked in on 3980 kc., six on 3635 and fourteen out-of-state, including stations from Virginia, Alabama, Mississippi, Kentucky and Georgia. Alabama SEC W4TKL said he would have activated his extensive Alabama AREC establishment if it had been a real emergency. SCM W4SCF and PAM W4PFP were both active.

Local nets were also activated throughout the state. In Nashville, EC W4O EZ alerted his AREC gang after getting word of the surprise drill at 1820 CST. Ten stations reported into the two-meter net, which was turned loose at 1910. On ten meters, sixteen stations reported between 1842 and 1855. All this was completely without any advance notice that a drill was to be held.

We think the Tennessee boys deserve a big hand for this spontaneous demonstration of their readiness.

The Communications Section of the Third Mobile Support Group, supported by members of the New Albany (Ind.) Mike and Key Club, gave a communications demonstration to the chiefs of the 20 volunteer fire departments of Jefferson County, Ky., on Monday, May 16th. The exercise



was designed to give training to the members of the communications section and to acquaint the fire people with the capabilities and limitations, and to give them a general knowledge of communications, equipment and personnel; also to show them how properly to word messages, which were then transmitted from the president of their association to the various chiefs. Replies came through in most cases. The test was quite successful. The communications picture in Louisville is shaping up right nicely.

— WABAZ, EC Jefferson Co., Ky.

Seventeen ECs, representing 5710 AREC members, submitted reports for May activities. This represents an increase of seven reports from last year's mark, and over 3000 AREC members represented. An encouraging sign of progress, we'd say. The following sections reported, through their SECs (new sections for the year in italics): Ontario, Western N. Y., Western Fla., *Maine*, South Dakota, Montana, Alabama, Los Angeles, *West Va.*, Minnesota, N. Y. C.-L. I., Oregon, San Joaquin Valley, Eastern Fla., *Nebraska*, Wisconsin, Washington. Twenty-six sections have reported in 1955, only six below last year's total. Midyear summary in October QST.

RACES News

Some time ago we received a very fine article from W6JAU on the Arcadia, Calif., civil defense emergency radio set-up. W6JAU is not only EC for Arcadia, but also communications chairman for the Arcadia Red Cross Disaster Corps and radio officer for Civil Defense Area D. In Arcadia, civil defense and Red Cross work hand-in-hand with the AREC to form a closely-knit organization to provide any kind of emergency communications called for. They have



14 mobiles, two pack sets and one hand-carried unit, two gasoline-driven generators and necessary fixed station equipment to set up a net control station anywhere in a matter of minutes. Mobility and versatility of equipment are paramount in Arcadia. The fixed net control is K6AQT, located in the basement of the City Hall. Vertical polarization is used by all units to facilitate mobile work.

Arcadia, being the control center headquarters for Civil Defense Area D, has the responsibility of coordinating eleven cities in its area, some of which have similar mobile nets of their own. Those which do not are served by the Arcadia group or that of a near-by or adjacent city. The Arcadia group meets each month and conducts frequent net drills and demonstrations. All members have Red Cross and civil defense identification, including RACES clearances. The group even has a TVI Committee.

A salute to Arcadia and its well-organized establishment of amateurs serving civil defense and the Red Cross!

Recent reports from the City of Baltimore indicate a healthy increase in interest and activity among the RACES group. In addition to participation in "Operation Alert" (see summary elsewhere in this issue of QST), a city-wide radio alert is held the third Friday of each month, with six rigs each putting 30 watts into a ground-plane antenna on 145-147 Mc., working from 1930 to 2130 EDST and working into 120 field units.

These alerts and practice drills pay off, interest-wise, training-wise and civil defense-wise. *Join your RACES group today!*

Left: This is part of the Charlotte (N. C.) Civil Defense Net group. The net has about 32 stations on its roll, about 20 reporting into each Sunday drill. In picture, sitting, are W4s FNV AYA BTZ and an SWL; standing are W4s CZR BUA ZQB (EC) REW and WXZ (SCM). *Right:* Andy Clark, W4HYT, served as EC for Dade County, Florida, for a number of years. He is one of the instigators of the Dade Emergency Net. This is Andy at his operating position.

1955 FIELD DAY NOTE

Field Day High Claimed Scores will appear in October instead of September QST due to the later scheduling of the contest this year.

TRAFFIC TOPICS

On the first day of August, we put all present net registration file cards behind a tab marked "Inactive Nets." Since then, nets reregistered, or new nets registered, have been transferred to the "Active Nets" tab. This is regular practice in our net registration department. August 1st is the renewal date. September QST makes the announcement. November QST carries the first net list, followed by supplementary lists in QSTs for January, March and May. The complete, multithumbed net directory comes out in December.

Each year we try to aim at getting nets reregistered a little earlier, but so far we haven't been making it. One big reason for this is that compiling and maintaining the directory is a stupendous job requiring a lot of someone's time; then it must be checked, rechecked and cross-checked before it can be reduced to lithograph process. After that, it must be shepherded through the lithographing room and mail room in competition with regular bulletins like the CD Bulletin, LO Bulletin, Club Bulletins, 'Phone Bulletins, Bulletins about Bulletins, etc. ad infinitum. And because the Net Directory is somewhat voluminous, and getting more so each year, it is often by-passed to get at other bulletins which carry mailing suspense dates.

Each of you can help by getting your net registered *early*. This year, we'd like to start putting together the litho net directory around the first of November, have it completed by mid-November and in the mail by December 1st. We can't do this unless you cooperate by registering or reregistering *now*, and make it a standard practice on someone's part to keep that registration up to date immediately any changes are made.

We have registration cards (Form CD-85) available upon request. They're the same as last year's, and have space for the following information: (1) *Name of Net*; please adopt an *official* name and stick to it. (2) *Net Designation*, if any; most c.w. nets have designations and some 'phone nets have, such as EAN, TCPN, etc. (3) *Frequency (or -ies)*; give the exact frequency, not just the band. (4) *Days*; tell us *which* days, not how many; "daily" means every day, *including* Sunday. (5) *Manager*; the guy who runs the net, called NCS on some nets; what we want is the call of the head man on the net, to whom any correspondence can be directed. (6) *Time* the net starts and time it ends; please use standard time, and be sure to indicate which time zone. (7) *Direct Coverage*; area covered by regular net members, not through liaisons with other nets. (8) *Purpose* of net; this year, we're not registering social, or rag-chew nets, but only those with an emergency or traffic purpose. (9) *Starting Date*; if an old date, give the year; if a new one, the month and year. (10) *Net Control Stations*; list them; they go on our NCS mailing list to receive Emergency and Traffic Bulletins. (11) *NTS*; indicate whether or not the net is affiliated with the National Traffic System. (12) *Liaisons*; list the nets with which regular liaison is conducted. (13) Name and/or call of the person submitting the information.

Most of this information is transferred to a regular net file card. Original registration cards (the ones you send in) are kept on file for a year, then discarded. Use of the regular registration card is not required, but it's a convenience both to you and to us to use it. If not used, please give us the



information above by card or letter. Basic registration is the name of the net, frequency, days and time; without these four essentials, no net will be registered.

We cannot search through bulletins, reports or miscellaneous correspondence for net registration information. We'll use it as we come across it, but to be sure your net is registered, make a specific point of sending us the necessary information for that purpose alone.

Only one miscellaneous traffic report this month: The Early Bird Net traffic count for June was 428 messages. Since December 5, 1949, this net has conducted 1480 sessions and handled 23,311 messages.

National Traffic System. We seem to need a small "shot in the arm" about reporting. It's natural enough for net reports to fall off during the summer months, but now that NTS is an established institution among organized traffic circles, we'd like to feel that 100% reporting is the customary thing, not the exception. Can we have a bit better consistency in this regard, gang?

June reports:

Net	Ses- sions	Traffic	Rate	Average	Repre- sentation
1RN	25 ¹	277	0.42	11.1	80%
3RN	37	209	0.50	5.6	80.2%
RN5	42	524	0.60	12.5	50.3%
RN6	36 ²	166	0.26	4.6	....
RN7	49	220	....	4.4	29%
8RN	41	87	....	2	....
9RN ³	11	150	....	13.6	....
TEN	70	954	....	13.6	51.4%
TRN	14	46	....	3	66.7%
EAN	23	716	0.97	31	93.5%
Sections ⁴	300	1359	....	....	....
TCC-Pacific		189	....	....	....
Summary	648	4907	EAN	7.6	EAN
Record	648	8183	....	15.9	....
Late reports:					
RN7 (May)	48	299	....	6.2	37%

¹ Out of 26 sessions held

² Out of 44 sessions held

³ Report by W9DO of 11 sessions for which he was NCS.

⁴ Section nets reporting: KYN (Ky.); CVN (Calif.); QKS, QKS-SS and QKN (Kans.); MON-SMN (Mo.); CN and MCN (Conn.); NTX (N. Texas); WVN (W. Va.); AENB & AENP (Ala.); GSN (Ga.).

A complete list of NTS net managers at regional and area level may be in order; it has been quite some time since one was presented here:

Area Nets: Eastern Area Net — W8SCW; Central Area Net — W9JUU; Pacific Area Net — W7AFP.

Regional Nets: 1RN — W1BVR; 2RN — W2LPJ; 3RN — W3NRE; 4RN — W4BVE; RN5 — W4OGG; RN6 — W6ZRJ; RN7 — VE7ASR; 8RN — W8DSX; 9RN — W4KKW; TEN (Tenth Regional Net) — W0DQL; TRN (Thirteenth Regional Net) — VE3GI. The Eleventh and Twelfth Regional Nets have never materialized, being originally intended for the Mountain Area. These nets were absorbed into the Seventh and Sixth Regional Nets respectively and report into the Pacific Area Net.

Transcontinental Corps: Eastern Area Director — W8UPB; Central Area Director — W9JUU; Pacific Area Director — W6HC (until September 30th).

Maine and W. Mass. made perfect attendance in 1RN during June. W4OGG reports that morning sessions (0600 CST, 3645 kc., Mon. through Sat.) are still going strong. RN6 has good representation from California sections, not so good from others; a very fine RN6 Bulletin was issued in July. W9DO reported his eleven sessions of 9RN, and is filling in until new manager W4KKW takes hold. TEN conducts a session at 1700 CST in addition to the regular sessions at 1945 and 2130. VE3GI reports that VE2DR is holding down Quebec representation to TRN single handed, that Maritimes coverage is very spotty, and that the use of 7070 kc. has been dropped as of August 1st.

W6HC indicates that the following TCC stations submitted reports for June: W0KQD, W7CCL, K6BDF, W6ADB, VE7QC, K0VBB, W6IPW. Total traffic reported amounted to 189. Many TCC stations are off for vacations. W6HC announces his resignation as TCC Director effective September 30th due to the pressure of other business.

BRASS POUNDERS LEAGUE

winner of BPL Certificates for June traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3WIQ	195	904	1021	73	2193
W3CUL	61	644	509	117	1331
W9NZZ	300	464	2	458	1224
W0CPI	24	579	512	67	1182
W3VYJ	67	533	494	36	1130
W7PGY	14	546	523	23	1106
W7BA	11	546	529	16	1102
W0BDR	62	519	485	7	1073
W0PZO	0	452	442	8	902
W0NSA	15	453	432	1	901
W4FFC	5	450	420	15	890
W9DO	13	359	315	47	734
W7VAZ	3	356	332	24	715
K4AKP	8	301	279	23	611
W9TT	1	294	250	0	545
W0GAR	11	248	250	9	518
W6PTX	50	234	232	1	517
W4PJJ	4	256	230	26	516
W3WV	7	268	206	34	515
W4OGG	11	248	237	5	501

More-Than-One-Operator-Stations

W4CTJ	20	2160	1940	240	4360
W6IAB	37	1272	1199	73	2581
W6YDK	32	741	689	52	1544
K5FFA	34	236	241	9	520
Late Reports:					
K5FHU (May)	10	587	511	11	1119
KRFUJ (May)	103	328	311	17	759

RPL for 100 or more originations-plus deliveries:

K4ASU	184	W0RLQ	108	W1CDX	101
W4PIM	142	V06AH	108	Late Reports:	
W9VEY	132	W0BW	107	V0EDPO (May)	120
KP4WT	113	W4HDR	105	W0YVC (Mar.)	114
W6MBW	111	W4KKW	103	W0NNU (May)	112

RPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: K2BJB, W3WG, W4COU, W4HDR, W8DAE, W0PZO.

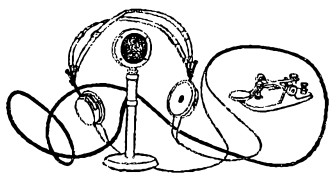
The BPL is open to all amateurs in the United States, Canada, Cuba, and U. S. possessions who report to their SCM a message total of 500 or more, or 100 or more originations-plus-deliveries for any calendar month. All messages must be handled on amateur frequencies, within 48 hours of receipt, in standard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

HOBBY SURVEY

In a recent ARRL field organization survey asking about "any other hobbies" and "your favorite contest," answers came from all classes of appointees. Results apply in the main to the field organization group, of course. The typical appointee-operator has an input of 236 watts and operates 43 hours per month. His interest in broad terms shapes up as follows: 30% traffic, 30% rag chewing, 22.3% DX, 17.7% construction.

Favorite contest? Looking at the "big four" in ARRL affairs it came out like this: SS 40.4%, FD 31.9%, DX Competition 19%, V.H.F. SS 8.7%. The one favorite band? 30 got 68% of the votes, 40 got 15%. Looked at from the standpoint of all-band use the bands looked as follows: 160 2.2%, 80 38.7%, 40 20.5%, 20 18%, 15 5%, 11 4%, 10 6.6%, 6 1.7%, 2-and-above 6.9%. Half the gang used two favorite bands most of the time. Over a quarter of the gang have just one favorite band. Few use over three bands. 25% had emergency power for a home emergency station; 37% had mobiles. Answers about interests included such expressions as "What other hobby could there be?" "Are you kidding?" "Who could afford another?" "No favorite contest. I love 'em all." 20% insisted there could be no other hobby interest than amateur radio. But this group was outnumbered by those with other interests.

It is said that a man is fully alive only in proportion to his interests. There is a lot in that view but we amateurs have very little to worry about . . . to judge from the survey of other hobbies. We found over 100 hobbies listed by name! No indication of hobby-time for these other things was indicated. However, a variety in interests, the balanced life our *Amateur Code* indicates is by most standards rich in the things that make for contrast and triumphant living values. Seventy percent of our gang engage in five most popular additional hobbies among the one hundred: (1) photography 32%; (2) fishing 9.7%; (3) music 7%; (4) stamps 6.6%; (5) hi-fi 5.8%. Others run the gamut from bird watching and skin diving to breeding ponies, raising parakeets, canaries, tropical fish, dogs, keeping bees and building models. There's hardly anything amateurs don't do when it comes to other hobbies, too!



IN February of this year we made our first appearance on this page. In the intervening months we have tried through this means to open the doors of Hallicrafters engineering laboratories to thousands of hams throughout the world. We hope we have been of service to you in the growing field of single sideband with articles on receivers, exciters and amplifiers. As the world's largest manufacturer of ham equipment, we will continue to cover these and other technical subjects in the future.

BUT let's look back for a moment on what has happened in the way of product development since February. We introduced the SX-96 with selectable sideband which promises to be the most popular medium priced receiver ever produced. In recent months the HT-31 linear amplifier made its appearance, giving "talk power" equivalent to a kilowatt of AM in a compact, table-top package.

OTHER new and exciting products have been engineered for you, the hams.

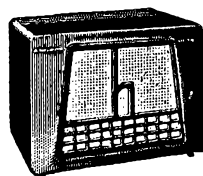
AN extremely stable filter-type AM-CW-SSB transmitter/exciter (model HT-30) will be available soon. A new receiver (model SX-100) incorporating the highlights of the SX-96 — and then some — is in production. A complete, highly styled console made up of the HT-30, HT-31 and SX-100 — ready to operate — is planned for later this fall.

IMMEDIATELY available for ham, novice and short-wave listeners are popular receivers like the S-38D, S-53A, S-85, SX-99 and SX-62A. For industrial, emergency and Civil Defense use we have the low cost S-94 and S-95 FM receivers as well as our deluxe "Littlefone" two-way radio telephones.

THE parade of new products will continue in 1956; but in this brief report we wanted to keep you posted on our plans for the immediate months to come. We hope that your plans will include Hallicrafters equipment.

Birdall Halligan, Jr. *W. J. Halligan W9AC*

for **hallicrafters**





New

Heathkit VFO KIT

MODEL VF-1

\$1950

Ship. Wt. 7 lbs.

- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OAZ voltage regulator.
- 10 Volt average output on fundamental frequencies.
- 7 Band calibration, 160 through 10 meters, from 3 basic oscillator frequencies.

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 milli. 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 1/2" crystal holder. Construction is simple and wiring is easy.

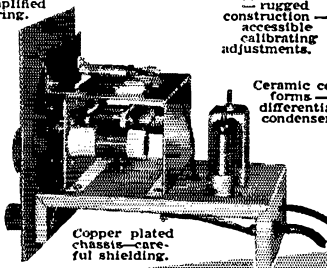
Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical

Open layout—easy to build—simplified wiring.

Smooth acting illuminated dial drive.

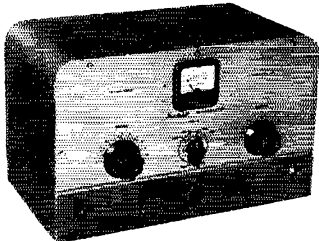
Clean appearance—rugged construction—accessible calibrating adjustments.

Ceramic coil forms—differential condenser.



Copper plated chassis—careful shielding.

Heathkit AMATEUR TRANSMITTER KIT



MODEL AT-1

\$2950

Ship. Wt. 16 lbs.

SPECIFICATIONS:

Range 80, 40, 20, 15, 11, 10 meters.
 6AG7 Oscillator-multiplier.
 6L6 Amplifier-doubler
 6U4G Rectifier
 105-125 Volt A.C. 50-60 cycles 100 watts. Size: 8 1/8 inch high x 13 1/2 inch wide x 7 inch deep.

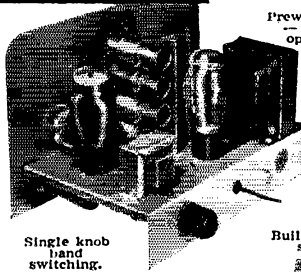
Crystal or VFO excitation.

Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporating 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.

Rugged, clean construction.

Prewound coils—metered operation.

52 ohm coaxial output.



Single knob and switching.

Built-in power supply.

Heathkit COMMUNICATIONS RECEIVER KIT

Four band operation 535 to 35 Mc.

Six tube transformer operation.

SPECIFICATIONS:

Range.....535 Kc to 35 Mc
 12BE6 Mixer-oscillator
 12A6 I. F. Amplifier
 12AV8 Detector—AVC—audio
 12BA6 B. F. O. oscillator
 12AG Beam power output
 5Y3GT Rectifier
 105-125 volts A.C. 50-60 cycles, 45 watts.

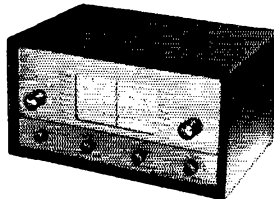
Stable BFO oscillator circuit.

Electrical bandspread and scale.

RF gain control with AVC or M.V.C.

5 1/2 inch PM Speaker-Headphone Jack.

Noise limiter—standby switch.



MODEL AR-2

\$2550

Ship. Wt. 12 lbs.

CABINET:

Proxylon impregnated fabric covered plywood cabinet. Ship. weight 7 lbs. Number 91-10, \$4.50.

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 LF 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.

HEATH COMPANY
 BENTON HARBOR 9, MICHIGAN

New HEATHKIT DX-100

PHONE AND CW TRANSMITTER KIT



MODEL DX-100

Shpg. Wt. 120 lbs.

\$189.50

Shipped motor freight unless otherwise specified. \$50.00 deposit with C.O.D. orders.

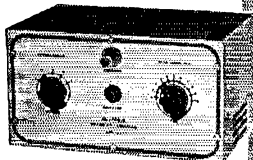
- R.F. output 100 watts Phone, 125 watts CW.
- Built-in VFO, modulator, power supplies. Kit includes all components, tubes, cabinet and detailed construction manual.
- Crystal or VFO operation (crystals not included with kit).
- Pi network output, matches 50-600 ohms non-reactive load. Reduces harmonic output.
- Treated for TVI suppression by extensive shielding and filtering.
- Single knob bandswitching, 160 meters through 10 meters.
- Pre-punched chassis, well illustrated construction manual, high quality components used throughout—sturdy mechanical assembly.

This modern-design Transmitter has its own VFO and plate-modulator built in to provide CW or phone operation from 160 meters through 10 meters. It is TVI suppressed, with all incoming and out-going circuits filtered, plenty of shielding, and strong metal cabinet with interlocking seams. Uses pi network interstage and output coupling. R.F. output 100 watts phone, 125 watts CW. Switch-selection of VFO or 4 crystals (crystals not included).

Incorporates high quality features not expected at this price level. Copper plated chassis—wide-spaced tuning capacitors — excellent quality components throughout—illuminated VFO dial and meter face—remote socket for connection of external switch or control of an external antenna relay. Preformed wiring harness—concentric control shafts. Plenty of step-by-step instructions and pictorial diagrams.

All power supplies built-in. Covers 160, 80, 40, 20, 15, 11 and 10 meters with single-knob bandswitching. Panel meter reads Driver Ip, Final Ig, Ip, and Ep, and Modulator Ip. Uses 6AU6 VFO, 12BY7 Xtal osc.-buffer, 5763 driver, and parallel 6146 final. 12AX7 speech amp., 12BY7 driver, push-pull 1625 modulators. Power supplies use 5V4 low voltage rect., 6AL5 bias rect., 0A2 VFO voltage reg., (2) 5R4GY hi voltage rect., and 6AQ5 clamp tube. R.F. output to coax. connector. Overall dimensions 20 3/4" W x 13 3/4" H x 16" D.

Heathkit ANTENNA COUPLER KIT

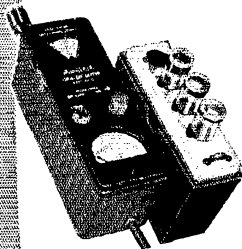


MODEL AC-1

\$14.50 Shpg. Wt. 4 lbs.

Poor matching allows valuable communications energy to be lost. The Model AC-1 will properly match your low power transmitter to an end-fed long wire antenna. Also attenuates signals above 36 Mc, reducing TVI. 52 ohm coax. input—power up to 75 watts—10 through 80 meters—tapped inductor and variable condenser—neon RF indicator—copper plated chassis and high quality components.

Heathkit GRID DIP METER KIT



MODEL GD-1B

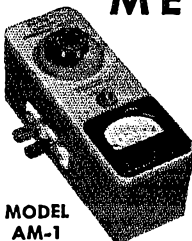
\$19.50 Shpg. Wt. 4 lbs.

The invaluable instrument for all Hams. Numerous applications such as pretuning, neutralization, locating parasites, correcting TVI, adjusting antennas, design procedures, etc. Receiver applications include measuring C, L and Q of components—determining RF circuit resonant frequencies.

Covers 80, 40, 20, 11, 10, 6, 2, and 1 1/2 meter Ham bands. Complete frequency coverage from 2—250 Mc, using ready-wound plug-in coils provided with the kit. Accessory coil kit, Part 341-A at \$3.00 extends low frequency range to 350 Kc. Dial correlation curves furnished.

Compact construction, one hand operation, AC transformer operated, variable sensitivity control, thumb wheel drive, and direct reading calibrations. Precalibrated dial with additional blank dials for individual calibration. You'll like the ready convenience and smart appearance of this kit with its baked enamel panel and crackle finish cabinet.

Heathkit ANTENNA IMPEDANCE METER KIT



MODEL AM-1

\$14.50 Shpg. Wt. 2 lbs.

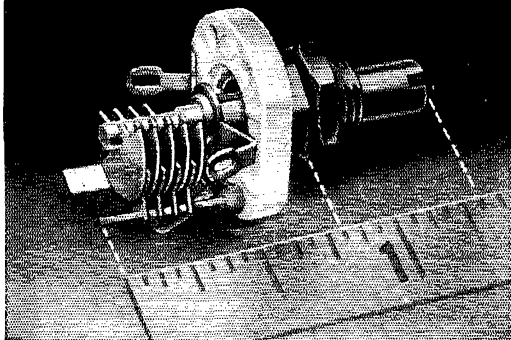
Use the Model AM-1 in conjunction with a signal source for measuring antenna impedance, line matching purposes, adjustment of beam and mobile antennas, and to insure proper impedance match for optimum overall system operation. Will double, also, as a phone monitor or relative field strength indicator.

100 μ a. meter employed. Covers the range from 0 to 600 ohms. Cabinet is only 7" long, 2 1/4" wide, and 3 3/4" deep. An instrument of many uses for the amateur.

HEATH COMPANY

A SUBSIDIARY OF DAYSTROM, INC.
BENTON HARBOR 9, MICHIGAN

"LITTLE MAC" does a big job!



Ideal trimmer for VHF range

To keep pace with the continuing efforts of the electronic industry toward miniaturization of components, Hammarlund has introduced a tiny variable capacitor, type "MAC". This component provides the low minimum capacity essential for use as a trimmer in the VHF range.

The silicone-treated base is only $\frac{3}{4}$ x $\frac{5}{8}$ inches. Its rotor and stator are soldered assemblies of brass, nickel-plated for low losses, while the wiper rotor contact is nickel-plated beryllium-copper. Rotor and stator terminals are positioned to permit short leads. A threaded bearing is provided with flat sides to permit single-hole mounting without turning.

The new units are available to fulfill capacity requirements between 1.4 and 19.6 mmf. Try one in your next piece of gear.



If you haven't received your copy of the Capacitor Catalog, write to The Hammarlund Mfg. Co., Inc., 460 W. 34th St., New York 1, N. Y. Ask for Bulletin C9

HAMMARLUND

(Continued from page 74)

K2DVC, secy.; TON, treas. "Gadget Nite" was held by the KBT Club. SJV spoke at an RAWNT meeting on AREC and c.d. The RARA V.H.F. meeting was held at the QTH of UXP. New officers are K2CEH, chairman; BCL, vice-chairman; ZS, secy. The SRPN picnic was held at Schoharie with NAI in charge of arrangements and prizes. FCD is going overseas with the AF. New officers of the Watertown ARC are K2GWN, pres.; FDI, vice-pres.; KN2JDE secy.; K2DUO, treas. The Club was commended highly by the c.d. director on its participation in the recent c.d. test. All members are in RACES. K2DVC, EC and RO for Genesee County, reports the C.D. Director, Mr. Clemt, was pleased and impressed with their work in the c.d. test. All amateurs should make a special effort to obtain newspaper publicity in such matters, keeping Amateur Radio for Public Service before the public. The XYL of GBX received the call KN2OBX. K2GVJ set up a B&W for demonstration in communications for the local 6th graders. KN2ORF is a sergeant in the AF. EMW renewed as ORS. The Syracuse V.H.F. Club received nice publicity in the *Syracuse Herald-Journal* for Field Day activity. K2K1R is interested in getting a teen-age net going on 3720 kc. Contact Junior on that frequency. OWF, ILQ, HWC, SNI, UTH, and K2CEH are quite active on 6 meters. Traffic: W2RUF 333, ZRC 191, K2AMZ 126, OE 53, ZLT 42, GBX 36, HKA 36, DSR 34, RUT 27, FEB 20, SJV 17, DSS 14, WS 10, K2K1R 4.

WESTERN PENNSYLVANIA—SCM, R. M. Heck, W3NCD—SEC: GEG, RMA: UHN, NUG, NRE, and GEG. PAMs: AER and VKD. UJP reports the Breeze Shooters Handfest was a success with 358 hams registering, plus the XYLs, SWLs, and jr. operators. The prizes were all given out, with 81QT, 2NCP, NJO, and MWG getting away with the main ones. The lectures, books, and other entertainment moved smoothly. JT entertained W0ENQ. ZUS now has a VFO. The BSN ground-wave contest unofficially reports 22 logs, 89 contacts, 180 miles, DX between VWA and 8RVU. VEK recently was discharged from the Army. Sixty-six hams participated in the Allegheny County C.D. Drill. One net control completely mobile was PIQ/3. UHM and OUA are working on Scott Township C.D. ZDW is working DX on 20 meters. OKU is a.s.b. on 40 meters. The 2- and 6-meter beams are up at the SCARC's KWH. VKD had as visitors KA2DV, F7CV, 8DQ, and UHN. The Indiana ARC was in Field Day with about 40 hams operating BMD/3 all bands at 60 watts making 320 QSOs. BRC is heard on 20-meter phone. From RAE: YXE dropped the "N" from his call and joined the 10-meter net. YKE was first in Erie with a DX-100 aired. WDK is getting nice signals from his also. The Erie Novice Net is set up by WN3ZNY Sun. at 1:00 p.m. on 3705 kc. SUK now is on 50 Mc. with 100 watts and a four-element beam. 81JG reports the SUK 220-Mc. n.f.m. signals get through the QRM better than his a.m. Some 50-Mc. QSOs from Burgettstown were 5HEZ, 4FBL, 0MUG, and VE1EF. SUK is a new QES in the section. Traffic: W3WVQ 2193, UHN 25, KNQ 12, VKD 7, KUN 6, UTR 6, NCD 5.

CENTRAL DIVISION

ILLINOIS—SCM, George T. Schreiber, W9YIX—SEC: HOA, RMA: BUK and MRQ, PAM: UQT, Cook County EC: HPG. Section nets: IEN phone, 3940 kc.; ILN v.w., 3515 kc. New Novice calls heard are AGU, RSY, UGA, and YCF. New General Class licenses are OEP and PND. Congratulations to the Elgin Radio Amateur Service Club and the Peoria-Area Amateur Radio Club on their affiliation with ARRL. MZW, formerly of Herbert, has bought a new home in Rockford. The St. Clair Amateur Radio Club really is going great guns in c.d. work, conducting drills weekly, planned by Novice RSY. MKN is back on mobile. JSQ checks in a MARS Net each Tue. night and then dashes madly to St. Louis to attend Naval Reserve drill. UWP is punching holes in the ionosphere with his new Elmac. KCV soon will be operating with a foreign call, per Uncle Sam's orders. BA writes a newsy letter on doings downstate; we wish we had space to reproduce in full. HPG was the only OO in the section to participate in the May F.M.T. What's the matter, NN and PBI? PHE is back on the air after extensive repairs. The CWC Amateur Radio Club is interested in c.d. work and is trying to work out a program with HOA, the Section Emergency Coördinator. KCW reports that during the recent c.d. test, 47 stations checked into the Watch Dog Net on 2 meters. BPU enjoys tuning his new Collins receiver and using his 10-16-20 beam. KLD has a new 829B final for 2 meters. NKR skeds Greenland daily on 20 meters. QGO and FHK returned from W6-Land. SKR's latest project is a grounded-grid amplifier using an 837. NIU is happy he had to overhaul the SRRC Field Day generator only once during the session. Are you more than 50 years old? Then you are eligible for the 3940 Over The Hill Club. Ask V SX. GDI is back to the air waves, having gotten fishing out of his system for the year, but GAS brags he has not been on the air for a year because of the same sport. VEY has a radio family. His son is EZA and his daughter recently was licensed as KN6AMD. Evidently Field Day in the section was a big success. We received Field Day messages from fifteen stations, all operating portable in the test.

(Continued on page 80)

After three years engineering and design time...

The NEW

PRO-310



Three years ago, Hammarlund set out to design and build an amateur receiver that would provide absolutely the last word in performance. And here it is—the NEW Pro-310.

This rig was designed with performance in mind. We've not cut corners. Frequency readings can be read to 1 part in 5000; the band-spread can be continuously calibrated over the entire range; it is exceptionally stable; construction is sectionalized; and many other features

are built in to give one thing—top performance.

If you've longed for a receiver that's as modern as this minute, you want a new Pro-310. Look it over at your dealers'. If he doesn't have one now, he'll be getting his stock soon. Get specs and other information either from him or by writing The Hammarlund Manufacturing Co., 460 West 34th Street, New York 1, N.Y. Ask for Bulletin R-9.



HAMMARLUND

Since 1910

DAKOTA DIVISION

They are ABI, BA, DNN, DOP, HKA, IAW, NOZ, NZ, PCS, QLZ, TBP, THT, VSX, WJF, and YHP. If your station is not listed above, get after the chap you relayed to. Comes the cooler weather we are going to make an attempt to bring leadership appointments up to date. Please look at the dates on your certificates and if old, mail to your SCM for authentication. Traffic: (June) W9DO 734, CSW 183, VEY 144, BUK 109, YIX 52, VUID 44, CTZ 42, KLD 40, VSX 36, SME 32, LXJ 26, QQG 25, CZB 23, CEE 22, MRQ 19, VER 11, LL 9, BPU 6, BA 4, PIE 3, OR 2, JMC 1. (May) W9VER 26.

INDIANA—SCM, George H. Graue, W9BKJ—A state-wide contest sponsored by the Indiana Radio Club Council (IRCC) was partly responsible for the large club station activity in Field Day. A plaque goes to the winner. Field Day messages addressed to the SCM were received from AB/9, EIV/9, GHA/9, HSP/9, KOY/9, LDT/9, PRD/9, REG/9, RNC/9, UC/9, and UPJ/9. CAREN reports 20 sessions with traffic of 29. WWT reports RFN traffic of 197. NTA reports for IFN with a traffic total of 335. Brass Pounders for the month are NZZ and TT. KLR has moved and is active again on 2 meters. JYQ has an s.s.b. exciter. New at East Chicago is N9AJY, the XYL of IBZ. NNT is in the hospital. VPJ has a new Hallcrafters. ELR is helping Novices prepare for the General Class exam. New at Kewanna are N9ADN, ADP, and AII. New at Plymouth are N9AGF and AGG. CEA had a big write-up in the Wabaah paper pertaining to his EC work. CKR is convalescing. BRM is off to serve Uncle Sam. HRH is leaving Evansville. FHU received his DXCC. The TARS furnished communications for the Eagles Parade. Assisting were BRN, WQC, ABW, HKKT, AML, and RYM, all on 29.6-Mc. mobile. Our PAM, NTA, reports the following stations logged on Operation Alert in this section: AAY, AB, AQR, ASX, AYP, CBR, CC, CDW, CEA, CMT, CTF, DFW, DOK, JPT, DUD, EAE, EGQ, EHZ, ELR, EQO, GRN, HSG, JJC, JLG, JWI, JYO, KDV, LIT, LZJ, MDC, NSY, NTA, PAS, PMT, PRO, PUF, QAD, QYQ, RJJ, RGS, SAT, UB, UMS, UOQ, VNG, VNV, VSH, WBH, WHL, WRO, YE, YVS, ZKW, ZRP, and ZTN. EGQ, LZJ, and VSH are cited for outstanding work on this test. Vigo County has a 50-watt link unit as net control on 50.58 Mc. and 15 mobiles that do frequently. NH is keeping a weekly schedule with his brother 4G7K. AQR has moved to Tipton. DKR has a 9-watt mobile. N9AKE is new in Jeffersonville. APW has a new rig and antenna. WWT reports that RFN handled 81 pieces of traffic, making a total of 313 pieces of traffic handled by IFN and RFN on the c.d. test. WAU has a DX-100. WTY has a Viking II. UQP has a 1-watt that gets out. Ye editor of *Ham News* visited NZZ, BKJ, and CLF. AB has the RC-610 working again and is on IFN regularly. Traffic: (June) W9NZZ 1234, TT 545, WWT 212, UQP 142, AB 136, CTF 105, TQC 103, EHZ 100, NTA 96, ZYK 88, WRO 76, JBQ 72, QYQ 72, WBA 50, BKJ 44, LIT 44, STC 43, EQO 37, VNV 31, PQA 26, JYQ 25, SVL 23, CMT 19, ZIB 19, CC 17, HRY 17, QR 16, AQR 10, DKR 10, DOK 10, ALL 8, AZF 8, GDL 5, BDP 4, NH 4, FGX 3, YVS 3, HSG 2, UWU 1. (May) W9AB 34.

WISCONSIN—SCM, Reno W. Goetsch, W9RQM—SEC: OVO. PAMs: ESJ and GMY. RMs: IXA and RTP. Nets: WIN, 3685 kc., 7 P.M. daily; BEN, 3950 kc., 6 P.M. daily; WPN, 3950 kc., 1215 Mon.—Sat., 0930 Sun. Wisconsin Mobile and c.d. frequency: 29.620 kc. UTV renewed ORS appointment and is on with a Viking Ranger. RQK has been doing some c.w. work this summer. New officers of the Fond du Lac Mike & Key Club are: LUQ, pres.; DIA, vice-pres.; VJK, secy.-treas. DIK got Nevada to complete his WAS. 7ZHT (ex-9KJM), now in Nevada, was back in Wisconsin during his vacation. IIB is designing a new high-power mobile. The BEN picnic was held at Waterloo July 10th. Some choice DX worked by RKP includes 4X4DF, OY2Z, SUIIG, ZM6AS and CT2BO. CCO is in the market for some mobile gear. WLW has a new Viking KW on the air. The Polecat Net Picnic was held at Green Lake June 12th. IJU is building 144-Mc. equipment. WN9UMK is building 144-Mc. converter. Rhineland was host for the July meeting of WVRA (Wausau). We regret to report UIM as a silent key. QCH received his WAS certificate, and is busy on 4-Mc. s.s.b. with a 10A and Viking II. BNC is on 7-Mc. c.w. from his new trailer house. JEF, with 90 watts on 'phone and 200 watts on c.w., needs only Arizona for WAS. ANA can be heard from Yuma, Ariz., on 14.235 kc. YWI has a new SX-96. The mobiles of RBI, PYE, TRU, HMG, and IHB were active in the June C.D. Test with UTV, UGT, and MQK at the control station. A net certificate (WPN) was issued to SJL. Active in Field Day: SWQ, Madison; AIQ, Sturgeon Bay; HRM, Milwaukee; NUW, Wausau; SLT and ZGW, Eau Claire; RQQ, Crandon; UDU, Racine; DIK, Fond du Lac; DSP, Chippewa Falls; RQN, Superior; BXM, Marshfield; TCH, Beaver Dam. Weekly drills for stations licensed in the Wisconsin RACES net are held at 8 a.m. All ECs are requested to secure full participation in this activity. See you at the Central Division Convention, So. Bend, Ind., Oct. 15-16. Traffic: W9CXY 392, SAA 125, UTV 83, YZA 36, NUW 30, GMY 24, RQK 19, RQM 18, DIK 7, AJU 5, CCO 3, RKP 3, IJU 2, MUM 2, WN9UMK 2, W9WLW 2, IAL 1.

