

QST

October 1960

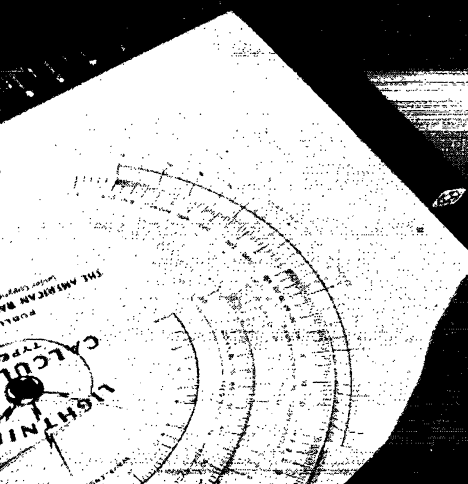
50 Cents

55c in Canada

devoted entirely to

amateur

radio



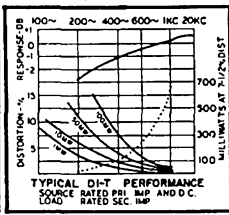
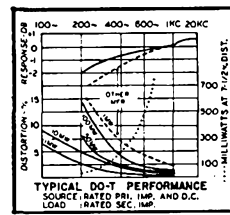


DO-T and DI-T TRANSFORMERS

Sealed to MIL-T-27A Specs.



DO-T: 3/8 Dia. x 1 1/2", 1/10 Oz.; DI-T: 3/8 Dia. x 1/2", 1/20 Oz.



DO-T No.	Pri. Imp.	D.C. Ma.t in Pri.	Sec. Imp.	Pri. Res. DO-T	Pri. Res. DI-T	Mw. Level	DI-T No.
DO-T1	20,000 30,000	.5 .5	800 1200	850	815	50	DI-T1
DO-T2	500 600	3 3	50 60	60	65	100	DI-T2
DO-T3	1000 1200	3 3	50 60	115	110	100	DI-T3
DO-T4	600	3	3.2	60		100	
DO-T5	1200	2	3.2	115	110	100	DI-T5
DO-T6	10,000	1	3.2	790		100	
DO-T7	200,000 500	0	1000 100,000	8500		25	
Reactor 2.5 Hys./2 Ma., .9 Hy./4 Ma							
DO-T8	10,000 12,000	1 1	500 CT 600 CT	800	870	100	DI-T8
Reactor 3.5 Hys./2 Ma., 1 Hy./5 Ma							
DO-T9	10,000 12,000	1 1	500 CT 600 CT	800	870	100	DI-T9
DO-T10	10,000 12,500	1 1	1200 CT 1500 CT	800	870	100	DI-T10
DO-T11	10,000 12,500	1 1	2000 CT 2500 CT	800	870	100	DI-T11
DO-T12	150 CT 200 CT	10 10	12 16	11		500	
DO-T13	300 CT 400 CT	7 7	12 16	20		500	
DO-T14	600 CT 800 CT	5 5	12 16	43		500	
DO-T15	800 CT 1070 CT	4 4	12 16	51		500	
DO-T16	1000 CT 1330 CT	3.5 3.5	12 16	71		500	
DO-T17	1500 CT 2000 CT	3 3	12 16	108		500	
DO-T18	7500 CT 10,000 CT	1 1	12 16	505		500	
DO-T19	300 CT	7	600	19	20	500	DI-T19
DO-T20	500 CT	5.5	600	31	32	500	DI-T20
DO-T21	900 CT	4	600	53	53	500	DI-T21
DO-T22	1500 CT 600	3 5	600 1500 CT	86	87	500	DI-T22
DO-T23	20,000 CT 30,000 CT	.5 .5	800 CT 1200 CT	850	815	100	DI-T23
DO-T24	200,000 CT 500 CT	0	1000 CT 100,000 CT	8500		25	
DO-T25	10,000 CT 12,000 CT	1 1	1500 CT 1800 CT	800	870	100	DI-T25

DO-T No.	Pri. Imp.	D.C. Ma.t in Pri.	Sec. Imp.	Pri. Res. DO-T	Pri. Res. DI-T	Mw. Level	DI-T No.
Reactor 4.5 Hys./2 Ma., 1.2 Hys./4 Ma.							
DO-T26	6 Hys./2 Ma.	1.5 Hys./5 Ma.	2100			2300	DI-T26
Reactor .9 Hy./2 Ma., .5 Hy./6 Ma.							
DO-T27	1.25 Hys./2 Ma.	.5 Hy./11 Ma.	100			25	DI-T27
Reactor .1 Hy./4 Ma., .08 Hy./10 Ma.							
DO-T28	.3 Hy./4 Ma.	.15 Hys./20 Ma.	25				DI-T28
DO-T29	120 CT 150 CT	10 10	3.2 4	10		500	
DO-T30	320 CT 400 CT	7 7	3.2 4	20		500	
DO-T31	640 CT 800 CT	5 5	3.2 4	43		500	
DO-T32	800 CT 1000 CT	4 4	3.2 4	51		500	
DO-T33	1060 CT 1330 CT	3.5 3.5	3.2 4	71		500	
DO-T34	1600 CT 2000 CT	3 3	3.2 4	109		500	
DO-T35	8000 CT 10,000 CT	1 1	3.2 4	505		100	
DO-T36	10,000 CT 12,000 CT	1 1	10,000 CT 12,000 CT	950	970	100	DI-T36
DO-T37	2000 CT 2500 CT	3 3	8000 Split 10,000 Split	195		100	
DO-T38	10,000 CT 12,000 CT	1 1	2000 Split 2400 Split	560		100	
DO-T39	20,000 CT 30,000 CT	.5 .5	1000 Split 1500 Split	800		100	
DO-T40	40,000 CT 50,000 CT	.25 .25	400 Split 500 Split	1700		50	
DO-T41	400 CT 500 CT	8 6	400 Split 500 Split	46		500	
DO-T42	400 CT 500 CT	8 6	120 Split 150 Split	46		500	
DO-T43	400 CT 500 CT	8 6	40 Split 