SOUTH DAKOTA—SCM, J. W. Sikorski, W0RRN—Asst. SCMs: Earl Shirley, 0YQR, and Martha Shirley, 0ZWL. SEC: GCP. PAMs: GDE, BNA, NEO, and PRL. RM: SMV. LXJ has moved from Sisseton to Centerville and will be in business with his father. Incomplete reports indicate that more South Dakota stations operated in Field Day than in any previous contest. SCT now is a member of AF MARS. RRN and family vacationed in Indiana and Illinois. NAB and BJH have built 6-meter mobiles. Net reports: C.W. Net, 13 sessions, 82 QNT, QTC 43; 75-Net, average QNI 31, average daily QTC 6. NAB has a new daughter. Very few reports were received this month. Please help out your new SCM, Les Price, WLP, Hermosa, and keep him notified of all your ham activities. This will be the last station activities from RRN, and again I want to thank all of you who have helped in the past several years. See you in Yankton in September. Traffic: (June) W0GDE 59, SMV 53, SCT 38, PIIR 17, RSP 12, RQI 9. (May) W0WBW 6.

MINNESOTA—SCM, Charles M. Boye, W0MXX—Asst. SCMs: Vince Smythe, 00GGQ, SEC: GTX. RMs: DQL and KLG. PAMs: JIE and UCW. Don't forget Sept. 9th to Sept. 11th, the dates of the Second Annual 10,000 Lakes QSO Party. Sponsored by the Minneapolis and St. Paul Radio Clubs to enable Minnesota hams to get better acquainted with each other, the party is open to all amateur radio operators to encourage everyone to make new friendships in Minnesota. Another gold cup was given to the most deserving amateur station in Minnesota. This cup is given annually by the Minneapolis Radio Club and is known as the Forrest Bryant W9FDS Award. The cup was awarded to AUI for his outstanding contribution to ham radio. As mentioned before, all amateurs in Minnesota are eligible to compete for this cup. All you have to do is write a letter to the secretary of the Minneapolis Radio Club giving the name of the ham you think is the most deserving and stating the outstanding contributions he or she has given to amateur radio. HFY is on the air with a pair of 6146s and a new antenna. VBS worked 21 countries on 40-meter c.w. in 5 months. OGH is building a receiver and experimenting with remote controls using transistors. KXC is back from Nevada after working with the A.P.C. WZZ worked New York on his first contact after getting his license. Gordie Simon's code class has produced two more Novices, BIT and BFU. Four Novices who have just received their General Class licenses are VRK, WDW, WZZ, and AIK. AZC is a new Novice. SYD is mobile. TYX is teaching 7 students code and theory. SYD is operating a station for the Boy Scouts. URQ and KJZ attended the Dakota Division Convention in North Dakota and had a wonderful time. Traffic: W0KLG 281, HFY 189, RLQ 146, TUS 135, KJZ 106, WMA 83, LST 82, MBD 73, QDP 73, UOJ 66, WVO 55, TKX 54, LUX 52, GTX 44, UCW 38, BUO 31, NJZ 27, RVO 26, VRK 24, GGQ 23, IRJ 23, NTV 21, FCU 15, RLI 14, VEP 13, AFP 11, ZBL 11, OJG 7, MXC 6, OPA 6, SYD 5, QVR 4, HTT 3.

MINNESOTA (10,000 LAKES) QSO PARTY

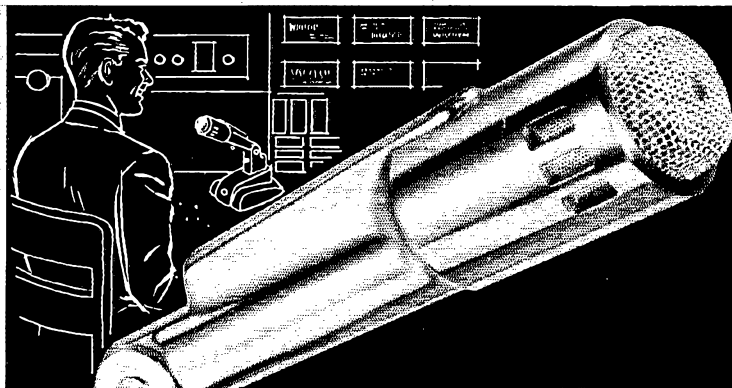
Sept. 9 (1900 CST) to Sept. 11 (2400 CST)

Sponsored by the Minneapolis & St. Paul Radio Clubs to enable Minnesota hams to get better acquainted with each other. The party is open to all amateur radio operators to encourage everyone to make new friendships in Minnesota. Rules: (1) Exchange signal report, city and state. (2) Any and all bands and any type of emission may be used. We suggest 3820 and 7220 kc. for 'phone, 3650 and 7050 kc. for c.w. (3) Scoring: (a) Minnesota stations, 10 points for each contact with another Minnesota station, 5 points for each contact outside Minnesota; multiply by the number of states, provinces and foreign countries worked. (b) Stations outside Minnesota, 50 points for each contact with a Minnesota station; multiply by the number of Minnesota cities or towns worked. (c) A station may be worked only once for scoring credit. (d) No time limits or power multipliers. (4) Awards: (a) Certificates to 3 highest Minnesota scorers, and for highest score from each state, province and foreign country. (b) Separate awards for Novices. (c) Separate awards for all V.H.F. scores. (5) Submit logs to: Contest, P. O. Box 512, St. Paul, Minn., before October 1, 1955. All entrants will receive complete results by direct mail.

DELTA DIVISION

ARKANSAS—Owen G. Mahaffey, W5FMF—The OZK C.W. Net will take a vacation during the summer and will start again the first Monday in September with SKM in charge. Your SCM had the pleasure of attending the South East Arkansas Amateur Radio Club Hamfest in Pine
(Continued on page 82)

If you operate 'phone YOU WON'T BE SATISFIED UNTIL YOU OWN



the completely new
664 VARIABLE D*
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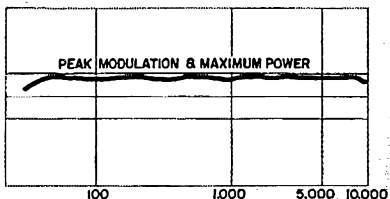
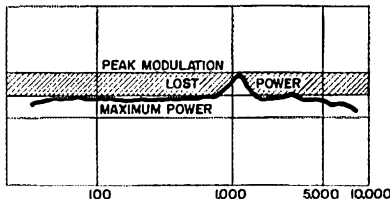
The 664 will equal a useful power increase of four times over commonly-used peaked microphones, and could well be the best investment, dollar-wise, in your shack

Here is a totally new concept in microphones for amateur phone communication.

The cardioid (high directivity at all frequencies) pickup pattern enables you to have a *real* "arm chair QSO." The forward gain of 5 db** allows you to speak at nearly twice the distance you have been working to a conventional microphone. Unwanted sounds in the shack are rejected nearly twice as effectively as by ordinarily-used non-directional microphones.

The response curve is tailored to put the highest degree of intelligibility on your carrier. Your 100% modulation is all speech . . . in full character . . . with bite and punch. This curve, compared to ordinary microphones, will give you up to 12 db more usable audio—without splatter or hash.

We invite you to prove to yourself that the 664 will outperform your present mike by a direct comparison. If it doesn't out-hurdle QRM, your distributor will refund the purchase price without qualification.



A peak in the response curve limits modulation to the peak value. A peak-free response brings the full power level to 100% modulation gaining an intelligibility increase equal to the peak in the average mike. The 664 is peak-free and gives the highest usable power of any microphone for AM, NFM and SSB.

New Variable D* Dynamic Microphone operates on the principle of multiple sound paths to the diaphragm. Spaced apertures to the rear of the diaphragm are phased to provide cancellation of rear sounds and give full response to sound from the front.

This new principle enables the curve to be free from peaks or dips. Insures freedom of blasting and boominess from close talking. Eliminates effect from mechanical shock. High level --55 db. Acoustalloy diaphragm. Switch easily changed to relay control, if desired. Absolutely unaffected by moisture, humidity, or temperature.

Model 664. Without Stand.....Net Price: \$47.70
 Model 419. Desk Stand.....Net: 9.00

**Forward gain is that compared to a pressure mike; actual front-to-back hemisphere pick-up ratio is 20 db.

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Bluff. There were about 125 present and several nice prizes were awarded. There was some good entertainment, plenty to eat and everyone had a good time. Several official appointments were made. On returning home I met with the Fort Smith Amateur Radio Club in a pre-arranged special meeting where some urgently-needed appointments were made. As there will not be a Division Convention this year I would like to meet with other clubs in the State. Appointments made in June: HNU, PZR, and ANR as ECs; VTZ, JWL and EUQ as OOs; VAN, VYM, and EUQ as OBSs; IWE, VAN, WUM, NKH, VAA, DYS, UEC, VYM, and ZII as OPSs. Traffic: W5CAF 82, JZL 2, PX 2.

LOUISIANA — SCM, Thomas J. Morgavi, W5FMO — Operation Alert 1955 brought out the SCM, SEC, 10 ECs, and 69 operators, mostly AREC members, in 7 major localities and a score of smaller communities, in support of the state civil defense operation. All in all, the final station tabulation looked like many of the Delta Net came in and took over for the 26 hours. IUG is to be commended for his efforts. Baton Rouge and Istrouma ARC met jointly in welcoming 1BDI on June 13th and the New Orleans group was host to Ed on June 17th. The topics were ARRL matters and amateur activities in general. DHW got his General Class license and is active on 'phone. DTM is a new ham in Lake Charles. WEO is in Lake Charles for the summer months. VRO, in Goose Bay, Labrador, is waiting for his Globe King to arrive to get on the air. ZAP has a B&W 5100 a.m. transmitter with a B&W 51SB sileband generator. He also is going mobile with a 75-meter rig in a '55 Pontiac convertible. After being off the air for a spell, GMR is back on 75 meters with a kw. VIC's harmonic now has his own call, KNSAUB. YSN meets BREN and the RN5 C.W. Net. The Greater New Orleans ARC is sponsoring another Labor Day "Week End in Old New Orleans." Write to Box 13003 and plan to attend this gala affair. K5FFA makes BPL alert. Let's get some reports in. This column needs your help. Traffic: K5FFA 520, W5MXQ 152, EA 71, NDV 70, VIC 58, FMO 8.

MISSISSIPPI — SCM, Julian G. Blakely, W5WZY — Operation Alert was successful with 50 stations taking part. KYC was NCS, with ART as alternate. Operations were carried on continuously for 12 hours. Out-of-section outlets were obtained and the press wires were "scooped" on every important development. Stations making "OA" a success were KYC, ART, IHP/M, PFC, WQE, YR, BTM, CPL, VME, UTK, EWE, DAT, WZY, WZZ, NFO, GDW, FES, ZZV, KHB, LRG/M, IZS, VTI, WBO, CAG, TDO/M, UJK, UK, SQU, SFC, EGU, HCW, TVW, BJR, K5ANK, BYG, UTM, TAK, SRJ, WMO, TXK/4, ANK, BCU, ZBC/5, TIE, AKM, PCD, 4MEF, and K4WDU. During the above operation PFC and other Jackson stations participated in a city-wide alert called by the c.d. 10 meters was used. WQE was liaison for the two nets. Our Communications Manager, 1BDI, paid a visit to the Jackson Radio Club. Many members from out of town were present and the meeting was enjoyed by all. The section turned out for Field Day with 5 clubs beating the air waves. K5FGJ/5 was in there, all bands, 30 watts, and nine operators. SRG/5 had eight operators, RRE/5 nine operators, TFF/5 five operators, and ZZZ/5 ten operators. Traffic: W5YFJ 105, JHS 58, EDE 21, BTM 20, DAT 11, WZY 8.

TENNESSEE — SCM, Harry C. Simpson, W4SCF — SEC: RRV, PAM; PFP, RM; WQW. The C.W. Net will reopen as you read this, and RM WQW sincerely requests your presence on the C.W. Net for the fall rush. It meets 3635 kc. 1900 CST Mon. through Sat. Your PAM, PFP, also requests more attendance on the Tennessee 'Phone Net, Mon.-Sat. 0645 CST, 3980 kc., plus Tue. and Thurs. at 1800 CST and Sun. at 0800. The Memphis Hamfest was a grand success, with 250 hams from 13 states. Guests included Ed Handy, ARRL Communications Mgr., and Captain Don Worth, 3rd Army Chief of MARS. Field Day was a success in this section also, with your SCM receiving reports from twelve club stations. PL, still recuperating, thanks his many friends for their letters, calls, and best wishes. The Bays Mountain Club plans a Work-All-States Party for a week-end outing. BCA, HUT, and SCF visited the Clarksville gang. WQT received a PS award, also won that Club's SS award. AEE reports approved RACES plans now include Chattanooga-Hamilton County (July 5), Tennessee State, Dresden-Weakley County, Memphis-Shelby County, and Knoxville-Knox County. IIB reports 6 meters was used very successfully in the Chattanooga Area during the recent c.d. alert. FLW reports a good workout for Weakley County in the same test, as did BAQ from the Memphis Area. UWA, in Kentucky for the summer, sends regards to his Tennessee friends. Traffic: (June) W4OGG 501, PQP 186, IIB 109, H1H 93, TZZ 93, WQT 91, WQW 81, YMB 49, VJ 42, SCF 40, FLW 38, SJ 34, ZBT 34, BAQ 26, UVP 17, UWA 15, CXY 12, AFD 10, HUT 9, K4BKX 8, W4HSX 6, BAO 4, DCH 4, FRB 4, STI 4, CLQ 3, KN4BNW 2, W4CTL 2, AEE 1. (May) W4TZD 110, UVP 42.

GREAT LAKES DIVISION

KENTUCKY — SCM, Robert E. Fields, W4SBI — SEC: CDA, RM; KKW. Acting PAM: NTZ. A large number of the Kentucky amateurs turned out for Field Day, the clubs turning in the highest scores and having the highest number of operators. Several Field Day messages were sent

to the SCM for a twenty-five (25) point credit. It sure is good to see so many working their gear with emergency power and operating conditions. Our next big day is the Lexington Hamfest Sept. 25th. CDA suggests that all Kentucky stations obtain copies of the ARRL Operating Manual and Emergency Communications Manual, free to ARRL members on request from either CDA or SBI. WNI is planning a 300-watt final for 2 meters. SBI now has an antenna up for 80 meters and hopes that it will work across the state line at least and also hopes to have a pair of 813s on before too long. JUI says he has a 13-year-old son interested in hamming who is up to 10 w.p.m. He also states that he is a real hard-boiled instructor. Traffic: W4KKW 182, QCD 165, ZIB 118, CDA 87, RPF 46, ZLK 40, ZDA 30, BZY 27, HSI 22, UWA/4 15, HOJ 14, SBI 14, WMF 14, SUD 10, SZB 9, KRC 8, IAY 6, JCN 6, JUI 4.

MICHIGAN — SCM, Thomas G. Mitchell, W8RAE — Asst. SCMs: Joe Beljan, 88CW (c.w.); Bob Cooper, 8AQA (phone), SEC: GJH. Activities seem to have hit the summer slump after a successful Field Day. Conditions have taken a toll on the traffic nets and the hot weather seems to have driven most of us outside. Judging from the Field Day activity noticed, there should be some new records this year. Despite the odds, many of the emergency nets seem to be functioning through the summer months as they well should. There is no new word from the SEC this month, but I am assured that he is continuing to work with the MOCD officials as mentioned in the last report. FGB reports that the call KQAA4 has been issued as a "Disaster Communications Service" for the St. Joseph-Benton Harbor Area and will be operated by Ground Observer Corps personnel. This station will use 1761.5 kc. (Ch. 9) and 1782.5 kc. (Ch. 12) for fixed and mobile work. This is the second such station authorization granted in Michigan. More details may be obtained from FGB. New officers ('55-'56) of the Catalpa Amateur Radio Society are: VVD, pres.; GBT, vice-pres.; UEO, rec. secy.; ELR, corr. secy. and treas. JKK says he needs some good dope on an 80-meter vertical antenna. Sounds like he is penned in. Anybody have any ideas for him? QIT sent some pictures of his neat basement shack and his magnesium three-element wide-spaced 20-meter rotary that weighs only 90 pounds. He should be ready for the DX openings that are starting. DUS is going after the DX business in an 8-9 manner. He is charting the CRPL information about two months in advance and it is most interesting to note the accuracy of the predictions. His stacked 10-, 15-, and 20-meter beams above the 120 feet of tower will be there when the times are right. PRL is eager to become active again and solicits word from those having good equipment available for sale. Traffic: (June) W8RUL 221, JYJ 124, ILP 109, MO 71, ZLK 50, DAP 40, RAE 40, NYC/8 84, FGB 33, IJL 33, GIX 30, SCW 27, IV 22, SJF 21, WXO 15, HSC 13, HKT 11, COW 10, PDF 10, SRK 8, DSE 7, AUD 6, RVZ 6, PEM 5, INF 4, FSZ 3, WVL 2. (May) W8VJ 31, OQH 20, SIB 2.

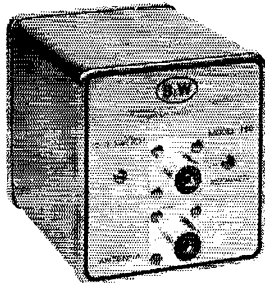
OHIO — SCM, John E. Slinger, W8AJW — Asst. SCMs: J. C. Erickson, 8DAE; W. B. Davis, 8JNF; and E. F. Bonnet, 8OVG. SEC: UPB, RMs: DAE and FYO. PAMs: EQN and HUX. New appointments are MBE and PII as ECs; IZF as OBS; and BOJ as OO Class IV. K8FCJ (4 operators) made RPL for May. We regret to report the death of DVP. GDQ reports excellent cooperation from Lorain Co. amateurs during the c.d. alert of June 15th. DCJ has procured a new Viking Ranger. The Springfield group has two club calls, NCM and TTE. VZE is trustee of the latter. SYZ worked all states as a Novice. MEI has become quite a 40-meter DX man, according to reports from the Dover Area. W2UKS/MM, aboard the SS *North America*, is operating all bands, both 'phone and c.w., during the summer Great Lakes cruise. The BSWRA, Akron, has scheduled its annual picnic for Aug. 28th at Happy Days Camp. LVT is scheduled to do academic research work in Mexico City. The West Park Radiops awarded loving cups to HFE, INW, AJW, and ZEU for their operating performances on Field Day. QCO has acquired a new harmonic. The Licking Co. amateurs held their Field Day at DSX's farm. The entire gang was practically rained out. HOS' seven-year-old daughter has received the call WN8BCT. Any younger amateurs in the section? The Cleveland Brasspounders had its generator go bad during Field Day after having made over 400 contacts with three transmitters during the first nine hours of operation. RBX reports the following from the Toledo Area: A proficiency award was given HNP for his help in setting up the RACES program in the Toledo Area; the Annual Radio Rifle Match, in which Detroit, Grand Rapids, Toledo, and Pittsburgh participated, was handled by PNY and YGR on 3610 kc.; the Toledo Club held Field Day beside a quarry so that members could fish or swim when the bands cooled off; BIQ is up to 93 countries on 21-Mc. 'phone; and the Bi-Annual QSO Party, a local affair, has been named "The Maynard A. Nelson QSO Party" in memory of HHF, who recently passed away. Cincy's *Mike and Key* reports that the GCARA'S Stag Hamfest will be another extravaganza. First prize will be a 75A-4 and second prize an Elmac AF-67. The Columbus *Caracape* informs us that PEN gave a talk on frequency measuring at the July 1st meeting; the CARA Picnic was held July 24th at Black Lick Woods;

(Continued on page 84)

QUALITY PRODUCTS

BY

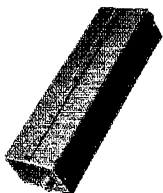
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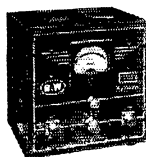
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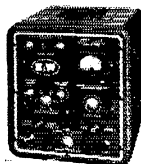
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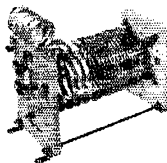
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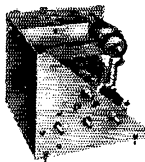
The S1SB generator offers sparkling SSB performance with your present B&W, Collins, or Johnson transmitter, on 80 through 10 meters with the output frequency control presently in your transmitter.

1 KW PI-NETWORK TANK COIL



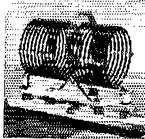
A high-power integral bandswitched pi-network tank coil for maximum efficiency from 80 through 10 meters. For Class "C" or linear operation. Minimum "Q" of 300 over entire operating range.

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Makes transmission on 80 through 10 meter bands available at the flip of a switch. Ideal driver for class "C" or linear amplifiers. May be equipped for use as low power transmitter.

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FYW has constructed a two-over-10-over-20 stacked beam; WN8ABM, a YL, worked a KP4 on 15 meters; OMY has made WAS; and SJQ has received his General Class license. Northeastern Ohio's *Ham Flasher* states that BYT has installed an all-band transmitter in his car; HIX has erected a 60-foot steel mast for various antennas; MID received a scholarship to the King's Point Merchant Marine Academy; HRV and JIF are running a code and theory class in East Palestine with six licenses resulting to date; and TNL is operating a Globe King on 75 meters. It was necessary to cancel a number of appointments this month because of non-reporting on the part of the appointees. This is unfortunate but, on the other hand, only "live wire" appointees aid in keeping this section at its high activity level. Traffic: (June) K8FCJ 327, W8DAE 206, MVJ 190, AMH 171, HDA 116, AJW 109, PM 102, ARO 100, IIR 88, AJH 86, GDQ 83, HFF 74, INW 72, HNP 52, RO 47, FJV 46, AL 39, JHH 30, MQQ 30, QXH 30, HPP 25, EQN 20, GZ 20, LHJ 18, ET 8, NPP 8, PMJ 8, QXQ 8, TLW 6, VTP 6, LGR 5, KXN 4, STR 4, URN 4, WON 4, WYL 4, DCJ 3, JIN 3, LMB 3, PFP 3, APC 2, AQ 2, AZR 2, JMD 2, RFX 2, VUS 2, BUM 1. (May) K8FCJ 759, W8IFX 88, MQQ 62.

HUDSON DIVISION

NEW YORK CITY AND LONG ISLAND — SCM, Carleton L. Coleman, WYBT — Asst. SCM: Harry J. Dannels, 2TUK. SEC: ADO. PAM: NJL. RMs: VNJ and LPJ. New appointment: K2ABW as ORS. At the time this column is being written, the section is in the midst of a hot spell of weather and the mobiles are out in full force. Incidentally, all mobiles are urged to sign up with their local EC for AREC work. Your assistance is needed and your mobiles can perform important work in time of emergency. VNI announces that the N.Y. Net, (3630 kc., 1930 EDT/EST) resumes full daily schedule on Sept. 5th. VNJ and OBU operated from the Statler Hotel handling traffic for the Walther League Convention. K2HYK's antennas are up an extra few feet to help his traffic count go higher, too. Many of our stations enjoyed vacation trips with ham radio gear accompanying them. JGV/1 made a good traffic score from W. Brookfield, Mass. KGN has ½ kw. on 20-meter c.w. IN has returned to the low-frequency bands but continues 144-Mc. activity. YSL has a new crystal converter for 144 Mc. K2EQH finds that his OBS skeds on 20 meters meet with the hearty approval of the local gang, who now hear ARRL bulletins regularly. K2AMM is happy to see increased 220-Mc. activity in Nassau County. K2OAZ is a new call at HJ. OBU is now heard on 'phone. All April CD Party N.Y.C.-L.I. 'phone entries, DLO, ORU, TUK, and EEN are Lake Success RC members. That should be a challenge to other clubs with appointment-holders. Let's have more section activity! PZE now is located in Smithtown. Field Day club activity was at a peak this year with many N.Y.C.-L.I. club entries. The Eastern Suffolk RC, K2ECC, with 18 operators, was located at Water Mill DPQ/2, the Huntington RC, cooperated with disaster and canteen units of the Red Cross and operated from Huntington with 5 transmitters and 30 operators. YKQ/2, the Lake Success RC, had 20 operators and 5 transmitters at Bethpage. The Nassau RC, BVL/2, used its '54 site at Rockville Center. Several clubs moved outside the section: The Tuboro RC, LG/3, and the Order of Boiled Owls, MUM/3, traveled to the Eastern Pennsylvania section while the Brooklyn Poly RC, BXK/2, ventured to Asbury Park. K2CUI is on his annual trip to F- and HB9-Lands. During "Operation Alert," VNJ spent 36 hours at JVG control center. Officers of the Frog Hollow RC, K2OFC, are AZA, pres.; KEB, secy.; FSM, treas.; and KDO, trustee. 4VFS/2 is on 75 meters from Bethpage. DLO built the W2IDZ filter for 50 Mc. from a QST article and it works fine on his TV set, enabling him to take part in recent 6-meter openings. K2LYD has a *Handbook* design 6146 rig. YHP completed a crystal converter for 144 Mc. K2CMV added four new countries to his log. EBN put up a new 14-Mc. ground plane. KN2JTW has 6BG6 rig and HQ-129X. K2DW has his WAC certificate endorsed for 2-way s.b. work. Please continue mailing all activity reports to TUK. Traffic: W2JQA 152, JGV 151, K2ABW 81, HXK 72, W2TUK 49, K2AMP 23, W2WVS 14, K2KXZ 11, W2EFC 10, PF 9, OBU 8, K2CRH 6, W2EEY 5, IN 5, MDM 4.

NORTHERN NEW JERSEY — SCM, Lloyd H. Manamoran, W2VQR — SEC: IIN. PAM: CCS. RMs: EAS, NKD, and CGG. The Irvington Radio Amateur Club has suspended activities for the summer season. CVW now is settled in his new QTH, and hopes to become more active again. DRV finds that time slips by very rapidly and sends in a five-month traffic report covering the period February to June. We will list the total of 62 in this part of the column to eliminate confusion. Thanks, Bob, even if it is late we appreciate it. KN2KHZ now is K2KHZ, having passed the General Class exam on July 6th. Congrats, Dave. He was very active in DX work while a Novice, running up a total of which to be very proud. The 15-w.p.m. CP did the trick for Dave and helped him on to the new ticket. As a further reward the XYL has presented him with a new rig, operator, David Alan. K2HXP has a 6146 rig on the way. K2GLS participated in his first Field Day and was very

favorably impressed. EFJ won the Irvington RC hidden transmitter hunt. The "booby" prize went to WFK who, according to reports, had to be roped into the site. Many activity reports have been received on Field Day activities. K2GAS is in bad shape; he is on with the six-watt exciter fighting the QRM. K2GAN and K2BFE are organizing a civil defense communications net for New Providence. A remarkable Field Day job was done by VAV and HJD. They joined together as a team and with a 30-watt transmitter worked right on through the entire contest period. The heavy rains slowed them down a bit, but never was the rig silent. A special Field Day QSL card is the reward for any station working them. In fact, the cards come in two designs and are sure FB. A great deal of credit goes to these two fellows who have the real old-fashioned Field Day spirit. K2BWQ has a new 75A-4. The KW51 has not been delivered as yet. K2EUN has left for Northern Texas. Drop a line to the local SCM (page 6 QST) for a transfer of your ORS appointment. Walt, K2APF is off the air because of receiver trouble. K2GRU received his Eagle Scout award. K2GBP, EKO, and CCI graduated from Tennek H.S. in June. All plan to enter college in the fall. K2DOX is a graduate of Xavier. NTY attended the telephone company meeting in St. John, Canada, and met VE1HQ, also at the meeting. K2BAJ has a new SX-96 but no transmitter; a bad combination for the nerves. K2DHE is toying with the idea of building a new s.b. rig. NIE is mobile every week end on the high seas. Traffic: W2EAS 180, K2GFX 52, BWQ 43, GAS 34, EUN 12, W2N1Y 2.

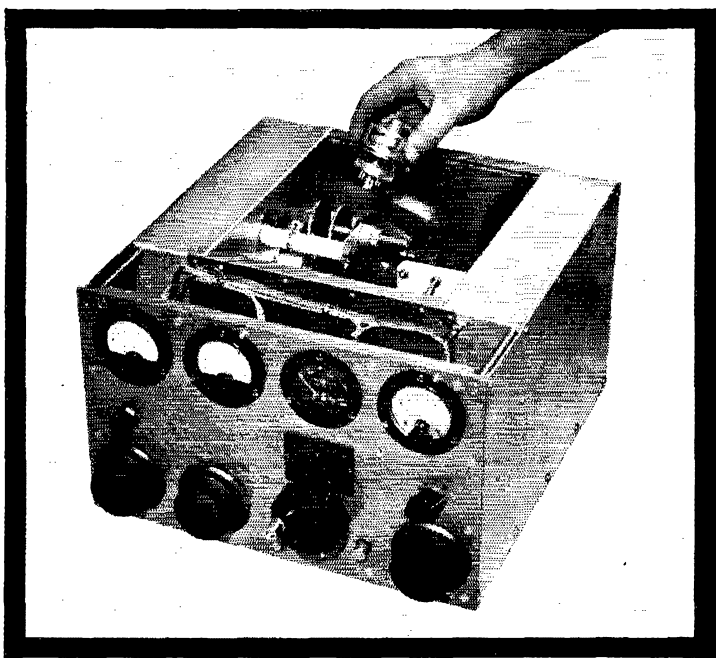
MIDWEST DIVISION

IOWA — SCM, Russell B. Marquis, W0BDR — As the new SCM I wish to extend the thanks of the Iowa gang to PP, the retiring SCM, for the faithful service he has rendered to the Iowa Section. Field Day entries: BXR, BBE, RMG, WAIL, YWW, ERG, QVN, MEL, AGB, GTF, TIU, JUI, IUY, RWG, KRU, RLY, TMY, K0BPR, and ANO. QVA renewed ORS and RM appointments and was host to BLH, LJW, and CGY. BLH, the Tall Corn manager, visited several Tall Corn members on a swing around the State. SCA and UJC received Asst. SCM appointments. DDV was mobile while on vacation in Arizona. KGX and PIK also were mobile on their vacations. BFW and PIK are sharing NCS duties during the summer for the Iowa YL Net. New stations are KN0MB, KN0BMC, KN0BDO, and K0BLJ. AEB has a new vertical for 80-meter s.b. UCE has the Ranger finished. QLU reports increasing activity on 50 Mc. with the Cedar Rapids Club using the band for intercom during Field Day. Nineteen attended the Tall Corn party in Cedar Rapids. The Charles City Club was host at the 160 'Phone Net picnic. SCA has a new Ranger VFO. The Central Iowa Radio Club held a picnic June 12th. The Fairfield High School Radio Club was organized Jan. 1st with 30 members. Officers of the Sioux City Radio Club are TLC, pres.; JKT, vice-pres.; UIJ, secy.; AQI, treas.; SQE, reporter; AZR, Sgt. at arms. Traffic: (June) W0BDR 1073, PZO 902, SCA 901, CZ 261, LJW 77, QVA 74, EHH 26, BLH 22, UCE 22, LGG 21, OXY 10, PAN 9, PUR 5, FDM 4, NGS 3, PKT 3, UTD 2, JUI 1. (May) W0OXY 9.

KANSAS — SCM, Earl N. Johnston, W0ICV — SEC: PAH. PAM: FNS. RM: KXL/N1Y. Ten Field Day groups reported their activities to the SCM this year. Field Day groups reporting were SeKan Radio Club, Ottawa Emergency Radio Club, WDAF-TV Radio Club, Central Kansas Amateur Radio Club, Eldorado Amateur Radio Club, Radio Club of Leavenworth Senior High School, Johnson County Radio Amateur Club, Hutchinson Amateur Radio Club, Kaw Valley Radio Club of Topeka, and GCH at Oakley. GGG is a new OBS operating on 3610 kc. at 1830 Mon., Wed., and Fri. FEO is attending ROTC Camp at Fort Carson, Colo., reporting on QKS from there on MARS station. EOT acquired an XYL June 26th. Hats off to one of the newest and most active radio clubs, the Wheat Belt Radio Club. It was organized about six months ago but already has 30 members, 70 per cent registered with AREC, conducted a very successful Field Day, has applied for ARRL affiliation, publishes a club *Newsletter*, and has gained very favorable publicity in several newspapers. UOL is president. The Eldorado Amateur Radio Club was given FTW's 300-watt rig for a club station and hopes to be assigned Jack's call in memoriam. The EARC held a family picnic for more than 36 hams and their families at Lake Eldorado June 5th. Traffic: (June) W0IFR 408, BLI 336, CET 299, N1Y 201, DEL 137, OHJ 135, MXG 92, SVB 71, EJD 48, EOT 34, FNS 32, SAF 23, FNA 23, YFE 16, LQX 11, VVM 10, EHT 8, VWR 7, UAT 6, QCG 4, RXM 4, ICV/M 3, LBJ 2, YJU 2, WNGVVT 2, W0YVY 1. (May) W0LBJ 35, NEX 19, KN6AHW 7.

MISSOURI — SCM, James W. Hoover, W0GEP — SEC: VRF. PAM: BVL. RMs: OUD and QXO. Ordinary activities were curtailed somewhat in June while preparing for Operation Alert and Field Day. CPI reports static is making traffic-handling difficult on 75 meters. GBJ reported a wet Field Day in Springfield. OMM visited ORF. This year is the 30th anniversary of EBE. E2M visited QMF. PWN is now equipped for VFO, multi-band operation. WAP reported an enjoyable dinner and ragchew attended

(Continued on page 86)



A PAIR OF EIMAC 4X250B's— the easy, modern approach to a compact one-kilowatt CW and SSB rig

You'd be amazed how easy it is to build a one-kilowatt rig using Eimac 4X250B radial-beam power tetrodes. Each of these bantam tubes handles 500 watts input with only 2000 volts on the plate. A pair in the final amplifier provides a kilowatt with the power supply and transmitter combined taking only a fraction of the space required for an old-fashioned kilowatt rack.

The straight forward modern approach afforded by 4X250B's allows simple circuit design. Driving power is so low that annoying TVI-producing harmonics generated in the driver stages are minimized. Low feedback capacitance makes stabilization of the amplifier stage easy.

The versatile 4X250B can supplant the famous 4X150A, and it offers the advantages of easier cooling and higher power. No forced-air cooling is required during stand-by periods if convection air is provided properly.

For further information on the new 4X250B, contact our Amateur Service Bureau or visit your Eimac distributor.

TYPICAL OPERATION

4X250B Radial-Beam Power Tetrode (Frequencies to 175mc per tube)

	Class-C CW or FM Phone	Class AB ₁ RF Linear
D-C Plate Voltage	2000v	2000v
D-C Screen Voltage	250v	350v
D-C Grid Voltage	-90v	-50v
D-C Plate Current	250ma	250ma*
Zero Sig D-C Plate Current	—	100ma
D-C Screen Current	25ma	15ma*
Peak RF Grid Voltage	115v	50v*
Driving Power	2.8w	0w
Plate Power Input	500w	500w*
Plate Power Output	410w	325w*

*Max Signal

An Eimac air system socket with built-in screen by-pass condenser provides optimum amplifier circuit stability and cooling arrangements for the 4X250B.

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by 17 hams in Grandview, June 23rd. His work has kept him from traffic. ETW graduated from St. Louis U. with a B.S. degree in physics. CKQ has qualified for a 2500 Trafficler certificate. RTW received an ORS appointment. SAK has applied for an OO appointment. Field Day operation reports were received from DZT, Springfield; SXY, Sedalia; VTF, Fayette; FLN, St. Louis; RFU, St. Louis; and K0ACK. The Suburban Radio Club installed antennas at its new QTH in time for Operation Alert. A combined net roster for MON and SMN has been published by SAK and VTF in *MONews*. Advances from Novice to General Class were made by TDT and ZWP. WN0WEQ received his Technician Class license. GEP visited the Northwest St. Louis Radio Club to discuss AREC plans and activities. BZK is working in Chicago during his summer vacation from school. 2- and 6-meter activity is picking up in the St. Louis Area. Traffic: (June) W0CPI 1182, GAR 518, GBJ 148, VTF 129, OMM 104, SAK 90, RTW 79, OUD 71, CKQ 44, BVL 42, IIR 38, HUI 31, VPQ 26, KIK 17, ECE 13, MFB 10, BUL 7, EBE 5, KA 4, QMF 4, TCF 4, GEP 3, MRQ 3. (May) K0FCT 247, W0HUI 26, RCV 14, QMF 8, VFP 3, ETW 1.

NEBRASKA—SCM, Floyd B. Campbell, W0CBH, Asst. SCM, Tom Boydston, 0YXK, SEC: JDJ. From the radiograms received at this office, there was a lot of activity on Field Day. FQB really has been organizing the c.d. system around Omaha. HMN has a new home-brewed 6-meter rig. RHL and his XYL spent 2 weeks touring California before leaving for duty in Okinawa. QKR really was busy during the recent storm at Gering and Scottsbluff. The new mobile (QKR) is fashioned after the Mighty Mo out of a recent QST. UOB is a full member of the Soo Radio Club, along with being chairman of the SRC and a member of the Sidney Area TVI Committee. AFG and DQN also are members of the SRC. We are sorry to report that GDZ has been transferred to W3-Land. Tiny did a very nice job as EC of Western Nebraska. JDJ spent a month in California recently. VNI is the new call of the Norfolk Radio Club. The UP Radio Club meets every other Wed. on 3940 kc. at 8 p.m. This is not restricted to employees of UP but is open to everybody. North Platte can boast of having 20 employees eligible for the club. Thanks to the many s.s.b. and a.m. stations for clearing the frequency during a tornado in Western Nebraska. VQR was on at Scottsbluff with loads of traffic and personally recognizes the following for their assistance: EMY, TIP, AFS, DDT, ERM, KLB, K0WBF, UFZ, LEF, EUT, BLM, and PUT. Traffic: (June) W0PMV 89, DDT 78, ZJF 66, HTA 48, K0WBF 40, W0VYX 22, AEM 16, P0P 14, CIH 11, AGP 8, EGQ 8, FR8 8, KVM 8, ORW 8, TIP 8, VGH 7, HQN 6, OCU 5, KDW 4, KLB 4, PON 4, LRF 3, LZL 3, QVV 3, K0BDF 2, W0CBH 2, DJJ 2, GTW 2, NHS 2, RMO 2, SZL 2. (May) W0KDW 12, FQB 6. (Apr.) W0KDW 39.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Milton F. Chaffee, W1EFW —SEC: LKF. PAM: LWN, RM: KYQ, MCN and CN 3640 (0645 and 1845), CPN 3880 (1830), CTN 3640 (Sun. 0900), CEN 29,580 kc. Traffic on CN reached 200, averaging 8.3 messages and 9.1 stations per session. MCN handled 108 with 4.86 and 6.4 as the same type averages. RGB, KYQ, and LIG rated QNI honors on CN while RGB, IBE, and RFJ led on MCN. Operation Alert apparently went off well. Bristol C.D. was manned by CKA, CLD, and RLN. Southington C.D. operation included ZZK, LFW, and Novice EQL. HDI Area 4 was operated by RGB, STT, WHR, ZEB, AKV, and PHP. PHP reports activity by JJD, IWY, YFG, ZJY, IYT, RRE, QMB, EBO, UOV, and MHF in their respective towns, and they handled 106 messages on 2 and 10 meters. CKA is on with a new Globe Champion. New Novices in Southington are (IAV and GFL. OO reports were received from BVB and RFC. ZJY and ZJZ are operating portable for the summer at Lenox, Mass. EZY, age 13, is a new New Haven Novice. RMW has resigned as EC of Norwalk to give somebody else a chance. FB bulletins were received from the Middlesex and Manchester Clubs. FYM is a new Middletown Novice. New Middlesex Club officers are EGX, pres.; EWD, vice-pres.; ZIH, secy.; and ZBL, treas. New ECs are QMB and KJT. Renewals include UJZ, UJG, RFJ, and BDI as OES; PHP as EC; and ORP and BDI as ORS. Have you checked your expiration date lately? UJZ reports operation at Mt. Equinox, Vt., in the V.H.F. Contest on 50, 144, 220, 432, and 3300 Mc., DX on the latter being 100 yards. Manchester claims 46 hams — one for each 800 population. Can any town top that? Connecticut Field Day scores should be good as many signals were heard on all bands. Eleven messages were received by the SCM. BDI/1 made 396 points with car mobile on 80- and 40-meter c.w. YYM/WPO have left the hills for a new QTH in Windsor Locks. ORP reports an expected break in his sked with 3IFQ, which has been going nearly 9 years. EOB has been transferred back to Chicopee, Mass. VJH recently was elected to Eta Kappa Nu, honorary E.E. fraternity at Rensselaer. Traffic: W1YBH 209, CUE 163, RGB 144, AW 84, TYQ, 73, EFW 72, LIG 70, KYQ 68, NJM 68, UFD 59, BDI 32, ZDX 28, KV 23, YNC 17, LV 13, HYF 6, ORP 1.

MAINE—SCM, Allan D. Duntley, W1BPI/VYA — We regret losing WRZ as PAM because of poor health; but

are very glad to announce the appointment of TWR as PAM. You have a hard job, Wes, to fill Harp's shoes, but we know you can do it. Hats off to the Augusta gang for getting FRS/1, a station to be proud of. BYK and YVB did yeoman service during Operation Alert, as did many of the other boys in all counties. FD is back on the mountain helping to "Keep Maine Green" from his perch 3 flights up in the tower. It's a good spot to work 2 meters and Oscar says all you guys and gals are always welcome. The PAWA is quite busy issuing WAM certificates. Keep them coming in, boys. The QFEs are waiting for a bundle from heaven. The strange sounds heard on "Heartbreak Ridge" are attributed to LQ modulating WRZ's rig. Jet also called on quite a few of the Augusta boys as well as your SCM. ZAG has a new mobile rig. The ZALs are now three. Congratulations on the new harmonic! EOP finally has cut some holes in his new Chrysler and is back mobile. Also KDE "operated" on his new Buick and is now putting out his usual lusty signal. WXI has joined the Vikings — husky boys, the "Norwegians." MFU now twists the knobs and dials at WTWO/TV in Bangor. Traffic: W1LKP 85, WTG 83, EFR 46, YYW 44, UDD 36, BBS 35, TWR 26, BX 20, LYR 19, BAD 16, QUA 14, ZMK 12, TGW 8, YVN 7, BDP 4, WHV 4, DMV 2.

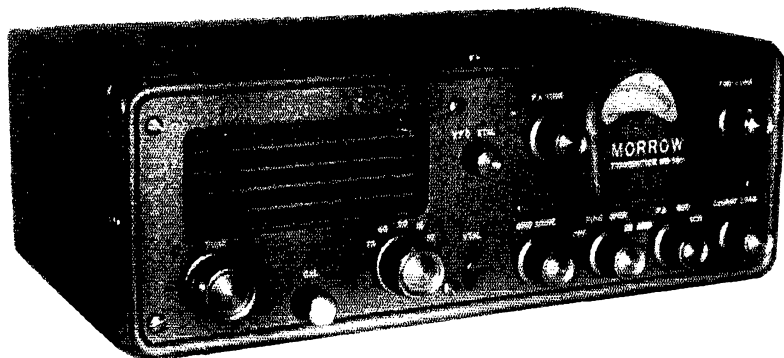
EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP — New appointments: SRG as OBS; ZWQ and WFQ, Alternate Radio Officers for Sector 1-B, as ECs. Appointments endorsed: DW Westwood, OTK Somerville, MKW Dennis, PST Brookline, as ECs; DWO and BY as ORS. QLT has applied for OO appointment; RQZ as EC for Abington and also as OBS. The South Shore Club held its annual banquet and installation of officers. Most of the clubs in this section were out on Field Day. As SCM some Field Day messages were received direct from IA/1, where 1 was doing some operating; others came by mail. UDC is the new c.d. director for Dedham. Sorry to have to announce the death of QIT, a cousin of SMV. Heard on 2 meters: TBX, LYL, QXX, ZGO, APV, FFR, F0B, BYI, mobile ZYO, WBR, PSG, and SIV. UFJ is on 75 meters. There was a lot of activity during the V.H.F. SS. RP is back on 75 meters and is going after WAS. PXH took part in the May F.M.T. Most of the c.d. groups were on during the nationwide c.d. test. IA, in Quincy, as head of Sector 1-B, was on for the full 24-hour period, with DXQ and ZHX staying all night. Others on were ALP, WFQ, ZWQ, VTT, CRO, VJC, and YJG. In the various towns these operators were among those active: MME, DUO, SMV, SH, WUV, VPR, AVG, ISU, FWS, WRN, WZN, CLF, MGL, GNK, QYN, HSN, IPE, YFA, OLP, QON, DW, KWD, ZYO, and LOS. UNA, an instructor at the Swampscott High School, reports a radio club where code and theory was given and the following new Novices: EVJ, EUU, ETW, EUT, EUY, and ETL. Other members are ZHG, ZBH, and BYB. OCK was the examiner. AVY has been ill. THO says he has a patent on a one-element 6-meter beam. The Framingham c.d. group has a 6-meter Gonset which was operated by ZOP, QVK, and MEG during Operation Alert. More units will be on 146,850 kc. The Braintree Radio Club held a meeting. BY is busy at work. SXD is going to DL+Land. LMU visited ex-8CP in Ohio. PIW plans a vertical for 10 meters. QMU is building power supplies. TTY has a Heath DX-100. HOL is on 6 meters. RM has two new cars. CLF says he is handling a lot of new traffic from Maine. The Hingham Club was out on Field Day with ADT, BIV, DMS, VAI, YOR, MD, AVG, SHNW, and VXD operating. LFE operated 20-meter c.w. on Field Day with the Old Colony Club. QLT says Field Day was the biggest event of the month for the Falmouth Amateur Club. UKO has a new SX-96 receiver. FZU is Radio Officer for Middleboro, and FEC is on the planning board for South Massachusetts. ECK is new in Bridgewater on 10 meters. WN1DXN, new in E. Bridgewater, is on 80-meter c.w. VHH is summering at Hull. The Bedford Radio Club held its Annual Banquet and Ladies' Night. The Winthrop C.D. Net had 19 stations on: UOC, CMW, TEO, KWD, NMX, TTH, BDU, DEL, DJ, OIR, DLY, DRP, DUV, FJF, MQB, BB, and DQF. WN1GBI is new in town. TQN graduated from West Point and is home for a while. A new ham in Wellfleet is WN1FQQ. MPT went to New Jersey on vacation. OSX is home again. TQQ had some bad steam burns. RDV and his XYL visited KPX and WNT. Traffic: (June) W1EPE 146, UKO 141, CLF 89, UE 42, AVY 35, TY 22, EMG 21, LM 18, NUP 14, WU 10, BY 7, QLT 6, ZDQ 4, ATX 3. (May) W1ABJ 1. (Apr.) W1AYG 2.

WESTERN MASSACHUSETTS—SCM, Osborne R. McKeraghan, W1HRV — SEC: RRX. RM: BVR. PAM: QWJ. The WM C.W. Net meets on 3560 kc. Mon. through Sat. at 1900 EDT. The WM 'Phone Net meets on 3870 kc. Wed. at 1800 EDT. RM BVR reports the C.W. Net is doing fine in spite of hot weather. A new OPS is DPY, Lenox. Section net certificates went to SRM and ZUU. The Central Mass. Amateur Radio Assn. held its 7th Annual Gabfest. It was a huge success with more than 100 at the banquet. Speakers included UED from Headquarters, Fr. Fitzgerald of Holy Cross College, FCC examiner DLT, and your SCM. Holy Cross College in Worcester has an active radio club with the station call UUY and a membership of about 15. Four are General Class licensees with the rest

(Continued on page 88)

Announcing: The New MORROW MB-560 Transmitter

90 Watt C.W., 60 Watt Phone All Band Companion
to the MORROW MBR-5 Receiver



MORROW Company engineers take great pride in announcing the new MB-560 Transmitter, their latest addition to the MORROW family of fine amateur equipment. The MB-560 has been painstakingly designed to afford the amateurs a new high in efficiency, versatility and operating convenience in a compact transmitter for fixed or mobile service. Full 90 watt input on C.W. and 60 watts on phone for five amateur bands. Compare the features of this new, easy-to-use, easy-to-install transmitter for mobile and home operation . . . then SWITCH TO MORROW TODAY!

1. **VFO or XTAL** — Extremely stable VFO directly calibrated for 80, 40, 20, 15 and 10 meter bands. Xtal socket and OSC calibrate control on front panel.

2. **ZERO-BEAT CONTROL** — Allows operator to accurately zero-in on incoming signals without turning final amplifier on.

3. **6146 POWER AMPLIFIER** — Efficient circuit delivers maximum power to antenna. Special two-section tuning capacitor allows band-spreading on 20, 15, and 10 meters.

4. **PI-NETWORK OUTPUT** — Circuit allows matching to wide range of antenna impedance for fixed, portable or mobile operation.

5. **NEGATIVE CLIPPER** — Push-pull Class "AB1" modulators with negative speech clipping for 100% high level modulation.

6. **BUILT-IN RELAYS** — Relays for controlling antenna and receiver silencing are built-in in the MB-560 Transmitter.

7. **FULLY METERED** — All necessary circuits are metered by front panel meter and selector switch.

8. **TUBE LINEUP** — 6146 PA 6AQ5 frequency multiplier, 6CL6 VFO and Xtal OSC, 2 6CU6 modulators, 12AX7 driver, 6AU6 pre-amplifier, 2 OB2 VR's.

9. **POWER REQUIREMENTS** — Operates on 6 or 12 volts. Requires 300-600 volts at 200 ma. and 250 volts at 75 ma. Latter voltage normally supplied by companion MBR-5 Receiver.

10. **SMALL AND SOLID** — Sturdily constructed of heavy aluminum for years of reliable service. Compact: 4" high x 11 $\frac{3}{4}$ " long x 6 $\frac{1}{2}$ " deep.

11. **POWER SUPPLIES** — PWR 6-12 DC exciter power supply \$29.95.

PWR 115X AC power supply for fixed operation for MBR-5 Receiver and MB-560 Transmitter \$29.50.

AC power pack for Receiver and Transmitter complete, available on request.

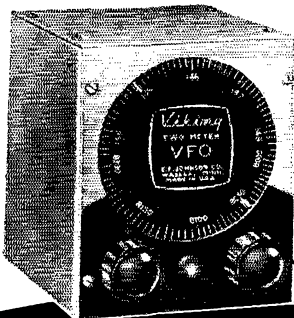
Interconnecting harness for using the MB-560 Transmitter and MBR-5 Receiver available as an accessory.

12. **AMATEUR NET** — \$189.50 complete with tubes, key and microphone plugs, power cable connectors, and MORROW-MOUNT quick mounting brackets.



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Operate any frequency in the two meter band! Replace those 8 mc crystals with this compact, easy-to-assemble VFO kit

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Novices and Novice trainees. Several rigs include a Navy TBM-10 and a Novice rig. The Club QNIs and has NCS jobs in the Deep Sea Drag Net and TCPN and has piled up 55 countries and WAC on 14 Mc. The Pittsfield Radio Club was very active Field Day with 5 rigs on emergency power, 20 operators, and used 5 bands. HCRA had 5 rigs and seven operators going strong at the same time. Others reporting Field Day activity were UIS, TPH, UUI, HJL, UEY, and AZW. The Berkshire County Amateur Radio Assn. recently was formed with its first scheduled meeting for September. AZW finally hooked a KA with 25 watts on 14 Mc. UXK, reporting from Formosa, says he will be leaving soon for W1-Land and expects to be operating from his home QTH in Leominster by October. He built a VFO during his spare time and will put it in use when he gets home. TVJ has passed the 1st-class commercial phone exam and has a summer job in a radio station. BYH reports 53 countries worked and he has a new VFO. Traffic: (June) WIBVR 82, TAY 36, ABD 34, HRV 36, WDW 9, BYH 7, WPW 4, DPY 3, TVJ 3. (May) WITVJ 13, AMI 10, WPW 2.

NEW HAMPSHIRE — SCM, Harold J. Preble, WHHS — SEC: BXU. RMs: CRW and COC. PAM: CDX. Field Day equipment is packed away for another year. A good time was had by all, as always. The Concord Brasspounders had nine set-ups on Oak Hill and reports more contacts than any previous year. Ask them about the incentive. PFA is building a new QTH at Salem, N. H., and hopes to be in it soon. His tower already is up and has beams for 20, 10, and 2 meters and a ground plane for 6 meters. Looks like an FB set-up. CDX made BPL the hard way in June. NIDYE has passed his General Class examination. ARR received a new mill for a graduation present and is keeping it hot handling traffic. ZIW is knocking off lots of DX on 10 meters. AJF operates from UYY, Holy Cross University, during the school year. GMH reports recent visits from WFG and WTH with families, also SEO and his XYL. RCEN is closed down for the months of July and August. Greetings to Novices NIEMM, NIEMV, NIEMW, NIEMX, NIEND, NIENL, NIENM, NIENO, NIENP, NIENR, NIEOW, NIEQN, NIECU, NIFDC, and NIGHW. Traffic: W1ARR 342, CRW 337, CDX 111, IP 74, ZIW 36, SAL 33, COC 30, WNDIWE 23, WICCE 18, HOU 14, GMH 13.

VERMONT — SCM, Robert L. Scott, W1RNA — Many of the gang are wondering what happened to the license plate bill. It was "harpooned." Thanks to all the fellows who worked for it and especially to BRG. The issue is not dead as far as we are concerned and next year will bring new endeavors to obtain the plates. The secretary of the BARC reports the following: More than 300 attended the 4th International Field Day and Vermont Hamfest, co-sponsored by the Montreal Amateur Radio Club of Montreal. Hams were present from New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, Vermont, and the Provinces of Quebec, Ontario, and British Columbia. TLI/M was winner of the 10-meter treasure hunt. Speakers were VE2BE, VE2TA, WIUED from ARRL, W1VEB, and W1RNA. A radiogram from the Vermont Green Mountain Net was handled via 80 and 10 meters to President Eisenhower at the Rutland Fair. A very fine letter was received in reply from Press Secretary Haggerty. Traffic: W1AVP 106, OAK 99, CMY 61, BJP 15, KJG 12, RNA 10.

NORTHWESTERN DIVISION

ALASKA — SCM, Dave A. Fulton, KL7AGU — The C.D. Test of June 15th went very well in the Anchorage Area with a good turnout of mobiles as well as a crew at the c.d. headquarters, which handled the situation very well as far as communications were concerned. The mobiles in the Anchorage Area were called upon a second time this month for aid in the Lions Club operation "Little Red Wagon" Telethon. There was a good turnout of mobiles on this operation also, even though it came on the same week end as Field Day. There seems to be quite a bit of interest in the Alaskan DX certificate. Maybe it's a little harder to get than we thought. No. 1 has not been given out as yet, but we do know of one station just waiting for the confirmations to roll in. There were some 15-meter openings to the States from the Anchorage Area in both June and July. How about some news from the rest of the territory?

IDAHO — SCM, Alan K. Ross, W7IWU — Rupert: CAP operated as portable in the Washington, D. C. Area in June. Gifford: VWS has a 25-w.p.m. Code Proficiency certificate. He needs Delaware, Rhode Island, Vermont, and Maine for WAS and would like schedules. Kellogg: RQG and WHZ had an FB Field Day making 21 contacts with emergency power. Emmett: HOV is the new EC for Emmett and Gem County and reports he has a 75-watt portable and three gas-driven generators available. Boise: 6EBK visited the gang at a "hamburger fry" while passing through. Some of the fellows are acquiring Motorola type 30D f.m. rigs for 2-meter mobile. The Gem State Amateur Radio Club worked a station at two hobby shows in June.

MONTANA — SCM, Leslie E. Crouter, W7CT — The Old Faithful Radio Club had a very successful ladies' night with 24 hams and their families attending. Two new hams in the club are WN7ZSR and WN7ZSS. Rigs were set up by FGB for Field Day for the Livingston gang and VMI of

(Continued on page 90)

PRECISION

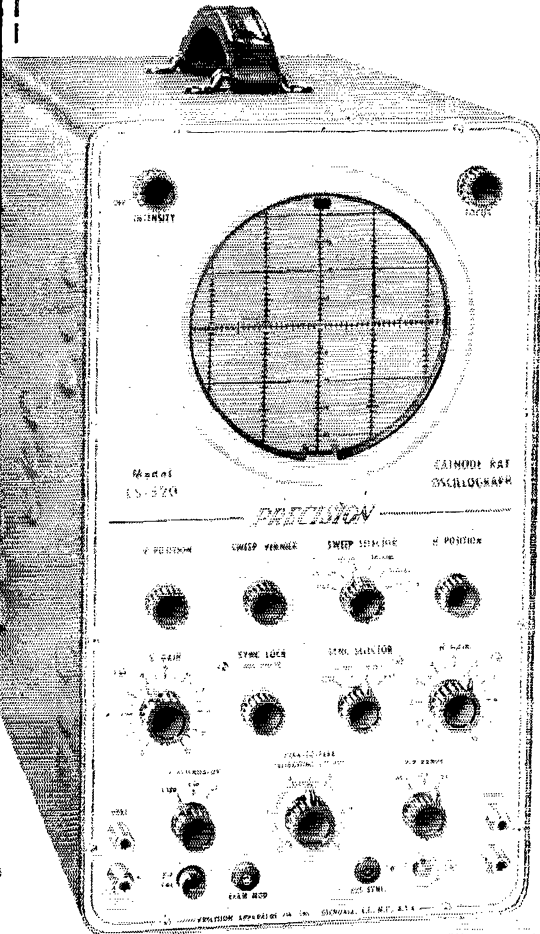
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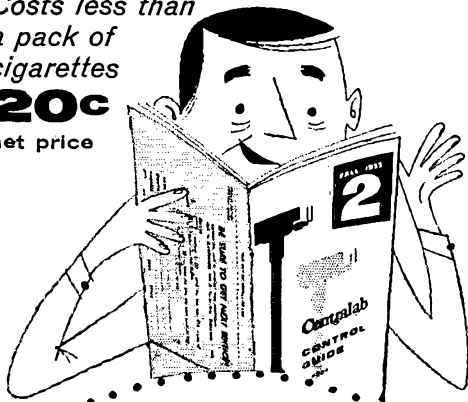
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ferred his ranch as the location for the event. Plans are being made for a picnic with the Gallatin Radio Club for some time in September. FGB and RZY are busy working on plans for simulated emergencies for the coming season. GEF has returned from vacation in Wβ-Land. YPN is busy converting a pair of BC-375s. WBC is working on modulation equipment so that he can reap full enjoyment of his new General Class ticket. The second Eastern Montana Ham Picnic was held at Wolf Point on June 19th attended by over a hundred, of which 44 were hams. There were 17 mobiles and 1 aero mobile. Thanks to TPE for the report on the picnic. RZY recently moved to Butte and is active on 75 meters. A new ham in Butte is WN7YKN. CDW has a new kw. on 20 and 40 meters. The Butte Club still has copper certificates for those who can show proof of having worked at least six Butte stations. Traffic: (June) W7MQ1 28, RYZ 4. (May) W7SFK 25.

OREGON — SCM, Edward F. Conyngham, W7ESJ — OO's report many second-harmonic signals outside the 40- and 20-meter bands, but band-edge operation was good. Field Day reports were received from LNG, Camp White on Rouge River; ANG, Cline Falls; SAA, Marys Peak; Y E, Benson Lookout; OTW, Mt. Buxton; KYC, Government Camp; ACY, Manzanita; SBT, Agate Desert; and RKP, Dodge Hill. This was an excellent turnout for Oregon. WAT will be QRL with school and work daytime and evenings but on Sundays will be on 40 meters. WHE moved to a new QTH and is rebuilding. AJN has trouble and is rebuilding. WLL ditto. APF believes the new final will solve the TVI difficulty. UJL is off on a camping trip. NFZ ran a test from City Park, Grants Pass, with mobiles in Medford and Ashland. UZU is building a new antenna system. LI and SEZ are starting up 2-meter MARS. VBF slowed down because of summer work. PRA is QRL OSN and RN7 but is building 2-meter equipment. PQJ is going strong with RTTY. SAR is wiring up a new Heathkit DX-100. RER has the kinks out of the new mobile. OJA, VIL, BEG, ISP, DIE, EZR, EKF, LNG, VPH, and ULR have a hot AREC and MARS project going on 10 meters. JRU, ABW, VDG, SBX, SBU, and UHC have the same thing going on 160 meters. Traffic: W7APF 92, PRA 78, WAT 50, THX 30, BLN 20, ESJ 12, UJL 9, LT 7.

WASHINGTON — SCM, Victor S. Gish, W7FIX — Nets: WARTS, 3970 kc., 1800 PST Mon. through Sat.; WSN, 3575 kc., 1900 PST Mon. through Fri. JPH is at school in Minneapolis. VAZ is using a Viking but building an 813 rig for traffic. FRU had antenna trouble but is back on the nets again. K7WAT reports the Port Lewis Amateur Radio Club has been formed with KUS as its first president. RCM, your SEC, is doing a swell job despite illness in the family. APS is doing most of his trafficking on RN7. UIN is a new OPS in Tacoma. WQD is a new OBS in Port Angeles with nightly skeds on 3940 kc. at 1930 PST. EVW and APS renewed appointments as OPS and ORS. LVB now is on the air with 210 watts. AIB and CWN were on Field Day with the West Seattle gang. PQT is busy on MARS and WSN. UYL changed her QTH but is back on the air again. EHH took his 100-watt portable on a vacation trip to New Jersey. HDT, YBV, and WN6KDJ/7 worked Field Day in the rain. FZB was on Field Day from Bainbridge Island. BMK is reinstalling mobile. AVM has a 2-meter beam up but still is having trouble hearing others. UQY reports the Richland gang is on summer routine. YJE contacted seven sections on 6 meters in the V.H.F. Contest. The Seattle Wireless Association now is ARRL-affiliated. PVZ is keeping regular skeds over the Cascades from Olympia to Yakima and Toppenish on 144 Mc. The Puyallup Club (YU) reports: TGO was on the TV program "You Asked for It"; OEB still is expanding the house; on Field Day EHJ, IYU, and MTX were on 75-meter phone; HMQ and XYL, WHV, on 2 meters; MPH mobile Lake Washington; VLC and RM1 are antenna experts. BA spent two weeks in Wβ-Land and visited W6NCP. He now is contemplating overhaul of the beam for better signals. Traffic: W7PGY 1106, BA 1102, VAZ 715, FRU 170, K7WAT 149, K6BDF/7 87, W7RCM 64, USO 50, APS 40, RXII 33, UIN 29, LVB 28, AIB 25, TGO 20, PQT 15, UYL 13, HHH 7, HDT 6, WQD 6, EVW 5, FZB 5, AVM 2, BMK 2, CWN 2.

PACIFIC DIVISION

NEVADA — SCM, Ray T. Warner, W7JU — SEC: WVQ, ECs: PEW, PRM, TVF, TJJ, and ZT. OPS: JUO and UPS. ORS: MVP, PEW, and VIU. OBS: BVZ. Nevada State frequencies: Phone 3880 and 7268 kc.; c.w. 3660 and 7110 kc. YKC, of Las Vegas, is enjoying his new DX-100. 6ABN, operating portable in Las Vegas, hit an FB opening on 6 meters July 3rd, giving many stations in the southwest their first Nevada on this band. JUO completed his all-band mobile in time for a Colorado vacation jaunt. KIO now is active with a Viking II. BJYN received an endorsed certificate for 50 Nevada QSOs. THH and VIQ received certificates for 25 Nevada QSLs. The Mobiliers, operating YN, were active on 2, 20, 40, and 80 meters at the Reno Hobby Show. The Southern Nevada Amateur Radio Club had a station operating from Healdorado Village during the recent celebration there. QGE, of Reno, now

(Continued on page 92)

THE CASE OF THE BANTAM

There is indeed such a case but there's nothing mysterious about it. This case contains the high "Q" coil assemblies, the "Heart" of the widely acclaimed, 15 and 20 meter Gonset Bantam Beams.

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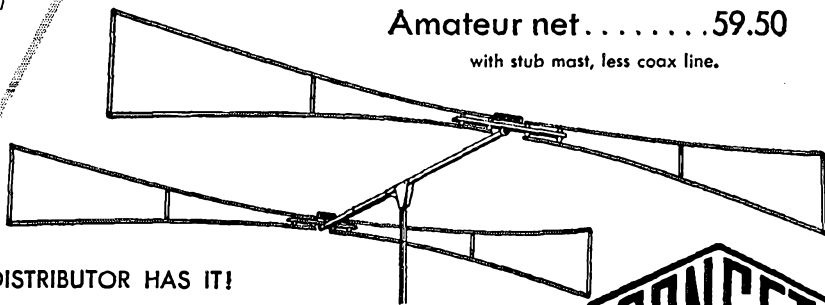
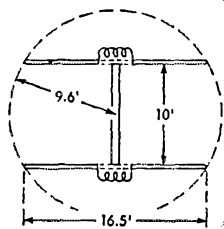
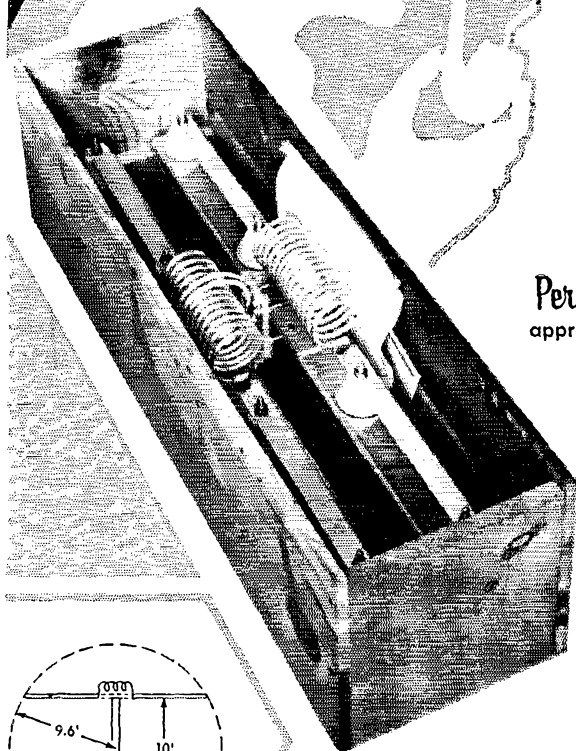
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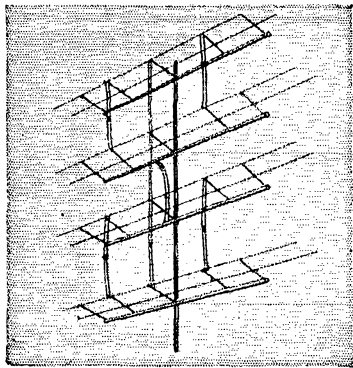
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is driving his 610 with a Ranger. ZT, RSY, and JU took in the Pacific Division Convention in Fresno.

SANTA CLARA VALLEY — SCM, R. Paul Tibbs, W6WGO — SEC: NVO, Asst. SCM: Roy E. Pinkham, 6BPT. K6BBD reports that a 33-ft. vertical antenna works very FB on 40 meters. Dick is looking for a Delaware contact for WAS. EXX's 50-Mc. rig is finished; now for the antenna. He worked 40 meters on Field Day for the PAARA and at Region Three headquarters during Operation Alert. WLI worked Field Day at AEX/6 near Saratoga. ZRJ rebuilt his receiver and made changes in his antenna as per George Grammer's dope passed to Doc at the Fresno Convention. K6GID is the new manager of NCN, replacing KFD, who resigned to take up schedules with Pacific stations for traffic work. GIL is planning on recruiting new stations for NCN. He would like all those stations in Northern California who can work c.w. on 3635 kc. to check into the net every night at 2000 hours PDST. Net sessions are not long and will not take much time from your activities. How about you boys who want to work with some real considerate operators? Speed is not fast. KN6JJG would like to start a net on 40 meters for Novice operators. Competition was very keen in the Section on Field Day. Most of the clubs had stations in the field and topnotch operators manning them. KIN has finished a three-element beam for 14 Mc. using inductive coupling. Al uses a Balun made from coax line to step up from 75-ohm line to 300 at the coupling rings. Traffic: (June) W6HC 135, ZRJ 144, FON 105, K6GID 88, W6AIT 39, K6BBD 29, KN6JJO 4, K6BAM 1, (May) K6GID 64, W6EXX 29.

SAN FRANCISCO — SCM, Walter A. Buckley, W6GGC — Asst. SCM: William T. Nakahara, 6GHL, KKM, secretary, reports new members of the Marin Amateur Radio Club are CXU, WNI, K6KNX, W6WQI, and W7WNL/6. LUM souped up his set and now has TVI. DXA is active on 2 meters. KKM operates 40-meter phone with 30 watts and received answers from K4s, KL7s, and KH6s. ZNT/6 now is at his new QTH in Mill Valley. TIJ recently retired after 40 years and he now expects to put lots of time into hamming. The Club will not hold any meetings until Sept. 9th. GQY will be QRL for a few months with the Youth Recreation Program. SLX reports that he is very busy helping some of the youths in Eureka to get their tickets. KN6HIW, KN6IKQ, and W6QMO attended the YLRL Convention. Jeri spent a week in Los Angeles visiting friends. WB was guest speaker for the San Francisco Club in June. He has monthly articles in Elmer's Tech News. The fellows enjoyed his talk on "New Ideas for Less Noise and Power Leaks in Receivers." KFS made his first out-of-state contact on 6 meters; he contacted FKY in Colorado. URA says openings on 6 meters have been very frequent lately. KFS and GGC were the hidden transmitter for the 29ers in June. KGANP, who won the hunt, is now in Uncle Sam's Navy. The HAMIS and the San Francisco Naval Shipyard joined ranks high on Mt. Davidson for Field Day. ARRL officials participating were NL, EC; UOQ, SEC; JWF, trustee of Red Cross communications; GGC, SCM. GHI did all the cooking for the boys and they were well fed. BIP and CTH were chairman and co-chairman for the San Francisco Radio Club. The Sonoma County Radio Club will hold its picnic at Sebastopol in September. Joan Neiman passed her Novice Class exam but has not yet received her call. GGV, of Stanford Research Lab., gave an interesting talk and demonstration on 2-meter c.d. and mobile transmitters to the boys at the San Francisco Naval Shipyard meeting. HJP was back in the San Francisco Area prior to departing for Okinawa with the U. S. Air Force. The bill for license plates for mobiles in California was OKed at this session of the legislature but at this writing has not been signed into law. GCV and PCN are settled in their new QTH. PIIT did a grand job collecting prizes for the Mission Trail Roundup held at El Verano. All attending reported a wonderful week end. KZF has been reappointed as EC for MTN. LOU is now at his new QTH, OPL, as usual, came through with a large donation of hot dogs and salad for the Roundup. RBQ was not well enough to participate in Field Day but donated the use of two of his big trucks. Sorry to have to list as a Silent Key, K6ABE, who drowned in the Russian River June 18th. Traffic: W6GQY 131, GGC 64, PIIT 55, GHI 12.

SACRAMENTO VALLEY — SCM, Harold L. Lucero, W6JDN — Field Day has come and gone and all clubs report a wonderful time. ASI just completed linear amplifier with 4-400As for his s.s.b. AK has gone s.s.b. with a 20A for an exciter and has a new 75-A4 and all the trimmings. ZF also has a 20A exciter for s.s.b. GTG is active on 75 meters. D1W has a new Mini-beam for 20 meters. HSB and HTS are doing experimental work with antennas and are quite active on c.d. and 20-meter phone. GDO moved to Fair Oaks and is active on 75-meter mobile. GQS is active on 75-meter mobile and has a "Gallon" on 75 meters. MIW has a new Viking Ranger for all bands, but still is faithful to 144 Mc. PIW has gone completely 144 Mc. but says he still isn't convinced that phone is doing away with c.w. on the lower frequencies. VBQ moved to Stockton. HSV moved to North Sacramento. JJJ is active on 75-meter mobile. QLT reports in from the San Joaquin Valley section that he is back on the air in his new QTH, 1053 Paradise Road, Modesto. At present Tony is on 75 meters. QYQ is

(Continued on page 94)

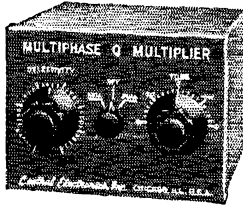
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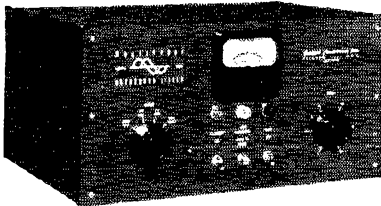
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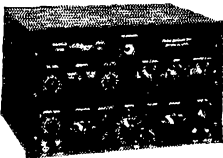
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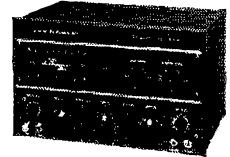
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- 10 Watts P.E.P. Output SSB, AM, PM and CW.
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active on MARS nets. TYC is now with the telephone company, Sacramento, and is active in c.d. work at Carmichael. UM is active in c.d. AHN would appreciate some "needling" to get back on the air. Come on, Hank, after 35 years you shouldn't need needling to get back on. K6BWC and his new XYL are honeymooning. QVI is on RTTY. ICO lost his entire mobile whip. K6RYS is mobile on 160 meters. IZC moved to a new QTH. MWR has mobile installed in the pickup. Traffic: W6ZF 7, JDN 6, DTW 2, GTG 2, K6KHE 1.

SAN JOAQUIN VALLEY — Acting SCM, Edward L. Bewley, W6GIW — SEC: EBL, RM: K6EVM, JPU. Ralph Saroyan, was nominated as SCM, and as his was the only name submitted he automatically becomes unanimously elected. Ralph is the EC in Fresno County, and has proved himself as a hard and conscientious worker for the good of his fellow hams. I feel sure that a better choice could not have been made and hope the gang will give Ralph the same splendid cooperation that I received during my term of office. Field Day once more was the main event of June. From the reports received here, it was equal to or better than last year. I received five Field Day messages, which is the most yet, indicating the section was well represented. FEA and WJF have moved to the Bay Area, but as yet have no permanent address. FEA attended the YLRL National Convention in Santa Monica. Gertie is the sixth district chairman. EBI, reports his Heathkit DX-100 is an FB rig. According to most reports received the June c.d. alert drill was a success. It was the first in Stanislaus County to use ham radio, and many c.d. officials were surprised to find ham radio so efficient. The CVRC Picnic was a success and all who attended enjoyed themselves. Maybe it will be an annual event. Traffic: W6TTY 517, AOB 80, K6EVM 56, W6EBL 37, K6BMM 5, W6FEA 5, GIW 5, WJF 3.

ROANOKE DIVISION

NORTH CAROLINA — SCM, Charles H. Brydges, W4WXX — SEC: ZG, RM: VHH, PAM: ONML. The Piedmont Amateur Radio Club is active in Salisbury with a new air-conditioned shack. The club station, EXU, is on with a kw. EYZ did a fine job as NCS of the Tarheel Net during June. JZQ is new EC for several counties in the eastern part of the State. New Novices in the Charlotte Area are KN4DRV, KN4DHL, and KN4DWL. Two meters still is in the picture. RRH heard CVQ and is looking for a Charlotte station. HYT is now General Class and will be on 80, 75, and 40 meters with 100 watts. The Tarnetto Club operated SOD/4 on Field Day from a 40-ft. observation tower. HLY/4 was at Cowhee Bald, MOE/4 at Elke Mountain, NC/4 at Tanglewood Forest, and OXQ/4 at Rankin Lake. Two new YLs in Salisbury are KN4DTL and KN4DTC. ZG is moving to a new temporary QTH. Welcome to HIF from Atlanta and now in Fayetteville. Get all the publicity on ham radio you can in your local papers; it will let the public know how we work. The Forest City Hamfest was a big success. If you want to join the AREC (Amateur Radio Emergency Corps) please drop me a line requesting application forms. GHS is moving to Charlotte. The Greensboro Radio Club Field Day netted 596 contacts. One 30-watt and two 100-watt rigs were used. The Greensboro 2-meter Net still meets on 146.88 on Thurs. at 8 p.m. SGD reports the Tarheel Emergency Net now has very good participation. Even though 3865 kc. is our net frequency, fixed stations should not remain on the frequency all of the time. Mobile stations would like to work also. When you have a sked on the net frequency move off the net frequency when the contact is made and give mobile stations a chance. This idea came from many of the fellows throughout the State. Traffic: W4RRH 50, GHS 11, ACY 7, BUA 6, SOD 5, BUW 3.

SOUTH CAROLINA — SCM, T. Hunter Wood, W4-ANK — HDR has received the BPL Medallion from the ARRL as an award for making Brass Pounders League three times. The striking feature of this achievement is that it was all accomplished on 'phone and he is the first South Carolina amateur to receive this award for traffic-handling. LXX was on 40-meter c.w. in the CD Contest and reports from the Florence group that VAM is completing a kw. rig and has a new 20-meter beam. SMI is on 75-meter 'phone with 12 watts using Heising modulation and receiving good reports. ZUV reports working a VK on 40-meter 'phone and is active on 75-meter mobile. ULH is building a new 500-watt bandswitching final using 250THs. TSU is completing a kw. s.s.b./a.m./c.w. rig. AUL expects to be on 20-meter c.w. soon with his 500-watter. FXG is on 40-meter c.w. and plans to work 20-meter c.w. for DX. LLH is on 20-meter 'phone and is planning a new antenna. Field Day activity within the State was high this year with more club groups participating than in previous years. The C.W. Net operates on 3795 kc. at 7 p.m. weekdays. Traffic: W4HDR 162, ZIZ 137, FFH 103, ANK 59, FAL 16.

VIRGINIA — SCM, John Carl Morgan, W4KX — SEC: RTV. This year showed a new high in Field Day activity, both by clubs and individual groups. BLR produced a new tax exemption for OM BVB. New VFN Mgr. YVG tried a new call-up system, but the majority voted preference for the old method so he went back to that after

(Continued on page 96)

MALLORY HAM BULLETIN

You'll like every feature of the New MALLORY VIBRAPACK® Power Supply



Designing a battery-operated mobile rig? For the power supply, take a look at the features that are built into the new Mallory Vibrapack.

HEFT IT—the Vibrapack fits easily into the palm of your hand. It's less than 5½ inches in its longest dimension.

CHECK ITS WEIGHT—it's barely 4 pounds.

LOOK INSIDE—its sturdy steel cover and bottom plate snap off quickly, without need for struggling with screws or complicated fasteners.

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LISTEN to its quiet operation. Mechanical hum is reduced practically to zero in the new Mallory Vibrator used in the Vibrapack.

ASK any police radio engineer about the long life and dependability of its series-drive, heavy-duty communications vibrator . . . the same components used in police, taxi and utility 2-way mobile gear everywhere.

Designed for the economy minded amateur or commercial engineer, the new Vibrapack gives you a lot of performance at modest cost. Its ruggedness and dependability are based on principles developed by Mallory during more than 25 years of building vibrator power supplies for communications equipment.

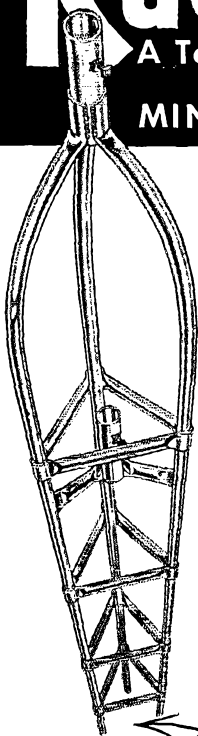
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MINIATURE BEAM



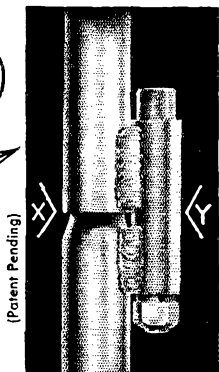
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Safe in 80 mph winds without ugly, hazardous guy wires (something the XYL will like). Install a Kuehne tower yourself on roof or ground. It goes up quickly, easily, at low cost. Tested and proved for miniature arrays. Accommodates 1½" mast and rotor. Built of 16 ga. cold-rolled steel sections reinforced with steel gird-around ties spaced 12" apart. Zinc electro-plated finish. Cadmium-plated connecting hardware. Assembly blueprints furnished upon request of purchaser. One year parts guarantee. Order from your Kuehne Distributor. If none nearby, we will ship to your door.

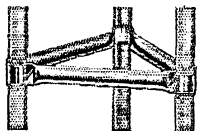
Exclusive LATERAL LOAD BEARERS

Note (Y) how bolt connects through load bearers lifetime welded to side of each section leg with twin 1½" fillets. No holes in or load on joints. No horizontal bolts to tear through. Nothing stronger. Only Kuehne has it! Arrow (X) shows ventilated open joint for free moisture drainage.

No Load on Joints!



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two weeks. VN is continuing its full schedule during the summer, but Manager PXA says QRN is plentiful and traffic isn't. 3DWP, of K4MC, is donning double harness. Don says the XYL-to-be can expect a new rig (ham) for a wedding present. Ardent contester JIJ was Virginia winner in the Vermont QSO Party, and placed third in the YL/OM fracas. IA/TFX and menage moved to Warrenton. YZC/YE/KN4CAX say the new QTH looks good. One Field Day note came from BYZ, who says he and EGA went to White Oak Mt. Result — no contact, ten chigger bites. That's starting from scratch, eh? K4NCP, at Dam Neck now has 5 General and one Novice Class operators. KFC worked KCGG for No. 228. BZE has the neighborhood wrapped in wire, judging from his reports of antenna experiments. IF says KRR is back in Portsmouth and KN4CQZ is out of the Navy and has returned to Indiana. PFC BPLEd again. K4ASU is promoting ham radio among fellow instructors at the Navy Radio School and is readying the school club station. Note to all net stations, if you feel you rate a certificate drop the SCM a card. He may be assuming you already have one. Remember the Virginia QSO Party Sunday Sept. 11th at 0800-2000. Details elsewhere in this issue. Hope C U all. Traffic: W4PFC 890, K4ASU 215, W4BLR 174, K4MC 164, W4CGE 157, W4DZ 58, YZC 56, CFV 47, YKB 37, AAD 35, YVG 21, TVO 20, BYZ 11, TFX 10, TYC 9, SIE 8, KFC 6, K4NCP 6, W4BZE 4, IF 4.

1955 VIRGINIA SECTION QSO PARTY Sunday, September 11th

A QSO Party, open to all Virginia hams, will be held between the hours of 8:00 a.m. and 8:00 p.m. EST on September 11, 1955. Any band or mode may be used, but only one QSO per station per band (except for mobiles) is allowed.

Information to be exchanged consists of Number of QSO, RS or RST report, County in Virginia, and operator's "handle." Example: W4YYY, working W4XXX for his tenth contest QSO, sends him "NR 10 W4YYY 599 CLARKE (COUNTY) IGNATZ." W4XXX then sends a similar message in return.

Scoring: Between General Class or higher licensees, score 1 point for each message sent and for each received, or a maximum of 2 points per contact. For each message sent and received where at least one end of the QSO is a Novice (i.e. Novice to Novice, or Novice to higher class licensee), score 5 points, or a maximum of 10 points per contact. Multiply total number of contact points by the number of different stations worked, and multiply that in turn by the number of different counties, to determine final score.

Call "CQ VA" on c.w. and "CQ Virginia Section Party" on phone. General or higher class licensees should call "CQ VA WN" to indicate they intend to listen within the appropriate Novice sub-band. Novices should listen outside the nearest sub-band limit for calls from higher class licensees.

Mobiles operating in more than one county may be worked once in each different county by a fixed station. Similarly, a mobile operating in more than one county may count the same fixed station as another contact from each new county.

Good rallying points include the Virginia Net frequencies, 3680 and 3835 kc.

Abstracts of logs should be mailed to SCM W4KX not later than October 1, 1955.

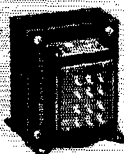
WEST VIRGINIA — SCM, Albert H. Hix, W8PQQ — SEC: GEP, PAM; GCZ, RMs: DFC, GBF, HZA, and JWX. I would like to take this opportunity to announce that GEP is the new SEC. It is requested that the ECs put on a drive to obtain greater AREC membership. Cooperation on the part of hams registering for the AREC will be appreciated by all concerned. The Naval Research Radio Club of Washington, D. C., operated Field Day at Raven Rock, W. Va., with 6 rigs. Several clubs were active in Field Day this year. GBF and PZT again are to be congratulated on their excellent frequency measurement results in the recent Test. OIC is putting up a 1250-ft. long wire. IWB has a new Ranger. CLX now is s.s.b. GCN is doing a bang-up job on s.s.b. NLT has a 40-ft. tower and will have a new beam soon. A Johnson KW, exciter, and auxiliaries have been purchased by the State for installation in the Capitol Building. This equipment is for RACES; however, it also will be used on the ham bands. A special room is being made available for it. CKW and AJI were home recently. PNR is building a new kw. rig. 4ALR, of Louisville, visited PQQ recently. Fellows, please send in more activities information. UYR is ORS. N8VMM is active in Sinks Grove. JGI works 14-Mc. c.w. Traffic: W8HZA 60, GEP 19, PZT 12, PQQ 7.

(Continued on page 98)

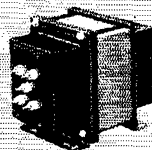
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"POLY-PEDANCE"
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TRANSFORMERS

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.

PART NO.	MAX. WATTS	MAX. D.C.	MTG. TYPE	LIST PRICE
A-3891	15	Pri—100 ma Sec—100 ma	D	\$13.60
A-3892	30	Pri—150 ma Sec—150 ma	D	17.20
A-3893	60	Pri—180 ma Sec—180 ma	D	18.60
A-3894	125	Pri—225 ma Sec—225 ma	D	22.50
A-3898	300	Pri—260 ma Sec—260 ma	FS	70.65
A-3899	600	Pri—500 ma Sec—500 ma	FS	140.70



D



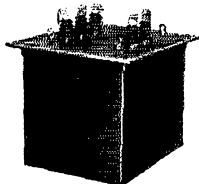
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There are many other Chicago-Stancor modulation transformers, for every class of operation, from this



5 watt, 1 pound, Stancor unit,
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and they are all stock units—sold by your local Chicago Standard distributor.

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Filament—Thoriated Tungsten (quick heating)	
Voltage	6.0 volts
Current	3.5 amps
Plate Voltage, Max.	2000 volts
Plate Current, Max.	150 ma.
Screen Voltage, Max.	600 volts
Plate Dissipation, Max.	75 watts

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ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Karl Brueggman, W0CDX—This month's report was written by KQD. Stations earning Section Net certificates on CSSN since last December are K0ANZ, W0TVI, W0PGN, K0WBB, W0KQD, and W0TUT. CSSN is taking a vacation from July 1st to Oct. 1st. During this year's Operation Alert all ten Mutual Aid Areas were represented for the first time on the State RACES Net. State Radio Officer WIR had activities at state level very well organized. HNN had a picnic at Salida on June 5th attended by 44. The Sky Hi Radio Club has 3 clergymen among its members, also 2 new licensees, W0OXQ and KN0AXC. K0WBB missed BPL for the first time in 7 months. KN0BUL is a new licensee in Salida. MYX is on with 100 watts, phone and c.w., at the home station now. OGO is a new HNN member. KHQ hopes to be on the air soon with a Viking II. K0ANZ has gone home to California for the summer. PBN is returning to California where he will be stationed at Hamilton AFB. PGN serves as net reporter for CSSN and LNH for HNN. MFF has graduated from 7 watts to 70 watts. About 35 people attended the hamfest at Estes Park on June 18-19. IA reports that 9 Boulder operators participated in Field Day activities with one 30-watt transmitter and made 162 contacts. NVX checked into HNN as K0WAR from Ft. Carson while on two weeks duty there. IUF is moving to Denver. YNC now is living in Woodland Park. WFR won the mobile station offered as pre-registration prize at the Albuquerque Hamfest. AGU operated mobile and DRY portable for several days at Beaver Creek camp. Traffic: (June) K0WBB 365, W0KQD 274, K0FAM 127, W0PGN 67, NVX 32, TVB 32, EQK 31, BEN 27, YMP 21, NVU 19, UNMI 10, HOP 9, YNC 9, IA 7, SWK 4, OMN 3, UMS 3, LEK 2, SKK 2, OGO 1. (May) W0NVU 194. (Mar.) W0YNC 118.

UTAH—SCM, Floyd L. Hinshaw, W7UTM—Summeritis has hit the Utah section! Everyone seems to be on "vacation" as far as news items are concerned. SAZ says Eric has received his Novice call, WNTAAN, after a long wait. OOK has been appointed liaison station on the MARS Governor-to-Commanding-General Sixth Region for emergencies. LQE and VJL were mainstays on c.w. for the Ogden Club at Snow Basin. RQT had his kw. phone rig out for Field Day also at Snow Basin. The Ogden Club was the only Field Day group to forward the SCM message this year. Traffic: W7UTM 2.

WYOMING—SCM, Wallace J. Ritter, W7PKX—WNA has moved to Rapid City, S. D. ILW will become new club president. A CAP unit is being organized at Newcastle. HDS reports several new Novices at Cheyenne, and a new operator for the MARS station. There was not much activity on Field Day in Wyoming with only PSO operating portable. The Wyoming section did very well in the c.d. alert Lemon Juice even though no RACES set-up was in operation. All c.d. traffic handled had prompt replies with one exception. HDS and UZP are holding down the Pony Express frequency during the daytime and did a bang-up job. Traffic: W7PKX 86, HDS 76, MNW 21, PAV 16, YSF 8.

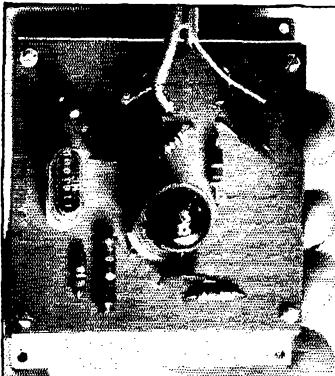
SOUTHEASTERN DIVISION

ALABAMA—SCM, Joe A. Shannon, W4MI—SEC: TKL, RM: KIX, PAM: WOG. New officers of the Birmingham Club are UFI, pres.; IHV, 1st vice-pres.; BMV, 2nd vice-pres.; KNW, secy.-treas.; YEP, rec. secy. WOG still is chasing DX and coming up with some good ones; he also participated with the Tuscaloosa Club in Field Day. DTT, TWK, and K4AOZ are feverishly working on mobile installations. The Huntville Club now has a club call, K4DTV, with IHU as custodian. ZSH has moved and is now located two blocks from VIY. CAH took third place in mobile transmitter hunts at both the Pensacola Fest and the St. Petersburg Convention. USM has the Lyco 600 going at Auburn and is regularly on AENB. KN4CWE is new in Carbon Hill and is giving a Globe Trotter a good workout. DGN is heard on 75 meters occasionally from Decatur. K4AOZ-K4APF are blasting a hole on all bands with the newly-acquired Globe King, and planning an emergency power plant. EBD reports a total of 188 call-ins on AENR during June with three new mobiles, WLM, EFF, and K4CYB. ZSQ has the 20-meter beam up and has acquired a Super Pro. PRS reports good hunting on 2 meters. GOL has a new jr. operator, Nancy Carol. VDK and VDL are listening on a new 75A-3. Traffic: (June) W4HKK 180, YRO 78, WOG 70, KIX 65, DTT 35, ZSQ 27, TKL 26, ZSH 21, OAO 14, CAH 11, EJJ 10, MI 9, TXO 9, EVO 4, TWK 2, USM 2. (May) W4OAO 29.

EASTERN DIVISION—SCM, John W. Hollister, jr., W4FWZ—Looks like June Field Day went over in a big, big way. Radiograms were received from K4DPZ, K4NRC, K4ANW, W4DU, NEK, NVU, PLB, YI, YKY, and ZBA. As usual, Jacksonville and Miami had big turnouts. An excellent report from IYT reflected results of careful planning. Daytona: PSS uses a T-90 and says that AYD is portable in Okalochee (June) and also FET has returned from near WSM! Lake City: Realizing that his city had no amateurs YNM obtained a ticket and in a year coached more than 14 fellows. His AREC has 13 members. That

(Continued on page 100)

HOW TO ORDER: In order to give the fastest possible service, crystals and oscillators are sold direct. Where cash accompanies the order, International will prepay the postage; otherwise, shipment will be made C. O. D.



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For Generating Spot Frequency Signals with Guaranteed Tolerance
1000 KC to 15,000 KC fundamental operation

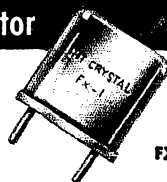
Since the operating tolerance of a crystal is greatly affected by the associated operating circuit, the use of the FO-1 Oscillator in conjunction with the FX-1 Crystal will guarantee close tolerance operation. Tolerances as close as .001 percent can be obtained.

- FO-1 —Oscillator Kit (less tube and crystal)..... \$3.95
FO-1A —Oscillator, factory wired and tested with tube (less crystal) \$6.95

FX-1 CRYSTAL Companion to the FO-1 Oscillator

The FX-1 Crystal is designed for use only with the FO-1 Oscillator. For tolerances of .01% and .005%, any FX-1 Crystal can be used with any FO-1 Oscillator.

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FX-1

Tolerance	1000-1499 KC	1500-1999 KC	2000-9999 KC	10,000-15,000 KC
FX-1 .01%	\$5.25	\$3.75	\$2.50	\$3.25
FX-1 .005%	\$6.00	\$4.50	\$3.00	\$4.00
(.0025% and .001% tolerances are available only by purchasing the FO-1 Oscillator and Crystal together)				
FX-1 .0025%	\$6.75*	\$5.25*	\$3.75*	\$4.75*
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*Prices are for crystal only. To insure this tolerance crystal must be purchased with oscillator factory wired and tested. For total price add \$6.95 to price of crystal desired.



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FA-9 Spot Frequencies 1500 KC to 75 MC .01%

.01% TOLERANCE—Crystals are all of the plated, hermetically sealed type and calibrated to .01% or better of the specified frequency. See specifications below:

Holders: Metal, hermetically sealed, available in .093 dia. pins (FA-9) or .050 dia. pins (FA-5).
Calibration Tolerance: ±.01% of nominal at 30° C.

Temperature Range: -40° C to +70° C.

Tolerance over temperature range from frequency at 30° C ±.01%.

Circuits: Designed to operate into a load capacitance of 32 mmf on the fundamental between 2000 KC and 15 MC. Designed to operate at anti-resonance on overtone modes into a grid circuit without additional capacitance load. Write for recommended circuits.

Orders for less than five crystals will be processed and shipped in one working day.

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Pin Spacing .486 (*FA-9 fits same socket as FT-242)

RANGE	TOLERANCE	PRICE
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1500-1799 KC	.01%	\$4.50
1800-1999 KC	.01%	\$3.90
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Overtone Crystals		
<i>(for 3rd overtone operation)</i>		
15 MC—29.99 MC	.01%	\$2.80
30 MC—54 MC	.01%	\$3.90
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55 MC—75 MC	.01%	\$4.50

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Wire mounted, plated crystals, for use in commercial equipment where close tolerances must be observed. All units are calibrated for the specific load presented by equipment.

Holders: Metal, hermetically sealed.

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Tolerance over Temp. ±.005% from -55° to +90° C.

Range: ±.002% from -30° C to +60° C.

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Circuits: As specified by customer. Crystals are available for all major two-way equipments. In most cases the necessary correlation data is on file.

Drive level: Maximum—10 milliwatts for fundamental, 5 milliwatts for overtone.

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Pin dia. .050	Pin dia. .095	Pin dia. .125
Pin length. .238	Pin length. .445	Pin length. .820
Pin spacing on each of above is .486		

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took real work plus a strong desire to bring ham radio into his city. Thanks, Harry, and the gang: CYG, EGY, EGS, BKV, EGV, ADU, KNs BNO, BOS, DQF, BLL, DHK, and DON, Masaryktown: WN4HSN was high school valedictorian. Miami: A card from ES says he is a ranch-owner. Alonzo also says that GJI gave all his gear to LJM. KN4DRD is new, thanks to DJY. *Bird Sparks*: ZGL got his General Class license. JCG, DTJ, and WYR were on the WAHR ham hour. The Flamingo Net is now 2½ years old and can be placed high among nets of national interest. Ocala: DVR's XYL is now K4DQG. The Red Cross Emergency Net is composed of DVR, HCQ, HJT, ASH, and K4ANJ. Tampa: TYE meets 7 c.w. nets and 2 phone nets. Bob reports his new Viking Adventurer exciter is a help. General: NW is now MO for the Knights of the Kilocycle. Dan also is president of the FBA. Resolve now to overhaul the emergency gear and join a traffic and emergency net. Ask me about 'em. Oh yes, the AREC is sponsored by ARRL. *Affiliated Clubs* sponsor ARRL activities at the local level. Traffic: (June) W4PJU 516, TYE 369, DVR 110, WS 54, WEO 35, FSS 32, LAP 30, BZI 22, IYT 19, ELS 13, FWZ 12, PBS 7, HDU 6. (May) W4IM 4, YNMI 3, HDU 2.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PLE. ECs: HIZ and MFY. K4AKP makes BPL for the fourth straight month. KN4ADY and KN4AEP are working hard to get their General Class licenses. BGG still is trying to find an antenna to fit his yard. GMS is working hard on a 15-meter beam. ZFL keeps the Pensy Radio Club transmitter hot. MUX is back from DX-Land. AXP is always improving his rig. CCY still is trying to put the last watt into the air. Hi, FHQ has a new project going. RUF swears by his Viking II. YES won the DX-100 at the Pensy Hamfest. PQW missed a hamfest!! MS has the 5100-51NSB going and is after s.s.b. WAC with low power. HJA has the mobile gear installed and perking FB. CQX is keeping Crestview represented. FDL and UC still are keeping the gang supplied with parts. KN4CLJ is improving the code speed. KN4DAF is putting out an FB signal. DAO/DHF keeps 75 meters hot. RZV still is kingpin of the Dagwood Net. PAA is planning a tower and beam. TTM/PTK are heard now and then. KN4AGM is going after her Technician Class license. Ed Handy's visit to the Pensy Radio Club was enjoyed by all. VR gets out FB on 7 Mc. JPD keeps the 5100 on 7 Mc. also. K4BZX has been transferred. EAR wants more audio. Traffic: K4AKP 811.

GEORGIA — SCM, George W. Parker, W4NS — SEC: OPE. PAMs: ACH and LXE. RMAs: MTS and OCG. Nets: The Georgia Cracker Emergency Net meets on 3995 kc. Sun. 0830. Tue. and Thurs. 1900 EST; Georgia State Net (GSN) 3590 kc. Mon. through Fri. 1900 EST; Atlanta C.W. Net 7040 kc. Sun. 2100 EST. YTO is starting an antenna farm. He now has 3 poles set complete with a pair of woodpeckers in each pole. BXV is getting good reports from DX on his 45-watt 7-Mc. rig, and is looking for a Utah contact for WAS. BQT is building a sideband rig. Heard on 40 and 80 meters were KN4s ANZ, APC, and DKM. CFJ operated 21 hours during the recent Operation Alert with the help of OPE and UMM. BAI (13 years old) is NCS of GSN. BWD is going mobile. IHF has moved to North Carolina. GCDU paid a visit to the shack of FZO recently. FYC now has emergency power and is C.D. Radio Officer for Lamar County Area. BXV and BYJ are new Class IV OOs. All appointees are requested to check the dates on their certificates and send them to the SCM for endorsement if over one year old. Field Day messages are acknowledged from CVY/4, BKM/4, GXV/4, MQN/4, and ZOA/4. The entire Georgia gang had an FB time at the St. Petersburg Convention. NS has a new DX-100 on the way. FWP has his on the air. ZD and TT attended the Mobile, Ala., Hamfest. Traffic: W4CFJ 4360, PIM 356, OCG 303, 13DY 55, HYY 50, IMQ 32, BWD 23, NS 22, ZUP 18, MTS 16.

WEST INDIES — SCM, William Werner, KP4DJ — DV renewed ORS and OBS appointments. VT finally got on with an 813 and acted as NCS of the 3925-kc. Emergency Net. ES is using a B&W s.s.b. generator to drive a 32V-3. MP is testing a kw. s.s.b. transmitter and has a new Mosley V.P. beam. ABA has cathode modulation working fine. W5VUP and W6GXS visited KP4 and KV4-Land. ABD is active on 20-meter phone. K. AAA, AAM, ABA, ABN, DC, DJ, DV, and HZ operated at Isla Cabras on Field Day. ABD, ACF, BJ, CC, CU, KD, LK, MV, NL, QA, and VH visited Field Day operations. AAN, ABN, and ACU are on 144 Mc. with Gonset Communicator. Emergency frequency allocations for Puerto Rico are 3825 kc. Arecibo, 3850 Guayama, 3865 Virgin Islands, 3885 San Juan and Fajardo, 3900 Ponce, 3925 Island Net frequency for NCS and District NCS only, 3950 Casaca, 3960 Aguadilla, 3980 Mayaguez. DP has 20-meter Tel Rex and new tower with rotator. AIS mounted his 20-meter Tel Rex on retractable 30-ft. tower. MV brought his 20-meter Tel Rex to Field Day operations. CO, WT, ES, WR, DV, RC, DJ, HZ, RD, QM, MC, HM, PW, VH, QA, RE, QF, ZV, WV, KV4AA, and BA participated in Operation Alert. LK is putting up all-band vertical. KD and his son BJ were initiated into the Royal Order of the Wouff Hong at the South-eastern Division Convention. CC received a QSL card from DU7SV for a 3.5-Mc. QSO. NY sends greetings from Marcy, N. Y., Police Dept. and is planning an amateur radio

(Continued on page 102)

Quality, Style and Beauty



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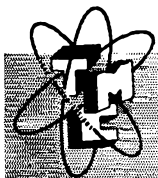
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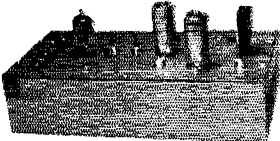
- CC5-50..... 50-54 Mc.
- CC5-120..... CAP Intercom.
- CC5-144..... 144-148 Mc.
- CC5-148..... CAP Intercom.
- CC5-220..... 220-225 Mc.

Choose I.F. frequency—6-10, 7-11, 8-12, 10-14, 12-16, 14-18 or for COLLINS, 26-30 Mc. Model CC5-220 with I.F. 14 to 19 Mc only. These are Cascade models—4 db noise figure. (144 Mc) Tube line up: 6BZ7, 2-6CB6, 2-6J6.

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Model CC5-50, 144 and 148 (in kit form)

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**TECRAFT
Models
C3 & CC3**

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- CC3-50.....(1-6BK7 6CB6 6J6)..... 6 meters
- CC3-144..(1-6BZ7 2-6J6)..... 2 meters
- CC3-220..(1-6BZ7 26J6)..... 1 1/4 meters

Models C3 and CC3 Complete \$34.95

Kits except CC3-220pr. \$24.95

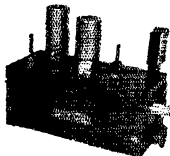
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auxiliary composed of AREC members in the various towns to cooperate with police and operate amateur transmitters from police stations emergency power supplies. If interested, contact Lt. Pabon, KP4DC, or your SCAM, Aug. 13th was the 18th anniversary of the PRARC. Traffic: KPAWT 177, ID 54, MC 33, WR 5, DJ 4, KV4AA 4, KP4QA 3, KV4BA 2, KP4ES 1, QF 1, WW 1.

CANAL ZONE—SCM, Roger M. Howe, KZ5RM—Field Day was lots of fun. Location this year was the village of Gamboa where 3 transmitters were kept on the air (2 simultaneously) for 24 hours on 10, 15, and 20 meters feeding cubical quad antennas. Workers and phone operators, under the able co-chairmanship of CF and RV, were VR, LB, GF, BD, HO, JJ, WA, and JJ's XYL. Burning the midnight oil on c.w. were veterans HR, BG, and GO. Among the visitors were PB, NM, JM, MJ, FL, BC, and AE. Vacationing KZ5s are spread out like this: LR, Corpus Christi; DG and GD, en route from Santa Monica (where DG attended the YLRL Convention) to Seattle; RM, Miami; PL, Newport Beach, Calif., and en route to Honolulu; PP, El Monte, Calif.; JD, Chicago; VP and "Bill" (W5URJ-5 from KZ5CS) in Corpus Christi, with 11 prospective fathers from Coco Solo, Canal Zone, on temporary duty Stateside for a few weeks, and are they keeping the traffic circuits busy with news from the hearthside! W5LUH, Roger, PAA, flew down here twice for visits in June. Traffic: KZ5WA 154, VR 37, BR 25, RV 12.

SOUTHWESTERN DIVISION

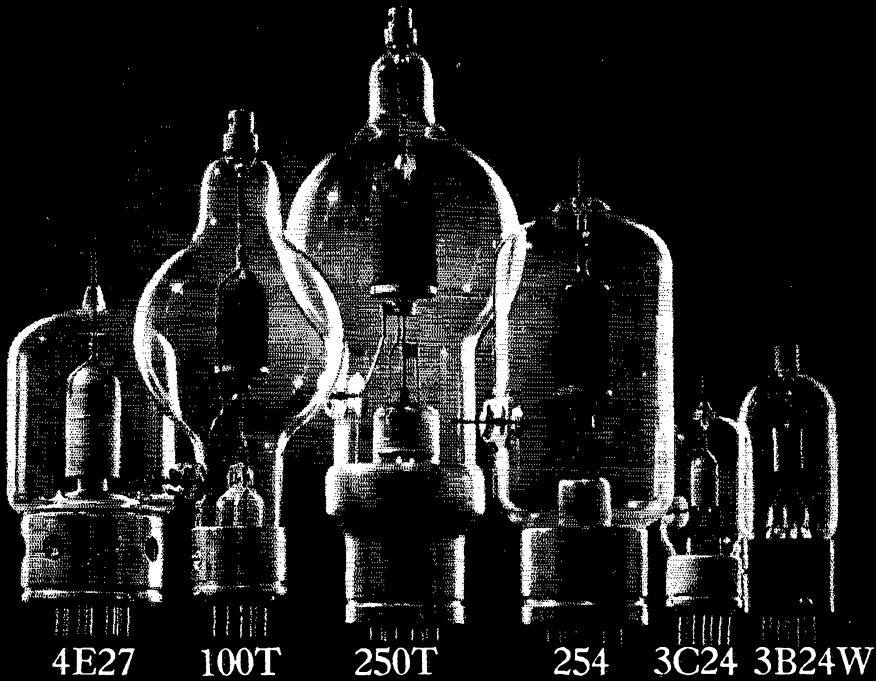
LOS ANGELES—SCM, William J. Schuch, W6CMN—SEC: QJW. RMs: BHG, GJP, and K6DQA. PAMs: PIB and YJ. K6IYF received an RCC certificate. K6HBA has ITV. NTN, has the clicks in the GO-9 licked and again is active. Traffic-minded hams should contact K6DQA, manager of SCN. He needs help. K6BEQ now is 144-Mc. mobile. AM is running 25 watts at his town house, 900 at the ranch. HIF is very QRL at his job of railroading. YVJ is moving to a new home in West Valley. K6EA is QRL with paint brush on the shack and also is working MARS. KN6HOV dropped the "N" from his call. K6COP worked his first VS. The San Fernando gang holds bi-monthly transmitter hunts. All comers are welcome. Contact MEP, CHR, or HGZ for information. The San Bernardino Micro Wave Society worked Field Day on 56, 144, 220, 2400, and 3400 Mc. and came up with a total of 306 stations for a score of 6165 points. A new net is operating on 6 meters and is tied in with the 2 x 4 Net. It is called 2 x 6; K6HKS is net control. Most OOs report they could have done a bang-up business on Field Day. CMN, GJP, and GYH will be at Needles for the Marathon Boat Races Oct. 2nd, a yearly cloze for them. ESR has a new 14-Mc. beam. The Beachwood Amateur Radio Club meets in Hollywood. Contact K6ELX for the dope. RKU and MBA have finished "Q" multipliers and report great results. The Hughes Aircraft employees have formed a new club. Contact K6HKE for information. So many clubs have sent in information on Field Day that it would be impossible to enumerate them all here. By the looks of some of the scores the West Coast should place well up in the national percentage. KN6ITO is Mayor of Avalon. K6DBI and W6EAH are on the technical staff of KBBG, Catalina Island. Thanks, Mel. KZ5BE visited W6GYH and RP. Reports are coming in late, gang; help me out by getting them here immediately after the first. Thanks. Traffic: WGGYH 285, KGEJT 271, DQA 159, W6MBW 152, BHG 138, WPF 128, USY 114, CAK 39, K6COP 39, HOV 33, W6CK 24, ORS 20, K6EA 17, W6YVJ 16, CBO 14, K6KCT 12, W5NTN 11, WT 11, GJP 10, HIF 9, K6IYF 8, W6AM 6, K6ELX 6, HBA 3, BEQ 1, LTA 1, UED 1. (May) W6MBW 413, TDO 87, KN6JIN 6, W6NTN 1.

ARIZONA—SCM, Albert H. Steinbrecher, W7LVR—Asst. SCMs: Kenneth P. Cole, 7QZH, and Dr. John A. Stewart, 7SX. SEC: VRB. PAM: KOY. Arizona Phone Net: Tue. and Thurs. 7 p.m. MST, 3865 kc. The month of June saw quite a bit of activity around the State. The Nationwide Civil Defense "Operation Alert" embraced 40 operators located in 14 communities in Arizona. The following towns and calls were represented: Phoenix: KOY and RBA were NCS for the State, with QZX and YFG located at State C.D. Headquarters. Other Phoenix stations were MAE, MQW, NCL, QZH, SUL, UYA, and mobiles JLV, NAP, and TNY. Tucson: LAD was NCS at C.D. Headquarters with LHD and ULP. Mobiles located around the City were: LVR, MOB, MQE, QHD, RNB, STV, UCX, VZJ, and YXE. Flagstaff: LSK, Fort Huachuca: 5GK, Fry: MES. Gila Bend: LFZ, Globe: PKM, Kingman: UXX, Morenci: LZT and PXM/M. Payson: VYM. Prescott: OPY, Weldon: RIP, Winslow: PJY, Yuma: OFA, TJT, and WBG. The OPRC elected MOB, pres.: ULP, vice-pres.: LAD, secy.-treas. Field Day found 4 groups active around the State: Yuma: ACN, BMC, EYT, JNY, GEB, OFA, SXR, TJT, WNO, WRP, ZTA, ZTR, ZTZ, 8ICF, and 6ANM were at Boy Scout Park. Other groups were on Mount Lemmon, with L/P and PZ on Minus Mountain and Mt. Union. WUG has left for CT2-Land and will be on the lookout for Arizona contacts. His call will be CS5AC. Traffic: W7WUG 54, LVR 16.

SAN DIEGO—SCM, Don Stansifer, W6LRU—All are

(Continued on page 104)

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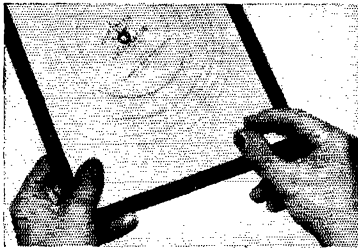
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reminded that the Southwestern Division Convention will be held Sept. 30th, Oct. 1st, and Oct. 2nd in San Diego. Everyone is invited. WYA, convention chairman, has returned from the East where he visited Headquarters. A new club, the Mike and Key Club, is desirous of affiliation with ARRL. Officers are: K6DVD, pres.; K6CJS, vice-pres.; W6URP, secy.; and K6JHD, treas. They invite any interested parties to contact URP. Most members are from the Lemon Grove/La Mesa/Encanto Area. IAB, at Camp Pendleton, is on 2 meters with 100 watts. BAM, old-time DXer in Santa Ana, worked VQ6LQ and hopes to reach 200 countries some day. Ex-KH6AJF and KL7BLG now are operating from YDK. KL7MF, ex-SIG, ex-MI, and his wife, Louise, were recent San Diego visitors while on vacation. The picnic at Orange County Park was very successful, as was the Upper Ten Picnic at Cardiff. OZO is sporting a new Communicator on 2 meters. Two fine examples of amateur public relations were evident recently when stations were manned at the Orange County Home Show and the San Diego County Fair. Credit goes to VFT, the SEC, and the AREC members who manned the station at the San Diego Fair with an impressive array. CAE has passed the 170 mark in countries worked. CRT still is working new ones. WNN worked VS1CT in Sarawak on 14-Mc. phone. ZWK also is heard working 1X on 14-Mc. phone. LRU has a 75A-1 and still is hunting for country No. 200. Field Day is over, and from all indications the largest turnout in the section in history was recorded. Some very terrific scores were run up, and a good time was had by all participating. Traffic: W6IAB 281, YDK 1514, K6DBG 26.

SANTA BARBARA — SCM, William B. Farwell, W6QIW — New appointments: K6KPU as SEC; K6D as ORS and OPS. Glad to have K6KPU as our new SEC. We know he will make a good one. KFM is new Communication Chief. CJD, and Disaster Corp, Santa Barbara. JGQ is Communication Chief for Region Seven. Congrats to KN6LFG on getting his ham ticket the hard way. He is blind. GYT is stationed on desolated San Nicholas Island. KN6JUN has a new four-element beam on 145 Mc. WYN has gone with the Navy to Hawaii. K6CNY is conducting a code and theory class. All the clubs in the Santa Barbara section were very active on Field Day and your SCM received Field Day messages from all. QHC puts out a potent signal on a.s.b. Traffic: K6NRI 85, W6QIW 56, NKT 26, BRY 18, K6CNY 11, KPU 9, W6YCF 5, PKW 2.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, T. Bruce Craig, W5JQD — SEC: RRM; PAMs: PAK and IWQ. RMs: PCN and QHJ. QDF is out of the Air Force and attending Tech College. K5FID now is the call at Reese AFB, Lubbock, with ZFB as chief operator. The Panhandle Amateur Radio Club at Amarillo announced new officers are SOC, pres.: YR, vice-pres.; CKV, secy.-treas. AHC served as relay in long skip from Lubbock to Ralls when a storm destroyed communications. JQD handled only a few messages through IVW. NTX (No. Tex. C.W. Net) meets on 3770 kc. at 1845 daily and needs more stations. The Snyder Amateur Radio Club had a pleasant surprise June 21st when Milt Russel, DL4FZ, from Germany, dropped in to visit and join the club. WN5GTW reports completion of WAS. Reagan County Amateurs (Texon) report a good Field Day; a new ham is KN5BBO; WWF furnished the transmitter for Field Day; GKY uses a 33-ft. vertical made from telescoping TV mast and works 1B on 40 and 15 meters; WNJ/M received Q589 from Guam on 40-meter mobile. ACK plans a new transmitter with grid-block keying. K5FFB is net control of the Yankee Net (0900 on 7200 kc. daily). DTA/5 reports WAS on 75-meter c.w. with 65 watts. NFO reports the Terry County Radio Club will have a hidden transmitter hunt. MBP reports 82 per cent attendance on the Blue Ridge Net (160 meters) for June. LR (originally W6LY) has returned to Dallas after 2 years with the ECDA in Chicago. He reports the Oak Cliff Radio Club is in the planning stage. ACU, JUN, and JQD vacationed in New Mexico and worked PTK (the son of JQD) on regular schedule. Traffic: W5KPB 185, UBW 141, CVA 124, FJB 120, AIC 91, PAK 64, CF 33, TFP 33, ACK 32, CVW 25, ZTB 16, ASA 13.

OKLAHOMA — SCM, Dr. Will G. Crandall, W5RST — Asst. SCM: Ewing Canady, 5GIQ. SEC: KY, RMI; GVS. PAMs: PML, SVR, and ROZ. The high point of the month was, of course, the West Gulf Division Convention at Fort Worth, which was excellently managed and had a wonderful attendance, giving many of us a chance for a QSO "vis-avis" with those we had been meeting on the air for years. Many questions were thrashed out at the various sectional meetings. The Bar-B-Q and dance was well attended and only marred by the sudden death of IIK. One of the fine things at the Convention was the presentation, in absentia, of a scroll signed by the net controls of the North Texas-Oklahoma Traffic Net to PAK in recognition of his splendid services as net manager. Everyone who attended seemed satisfied that CF had been elected Director of the West Gulf Division. The Watonga Ham Picnic was reported a success by all. We expect good results from JCB, new Oklahoma County EC. DFV is the new Payne County EC, succeeding TKE. GVV should be heard more often on ham

(Continued on page 106)

2 DX Bands!

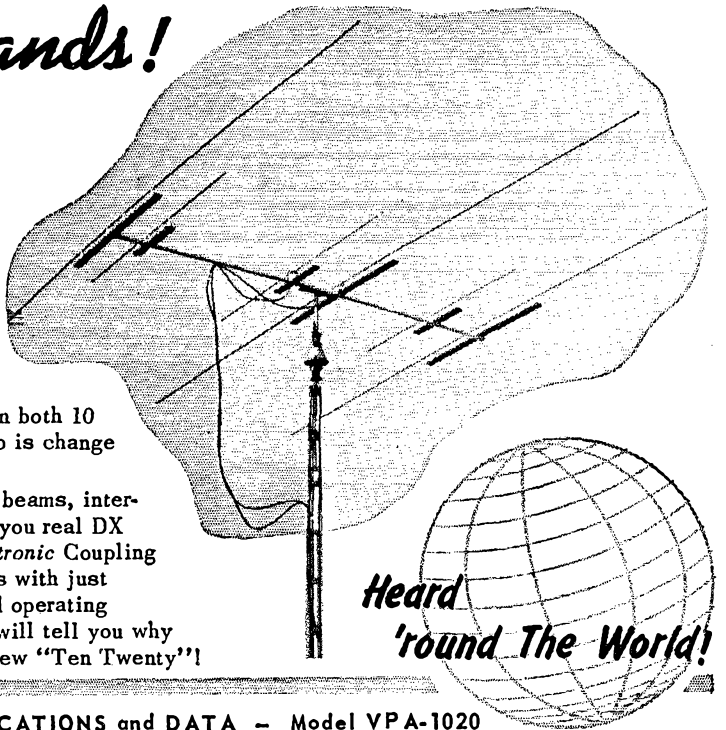
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Forward Gain (over full size dipole): 7.5db.

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(Performance data essentially the same for both ten and twenty meter operation.)

Elements: 61ST6 Tubular Aluminum. Maximum length, 22½'.

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Wind Load: 228 lbs.

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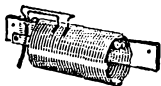
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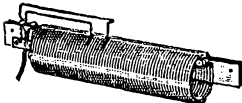
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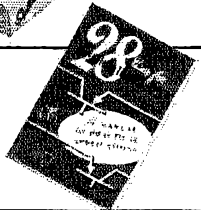
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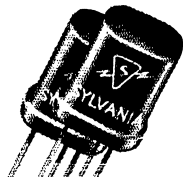


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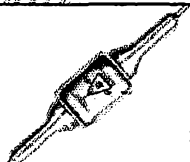
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106

frequencies with a DX-100. The Oil Capital Mobile Club is active and thriving. The Tulsa Central ARC has its club call and used it Field Day. It's too bad that many club calls are heard only on Field Day. Traffic: W5GVS 325, KY 42, FEC 32, PML 30, QAC 29, CBY 26, ADC 24, RST 23, CFG 20, HCG 14, PNG 14, SVR 7, GXH 6, ITF 6, TNW 6, BBB 5, TKI 4, UCT 3, VAX 3.

SOUTHERN TEXAS—SCM, Morley Bartholomew, W5QDX—SEC: QEM. The Fort Worth Convention was a big success. The guys and gals who spent much of their time to put on the show deserve a vote of thanks. Galveston was selected for the 1956 Convention. VUS, Galveston Area EC, has that section ready for any emergency. AET, Hidalgo County EC, has spent more than two years to completely organize the hams there. Seventy-seven were in attendance July 3rd at a barbecue given by WIS at his farm. YXH spent several weeks in the hospital. According to last reports Vince is on the mend. URW has a new DX-100. The 144 and Up Club held its second V.H.F. Roundup July 3rd on the farm of FSC near Deaunville. KN5BFF has just gotten on the air. FND is on 2 meters, while DIC and HHO are busy completing their 2-meter rigs. The Texas YL Roundup Net meets each Thurs. 8:30 A.M. on 3880 kc. All YLs are invited to check in. NC is WXY, the alternate is ZPD. LOW is busy organizing the Corpus Christi emergency group. QZZ soon will be operating KL7 from Anchorage. TQL is portable at Rockdale this summer. MN keeps regular schedules with KH6AJF, CTZ, DFA, EPZ, UNZ, WN5a HTE, HTG, and HTJ kept regular schedules with their families at Houston while attending summer encampment with the Texas National Guard at Fort Hood. Fellows, please send in your activities reports. Traffic: W5MNO 299, URW 11.

NEW MEXICO—SCM, Einar H. Morterud, W5FPB—SEC: KCV, PAM: BIW, V.H.F. PAM: FPB, RM: JZT. The NMEPN meets on 3838 kc. Tue, and Thurs. at 1800 MST, Sun. at 0730; the NM Breakfast Club meets on 3838 kc. daily except Sun. at 0700-0830 MST. The NM C.W. Net meets on 3633 kc. daily at 1900 MST. ZU and his XYL, CEE, and your SCM attended the West Gulf Division Convention. NSJ is running 120 watts to an 829B on 50 Mc. and has worked 20 states; he also is building 50- and 430-Mc. portables. KWP is active on 50 Mc. and is building a 28-50-Mc. rig for mobile or portable. MYI is putting a 6146 on 50 Mc. and has a 1-watt 50-Mc. handy-talkie. MYQ is building a Ferrisweep for receiver alignment. RFF is building a 28-50-144 Mc. receiver with variable i.f. New appointees: NQG and ZU as ECs; MSC and WNU as OOs; RFF and WNU as ORS. Many old appointments that were not endorsed have been cancelled. There are 64 active members in the Albuquerque, Los Alamos, Mesilla Valley, and Roswell Chapters of the Amateur Radio Caravan Club of New Mexico. KN5ADS, W5FAG, ECS, FJE, FMM, OAI, PIZ, UCX, VJN, and ZSL assisted in the Albuquerque Operation Alert. Hobbs, Los Alamos, Mesilla Valley, and Sandia Base Radio Clubs, K5ADQ, W5DAH, PIZ, WBJ, and W9TLM/5 participated in Field Day. Traffic: (June) K5FEF 171, W5CEE 31, RFF 28, BZB 9, ECS 2. (May) K5FHU 1119.

CANADIAN DIVISION

MARITIME—SCM, Douglas C. Johnson, VE1OM—Asst. SCMs: Fritz A. Webb, 1DB, Aaron D. Solomon, 1OC, SEC: RR. From Field Day messages received, the following are calls of clubs or groups active on that week end: VE1s IM, CW, FO, RC, WO, ND, LC, SH, GM, DN, JY, VOs IT/VO2. VE1WL was active as a Class B station. Recent visitors to Halifax were W1TQP and VE2AHZ. The latter is known professionally as the "Great Morton." VC is busy putting the finishing touches to a new DX-100 transmitter. BILL reports the meeting of the Bathurst and Campbellton AREC each Sunday morning. IT is a new N. B. ham and operates 80-meter c.w. on the low end. Bouquets to KZ for his untiring efforts in providing hams with P.E.I. QSOs for the WAVE award. AEB is testing a new 60-watt official mobile unit and it promises to put out a husky signal from the Restigouche Area. Congrats to BN. In the recent Frequency Measuring Test Les came up with an average error of 21.7 parts per million. EF, QY, and OM have been busy giving out with N. S. QSOs on 50 Mc. during recent good openings. W2WSP has been heard mobile in the Liverpool Area. Traffic: VO6AH 215, VE1FQ 122, AV 56, VO6AF 32, VE1UT 31, ME 16, GA 15, OM 8, ABZ 7.

ONTARIO—SCM, G. Eric Farquhar, VE3IA—Field Day in this section was most successful and now that it is over the gang is getting back to normal operation. While the summer lull is upon us mobilers and traffic-handling stations are active. Active in Alert No. 2 were FU, BXX, BIW, AHL, BY, IE, BUR, FAM, DU, and HO. BNQ, striving for WAPA, tallies 18 out of a possible 63 counties. The North Bay Hamfest again was voted the best yet. The last meeting of London Amateur Radio Club was very profitable to those attending, who heard YJ deliver an excellent discussion on antennas and transmission lines. VZ has a home-brew transistor receiver. BSIJ is the call of the Quinte ARC Belleville. BCY is back on the air after a long absence. BSW vacationed in the Maritimes and

(Continued on page 108)

"Worked 87 foreign countries, all continents and 30 zones" with a Gotham Antenna and **35** watts.

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Florida, 1955

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When my Gotham arrived, it was easily assembled in a couple hours. The same transmitter was used to excite the Gotham antenna, using the same power as before. Results have been quite gratifying, and it is interesting to note that in the three months since using the Gotham antenna, I have worked 87 foreign countries, all continents, and 30 zones.

I am able to keep schedule with amateur radio—* in the Cape Verde Islands every week. It was impossible to even hear this station before using the Gotham beam.

Extremely high winds are prevalent in this part of Florida. The Gotham beam has withstood blows in excess of 50 miles an hour without failure.

The elements bend almost double in these high winds, but readily return to their original configuration when the wind abates. I feel that this is an extremely important feature of the Gotham antenna.

I have enthusiastically recommended Gotham to all the hams who ask what type I am using (and most of them do, when I tell them the amount of power I'm using). I wish you every success with your product, and feel that it is well worth the modest price.

Yours very truly,

(Names and *call letters upon request.)

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 - Deluxe 3-El Gamma match 46.95
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dropped into Headquarters. With deep regret we record the sudden passing of Bert Knowles, QB. For many years he worked faithfully as QSL Manager for this section. It is regrettable that no one took time to inform us more fully, yet several stations were heard indicating their wish that they be appointed but a few hours after the news broke! To us this is not ham radio. To the incoming QSL Manager, whose appointment comes from Headquarters, we extend best wishes and trust that he will follow the high standard of service to ham radio that Bert set. Traffic: (June) VE3VZ 120, NO 92, BUR 77, DPO 68, KMI 40, AUU 37, TO 2, VD 1. (May) VE3DPO 192.

QUEBEC—SCM, Gordon A. Lynn, VE2GL—It is with regret that we record the passing of ASW. Dr. Stockwell died very suddenly in the middle of June and the sympathy of the entire VE2 gang is extended to the bereaved. Field Day held the spotlight in activity in June, VE2 being represented by many groups in many parts of the Province. BK operates week ends from his summer QTH at Dunany with 120 watts to a pair of 6146s and has an 813 linear on c.w., a.m., and s.s.b. from the home QTH. XX's new mobile in the new car sounds FB, as does that of WK, who has an Elmac AF67 with 60 watts. BE is enjoying s.s.b. and BG is gradually falling too! Recently-appointed Aest. EC VE2ADD was active with his Amos members in search for a missing man. OB has a new jr. operator. FL has acquired a Mark II which will be at the disposal of all area AREC members as a portable station when needed. EC reports continuing skeds daily at 0830 and 1300 on 3.7 Mc, with KJ, APP, UB, and AOB. ACS is operating from Forestville for the summer. ANK and AUH are fighting for WAS. KG is building a new rig with 829 final for the new car. PQN continues operating on a reduced summer schedule, Mon., Wed., and Fri. at 7:15 p.m. on 3670 kc. Traffic: VE2EC 35, GL 14, FL 10.

ALBERTA—SCM, Sydney T. Jones, VE6MJ—PAM: OD, RM: XG. The NARC has lost its president, ZR. Ernie and his XYL have moved to Montreal with CPA. Best wishes from the Edmonton gang, Ernie and Barbara. YD was heard recently on 3.7-Mc. phone after a long absence. BI has been bitten by the ham bug again. MJ is considering mobile operation. HM and NX kept in touch with Isachsen and relayed traffic in connection with the mercy flight. NX has made DXCC. VE8MD is visiting with IIM before taking off for the north to install another weather station. OS reports two new calls in Lethbridge, MR and UL. WC has made a start on the new 813 final. AL has gremlins in the new rig. Congratulations to FV on his election to membership in the A-1 Operator Club. CE was heard from his mobile while operating in British Columbia. CE and family have returned from a vacation to Vancouver Island. His son Peter is sporting a brand-new call. Traffic: VE6HM 67, NX 55, OD 32, YE 25, WC 16, MJ 6.

SASKATCHEWAN—SCM, Harold R. Horn, VE5HR—Sorry, gang, but the SX-96 did not stay with us. 2BG, Canada's oldest licensed ham (1907), was the lucky man. 5AI won the Gus Cox Trophy for c.w. Lorne turned out an FB copy for c.w. MQ is the proud possessor of the fur-lined button holes for the efforts in the Liars Contest. 3EY, ex-5UO from Ottawa, came the longest distance, with 7QE second. 7QE also was the oldest ham at the hamfest. PT was the youngest. MO was first in finding the hidden transmitter, with TH coming second. TH also put over some FB sports events for the ladies and youngsters. The best mobile was won by LW, with BL second. XX and YY, Keith and June Baker, our newest hams, helped to show that Regina holds some kind of a record for double-letter calls. NN, WW, XX, YY, and ZZ all have Regina as their QTH. 6PE, 4AS, 4GE, and 4RF were other districts represented. To those who came to the hamfest, thanks again and we hope you enjoyed yourselves. To the others, sorry you could not make it but hope to see you at the next one.

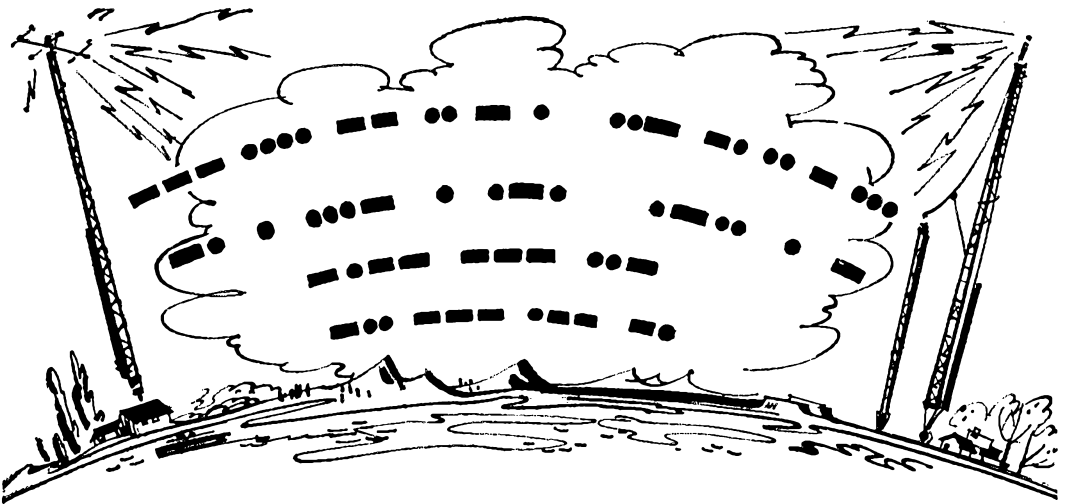
FEED-BACK

W8MNX informs us that the part number for the modulation transformer in the 50-Mc. rig, described in July *QST*, is A-3008 instead of A-3003.

In the "Four Band S.S.B. VFO," July *QST*, the grid resistor should be 0.1 megohm instead of 0.01 megohm.

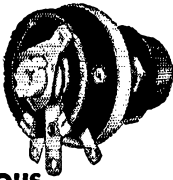
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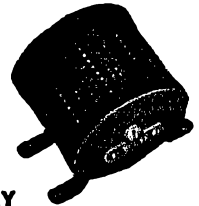
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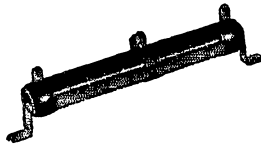
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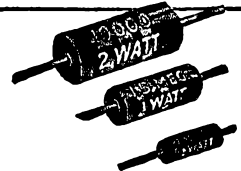
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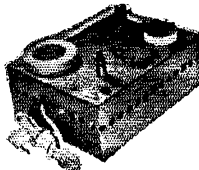
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THE *hump* (around 8 words) is the thing that tells you you have wasted your time by starting out wrong. Thirty years ago when we started teaching Code our students too ran head-on into the *hump*. We went to work to find out why. TWO-PHASE, STEP BY STEP instruction is the perfect answer. In this method dotdash is not A. The SOUND resulting from dotdash is A. There is also the important factor of correct timing. If the signals are not timed correctly the resulting sound will not be correct. There are many, many things connected with proper Code instruction, many of them so small they seem inconsequential. Others are so technical that many so-called experts fail to understand them. It's a long story but I have it all written up and will be glad to send it to you. A postcard will bring you the full story.

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Solarized QSO

(Continued from page 11)

CQ-1) amplifier. Although the receiver was usually limited to 'phone reception only, the "rushing" noise of very strong c.w. signals could sometimes be copied. A separate random-length antenna was used for receiving.

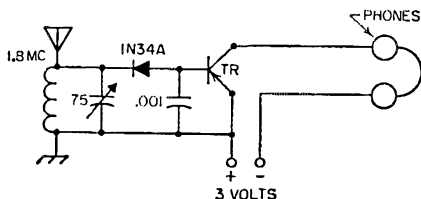


Fig. 3—Transistor receiver using a crystal detector and transistor amplifier.

Results

A total of four two-way contacts, two 'phone and two c.w., was made with Field Day stations W1ICP/1 and W1DXI/1. Both of these stations reported the solar-powered signals loud and clear. Although the distances involved for these contacts were only a few hundred feet, several miles could probably be worked with proper antennas and good conditions.

Code-Practice Oscillator

(Continued from page 22)

the peak current, and in conjunction with the 20- μ f. condenser provides sufficient filtering to give a crystal-like tone. The two resistors in series across the plate supply serve as a bleeder and help to hold the voltage under control when the oscillator section is not operating.

The second triode section of the 12AU7 functions as an oscillator in a Hartley circuit in which the plate is at ground potential for audio, with output taken from the cathode circuit. The voltage drop across the 2000-ohm resistor in the plate-supply section provides the necessary 10 volts to bias the triode to cut-off. Only the bias voltage of 10 volts appears across the key.

The 3-4-ohm voice coil of the usual 2- to 4-inch speaker is connected directly in the cathode return, eliminating the output to voice-coil transformer usually required. A speaker without the output transformer compares in cost with low-cost 'phones, therefore speaker output can be obtained without increased cost. If it is desired to use headphones, they may be connected at the points indicated. Suitable output was obtained using 'phones from 500 ohms up. (If the speaker is omitted, the negative supply lead is connected directly to the bottom of L_1 .)

The heater circuit should not be grounded, because the full plate voltage would appear between the cathode and heater in the rectifier section. With the heater floating, the cathode-to-heater insulation of the two sections is in series, providing sufficient rating for the voltage used.

(Continued on page 112)

The Original

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Devised and created by E-Z Way over 5 years ago. Often copied but never equalled. (Patent applied for.)

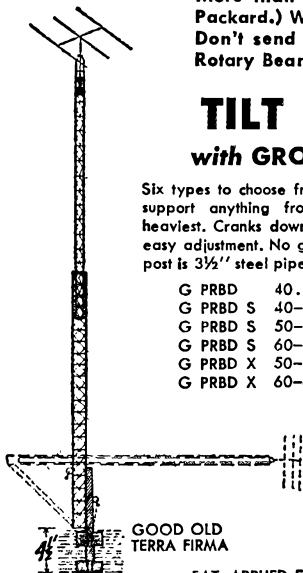
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More than 15,000 satisfied users. "Ask the Ham who owns one." (Courtesy, Packard.) We make one of the sturdiest and most versatile towers in the industry. Don't send a boy to do a man's job. E-Z Way Towers are designed to support Rotary Beams—not just a light weight TV antenna. We invite comparison.

TILT OVER with GROUND POST

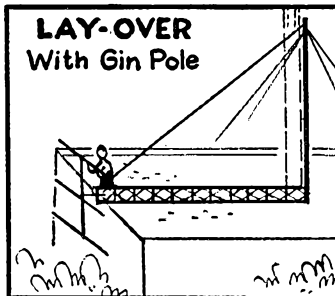
Six types to choose from—40 to 65 ft. Built to support anything from a Mini-Beam to the heaviest. Cranks down and tilts over for quick, easy adjustment. No guy wires needed. Ground post is 3½" steel pipe or larger.

G PRBD	40	.....	\$120
G PRBD S	40-45	.....	\$160
G PRBD S	50-60	.....	\$210
G PRBD S	60-65	.....	\$260
G PRBD X	50-55	.....	\$325
G PRBD X	60-65	.....	\$385



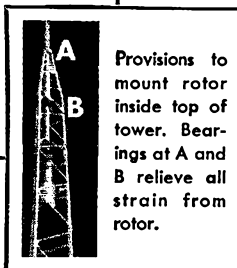
Three types to choose from—40 to 60 ft. Ideal one-man installation for flat roofs or porches. Cranks up and down and lays over for easy antenna adjustment. No guy wires needed. Tower is locked in a V-bracket at top of gin pole.

GIN-RBD 40	\$125.00
GIN-RBD 40-45	\$165.00
GIN-RBD 50-60	\$215.00



We pay freight charges on any towers shipped in U. S.

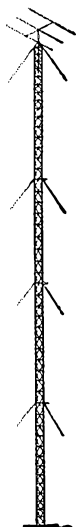
Add 10% to prices shown for West Coast orders. All E-Z Way Towers have heavy dip-coated Goodyear Pliolite S-5 (rubber base aluminum enamel). Hot dipped galvanized available at extra charge. Lightest cables used on our Ham towers is 2000 lb. test—most cables used are 2600 lb. test.



Provisions to mount rotor inside top of tower. Bearings at A and B relieve all strain from rotor.

BUILD IT YOURSELF

Go as high as you like with 30 ft. sections. 320 ft.?



C-10

Width 10"
Max. Height 120 ft.
Guy Spacing 27 ft.
Weight per ft. 4½ lbs.
Price (approx.) \$2 per ft.



C-15

Width 14"
Max. Height 200 ft.
Guy Spacing 40 ft.
Weight per ft. 8 lbs.
Price (approx.) \$3.50 per ft.



C-25

Width 25"
Max. Height 320 ft.
Guy Spacing 60 ft.
Weight per ft. 20 lbs.
Price (approx.) \$9 per ft.

Used extensively for VHF and UHF communication antennas. Two other sizes available. When maximum height and guy spacing are not exceeded, these towers will withstand a 60 lb. wind load.

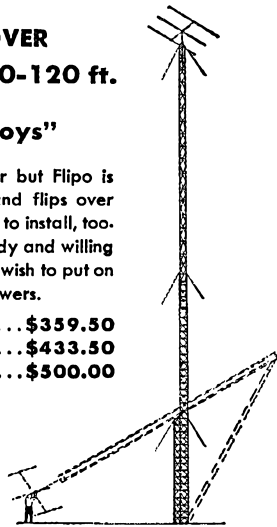
FLIP OVER

80-100-120 ft.

"for the high boys"

Gets you up in the air but Flipo is easily cranked down and flips over to adjust antenna. Easy to install, too. A real sturdy brute ready and willing to carry any load you wish to put on it. One of our finest towers.

FOX 80	.....	\$359.50
FOX 100	.....	\$433.50
FOX 120	.....	\$500.00



WRITE FOR CATALOG

When writing, please specify type of tower in which you are interested, height and expected antenna load. This information is necessary to give you accurate advice.

E-Z WAY TOWERS INC.

5901 E. BROADWAY
P. O. BOX 5491

PHONE 4-3916
TAMPA, FLORIDA

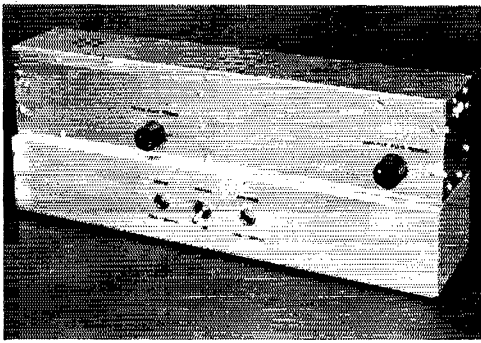


Fig. 17-31 — A tripler-amplifier for 432 Mc. using dual tetrodes. Shielded construction and forced air cooling are employed. . . . This sleek unit is just one of the many pieces of VHF equipment you can build from complete directions in the 1955 Radio Amateur's Handbook. Five chapters on VHF and UHF gear and antennas with dozens of photographs, tables and drawings in the 768-page . . .

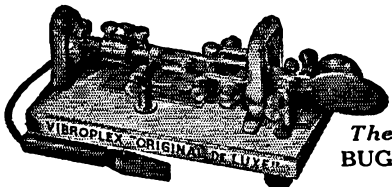
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Construction

To benefit from the circuit design, the unit should be completely enclosed in a cabinet. A midget speaker case makes a fine enclosure, and can be fitted with a subpanel and, if required, a perforated metal back plate. Alternately, a sloping-front meter case can be easily fitted with a grille at even less cost.

The original unit pictured was constructed in a case which may be recognized as a surplus electric-blanket control. A perforated metal speaker grille replaces the original thermometer-type dial arrangement. The knob on the left is the off-on switch which was an original part. The key jack is located behind the hole on the right. Although these surplus units have been available for a nominal price, few parts, other than the case, are adaptable to this construction.

Wiring

Wiring is straightforward and no difficulty will be experienced if the socket terminals are checked carefully and the proper polarity of the 20- μ f. electrolytic filter condenser is observed. Polarity of the coil L_1 is not critical, in event one of another make is used and its leads are coded differently from the one shown (the center-tap must of course be correctly identified). Since the values of L_1 and C_2 determine the tone, any large deviation in L_1 may require a change in the value of C_2 . A simple trial-and-error process will achieve a pleasing tone.

Civil Defense Package

(Continued from page 29)

slight a.c. hum on the modulation which was cleared up by changing the grounding point of the cathode and screen-grid by-pass condensers of the first audio stage from a ground lug on the power socket to a ground lug near the tube socket.

In tuning up the transmitter, the meter switch should be set to read doubler grid current and the crystal plate should be tuned for maximum reading, which will be around 0.5 ma. The crystal-oscillator plate current will be 5 or 6 ma. Next, tune the doubler for maximum final-amplifier grid current. This should be 3 or 4 ma. with a doubler plate current of about 20 ma. Attach a 10-watt light bulb as a dummy load and tune the final amplifier for maximum brightness of the bulb. The bulb should just perceptibly brighten further with voice modulation. The plate-current dip in the final amplifier should run around 40 to 50 ma., loaded, and the modulator plate current should kick up from a static value of 2.5 ma. to a maximum of 50 to 60 ma.

Measure the bias voltage across the resistor in the center tap of the power supply and adjust the slider for 22 volts bias. The slider should be set at 166 ohms. Make the adjustment with the transmitter on, as it takes the full current in the transmit position to cause the 22-volt drop across the resistor. The voltage will be less during re-

(Continued on page 114)

WHILE NEW YORK CITY SLEEPS

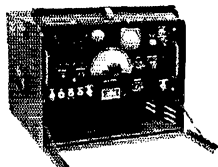
Amperex® VHF TUBES

STAND GUARD

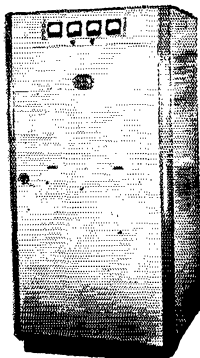
... and over 70,000 Amperex 5894 or 6252 VHF transmitting tubes are now in use all over the country, in approved equipment by Fire Departments, Civil Defense, Police and other Municipal Emergency Services ...

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Amperex TUBES
 have proven
MOST DEPENDABLE

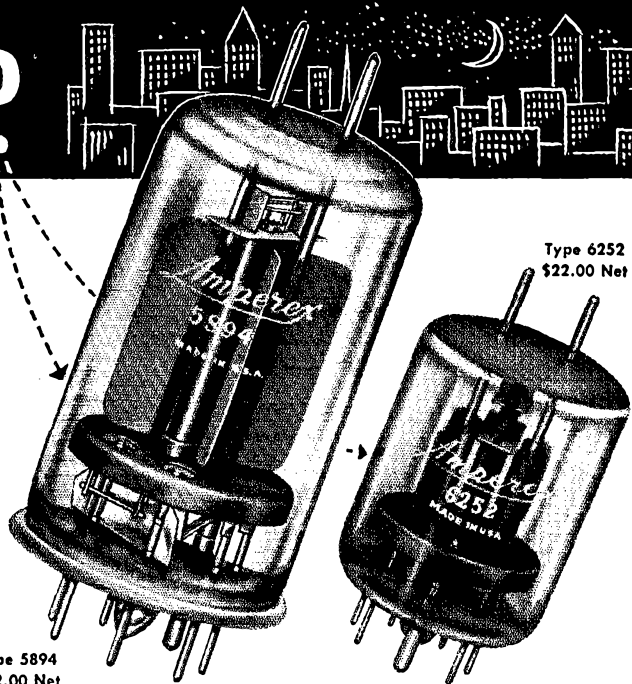
If disaster should strike, will your communication equipment meet the test? In time of disaster, there is no substitute for dependability — even initial cost becomes secondary! Long life, ruggedness and reliability were the watchwords in the final selection of these tubes. If you are planning new fixed or mobile stations, insist on AMPEREX type 5894 or 6252 to be sure!



Sonar Radio Corporation's FCDA-approved, Model CD-2 Transmitter, designed for CD fixed and emergency operation uses the Amperex type 6252.



Radio Engineering Laboratories' Type 715 Transmitter, used by New York City's Fire Department, employs the Amperex type 5894.



Type 5894
\$22.00 Net

Type 6252
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COMPARISON PROVES AMPEREX SUPERIORITY

Maximum Plate Input & Voltage VS Frequency
 (Push-pull, Class C Operation)

Service ICAS	Frequency Band (Mc)	AMPEREX 6252		Nearest Rated Competitive Tube	
		Plate Input Watts	Plate Volts	Plate Input Watts	Plate Volts
Plate	144-148	72	600	49	435
Modulated	220-225	72	600	44	370
Telephony	420-450	51.5	475	31	300

The AMPEREX 6252 ICAS higher voltage and input ratings show the advantage of the independently suspended anode construction which eliminates the need for internal insulation. Competitive tubes use mica insulators between the plate and the rest of the internal structure, resulting in low maximum anode voltage and greater derating at higher frequencies.

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ceiving, but the bias is not used during reception.

For dependable service, which is necessary in c.d. work, all components should be used well within their ratings. This applies to tubes as well as resistors and condensers. A stock of spare tubes and parts should be kept with the equipment in case of failure at a critical time.

Results

In actual use on the air in c.d. drills, this little peanut whistle has performed very well. The receiver also performs well, and although it is not selective enough for regular amateur use (it could be made so) it is ideal for c.d. work. No retuning is necessary for different net stations even though their crystals are 1 or 2 kilocycles high or low.

Installed as a mobile, other mobiles have been worked at distances up to 30 miles during c.d. drills.

Last but not least, there is no TVI from harmonics when a good low-pass filter is used (this is a must), even though the TV set is in the same room. However, it may be necessary to install a few high-pass filters on some near-by TV sets to prevent fundamental overload, even with the low power.

W/VE Contest

(Continued from page 58)

contact; (2) your call; (3) RST report given; (4) ARRL section. *Example:* NR 1 WØZZZ 579 Kausas.

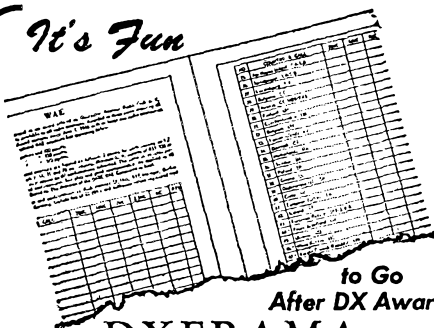
4) One point may be counted for each exchange sent and acknowledged. One point may be counted for each exchange received. For contest credit a station may be worked once on 'phone and once on c.w. on each band. VE/YO stations will multiply the total points by the number of U.S.A. ARRL sections worked. W/K stations will multiply the total points by the number of VE areas worked and also by 7.11, there being nine Canadian areas (VE1 through 8 plus VO).

A station using a power input of 30 watts or less will receive an additional multiplier of 2, and a station using from 30 watts to 100 watts will receive one of 1.5. The final score consists of "total points" multiplied by "sections" (times 7.11 in case of W/K stations) multiplied by the "power multiplier."

5) Each entry must be accompanied by the following declaration: "I hereby state that my station was operated strictly in accordance with the rules of the contest and governmental radio regulations, and I agree that the decision of the Contest Committee of the Montreal Amateur Radio Club, Inc., shall be final in all cases of dispute."

6) All entries shall be sent to Gordy Webster, VE2BB, 69 Pine Beach, Dorval, Quebec, Canada, and must be post-marked not later than midnight October 15, 1955.

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Strays

During a practice alert, messages poured into Pinedale, Calif., civil defense headquarters. The texts of these messages were concerned with evacuation, radioactive fall-out, etc. Operators were stunned though when they received this one: "Waiting since 5:30, stop. Dinner cold, stop. Drop dead, end." It was sent by the wife of a Fresno ham!

— KN6LEY

\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$

Call Henry

FOR

TOP-DOLLAR TRADE-INS



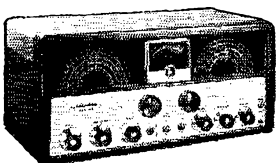
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Ted Henry
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Ranger wired....	293.00	Elmac PMR 6 or 12	134.50	Hallcrafters SX99	149.95
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VFO wired.....	62.50	Morrow FTR.....	125.83	National NC98...	149.95
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RMD DB-23.....	49.50	cator.....	229.50	H-W R-9.....	149.50
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MEMBERS of the League in eight ARRL Divisions will soon be nominating and voting for the directors who will represent them for the next two years. Every amateur taking part in these elections helps further the aims and protects the privileges he has as a ham. Naturally, only League members vote in ARRL elections. Let your voice be heard—sign up now.

QST and ARRL Membership
\$4 in the USA \$4.25 in Canada
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The American Radio Relay League, Inc.
 West Hartford 7, Conn.

144-Mc. Amplifier

(Continued from page 32)

condition, the final grid current peaks at the same tuning setting as that for minimum plate current.

The amplifier is operated at 2000 volts on the plates, at 250 ma. Modulation is supplied by a

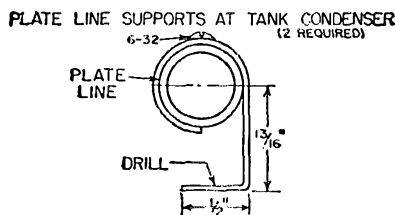
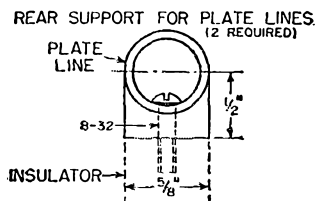
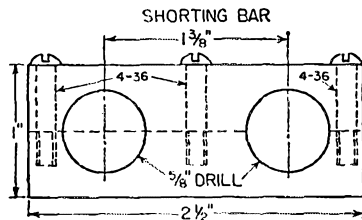
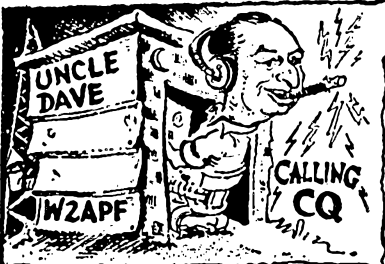


Fig. 3—Plate line accessories for the 2-meter amplifier. The shorting bar is made from a single piece of $\frac{3}{16}$ -inch brass. It is sawed along the dotted line after the holes are drilled. Screw holes in upper portion clear 4-36 screws. Lower portion is tapped. Rear supports for line can be made from a single $1 \times \frac{5}{8}$ -inch piece of brass if proper drilling tools are available, or they can be made from $1 \times \frac{3}{4}$ -inch stock and then cut at center with hacksaw. Contacts for the tuning capacitor are made from $\frac{1}{2} \times \frac{3}{16}$ -inch soft copper bus, formed around line with a soft hammer. All parts silver plated after completion.

pair of 811-As running at zero bias, having an output capability of around 300 watts. Checks have been made with the aid of an audio oscillator and an oscilloscope, and the amplifier operates very stably at 100 per cent modulation, either sine wave or voice, and the 'scope pattern shows good linearity in the modulated stage.

Strays

A QST sub (no pun) has been entered for the Commanding Officer of the USS *Nautilus*. QST rides deep!



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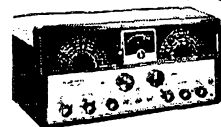
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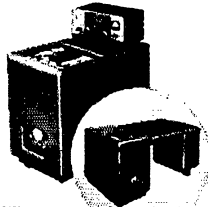
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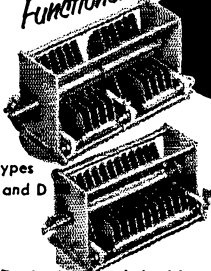
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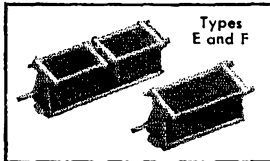


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TYPE C and D—For high voltage—high power applications. Maximum capacities from 50 to 500 mmfd. Breakdown ratings from 3,500 to 11,000 volts. Stealite insulators, aluminum end frames, 1/4" cadmium plated shafts. Panel space required: Type C, 5 1/2" wide x 5 3/4" high; Type D, 4 1/4" wide x 4" high.

TYPE E and F—For medium and low power transmitters. Maximum capacities from 35 to 500 mmfd. Breakdown ratings from 2,000 to 4,500 volts. Aluminum plates .032" thick, aluminum end frames and tie rods. Stealite insulators, rotor contacts are cadmium plated phosphor bronze. Panel space required: Type E, 2 3/4" square; Type F, 2" x 2 1/4".



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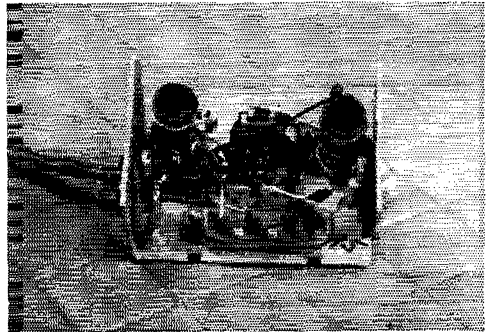


Preamplifiers

(Continued from page 36)

quency with a grid-dip meter. The tube should be inserted during this check and the slide switch placed in the "in" position.

With the preamplifier connected to the antenna and receiver, apply voltages, place the slide switch to the "out" position, and tune in a signal on the receiver. A grid-dip meter makes a good



Bottom view of the miniature preamplifier.

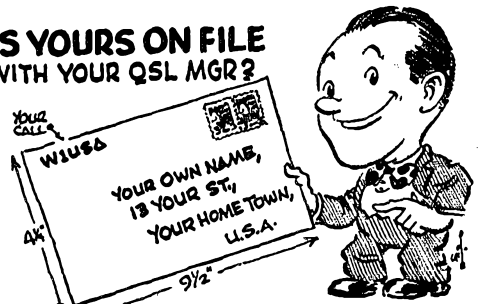
signal source for this alignment. Place the slide switch to the "in" position and adjust the slugs for maximum reading on the S-meter. If the receiver does not have an S-meter, the preamplifier can be adjusted for maximum signal or noise while listening to the audio output of the receiver with a pair of headphones (this eliminates outside noises). If the receiver has an S-meter, it should show an increase of 4 to 6 S-units when switching the preamplifier in. Coils have not been included for 80 and 40 meters, since most receivers operate satisfactorily at the lower frequencies and a preamplifier is not normally required.

COIL TABLE

Band	L ₁	L ₂	L ₃	L ₄	C _A
10	3 t.	20 t.	24 t.	3 t.	none
15	3 t.	27 t.	32 t.	3 t.	none
20	4 t.	27 t.	32 t.	4 t.	20 μf.

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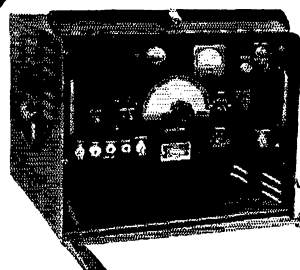
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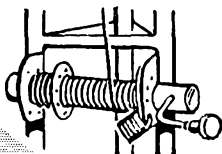
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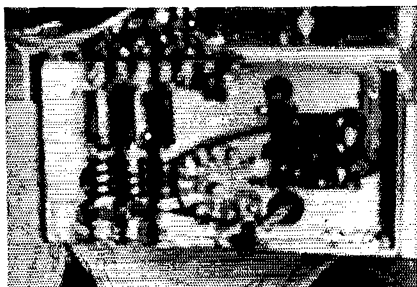


Bandswitching Rig

(Continued from page 41)

meter stage is too small. C_6 should then be set at less capacitance than originally, the VFO reset to 4000 kc., and the slug in L_2 readjusted for maximum grid current. If the readjustment for maximum grid current at 3200 kc. has required a decrease in the capacitance of C_6 , the tuning range of the 80-meter stage is too great. In this case, C_6 should be set initially at a higher capacitance at 4000 kc.

When an adjustment has been secured where the grid current remains essentially constant across the 80-meter band, the bandswitch should be turned to the 40-meter position. The VFO should be set to the low-frequency end of the band, and a high-resistance voltmeter connected



The v.h.f. filter components are enclosed in an extension added at the rear of the exciter chassis. The switch section is S_{2E} .

across the 40-meter doubler grid leak. C_7 should then be adjusted for maximum voltage. This voltage should remain essentially constant over the band.

The 40-meter stage, as well as the following multiplier stages, are lined up by the same method used for the 80-meter stage. The band-set condenser is set at midrange in each case, the VFO is tuned to the high-frequency end of the band, the slug in the plate inductor is adjusted for maximum 807 grid current, and then a check made at the low-frequency end of the band, repeating the process if there is a conspicuous difference in grid current at the ends of the bands. On 21 Mc., it should be necessary to adjust only the slug of L_5 after the circuit has been lined up on 14 Mc.

If parasitic oscillation occurs in the final amplifier when plate and screen voltages are applied, L_7 , L_8 , and L_9 should be adjusted, a turn at a time, until the parasitic is suppressed. In the multiband tuner, it is advisable to adjust L_{11} carefully so that 14 Mc. comes at maximum capacitance of C_{15} , and adjust L_{10} so that 7.3 Mc. comes with the capacitor near minimum capacitance. This procedure should result in maximum separation between fundamental and harmonic resonances.

After the steps described earlier were taken, no sign of instability could be found on any

(Continued on page 122)



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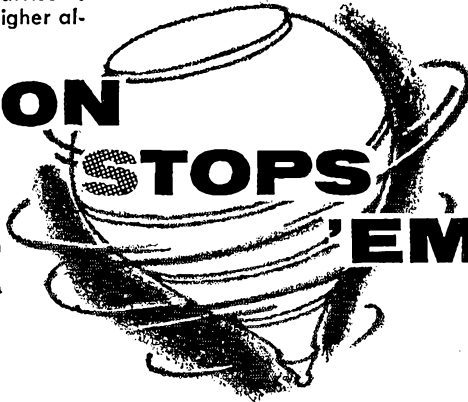
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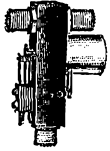
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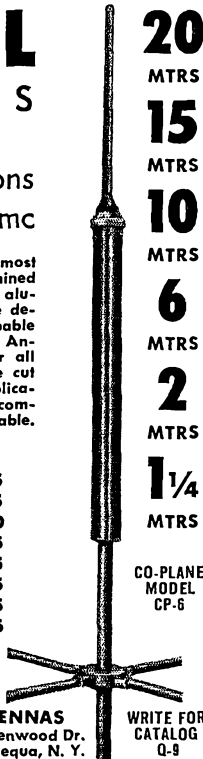
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World Above 50 Mc.

(Continued from page 62)

filed for the contest week end, September 17th and 18th. K4AMX will be operating from Mt. Mitchell, N. C. (highest point in eastern U.S.A.) on 50, 144 and possibly 220 Mc. Frequency on 2 will be 144.23, with 16-element horizontal array.

An International 2-Meter Relay is planned for the contest week end by the 2-Meter and Down Club of Los Angeles. Stations will be manned at various California high spots from the Mexican border north, but cooperation of W7s will be needed to complete the route to Canada. The northern terminal will probably be VE7FJ, in the Vancouver area.

The third-party traffic angle has been taken into consideration (we have an agreement with Canada, but not with Mexico) and if no special dispensation can be arranged for the occasion, the work from the Mexican end will be handled in such a way as to conform completely with our international obligations in such matters.

OES gang: Due to long copy this month we're holding back OES notes. Will combine two months in next issue. Reports are getting better all the time. Keep 'em coming!

June V.H.F. Party

(Continued from page 57)

W2MHE/2 ³ (W2s AMV MHE YGA) 1044-86-12-HD	W2MLX/2 2214-110-18-ABC
W2SFW/2 (W2s OW SFW) 392-49-8-B	W2DZA 1536-80-16-ABCD
W2DMF/2 (16 oprs.) 231-3-7-B	K2BJP... 900-100-9-B
N. Y. C.-L. I.	K2CCF... 600-100-6-B
W2FHJ... 3762-171-22-AB	K2HNA... 360-70-8-B
W2KIR... 1794-138-13-B	K2ICE... 360-80-7-B
W2BRV... 1524-127-12-B	KN2MLB 468-78-6-B
K2BWW... 1206-134-8-B	W2WCM... 315-45-7-AB
W2AOD... 846-91-9-BD	W2BYM... 297-33-9-A
W2LID... 791-113-7-B	K2GLI... 128-32-4-A
W2YHP... 784-112-7-B	W2ESC... 115-25-5-B
W2DLO... 744-61-12-ABC	W2OHL... 60-20-3-A
K2ATL... 450-75-6-B	W2TTM (Ruritan Hay R. Amateurs)... 2737-161-17-AB
W2JBQ... 378-54-7-B	
W2BOY... 352-88-4-B	
W2QQD/2 333-37-9-B	
W2EEN... 315-45-7-AB	
W2BNX/2 106-49-4-B	
W2WOF... 189-17-1-7BCD	
KN2KPT 180-45-4-B	
W2IN... 130-26-5-R	
KN2MPC 104-26-4-R	
K2AZT... 102-17-6-A	
W2VVKP... 75-25-3-B	
W2TUR... 60-30-2-B	
K2IFJ/2 ³ (W2IZT, E2s 1EJ)... 1807-139-13-B	
W2HNI (W2s HNI IVU, K2DVX) 1500-150-10-B	
W2GLO (Levittow A.R.C.) 425-83-5-ABD	
W2JU/2 (7 oprs.) 420-105-4-B	

MIDWEST DIVISION

Iowa

W6GUD... 198-32-6-B
W6VHP... 60-15-4-B
W6USQ... 24-8-3-A
KN6BAN 12-6-2-B

Kansas

W6GLN... 128-32-4-B
W6LL... 104-10-4-B
W6IFR... 56-14-4-B
W6MVG... 55-11-5-AB
W6MOX/0 27-9-3-B

Missouri

W6LOM... 48-12-4-B

Nebraska

W6HXH... 40-10-4-B

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(Continued on page 124)



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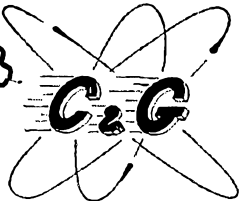
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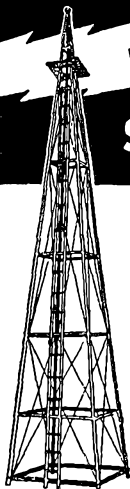
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WNIEFS... 70-35-2-B
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W1QXX... 938-117-8-B
W1JSM... 747-83-9-B
W1AIE... 639-71-9-AB
W1ZEN... 630-70-9-AB
W1DGO... 568-71-8-B
W1DJ... 480-60-8-AB
W1DBH... 404-101-4-B
W1AAL... 329-47-7-B
W1YVQ... 270-21-10-ACD
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WNIEHZ 168-56-3-B
W1IAP... 117-39-3-B
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W1MEG... 88-22-4-B
W1ISR... 54-27-2-AB
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W1CTE... 18-18-1-B
W1ALP... 14-7-2-B
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W1RGM/1 1050-75-14-AB
W1SWJ... 250-50-5-B
W1ESA... 116-29-4-B
W1PHU... 115-23-5-AB
W1RO... 90-18-5-AB

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(A.Y.) 1703-129-13-ABD
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E.R.C.) 540-88-6-ABD

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W7YJE... 216-27-8-A
W7YJE... 189-27-7-A
W7LHL... 180-60-3-B
W7UZB... 156-52-3-B
W7KO... 148-37-4-AB
W7PFA/7 126-42-3-B
W7SFL... 120-40-3-B
W7PQS... 102-17-6-A
W7QKE... 84-28-3-B
W7TLE... 28-28-1-B
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W6EDC... 1050-75-14-AB
K6BTR... 444-74-6-B
W6ZBS/M 135-27-5-B

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W6UTX... 210-70-3-B
K6BYQ/6 (5 ops.)
774-129-6-B

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K6GV... 116-29-4-B
W6FX... 9-3-3-B

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W6PIV/6 464-58-8-AB
W6MLN... 259-37-7-AB

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W4SOP... 102-34-3-B
K4MY... 84-21-4-AB
W4ACY... 80-40-2-B
W4YBH... 78-26-3-B
KN4BYX 50-25-2-B
W4ZXL... 46-23-2-B
W4CPT... 32-16-2-B
W4VHL... 30-15-2-B
W4MDA... 24-12-2-B
WN4IFO... 18-18-1-B
W4GNF... 9-9-1-B

South Carolina

W4CPZ... 22-11-2-B

Virginia

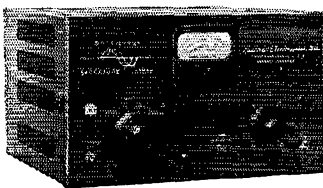
W4JCJ... 1008-84-12-AB
KN4BLC 255-51-5-B
W4VVE... 126-21-6-B
W4UCH... 70-14-5-A
W4VQZ... 63-21-3-B
K4BAT... 51-17-3-B
KN4CZ... 30-15-2-B
WN4HXB/4² (WN4HXB, W4s
VAD WSP)
200-50-4-B
K2DCC/4 (K2s CJK DCF)
170-34-5-B
W4TNQ (W1TNQ, KN4BRR)
112-28-4-B

West Virginia

W8REP... 15-5-3-B
W8ENZ/8 (5 ops.)
1846-137-13-ABC
W3PGA/8 (7 ops.)
1428-81-17-ABC

(Continued on page 126)

HARVEY PRESENTS CENTRAL ELECTRONICS EQUIPMENT for AM, CW and SSB



NEW BROAD-BAND Linear RF Amplifier Model 600L

The 600L has no tuning controls except a single knob selector covering all amateur bands from 10 through 160 meters. Requires only 2 watts effective or 4 watts peak envelope drive power for 500 watts dc input. New band-pass couplers provide 60 to 65% linear efficiency. Uses single 813, class AB₂, and automatic relay to protect 813 and RF couplers.

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Has built-in power supply with excellent regulation of bias and screen voltages. The 600L is effectively TVI-suppressed with thoroughly shielded and bypassed RF compartments.

Available in either table or rack model.
Complete (factory-wired) **\$349.50**

New MULTIPHASE 'Q' MULTIPLIERS

A tunable IF electronic filter that provides tremendous receiver selectivity for peaking or rejecting signals on AM, CW or SSB. Employs new 2-tube circuit with high-Q inductor. Continuously variable from 60 cps to normal IF pass-band. Interfering carriers attenuated up to 50 db.



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Model DQ — Designed for use with any receiver with 450 to 500 kc IF. Has power-IF connecting cable. Power requirements are 225-300 vdc at 12 ma and 6.3v at .6 amps. Can provide additional selectivity and BFO for mobile SSB or CW reception.
Kit **\$22.50**
Wired **29.50**

SIDEBAND SLICER Model A



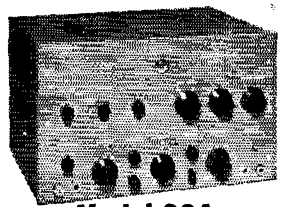
Permits selectable SSB reception on any receiver with 450-500 kc IF. Cuts QRM and reduces interference from 15 kc TV harmonics. Has built-in power supply.
Kit **\$49.50**
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AP-1 ADAPTER — Plug-in IF stage for use with Slicer. Allows receiver to be switched from SSB to normal.
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AP-2 ADAPTER — Combines AP-1 and crystal-mixer for use with receiver having 50, 85, 100, 915 kc or other IF systems.
Wired **\$17.50**

SIDEBAND SLICER — Model B
Complete Sideband Slicer same as Model A, but including built-in 'Q' Multiplier. Does not require AP-1 Adapter. **\$69.50**
Kit **\$69.50**
Wired **99.50**

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Model 20A MULTIPHASE EXCITER

20 watts peak envelope output on AM, PM, CW, and SSB. Has single switch for sideband selection . . . VOX on AM, PM and SSB, plus break-in operation on CW . . . bandswitching, 160 through 10 meters . . . magic eye indicator for carrier null and peak modulation . . . plus many other features. Choice of table or rack model.

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10 watts peak envelope output—AM, PM, CW and SSB. Uses plug-in coils. Improved version of earlier 10A.

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All-electronic VOX break-in anti-trip unit for use with loudspeaker. Prevents loud signals, heterodynes, etc. from tripping voice break-in. Plugs into socket of 20A or 10B Exciter.

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Crystal-controlled converter package to extend 458 VFO into 10-meter band. For use with 458 Conversion Kit.

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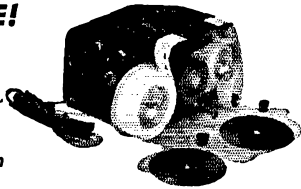
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W7QDJ... 2- 2- 1-B

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Eastern Florida

W4AYV... 70- 14- 5-A

Georgia

W4FWH... 90- 15- 6-AB

W4LNG... 44- 11- 4-AB

W4GIS... 39- 13- 3-R

W4IKK... 9- 3- 3-A

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KN6HPZ... 126- 63- 2-B

W8BWG... 44- 12- 4-A

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6165-400-15-ABCDE

W6SDW/6 (9 oprs.)

1780-177-10-ABD

Arizona

W7LEE... 28- 7- 4-B

San Diego

W6ZOP/6... 378- 63- 6-A

K6COE... 110- 22- 5-A

KN6HMS... 51- 17- 3-B

Santa Barbara

W6QKI/6 (5 oprs.)

1768-103-17-ABC

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W5SFW... 171- 19- 9-A

Oklahoma

W5PZ... 12- 6- 2-B

Southern Texas

W5FYW... 90- 15- 6-A

WN5LHFF/W5HFF

36- 9- 4-AB

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W5KWP... 126- 18- 7-A

W5LFH... 75- 15- 5-AB

W5CA... 4- 4- 1-B

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VE3AIB... 749-107- 7-AB

VE3DNX... 656- 82- 8-AB

VE3DIR... 560- 80- 7-B

VE3BGT... 494- 83- 8-AB

VE3AGW... 450- 75- 6-AB

VE3DSU... 282- 47- 6-B

VE3AET... 260- 52- 5-AB

VE3BNU... 184- 46- 4-B

VE3BBX... 132- 33- 4-AB

VE3AGG... 114- 38- 3-B

VE3DNP... 105- 35- 3-AB

VE3BVO... 102- 34- 3-AB

VE3NN... 44- 22- 2-B

VE3BMB... 10- 5- 2-A

British Columbia

VE7ASM/7

261- 29- 9-B

VE7AOG... 2- 2- 1-3

¹ Novice award winner. ² Multioperator award winner. ³ Hq. Staff, not eligible for award. ⁴ W1Q1S, opr.

On the TVI Front

(Continued from page 54)

Oregon: Astoria, Bend (2), Coos Bay, Eugene, Medford, Newberg, Pendleton, Portland (2), Roseburg (2), Salem, St. Helens.

Pennsylvania: Allentown, Altoona, Belle Vernon, Bellevue, Bethlehem, Boyertown, Bucks County (East & West Sections), Chalfont, Delaware County, Dubois, Easton, Glenside, Greenburg, Harrisburg, Havertown, Kingston, Lahaska, Lebanon, Lewisburg, Lock Haven, McKeesport, Meyerstown, New Brighton, Norristown, North Hills, Oil City, Philadelphia (5), Pittsburgh, Reading, Scranton, Selinsgrove, Sharon, Solesburg, Wilkes Barre, York.

Puerto Rico: San Juan.

Rhode Island: None.

South Carolina: Charleston, Columbia, Florence, Georgetown.

South Dakota: Mitchell, Rapid City, Sioux Falls.

Tennessee: Bristol, Chattanooga, Humboldt, Jackson, Knoxville, Memphis, Nashville, Oak Ridge.

Texas: Beaumont, Brownsville, Corpus Christi, Dallas, Deepwater, El Paso, Ft. Worth, Galveston, Houston, Kermit, Lubbock, Midland, Odessa, Orange, Pasadena, Port Arthur, San Antonio, Snyder, Texas City, Woodsboro.

Utah: Ogden, Provo, Salt Lake City.

Vermont: Burlington, Middlebury.

Virginia: Fredericksburg, Hopewell, Newport News, Norfolk, Petersburg (2), Radford, Richmond, Roanoke, Staunton, Winchester.

Washington: Bellingham, Bremerton, Chehalis, Ellensburg, Ephrata, Everett, Kennewick, Longview, Pasa, Richland, Seattle, Spokane (2), Sunnyside, Tacoma, Vancouver, Walla Walla (2), Yakima.

West Virginia: Dunbar, Fairmont, Huntington, Morgantown, Nitro, Parkersburg, St. Albans, Weston.

Wisconsin: Eau Claire, Fond Du Lac, Green Bay, Kenosha, La Crosse, Madison, Marinette, Milwaukee, Neenah, Oshkosh, Port Edwards, Racine, Wausau.

Wyoming: Casper, Cheyenne, Gillette, Powell, Sheridan.



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and simplified wiring instructions in-
cluded. Then plug into any 110 volt AC
source, and with accessories below,
you're ready to go.

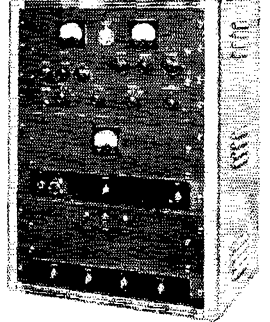
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This excellent Xmtr. offers 65 watts input on CW, 50 watts on fone. Is completely bandswitching 10 thru 160M. Combination Pi Network antenna tuner. 100% modulation of Final. Housed in 8" x 16" x 8" grey cabinet.



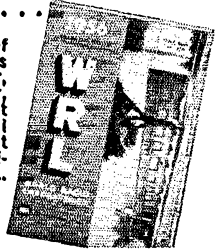
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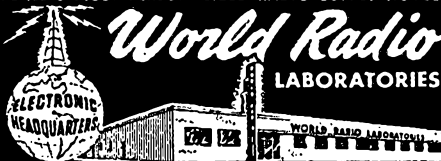


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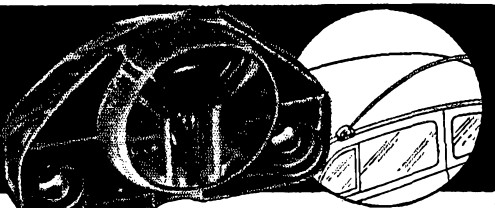
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New "TENACLIP" Reg. U. S. Pat. Off.

attaches to car... stops antenna whipping

Clear plastic clip quickly fastens to rain molding... holds right or left antennas. Prevents damage to antenna from low hanging limbs or driving into garage. See your dealer or order direct. No C.O.D.'s please. **\$1.98**

PLASTICLES, 4207 GRAND RIVER, DETROIT 8, MICH. **postpaid**

Happenings

(Continued from page 47)

limits of 800-900 cycles. No major difficulty having been disclosed by a preliminary examination, the petition has now been filed as follows:

FEDERAL COMMUNICATIONS COMMISSION

Petition for amendment of Paragraphs 12. 107(c) and (d) of the Rules Governing Amateur Radio Service, titled "Special Provisions Regarding Radio Teleprinter Transmissions."

Petition of the American Radio Relay League, Inc.

The American Radio Relay League files this petition on behalf of the more than 47,000 U. S. licensed amateur radio operators who are members of the League.

This petition was formulated pursuant to instructions of the Board of Directors of the League.

The League proposes that the present restriction on frequency-shift keying in the amateur service, now 800 to 900 cycles shift, be removed and that instead there be permitted any shift under 900 cycles. Specifically, the League proposes that Section 12. 107(c) of the amateur rules be amended to read as follows:

(c) When frequency-shift keying (type F-1 emission) is utilized, the deviation in frequency from the mark signal to the space signal, or from the space signal to the mark signal, shall be less than 900 cycles per second, and in consonance therewith, that Section 12. 107(d) be amended to read as follows:

(d) When audio-frequency-shift keying (type A-2 or type F-2 emission) is utilized, the highest fundamental modulation audio frequency shall not exceed 3000 cycles per second, and the difference between the modulating audio frequency for the mark signal and that for the space signal shall be less than 900 cycles per second. This proposal is based on the following considerations:

Experimentation

In recent years, with the availability of teleprinters to the Amateur Service, a number of experimentally-inclined amateurs have been using radioteleprinter communication, first with audio-frequency-shift keying primarily on the 14-Mc. band and, since the Commission's authorization for the use of F-1 emission on lower-frequency bands, with carrier frequency-shift-keying in the non-voice portions of the 3.5-, 7-, and 14-Mc. bands. Although at one time the number of available printer units sharply limited the number of amateurs who could engage in this work, at present there is an adequate supply of such units with the result that amateur use of F-1 teleprinter communication is increasing rapidly. The League believes that this is another field in which the amateurs can contribute to the advancement of the art, but amateurs are now handicapped with the limitation of frequency shift within the range 800-900 cycles per second. A number of leading amateurs in this field have indicated a strong interest in conducting experimental communication with lesser frequency shift, and the League believes they should be encouraged to do so. It is understood that commercial and military research groups also feel that a shift of considerably less than the present 850-cycle standard may well be found to be much more effective in teleprinter communication. The League urges the Commission to permit amateurs to take part in this investigation.

Improvement in Techniques

A reduction in permissible frequency shift will allow the use of receivers with narrower bandwidth, resulting in an improvement in signal-to-noise ratio. It will be possible to sharpen intermediate-frequency filters and amplifiers. It is also expected that a reduction in frequency shift will lessen the effects of selective fading, since this problem is eased when mark and space signals are brought closer together. A smaller frequency shift is also more easily obtainable when using crystal control, compared to the present difficulty of achieving direct 850-cycle shifts with 3.5-Mc. crystals.

Reduction in Interference

Although this is a matter of lesser importance, it should be mentioned (only to point out that potential interference

(Continued on page 130)

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		Primary Ohms	Secondary Ohms		Ohms	Ohms	
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AR-101	Input	100,000	3,000 CT	.5	3600	60	1 1/4" x 3/4" x 3/4"
AR-102	Input	100,000	1,500 CT	.5	3600	40	1 1/4" x 3/4" x 3/4"
AR-103	Driver	20,000	2,000 CT	1.0	400	50	1 1/4" x 3/4" x 3/4"
AR-104	Driver	20,000	1,000	1.0	400	50	1 1/4" x 3/4" x 3/4"
AR-105	Driver	20,000	400	1.0	600	30	1 1/4" x 3/4" x 3/4"
AR-106	Driver	16,000	3,000	1.5	620	350	3/4" x 3/4" x 3/4"
AR-107	Driver	15,000	200	1.5	1000	20	1 1/4" x 3/4" x 3/4"
AR-108	Driver	10,000	3,000 CT	0	200	100	3/4" x 3/4" x 3/4"
AR-109	Driver	10,000	2,000 CT	0	500	50	3/4" x 3/4" x 3/4"
AR-110	Output	10,000	25	2	600	2.5	1 1/4" x 3/4" x 3/4"
AR-111	Output	5,000	100	1	600	10	3/4" x 3/4" x 3/4"
AR-112	Output	3,500	200	1	120	25	1 1/4" x 3/4" x 3/4"
AR-113*	Driver	3,000 CT	1,000	3	100	60	3/4" x 3/4" x 3/4"
AR-114	Output	2,500	31	10	50	1	3/4" x 3/4" x 3/4"
AR-115	Input	2,000 CT	8,000 CT	0	150	650	3/4" x 3/4" x 3/4"
AR-116	Output	2,000	200	4	120	20	1 1/4" x 3/4" x 3/4"
AR-117	Output	500 CT	30	4	20	1.5	3/4" x 3/4" x 3/4"
AR-118	Output	500 CT	16	0	20	1.5	3/4" x 3/4" x 3/4"
AR-119	Output	500 CT	11	0	20	3	3/4" x 3/4" x 3/4"
AR-120*	Output	400 CT	3.2	1	20	.9	3/4" x 3/4" x 3/4"
AR-121*	Output	300 CT	3.2	0	20	.25	3/4" x 3/4" x 3/4"
AR-122*	Output	250 CT	3.2	0	11	.5	1 1/4" x 3/4" x 3/4"
AR-123	Input	200	2,000 CT	2	11	50	1 1/4" x 3/4" x 3/4"
AR-124*	Output	200 CT	16	0	20	1.3	3/4" x 3/4" x 3/4"
AR-125	Input	3	4,000	.0	.14	50	3/4" x 3/4" x 3/4"

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CK-722 RAYTHEON

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COMPARE IT WITH ANY MIKE AT 2 to 3 TIMES THE PRICE

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This special Kit enables the Manufacturer and Laboratory to make a pilot run of etched wire Printed Circuits with his own staff and facilities. Contains all the latest information, materials and methods for adapting your product to mass production techniques.
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This tiny I.F. is the same as used in the transistorized sets of the leading manufacturers. Ideal for building miniature equipment.
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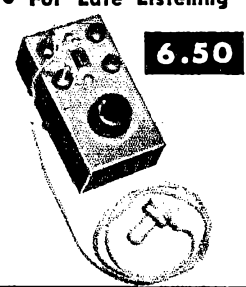
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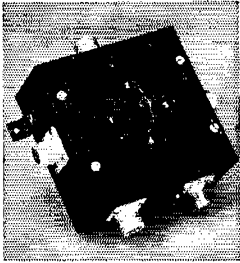


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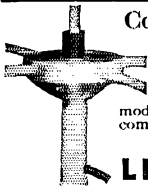
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130

to other types of emission in these amateur bands will certainly not be increased) that it is expected the use of a lesser frequency shift will accomplish a reduction in interference. Since, practically speaking, an F-1 signal uses the spectrum space of a c.w. signal with corresponding on-off keying, plus the frequency shift, it is apparent that a smaller shift will occupy less spectrum space and thereby provide less opportunity for interference.

* * *

In summary, the League believes that authorization for amateurs to employ F-1 emission frequency shifts less than 900 cycles per second will permit more extensive experimentation with radioteletypewriter communication, will result in an improvement in and simplification of teletypewriter techniques, and thereby will provide a more reliable means of communication.

AMERICAN RADIO RELAY LEAGUE, INC.

By PAUL M SEAGAL

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Its Attorneys

A. L. BUDLONG
General Manager
July 6, 1955

MINUTES ERROR

A typographical error appears in the 1955 Board meeting minutes in July QST (paragraph 59). Mr. Cowan of the West Gulf Division, not Mr. Gowan of the Dakota Division, is the third member of the Finance Committee. Mr. Gowan is, as reported in paragraph 65, on the Membership & Publications Committee.

Operation Alert

(Continued from page 51)

official who could not be contacted by telephone. W3AVL and W3ZZK relayed traffic via 2 meters to WN3ZYB in Calvert County. Eighteen c.d. messages were handled during the alert. Participating amateurs received congratulations from the county Civil Defense Director for the manner in which these messages were handled.

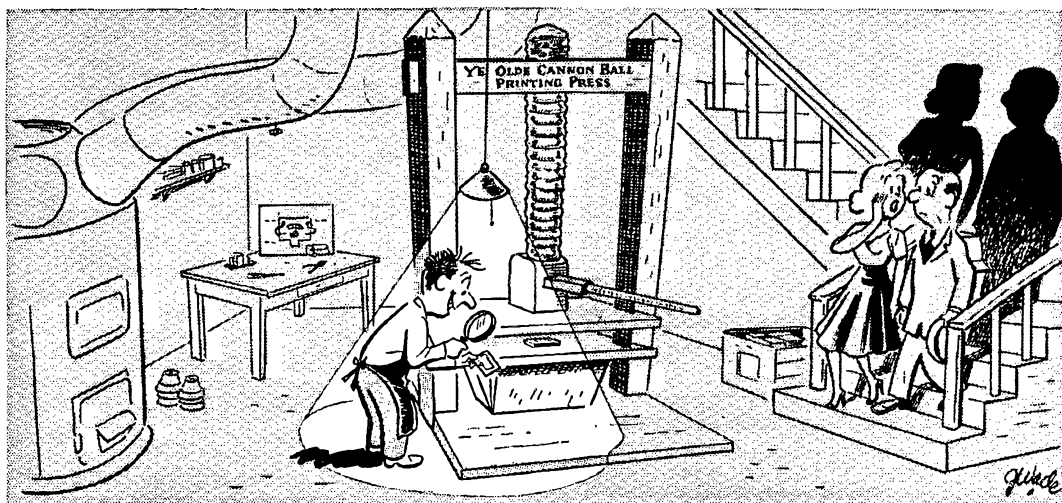
Massachusetts

In Winthrop, EC and RO W1BB alerted his group to participate on the basis that radio was the *only* means of communication. Both control and alternate control stations were operated, on six meters. The test was conducted on an area basis, although local stations were ready and standing by.

Acting EC and Radio Officer W1WGN reported some confusion in New Bedford as to whether the city was to be bombed or not. Nevertheless, amateurs participated wholeheartedly. The control station was operated from 1200 to 2145 by five amateurs to maintain contact with sector headquarters, with mobiles in New Bedford and the center of the city. Ten and two meters were used.

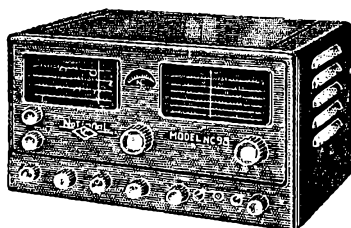
Sector 1-B, which includes 21 cities and towns in Eastern Mass., was activated from Quincy City Hall by nine amateurs. Seventeen towns reported on the nets on ten and two meters. Net control W1IA was on the air from 1130 the 15th until 1330 the following day.

(Continued on page 132)

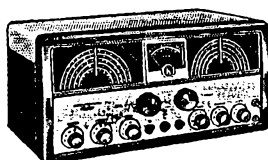


"Fred's really gone on those printed circuits!"

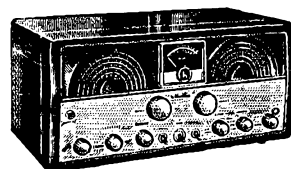
You'd have to look hard and long to find anything that even faintly resembles the satisfaction and money-saving that can be yours with a "Surprise" Trade-In allowance on used (factory-built) test and communication equipment. Put us to the test. Get your trade-in deal working today. Wire, write, phone or use handy coupon below.



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Less speaker. Net \$149.95



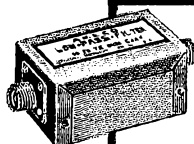
HALLCRAFTERS SX-96
Less speaker. Net \$249.95



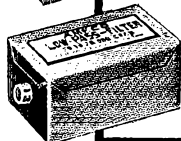
HALLCRAFTERS SX-99.
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LN-2



LN-1

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Supresses radiation of all frequencies above 40 MC, thereby removing a major cause of TVI. Uses constant K circuit, designed for use with 52 to 72 ohm coaxial cable. Will handle up to 200 watts of RF power. Complete with bracket, RCA type phono connectors and instructions.

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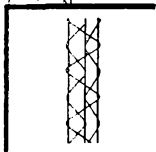
Send for your copy today



TRYLON

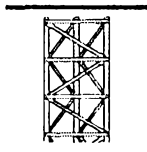
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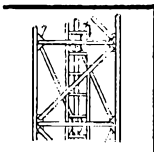
SERIES 650

Height to 80'
Width*—6.5"
10' section—
22 lbs.
Use—Mast for TV
Amateur, Port-
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type antennas



SERIES 2400

Height to 280'
Width*—22.6"
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Use—Tower for
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Beam, AM
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Microwave
antennas



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Height to 600'
Width*—60"
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653 lbs.
Use—TV Broad-
casting and
curtain antennas
for International
Broadcasting

* Between CG of Tower Legs

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TOO!**

EC and RO W1SPF of Worcester reports participation by five amateurs and two non-amateur operators. The city was "bombed" at 1428, smashing all communications in Worcester, leaving only one control center and two mobiles in operation. Those left had a mighty hard time of it, demonstrating that additional and more dispersed facilities are needed.

Sector I-C was alerted at 1800 and was on the air until 2300. Traffic was handled regarding food shortages for the evacuees who had been moved from Boston to Framingham. Communications from Framingham to sector headquarters in Sherborn was on 50,745 kc. The Sector I-C RO is W1ZOP, the EC W1MEG. The latter is also alternate radio officer and sent us this information.

Waltham EC W1JSM reports that they were alerted for control center and zone base action from 1800 to 2300 on the 15th. Four amateurs were active. The local net tied in zone bases to the control center.

Michigan

Although not yet authorized for RACES, the AREC gang at Sault Ste. Marie was active. W8NTD, the Twin Sault Radio Club's station,



This station was set up in the basement of the FCDA Building in Battle Creek, Mich., to provide contact with Gogua Lake Naval Training Center during exercises connected with Operation Alert in FCDA's Region IV. That's W8YAN at the mike, while W8SSH monitors a receiver.

was on the air for help in relaying traffic. The mobile control station, located in a specially-built bus, was supported by four mobiles for local operations, with seven other operators participating. Communications between the two Saults in Michigan and Ontario were conducted on ten meters.

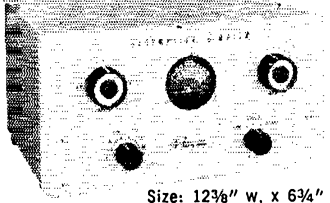
(Continued on page 134)

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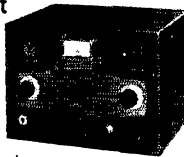
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Size: 12 3/8" w. x 6 3/4" h. x 10 1/2" d. Only \$69.00

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COMPLETELY SELF-CONTAINED! Power input — 50 Watts • Effectively TVI suppressed • Pi-network output tuning — no antenna tuner needed • Single knob Bandswitching on 80, 40, 20, 15, 11, 10 meters • COMPACT! 7 3/8" high x 10 3/8" wide x 8 1/8" deep. No. 240-181-1 VIKING ADVENTURER KIT, with tubes, less crystals and key. Complete with easy assembly and operating instructions.

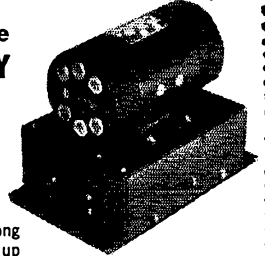


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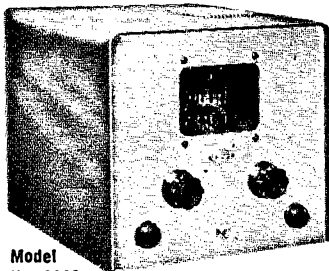
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This 6 Volt Mobile Power Supply has one of the finest and most effective filter systems of any we have had the pleasure to offer. The top-quality Pioneer Dynamotor and rugged commercial construction, along with the low price adds up to VALUE PLUS! The filter section contains three husky iron core chokes and two RF chokes, all with seven oil condensers to effectively filter both A and B, and RF hash. There are absolutely no electrolytics used. Input and output are terminated in a standard 6-prong Cinch-Jones S406AB socket. At the nominal input voltage of 5.5 Volts DC, it delivers 400 Volts at 175 Ma. Continuous duty; 250 Ma. easily at intermittent use. With storage battery up to snuff and husky A leads, output runs about 440 Volts. Base — 6" x 9 3/4" and 17" high.



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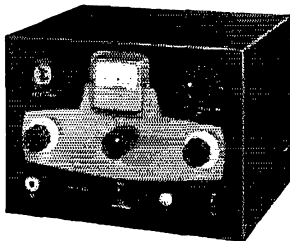
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New Jersey

Maplewood EC W2COT reports sixteen stations on stand-by, of which five were mobile, but no local incidents were attempted.

New York

K2DVC, EC and RO of Genesee County, N. Y., combined his RACES and AREC operators for a successful RACES test on RACES frequencies. K2IDQ set up his rig at c.d. headquarters. Activity commenced shortly before noon on the 15th and continued until 1022 the 16th. Ten and six meters were used. Everything went off fine, says K2DVC, and the c.d. director was very pleased and impressed.

Ontario

VE3AIB took over in Operation Alert due to the absence of the regular communications officer (and Toronto EC) VE3IL. Operation was conducted on 80, 75, 40, and 2 meters, concerned primarily with traffic direct between the various regional headquarters and provincial headquarters at Toronto. Most regions also operated their own amateur nets on other frequencies. This set-up worked very well during the hours 1800 to 2300 EST on the 15th.

Pennsylvania

Philadelphia County's Operation Alert was primarily concerned with evacuation procedures. Four sample evacuations were conducted, one from each of the city's four c.d. regions. Communications with the caravans were maintained at all times to the respective regional control centers on 29 Mc. A Navy blimp carried civil defense observations, communications with Philadelphia's Mobile Communications unit being conducted on RACES frequencies under the call K2NBD. The mobile unit operated as W3YXU/3. This mobile unit also maintained contact with the four control centers on 29 Mc. The turnout was large and very encouraging. EC W3DYL lists 41 amateurs and 10 amateur/RACES mobiles participating.

Puerto Rico

Puerto Rican amateurs participated in Operation Alert through their club station KP4ID, located at c.d. headquarters in Rio Piedras. This station was on the air from 0800 through 2030 on June 15th. Operation was on 3925 kc. Sixteen stations on Puerto Rico and the Virgin Islands checked in, handling 53 messages. Stations were also located at Gurabo C.D. Headquarters and Ramey Air Force Base, the latter maintaining contact with FCDA Regional headquarters in Thomasville, Georgia. A total of 22 amateurs participated.

Tennessee

Five amateur stations were set up and operating in Chattanooga when the yellow alert was sounded on June 15th, according to newspaper clippings sent us. J. D. Rivers was in charge of

(Continued on page 136)

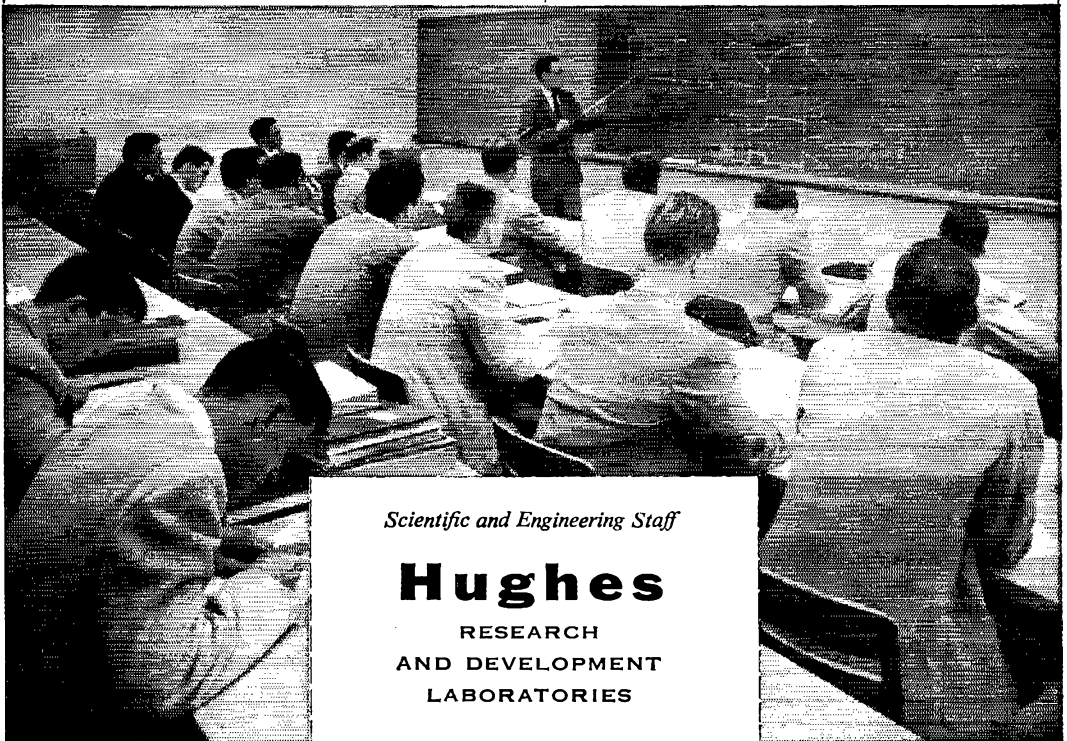
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- Designed for use with all multi-band transmitters of 1 Kilowatt or less.
- Complete with 80 feet of KW lead-in and instructions.

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136

the RACES group, maintaining communications with other cities in the state. More than 50 operators participated, and amateurs supplied their own equipment.

Eight emergency-powered rigs were used by the Oak Ridge gang over a 24-hour period. SEC W4RRV was present at c.d. headquarters, along with the city manager and c.d. director. All transmitters were of home construction.

Virginia

The Hampton RACES organization, under EC W4AJA and RO W4RGN, provided the nucleus for Operation Alert in the Hampton-Newport News-Warwick area. Nine amateurs staffed the control station in Hampton, while W4AJA acted as alternate control. Local units were not alerted, the trities set-up acting in support of Norfolk, the target area. Sixty-five official messages were handled.

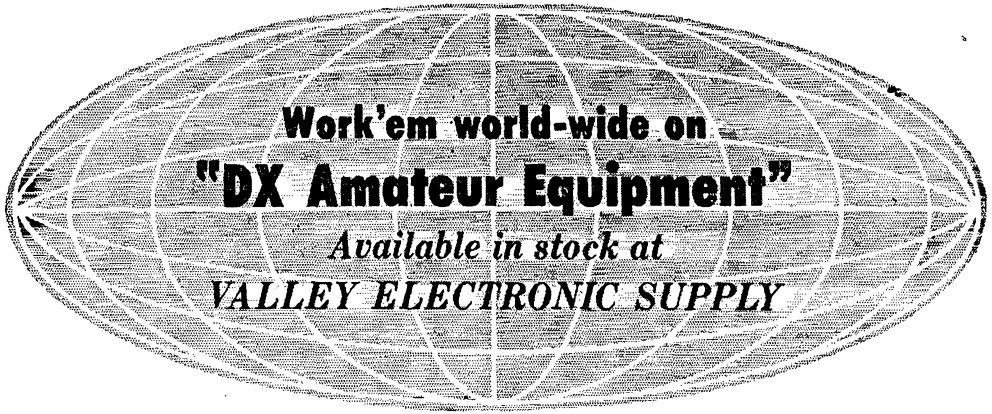
No previous planning was made in Norfolk, but 32 amateurs responded to the alert, 20 of whom were mobile. Assignments were made on the air or in person after the alert. At 1545 all mobile and portable stations were called in for regrouping and reassignment. Most traffic from then on was directed to Richmond (state control). A total of 99 messages were handled. The boys had their transmitter and antenna troubles, but the drill went off successfully.

The Falls Church RACES net held their own exercise on 20,580 kc. RO W4OP operated the control station, and mobiles were stationed at check points on evacuation routes. Four mobiles and four fixed stations participated, handling nine messages without difficulty. C.D. headquarters RACES station in Fairfax was covered by mobile W4TNQ, with W4ZNU assisting, maintaining communication with Falls Church on 145.3 Mc.

Conclusions

The first, and most obvious, conclusion is that a great deal more activity was conducted than has been reported above. We can report only the information we receive. Secondly, we congratulate and commend *all* who participated, whether an authorized or pending RACES group, on their representation of amateur radio in this very important national activity very much in the public eye. Thirdly, and last but not least, we want to point out to those who operated outside RACES frequencies (although they undoubtedly already know it) that they are conducting tests that are almost totally unrealistic in view of the certainty that *only RACES frequencies under RACES* will be available after any commencement of hostilities. It doesn't matter, unfortunately, that these frequencies are not sufficient for our needs. Until or unless additional frequencies can be made available, we have to plan to use the ones we have.

Thanks to those who reported for making it possible for us to give some idea of participation by amateurs in civil defense throughout the nation.



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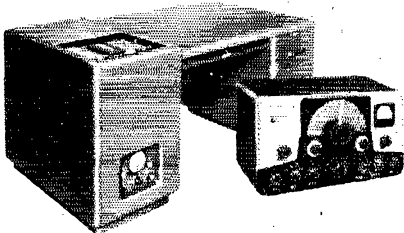
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New! Johnson Viking Kilowatt

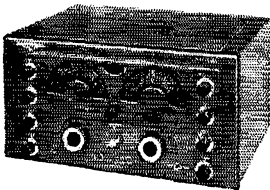
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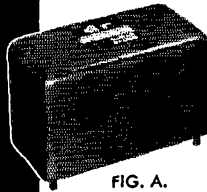


FIG. A.

SSB 22-25 KC. FILTER and component kit for 25-kc. carrier use with ring modulator. 500-ohm c. t. input, 100,000-ohm c. t. output. Essential component kit includes filter unit (fig. A above), toroidal 25-kc. oscillator coil and tuning capacitor, copper-oxide ring modulator, schematic. **Component kit: \$34.50**

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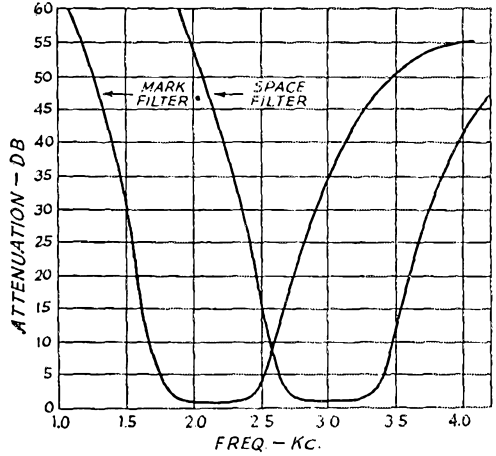
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turer's curves below, and an application sheet accompanying each filter shows a practical circuit in which the filters can be used. The characteristic impedance of each filter is 600 ohms, and the insertion loss is 2 db.

The BF-M1 and BF-S1 Filters are manufactured by D & R, Ltd., 402 East Gutierrez St., Santa Barbara, Calif.

— B. G.

Strays

BCI and TVI are (alas!) familiar terms, and by no means amusing. But here is a collection of interference abbreviations, turned up from QST files, that are surely novel and in some cases downright strange:

- GDI — Garage door interference
- BTI — Bath tub interference
- WPI — Water pipe interference
- OAI — Organ amplifier interference
- HAI — Hearing aid interference
- SPI — Stove pipe interference
- MPI — Motion picture interference
- RPI — Record player interference
- PAI — Public address interference
- ESI — Electric stove interference

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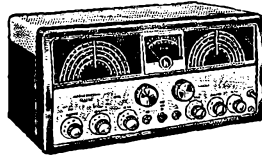
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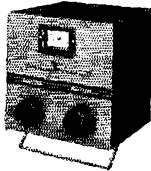
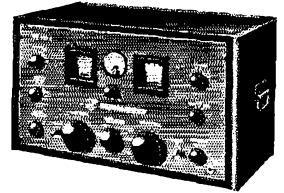


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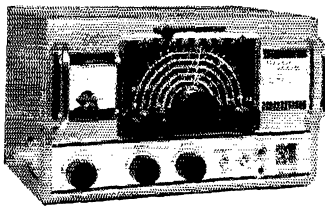
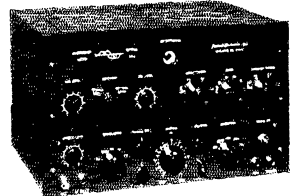
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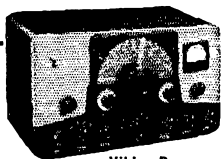
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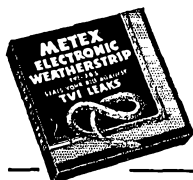


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radio license (since 1920), a degree in radio engineering from the University of California, and a law degree from George Washington University.

A large part of his career has been in the submarine service. During World War II, as commanding officer of the USS *Greenting*, he completed four successful submarine patrols, credited with a total of 11 sinkings. He also participated in the Korean hostilities as commanding officer of the USS *Wisconsin*.

Admiral Bruton's assignments have included Administrative Aide to Fleet Admiral Chester Nimitz when he was Chief of Naval Operations, and Aide to Fleet Admiral Ernest J. King when he was Commander-in-Chief, U. S. Fleet. From June, 1953, to September, 1954, he was Commander of the Navy task group at the Bikini atom bomb tests, and then was named Deputy Chief of Naval Operations (Administration).

Admiral Bruton holds several military awards, including the Navy Cross. He is a member of the ARRL. His present call is W4HH and although he is now inactive on the ham bands, he periodically threatens to open up again any day.

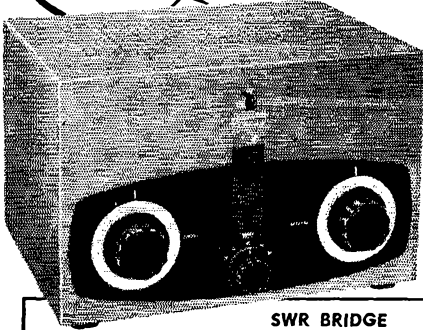
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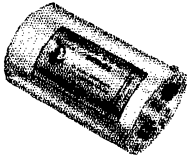
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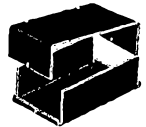
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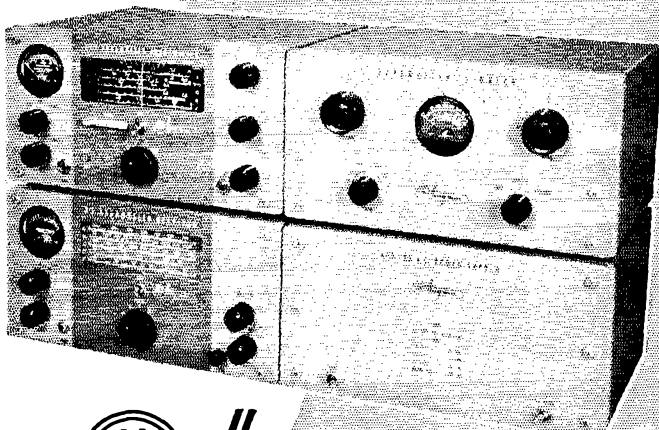
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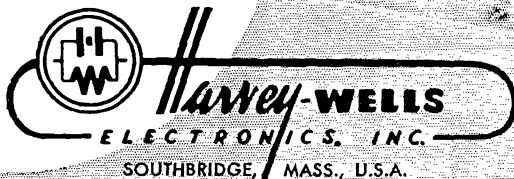
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372	394	415	484	507	530	440	461
374	395	416	485	508	531	441	462
375	396	418	487	509	533	442	463
376	397	419	488	511	534	444	464
377	398	420	490	512	536	445	465
379	401	422	491	513	537	446	466
380	402	423	492	514	538	447	468
381	403	424	493	515		448	469
383	404	425	494	516		450	470
384	405	426	495	518		451	472
385	406	427	496	519		452	473
386	407	431	497	520		453	474
388	409	435	498	523		454	475
389	411	436	501	523		455	476
390	411	436	502	525		456	477
391	412	438	503	526		457	479
392	413	481	504	527		458	480

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CR-1A SCR 522-1/4 Pin, 1/2" SP
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6370	7380	2045	2258	2390	3215	3945
6450	7390	2065	2280	2415	3237	3955
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6497	7580	2105	2290	2442	3322	
6522	7810	2125	2300	2532	3510	
6547	7930	2145	2305	2545	3520	
6610		2155	2320	2557	3550	

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4080	5397	5900	6706	7583	7873
4165	5435	5906	6725	7600	7875
4190	5437	5925	6740	7606	7900
4280	5485	5940	6750	7625	7906
4330	5500	5955	6773	7640	7925
4340	5582	5973	6775	7641	7940
4377	5660	6206	6800	7650	7950
4445	5675	6225	6825	7660	7975
4450	5677	6240	6850	7673	8240
4490	5700	6250	6875	7675	8250
4495	5706	6273	6900	7700	8273
4535	5740	6275	6925	7706	8280
4695	5750	6300	6950	7710	8300
4735	5760	6306	6975	7725	8306
4840	5773	6325	7450	7740	8310
4852	5775	6340	7473	7750	8316
4930	5780	6350	7475	7766	8320
4950	5806	6373	7500	7773	8325
5030	5810	6375	7506	7775	8630
5205	5850	6400	7520	7800	8663
5295	5852	6406	7525	7806	8690
5305	5873	6425	7540	7825	
5327	5875	6673	7550	7840	
5360	5880	6675	7573	7841	

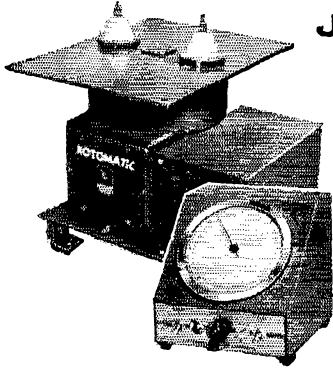
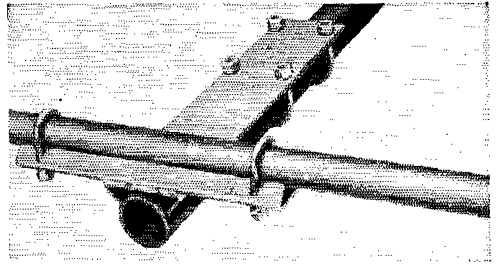
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1015	6100	6540	7150	8150	8500
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3800	6150	6600	7325	8225	8556
3885	6173	6606	7340	8340	8575
3940	6175	6625	7350	8350	8583
3990	6185	6640	7375	8360	8600
6000	6200	6650	7400	8370	8625
6006	6440	7000	7425	8375	8650
6025	6450	7025	7440	8380	8660
6040	6473	7050	8000	8383	8700
6042	6475	7075	8025	8400	8733
6050	6500	7100	8050	8425	
6073	6506	7125	8100	8450	
6075	6525	7140	8125	8475	

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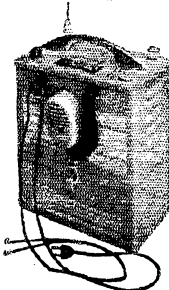
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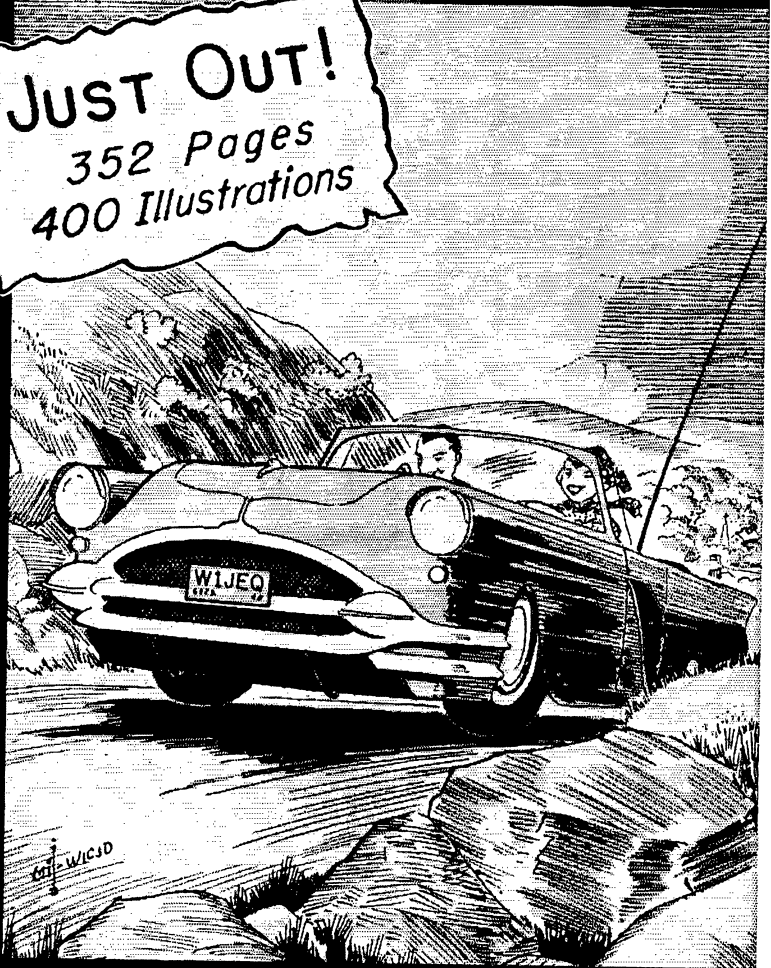
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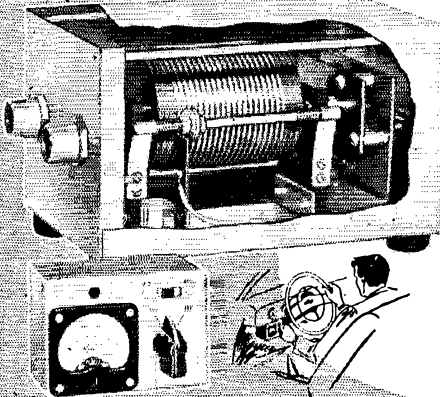


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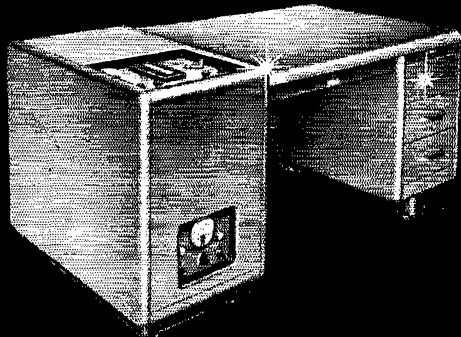
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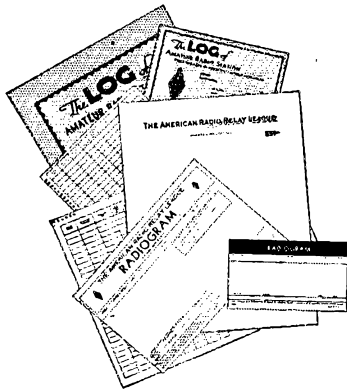
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HAM-ADS

(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 nor may commercial type copy be signed solely with amateur call letters.

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

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature, 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 inuring 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. To expedite handling of your copy please state whether you are a member of ARRL.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly. Typewritten copy preferred, but handwritten signature must accompany all authorized insertions.

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

Having made no investigation of the advertisers in the classified columns, 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 10.

MOTOROLA used FM communication equipment bought and sold. WSBGO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

WANTED: Cash or trade, fixed frequency receivers 28/42 Mc. W9VIV, Troy, Ill.

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, Lyland, Penna.

SUBSCRIPTIONS. Radio publications. Latest Call Books, \$4.00. Mrs. Earl Mead, Huntley, Montana.

URGENTLY need AN/APR-4 items particularly tuning units for important defense contracts. New high prices. Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio.

OUTSTANDING ham list always. Our prices on trade-ins of all amateur brands are realistic and down to earth. We feature Johnson, National, Collins, Hallcrafters, Gonset, Elmac, Trade-Wells, Morrow, Central Electronics and other leaders. We handle 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, W0BJV, Burghardt Radio Supply, Inc., Box 41, Watertown, S. Dak.

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MICHIGAN HAMS! Amateur supplies, standard brands. Store hours 0800 to 1800 Monday through Saturday. Roy J. Purchase, WRRP, Purchase Radio Supply, 605 Church St., Ann Arbor, Michigan. Tel. 8-8696. No. 8-8262.

2-METER aluminum Brownie beams, \$22 and up. Write to H. W. Snyder, W3LMC, 4330 Glenmore Ave., Baltimore 6, Md.

WANTED: All types aircraft & ground transmitters, receivers, ART-13, RT18/ARC1, R5/ARN7, BC610E, BC221 mounts and parts wanted. Fairest prices possible paid. Dames, W2KUU, 308 Hickory St., Arlington, N. J.

LEECE-NEVILLE 6 volt system, 100 amp. alternator, regulator & rectifier, \$60.00. Also Leece-Neville 12-volt system 100 amp. alternator, regulator & rectifier, \$85.00. Good condition. H. A. Zimmermann, 570 Jamaica Ave., Brooklyn 8, N. Y. Ulster 2-3472.

NEW and used Motorola, Link, RCA, G-P, etc., FM commercial communications equipment bought & sold. Allan M. Klein, W2FOU, 95-33 225th St., Bellrose, L. I., N. Y. Phone FL 4-3394.

VAN SICKLE has the new or used gear. Taylor 866As, \$1.95. Gene, W9KJF, 1320 Calhoun, Ft. Wayne, Indiana.

WANTED: ART-13 transmitters. Write B. Spivey, 3117 Rolling Road, Chevy Chase, Md.

CASH for AN/ARC-1, BC-610E, BC-614E, BC-939, BC-729, BC-221, TCS and others. Also Sig. Corps, Navy, Air Force stock catalogs; maint. and instr. 'I'M's for war surplus equipment. Amber Co., 393 Greenwich St., New York 13, N. Y.

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QSL-S. Samples free. Albertson, W4HUD, Box 322, High Point, N. C.

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QSL "Brownie." W3CJ1, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

QSL-SWI. 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 10¢. QSL Press, Box 71, Passaic, N. J.

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QSL. Postcard brings samples. Fred Leyden, W1NZJ, 454 Proctor Ave., Revere 51, Mass.

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QSL-S. Highest quality. Quick delivery. Samples 10¢. Dortch, W4DDF, Jocelyn Hollow Road, Nashville, Tenn.

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We will be looking for you at the ARRL Central Division Convention at South Bend, Indiana, October 15-16 are the dates. This will be the Big One for 1955! Advance registration \$3.50. Write to Box 551. Make checks payable to Central Division Convention. Do it now!

SORRY fellas, my ad ran a month ahead of time, in July QST, due to misunderstanding, QTH uncertain at that time. Apologize for any inconvenience. Am now repeating it, ready for queries: Trade: Argus C-4, 35 mm camera, 2.8 lens, flash gun, leather carrying case; all new, in original carton and Hallcrafters S20R recvr in gud cond for Hammarlund HQ-129X, in A-1 condx. K4BGG, Joe S. White, 5892 Lemon Ave., Long Beach, Calif.

HAMMARLUND HQ-129X for sale. In perfect electrical, physical and mechanical condx. Late model. Has HQ-140X bandspread dial (covers 15 meters), \$165 or best offer. Dave Smith, K2CHS, 54 Butler Road, Scarsdale, N. Y.

SALE: Lyseo 600, also AM modulator. Roger Simmons, Ashland, Ohio.

NEED ARC/3s. S. Gabriel, 4908 Hampden Lane, Washington 14, D. C.

W5AXL/MM correct mailing QTH Arthur E. Hutchins, R/O SS Fullerton Hills, Bernuth Lembeck Co., 420 Lexington Ave., New York 17, N. Y.

FREE list: parts, gadgetry, meters, oddities. Art Sorrell, W3AXG, 6310 63rd Pl., Riverdale, Md.

NEED ARC-1s. Lou Athanus, P. O. Box 5878, Bethesda, Md.

TRADE: New 80As, 21ts, 304TLs, 833As, 450TLs, 128As for NC183D SX-88, KW xmitter, etc. Hodge, Box 3221, Eastchester, Anchorage, Alaska.

SELL: ARC-5 converted to 85 Kc, I.F. similar to June 1955 QST article, with dynamotor, \$20.00; have full set of major components for 500 watt, 813 final, \$60.00; new Johnson Low Pass, \$9.00; American DHT mobile mike, \$7.00; American D4 dynamic mike, \$7.00 and pair of Balun coils on base with relay, \$6.00. W0RAK, Moline, 623 No. 5th, St. Peter, Minn.

VIKING II with V.F.O. Not more than 10 hours use. First \$250 takes it. Bob Slamp, Box 303, Baldwin, Michigan.

ART-13 Wanted: W4VHG, 4908 Hampden Lane, Bethesda, Md.

SELL: Viking I and VFO. Won't ship. TVI-suppressed. Perfect condition. Hy-Lite 3-element 15 over 3 element 20 beam. Never used. Still in original carton: \$75.00. Cost me \$125.00. Niagara low pass filter \$5.00. Multitester voltmeter, \$5.00. Filament and low voltage transformers and miscellaneous. O'Brien, 48 Prospect, Westwood, N. J. Westwood 5-1494M. New York Tel. Columbus 5-3700.

FOR Sale: Used Heathkit AT-1 transmitter. Goes to the first offer over \$20.00. Richard Bristo, W8UBA, RFD #1, Almont, Mich.

18TH ANNUAL "Stag Hamfest." Biggest Bargain Hamfest in U. S. A. Over 800 actual amateurs attended last year. Sponsored by the Greater Cincinnati Radio Association. Sunday September 11th. The location is Kopley Grove on Winton Road two miles south of Greenhills, Ohio. Registration: \$2.50 at the gate and here's what you get: hot dogs all day long, donuts & coffee served 'til noon, beer and pop served all day, full picnic dinner and supper (all you can eat). Rain or shine. Games, radio controlled model aeroplanes. For additional information contact Elmer Schubert, W8ALW, 3956 Harmar Court, Cincinnati 11, Ohio. SSB Station: New 20A exciter plus matching 500w linear amplifier, plus matching 20 75 custom VFO: \$475.00. F. G. B. George W. Korper, Jr., W1CFE, Northrop Road, Woodbridge, Conn.

RECEIVERS-Transmitters, repaired and aligned by competent engineers, using factory standard instruments. Collins-authorized service station, Hallcrafters, Hammarlund, National. Our nineteenth year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

BC-610E, speech amplifier, mike, spare parts. WAS and DXCC 10 meter phone. \$500.00. C. J. Ahern, Jr., W9WXT, Dwight, Ill.

V70D, Bud Gimix wavermeter, sale/trade. Need small modulator (or 616), etc. with pwr supply, same chassis. Camden area preferred. W2VMX, 609 Park Ave., Collingswood, N. J. CO 5-2360.

WANTED: S-40A or NC57. Hamilton, W8WVW, Box 282, Willoughby, Ohio.

SELL: 65 w cw xmtr. Coils, xtals for 80, 40. Rose W9ALO, 120 So. Keator, Mounds, Ill.

COLLINS 75A2 with spkr. Like new. \$125. Dr. Donald Spaan, Santa Monica Hospital, Santa Monica, Calif.

JOHNSON Ranger, factory-wired, used only 10 hours. \$225; Johnson Rotomatic dual 1st 20 meter beam (parasitic). Includes motor, direction indicator and change-over relay. 100 ft. control cable. \$225. Purchaser pays freight or express charges. Sam J. Rhoades, Jr., W5RVX, 1330 S. Atlanta Place, Tulsa, Okla.

SELL: Complete station, Heathkit, AT-1 xmtr., AR-2 rcvr., VF-1 VFO, AC-1 coupler. \$75.00 takes all. Perfect condx. 1 year old. Jim Rogers, W8RSX, 220 Iberia St., Mt. Gilead, Ohio.

TV Hams: 5527 Camera and BC-645 xmtr. Details on request. W0GXH, Bruce Thatcher, 263 N. Hyland, Ames, Iowa.

ART-113, unmodified ATC model with dynamotor, \$250.00; 500 watt modulator, pair 81fs, S-22 xfmr, \$40.00; BC654 PE103, metal stand, 81fs final, 40 watts on phone. \$45. Don Burton, W6ZSL, Box 239, Hi-Vista, Wilsona Rd., Via Lancaster, Calif.

VIKING II, Viking VFO, VT keyer, \$250.00. Will deliver within 100 miles. Frewitt, W9JKT, 2212 So. Webster, Kokomo, Ind.

LETTINE 240 and VFO \$65.00; BC455, new. \$5.50; 20 BC459's 40 & 80 converted, \$14.50 & \$6.00; B & W 80 TVL, JVL, \$2.25 & \$1.00; new PE94 generator, \$5.00; Johnson Var. 151 and 7000 volts, \$6.00; new Thordaron 2000 volts at 400 Ma., \$22.00; 1000 V at 125 Ma., \$6.00; 50 hr. at 40 Ma., \$2.00; B&W 500 watt series inductors 80 & 40 meters, \$4.00 each. Tex Dallas, W3RZV, Tamaqua, Pa.

VFO Patrol data. W5CA.

COMPLETE Station: Viking 1, TVI suppressed, S-40B; VFO, all accessories: \$350.00. K2DQH, Chris Lane, North Street, Harrison, N. Y.

BARGAINS — BC-342 receiver, A-1 condition, \$75.00; triangular self-supporting 36-foot aluminum tower, new, \$45. W1CEG, 183 Daly Ave., New Britain, Conn.

SALE: 200w. phone TVI suppressed, \$125.00; rcvr, \$75.00; Comp. mobile, Super Six, 35 w. RCA, ant., dynamotor, etc., \$50.00; PE101C, \$5.00; Sams 12 vols, \$100. Riders 14 vols, \$45; Hickok Tracometer \$95; stamp for list. F.o.b. No trades. Jim McCoy, 221E Pershing Blvd., Cheyenne, Wyoming.

FOR Sale or trade: Six Band mobile xmtr as on p. 436 of 1955 Handbook, \$60; KW modulation xfmr Stancor J3898, \$35.00; Elmac mobile rcvr 6 or 12v, \$100. Need: Teraf 2 mtr. converter and Millen Hi-freq. amplifier #90811, or what have you? Frank R. Leins, W4UFC, P.O. Box 302, Vidor, Texas.

SELL: Excellent SX-71 for \$150.00. Express prepaid in U. S. W7GND, 305 Ash St., Pullman, Wash.

813, (2) 4-125As, vy FB condx. best offer. W0QHS, R. Jacobsen, 1901 Penn St., Minneapolis 5, Minn.

PANORAMIC Adapter AN/APA-10 Tech. Manuals, \$2.75 postpaid in U. S. A. Electronicraft, 27 Milburn St., Bronxville 6, N. Y. NOVICES! For sale, fine Heathkit AT-1 with effective low-pass filter, a 30W xmtr with 350V power supply, high quality 80M doubler. Lowest prices. Ken Barriage, W9PMRO, 1345 Elida St., Janesville, Wis.

BARGAINS with new guarantee and completely reconditioned: S38, \$29.00; S40A, \$69.00; S40B, \$79.00; S76, \$129.00; SX71, \$159.00; NC98, \$119.00; HQ140X, \$219.00; TR550D, \$X71.00; Meissner EX, \$39.00; Viking II, \$239.00; Viking VFO, \$49.00; HQ129X, SP400X, NC125, NC130, NC240E, HR060, AR88, 75A1, 75A2, 75A3, 32V2, 32V3, PMRGA, AF67, Super 6, Commander, B&W 5100, many others cheap. Shipped on approval. Easy terms. Satisfaction guaranteed. List free. Henry Radio, Butler, Mo. HR060 ABCD, AC coils, crystal calibrator, first \$360. Want modulated LM frequency meter. Broughton, 3116 SE 39, Portland, Oregon.

LIKE New, factory-wired, 10A SSB exciter and converted BC459 VFO, \$105. UHF xmtr McCulloch Silver Phone, cw coils 144 and 220 Mc. 832-A hnal, \$20.00. W7PYG.

BARGAINS: With new guarantee: K-9er, \$12.50; S-38C, \$35.00; S-40B, \$79.00; Lysec 600, \$99.00; S-27, \$99.00; SX-44, \$129.00; S-76, \$149.00; SX-70, \$169.00; SX-42, \$169.00; HR0-50, \$275.00; Sontek V-1, \$60. \$29.50; Aldico TR75V, \$19.50; Heath AT-1, \$22.50; Meck T60, \$49.50; HT-17, \$29.95; KX Shifter, \$39.50; Globe Trotter, \$49.50; Globe Champ, \$199.00; Harvey-Wells Sr., \$69.00; Elmac A-54, \$99.00; Viking I, \$179.00; Viking II, \$229.00; SX-75, \$169.00; HT-9, \$139.00; Globe King 400B, \$325.00; 32V1, \$375.00; 32V2, \$425.00; 32V3, \$525.00. Subarco or S1-20A xmtr, \$29.95. Free trial. Terms financed by Leo, W6CFQ. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

SELL/Trade: Heath OM-1, V-7, TC-2; V-M phonograph, Model 972-A; Eicor tape recorder, Model 230; Gardiner sender; Metro-noma, chemical glassware barrel set. Send for complete list. Wanted: Pocket recorder; camera; electronic flash; transistorized equip. Witmer, 39 Onida Rd., Camp Hill, Penna.

WANTED: SWS-3, SW-5, SW-45, SW-58, NC-98, NC-101XA, NC-125, HRO-50, HQ-129X, SX-99, Millen 90711, Hart 75, DX-100, Adventurer, Metro 5B1E, "Signal Sender", Signal Slicer B, "Secto-O-Ject"; electronic key, John Bradley, General Delivery, Redwood City, Calif.

SELL: 2000 V. 500 mill power supply, \$75.00; modulator 810s with UTC VM5 600 watt, and Stancor A4765 input, \$60.00; Amertran 6200 V. CT 700 mills, \$60.00. Also other items from K.W. transmitter. E. Seller, East Bloomfield, N. Y.

SWAP: New Polaroid camera for mobile gear. Arnold, Jr., W3YDF, Rich Hill Road, RD 1, Cheswick, Penna.

SWAP: Heathkit 0-8 'scope and Vomag VTVM for HQ-120X or equivalent. J. Lennon, 234 Drake Ave., New Rochelle, N. Y.

SELL: Viking 11, \$250.00; National NC-183D receiver, \$270.00; both in excellent condx. Frank Schneider, K2EOA, 858 Kinsella St., Bronx, N.Y.

TRANSFORMER 3600 volt center-tap 450 Ma., \$20; BC-458, \$10.00; Cardwell XD-160-XS, \$3.00; Dynamax mike, \$5.00; BC-101 tuning unit, \$2.00; 72 ohm Ohmic dummy load, \$3.00; new 0-50 Ma. 3" square meter, \$1.25; T-17 microphone, \$1.00; BC-221 tuning capacitor, \$4.00; 3E29, \$3.00; crystals, capacitors, etc. Seidman, W2GNZ, 1535 Longfellow, New York City 60, N. Y.

FOR Sale: W8HHU station, usually run 304TL at 675 watts, 810 Class B modulator and power supply, TVI suppressed 32V2 at 1000 V, 5A, 1000V, 26 teletype with custom converter with scope tuning. Tel. 505, Minerva, Ohio, P.O. Box 217.

CASH for your gear. We buy as well as sell. Write for cash offer or trade. We stock Elmac, Gonset, Hallcrafters, Hammarlund, Johnson, Lysec, Master Mobile, Morrow, National and other ham gear. H & H Electronic Supply, Inc., 506 Kishwaukee St., Rockford, Ill.

SELL: NC183D rack model, like new, Viking 1, factory TVI-suppressed, with Viking VFO: \$500.00 for all or best offer each. F.o.b. I. Werlin, 39 Coolidge Road, Medford 55, Mass.

CLEANING out equipment excess to my needs: books, magazines, parts, AM, CW, SSB ham equipment, phonograph, radio, amplifier, TV set. Stamp for list, consider trades. W4API, Spitz, 1420 South Randolph, Arlington, Va.

WANTED: 75-200 watt xmtr in gud condx. Below \$125.00. Send description to: W7YQO, 4521-46 NE, Seattle, Washington.

SELL all band RF section 4-250A xmtr P1 networks, rack mounting, fully shielded, external VFO tank, \$225.00; modulator 810s on 10 inch chassis; Thordaron Multi-Match input and output, negative clipper filter, regulated bias supply \$135; heavy duty HV power supply, \$85; two finals, two 304TLs, each 10 inch; chassis 75 and 20, each \$40. Also SSB xtal filter, 150 watt xmtr complete, \$215. Many tubes, other parts. W1GR, A. W. Hyde, 77 Fairfield Road, Cranston, R. I.

VERTICAL Antenna: 20-40-80M. Aluminum construction. Material and instructions, \$69.50. El Cajon Electronic Engineering 720 So. Johnson Ave., El Cajon, California.

EX Signal Shifter, \$30; BC-459A, \$8.00; BC-453, \$8.00. One owner, with keys. Excellent condition. F.o.b. W0MLK, 315 Dix Road, Jefferson City, Mo.

WANTED: Used HQ-129X in gud condx. Will pay \$100.00. W1DIO 76 Austin St., New Britain, Conn.

SOLID NC183, ship-shape inside, respectable outside. Matched speaker, instruction manual: \$155. W2GTU.

COLLINS 75A2 factory installed, 3 Kc. mechanical filter, latest modification with 6DC and crystal 100 Kc. calibrator. Used very little, in original carton. Best offer over \$300 F.o.b. Atlantic City, 2427 Boardwalk, Irv Fishelberg, W2ZLD, New Jersey.

FOR Sale: HRO-60 with coils and speaker, \$375.00; Johnson Match-box, \$30.00; Webster Bandspreader, like new, \$17.50; Carter 600V, 170 M. dynamotor, \$15.00. W. R. West, P.O. Box 2423, Norfolk, Va.

FOR Sale or trade: Revere T-100 tape recorder, \$85; General Industries R-85L 2-speed disc recorder, \$22.50; portable mill, \$20.00; UTC LS-55 polypendence output xfmr, \$10.00; 1 rectone portable radio, \$10.00; Turner atk mike, \$4.00. Amperite contact microphone, \$4.00; all excellent condx, priced F.o.b. V. R. Hein, 418 Gregory, Rockford, Ill.

FOR SALE: New & used Gonset mobile equipment, communicators, 2-meter amplifiers, etc. We buy, sell, exchange ham gear. Graham Co., Stoneham, Mass. ST 6-1966.

MODULATORS: Model 50001 Communications modulator for transmitters with up to 100 watts input. Complete with tubes, power supply and over-modulation indicator, \$94.50. Photo and technical data available upon request. Department A3, Ampex Radio Products, Inc., 1195 West Lake Drive, Walling Lake, Michigan.

NEW Crystals for all commercial services at economical prices; also regrinding or replacement crystals for broadcast. Link, Motorola, G-E and other such types. 20 years of satisfaction and fast service. Send for L-7 catalog. Edison Electronic Co., Temple, Texas.

2 Meter beams, 6 element, horizontal or vertical, all seamless aluminum. \$6.95 prepaid. Wholesale Supply Co., Lunenburg, Mass.

TRADE: For men's golf clubs or guns. Fixed and mobile equipment. No junk! Write needs and your offer to W5SPS.

WANTED: Collins 310 B-1 or 310 B-3 with coils and instruction book. Must be in excellent condition with only very minor alterations. State price and bonds in your first letter. Sil Thompson, W5BUF, P.O. Box 1242, New Orleans, La.

COLLINS 32V3 with spare new RK4D-32, \$550; RME VHF152A, \$35; Hi stability 5.0/5.3 Mc VFO with pwr supp. for SSB exciter, \$200.00; Telrad 1000/1000 Kc frequency standard, \$100.00; W110 100 cfm induction motor blower (new), \$6.00. All F.o.b. or call for preferred. Tom McCann, K2CM, 146 Hillcrest Ave., Morristown, N. J.

FOR Sale: Globe King 500, HT-18 Hallcrafters VFO and SX-88 and speaker. First \$925.00 received. Dr. C. J. Mahowald, Parshall, N. Dak.

COLLINS 32V-3, \$495; Hallcrafters SX-96 receiver, \$210 with K46A speaker, \$225.00; Hallcrafters S-85 receiver, \$95.00; factory-wired 20A with QT-1, \$200.00; Elenco PA400 Linear amplifier, \$185.00; TBS-50D, \$75.00; RME-NC-55 mobile converter, \$35.00. Everything A-1 in original cartons. Oser, WIRMS, 198 Euclid Ave., Waterbury, Conn.

SELL Viking II and VFO, spare pairs 807s and 6146s, small hand crystal mike, all in perfect condition. Price: \$249.00. This rig made phone DXCC in one year. Will deliver within 50 miles. K2CJN, Steve Mann, 192 Staab Lane, Westbury, Long Island. Phone: EDgewood 3-3845.

FOR Sale: HQ-129X, less speaker, in excellent condition, \$140.00. Millen R9er with 10 and 20 meter coils, \$15.00. Doug Smith W1UKO, 8 Arcadia Rd., Natick, Mass. Phone OL 3-3748.

SELL: SX-25 receiver, exterior in excellent condition. Needs work internally. \$40.00. W9WDU, 1536 George St., La Crosse, Wis.

BC348Q and accessories, \$55.00. In excellent condition. W. C. Petrie, W02WU, 3821 Old Marion Rd., Cedar Rapids, Iowa.

BARGAIN Day at WIRMI; Sale HQ-129X, \$115; \$20 each; PE-135 dynamotor complete (filter case, new in crate); 600v 200 Ma, 300v 75 Ma pwr supply; pair of 6.6 AB2 40-w. modulator, National CRU modulation unit, 1500 Mc, 1000 v, 6 VTYM, Grid Dip 1-B Box 183, Greendush, Mass. Telephone Scituate 1068-J.

AR-FIVE Company standing wave bridges and 6-meter gear. SW-500 measures SWR on coax continuously with outputs 20 to 500 watts, \$16.95; CV-6 converter, cascade RF, crystal oscillator, 10-14 Mc. output to receiver, \$27.95. Any other output 7-30 Mc., \$29.95. TX-6-20 transmitter, 20 watts, fixed/mobile, phone/CW, many other features, \$64.95. Less tubes, \$54.95. Power supplies for above available with or kits. Soon, test equipment, many other items. Custom building a specialty. All letters answered. Write now! Jim, W9BMR & Ed, W4FFW/9, ex-W2QNZ, Ar-Five Company, Box 335, Shullsburg, Wis.

OSCILLOSCOPE: Dumont: 304A, \$175.00; 274A, \$60.00, used, like new. Request details. M. Brownstein, W3GKO, 4653 Boudinot St., Phila. 20, Pa.

FOR Sale: 200 watt TVI suppressed cw xmitter, pwr supply, VFO, antenna tuner. Like new BC348Q, LS-3 speaker, 28 Mc. converter. All for \$150.00. Will separate. Has. Dutton, W9QLK, Rte 3, Box 99, Elgin, Ill. Phone: Elgin 7402.

SELL 19 Mark II, complete manual, control boxes, mike and cables; BC-342 110 mc in excellent cond; transformer 1710 c/rt 800 ma; brand new 1952 Studebaker radio in original carton. Best offer. Peter Waasbord, 311 Byram Shore Road, Byram, Conn.

WANTED: Hallcrafters SR-75 transceiver in good condition. L. F. Megaw, W5PY, Box 296, Zapata, Texas.

NEW ICA Deluxe Signatone Cde Oscillator (Reg. \$15.75); Special, \$7.95. Key, \$1.35 extra. Surplus RG-8/U cable, 100 ft., \$5.95, 250 ft., \$13.25, 500 ft., \$25.00. Free Bargain Bulletin. Visit store for unadvertised bargains. 1.electronic Research, 719 Arch St., Philadelphia 6, Pa.

PASS Amateur theory exams. Check yourself with sample FCC-type questions and Novice and General class examinations. All for only \$4.95. Ameco Electronics, 1203 Bryant Ave., New York 59, N. Y.

COLLINS 800 cycle filter, \$15.00. W2EZM, LaGrange, 431 Oakland, Maple Shade, N. J.

HOUSE Cleaning time on Mockingbird Hill II: 500 watt final and modulator, BC-453 made up for SSB slicer operation, Q multiplier, antenna scope, BC458, SWR bridge, Hickok 534, Dumont 208, Wincharger tower 125 ft., miscellaneous, list. C. C. Richelieu, W8JS, 3536 Vista Ave., Cincinnati 8, Ohio.

COLLINS 32V3 for sale, in excellent cond, like new, \$500.00. No trades. Set of B&W 150 watt swinging link BV1 type coils for 80, 40, 20 and 10 meters. Don DeShazo, Jr., W9HVC, 529 Blackstone Ave., La Grange, Ill.

\$700 value. Complete station in excellent condition: Viking II with VFO and push to talk D104 microphone; SX71 receiver; TR-4 rotator and 15 mtr. beam; \$490.00, F.o.b. uncrated. Syl Polunsky, W5TGT, 915 Classen, San Angelo, Texas.

BOOK Sale: Principles & Practices of Telecasting Operations, Ennes, \$4.00; Television for Radiomen, Noll, \$4.00; Radio Engineering, Terman, \$4.50; Radio Engineering Handbook, Henney, \$5.50; High Frequency Measurements, Hund, \$3.00; Electronics Dictionary, Cook & Markus, (2 copies, \$3.00 each); Practical Radio (Communications), Niles & Hensley, (2 copies, \$4.00 each); Mathematics for Electricians & Radiomen, Cooke, (5 copies, \$2.50 each); Fundamentals of Vacuum Tubes, Eastman, \$3; The Radio Manual, Sterling, \$5.00; Electrical Fundamentals of Communication, Albert, (3 copies, \$3.00 each); All books like new and in perfect cond. Prices are postpaid. Will take \$50 for entire lot. All inquiries answered, W. Cook, 1614 Morson Rd., Jackson 9, Miss.

WANTED: Amateur and aircraft receivers, transmitters, direction finders. Especially: Magnat, AFR-S, ARN-7, ARC-1, ART-1, BC-10, BC-9, BC-348, teletype, BC-221; 32V, 75A, test equipment. Cash or trade for New Johnson Viking, Ranger, Central Electronics, Hallcrafters, Hammarlund, National, B&W, Gonset, Elmac, Harvey-Wells, Morrow, Tulrex, Fisher Hi-Fi, etc. Write: Altronics, Box 19, Boston 1, Mass., Richmond 2-0048 (Stores: 44 Canal, Boston; 60 Spring, Newport, R. I.).

WANTED: Heathkit A-1H, #184/6A26, FG.955, 606, 1295, WL32, #175A, Klystrons, Magnat, #184, all Western Electric and Sperry tubes, Selenium rectifiers and plates. Lo voltage hi capacity electrolytics, 2000 μ f and up, 50 volts operating. "TAB", 111 Liberty St., N. Y. 6, N. Y. Tel. RE 2-6245.

PERFORATED Aluminum sheet, .051, 5/64" OD Holes, 3/8" centers, 11.20 sq. ft.; cut to size. Send for listing on beams, aluminum tubing, etc. Radcliff*, Postoria, Ohio.

USED equipment available from the largest inventory of this type in the East. Here are a few samples: Gonset 10-1 converter, \$24.95; Triband, \$29.95; 3008, \$24.95; Super-curve, \$89.95; Hallcrafters S-22R, \$39.95; S-38, \$29.95; SX-43, \$129.95; SX-62, \$250.00; SX-96, \$199.95; HT-20, \$350.00; Johnson Mobile, \$99.95; Viking I with push-to-talk, \$199.95; Viking I TVI-suppressed, \$249.95; Ranger, \$210.00; \$44.95; Viking II, \$265.00; National Hi-Cube, \$99.95; HRO-M, \$99.95; HRO-50T, \$150.00; HRO-50, \$175.00; NC-40, NC-45, \$59.95; NC-88, \$89.95; NC-100X, \$75.00; NC-183D, \$295.00; SW-54, \$44.95; Collins 32V1, \$395.00; 32V2, \$450.00; 32V2, modified, \$495.00; many others. For latest complete list write Carl, WIBFT, Evans Radio, Concord, N. H.

SRI.L: Collins 75A-2, \$295; 310C, \$125.00; Dumont #241 scope, \$225; 32V2, \$395.00; 12,000 ohm relays, 110 Vac dpdt, \$1.75; Teletype equipment, Collins 30-J, \$275.00; Wnt: APR-4 receiver and tuning units, PAR-5 ART-15, Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. Tel. Richmond 0916.

FOR Sale: Radio Craft-Radio Electronics, 1947; Sept.; 1948, Feb.-Oct.; 1949, Jan., Feb., July; 1950, Jan.-Sept.; 1951, Feb., Nov.; Dec.; 1952 and 1953, all 12 issues. Some have torn covers but all are complete. Radio News/Radio & Television News: 1944, Jan., Mar., June, Sept., Oct., Nov.; 1945, June-Nov.; 1947, June, Aug., Nov.; Dec.; 1948-1953 incl., every issue; 1954, Dec. CQ; 1947, Aug., Oct., Dec.; 1948, Jan.-Dec. 1949-54 incl., every issue; 1955, Jan.-July. Perfect condition. 20¢ per copy. Cecil G. Baumgartner, Box #343, Milton, Penna.

TROUBLE Getting out? Put a punch in your signal the easy low-cost way. Low loss, low wire, fold-dipole antennas, \$4.95 and up. Write for free literature. R. J. Buchan Co., Bricelyn 4, Minn.

ELECTRONIC Blanket controls, 3 tubes, filament transformer, plate relay, resistors and condensers, in plastic case with cord, \$2.50 each postpaid. Dozen lots, \$2.00 each postpaid. John Randolph, W4QA, P.O. Box 2158, Asheville, N. C.

SELL: RME VHF2-11 superhet 14 tubes for 2-6-10-11, excellent, \$65.00; Link police car transmitter, untouched, excellent, \$30.00; Stancor ST-202-A table top CW 100 watt package complete, \$60.00; Brush tape recorder HK-401, excellent, \$100.00; Collins 32V2 including FM adaptor, excellent, \$465.00; modulator chassis 500 watt including two 810s, bargain, \$35.00. W2ADD.

AC Generators and plants. Katolig, Winpower and Pioneer. Discounts to amateurs and C.D. E. L. Ballou, W1GFD, Box 224, Wayland, Mass.

FOR Sale: Kilowatt transmitter 2-10T1s, final 2-104TTLs, modulator 2 Hi-Voltage power supplies; Lambda Modulation scope, exciter and speech amplifier, Supreme AF-100 with 4-65A output. Pictures on request: \$495.00. Also have for sale Johnson Ranger, in like new condition. Less than a year old! \$195.00. Col. M. B. Chatfield, Redstone Arsenal, Huntsville, Ala.

MODERNIZE Now! Highest trade-in allowance ever offered. Top-notch used equipment. Lowest wholesale prices anywhere. Write right now, not later. Most equipment in stock. Marshall Electronics, 855 Burlington, Frankfurt, Indiana.

WANTED: Monoscope tube, any age. Pat Blaney, New Straiksville, Ohio.

COLLINS 310B-1 exciter/VFO, all bands, \$165.00; National NC-183 receiver, NFM-83, speaker, recently factory-serviced, \$175.00; Select-O-Ject, power supply, \$18.50; Meissner signal shifter TVI suppressed, coils, \$20.00; loads panel meters, tubes, filter chokes and condensers, small, medium power transformers. Everything in top condition, F.o.b. Indianapolis. Request free details listing. Howard Severed, W9DPI, 2431 E. Riverside Dr., Indianapolis 23, Ind.

COLLINS 32V-3 in excellent condition, \$525.00. George Sperry 108 Oak Hill, Portsmouth, Va.

FOR Sale: Benlix TA-12, 150 watt transmitter and AC power supply, VFO, bandwidthing, 20-40-80 meters, Pi network output, TVI suppression, \$50.00. W0ATP, Thelemann, 6210 W. 76th Place, Overland Park, Kansas.

SHACK-CLEARING sale: 40-foot steel windmill tower, \$40.00; kilowatt coils, \$2.00 each; 4-element 10-meter beam, \$20.00; PE-103, brand new in crate, \$25.00; 5-volt, 10-amp., 2,000 volt insulated fight motor transformers, \$3.00 each; 304-TL, \$1.00; BC-455, \$3.00; 6VDC generator, \$18.00; Viking Matchbox, \$37.00; everything in perfectly new condx. W9OMH, R.F.D. #2, Hastings, Nebraska.

SELL: 300 w. Meissner 50B transmitter, 80 thru 10M, complete with VFO CW-Phone, time delay relays, B&W coils, \$220.00; Receiver NC-100ASD, 1400 Kc. to 30 Mc., \$50.00; HF-10 and 20, \$50.00. W4PKR, Valleau, Princeton, Ky. Tel. 2689-5247.

WANTED: Panafactor, Hallcrafters SP-44 or Panoramic, Mel Malley, W6SRU, 2251 Dewey St., Edgewater, Colo.

FOR Sale or trade: \$40A, Gonset, 3-30 converter, Balun coils, Kodak Pony 135; Need: Johnson Matchbox, W0RFL, 345 W. 9th St., Fremont, Nebr.

SELL: Heathkit A-1I transmitter, antenna coupler and VFO, \$50.00. Alan Steger, K2SYH, Box 97, Huntington Station, N. Y.

RADIO Club needing 16 mm sound movie projector with complete accessories, robot machine at big bargain from professional movie machine operator. ARRL member. Contact: Projectionist, Unique Theatre, 3645 East 1st St., Los Angeles 63, Calif.

WANTED: BC-610E, BC-614E, BC-939, BC-312, JB-60 & 70. Highest price paid. USECO, 2811-16th Street NE, Washington 18, D. C.

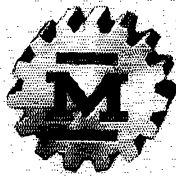
FOR Sale: Perfect working condition: TVI-suppressed, commercially built 500 watt phone-cw, xmitter, complete with 866s splatter suppressor, varicac-controlled power supply, modulator (pair 811As); Millen 90991 final (812As); Millen 90800 exciter, all in new deluxe 6 ft. locked door, Park-Metal cabinet, with rack on casters. Plug-in coils, all bands, also Collins VFO 310C2 with built-in power supply, Stromberg-Carlson speech amplifier and Harrison 500 watt antenna tuner with all coils. First bid \$460 or over takes all. Single package. Phone DEcator 2-4119, WIUWB, Julian Soban, 83 Arnold Rd., Newton Center 39, Mass.

FOR Sale: Hammarlund SP-400X in like new condx: \$250. Dr. Stephen R. Fromm, 35 Revere St., Boston 14, Mass.

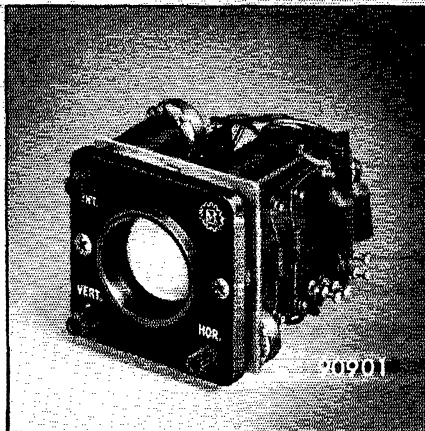
WANTED: Complete used 12 v mobile rig in good condx or used Gonset. Contact: Connie Gann, W1FGF, c/o ARRL, 38 LaSalle Rd., West Hartford 7, Conn.

QDP? Use Stick-Tack. See page 141. The Radio Stationers, COLLINS 32V3, little used, \$500 F.o.b. KH61J.

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One Inch
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Miniaturized, packaged panel mounting cathode ray oscilloscope designed for use in instrumentation in place of the conventional "pointer type" moving coil meters uses the 1" 1CP1 tube. Panel bezel matches in size and type the standard 2" square meters. Magnitude, phase displacement, wave shape, etc. are constantly visible on scope screen.

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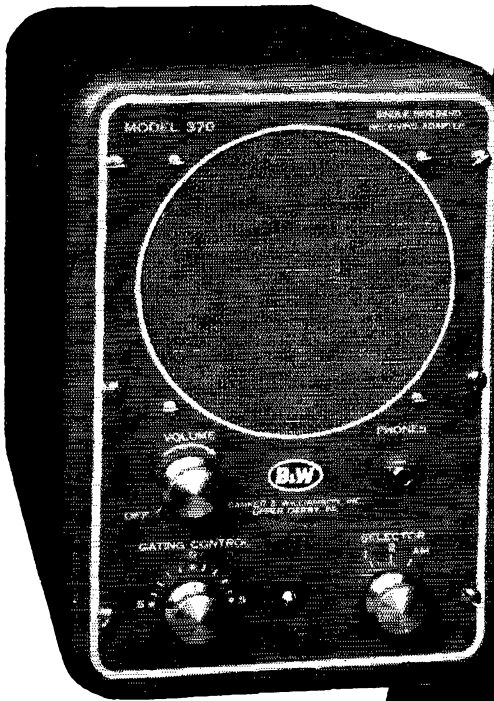
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- Superb performance on SSB



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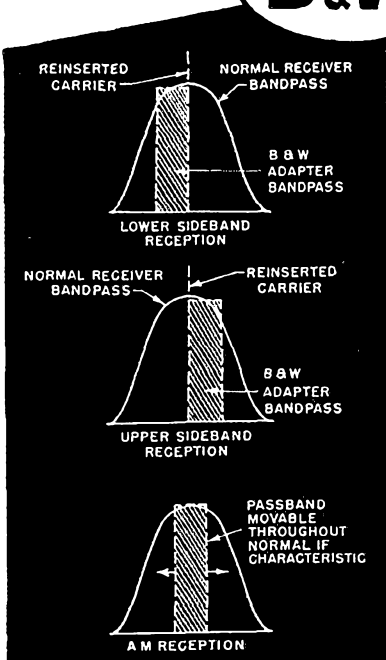
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Here . . . for the first time . . . is a truly selective bandpass type adapter for bringing the performance of yesterday's receivers up to the requirements of tomorrow! In addition to superlative performance on SSB, this unit offers true single-signal CW reception and selective sideband reception on AM phone signals.

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Relation of Model 370 passband to that of station receiver for various positions of the function switch.

BARKER & WILLIAMSON, Inc.

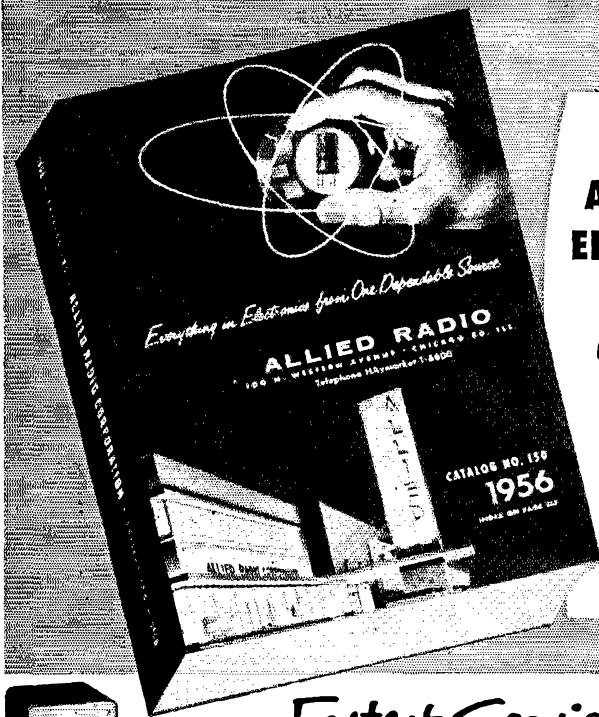
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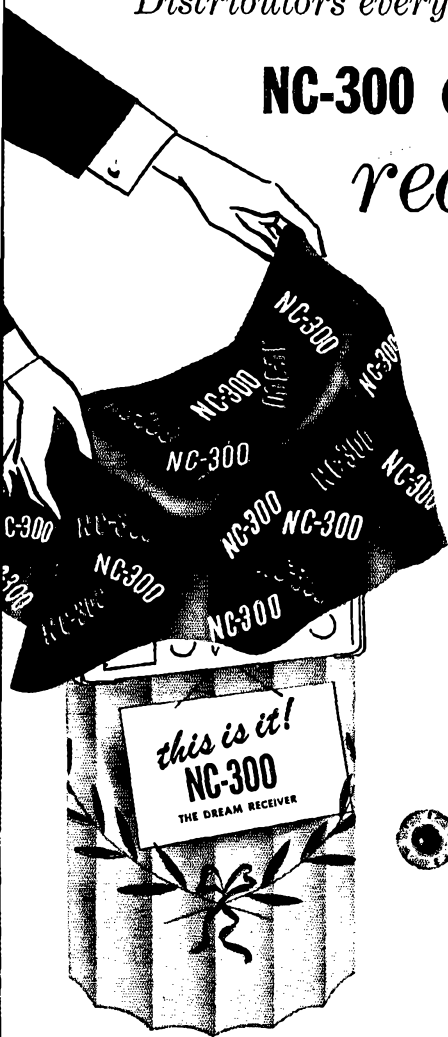
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NEW! Exclusive optional RF gain provision for best CW results allows independent control of IF gain!

NEW! Giant, easy to read, "S" meter!

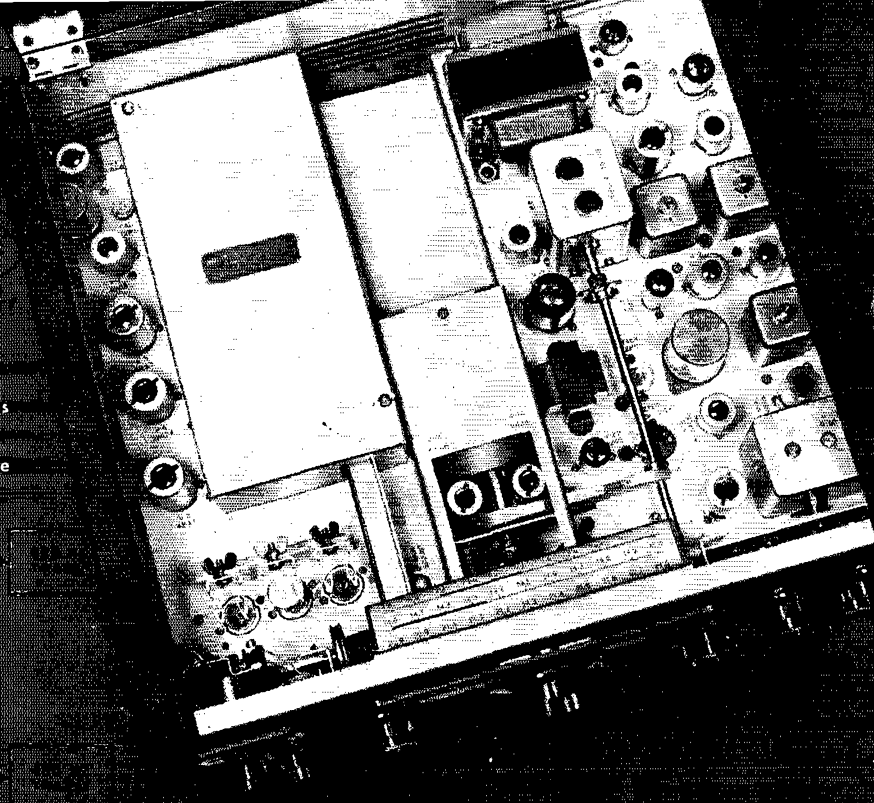
NEW! Provision for external control of RF gain automatically during transmitting periods.

NEW! Muting provision for CW break-in operation.

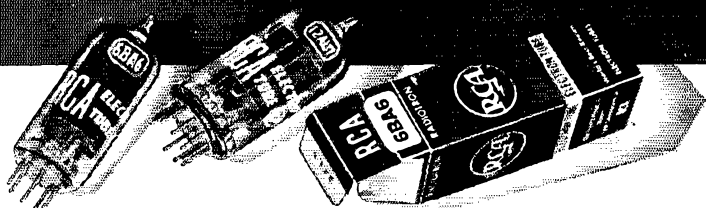
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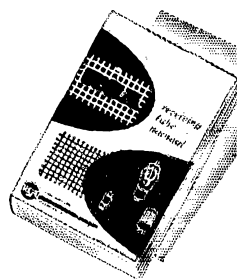
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Take the Collins 75A4, for example. Known by radio amateurs for its high signal sensitivity and operating stability, this versatile receiver uses RCA Receiving Tubes to assure maximum circuit performance from the input to the output.

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There is an RCA Receiving Tube for virtually every receiver and transmitter application in amateur radio. See your RCA Tube Distributor for the types you need. For technical data, write RCA, Commercial Engineering, Section I37M, Harrison, N. J.



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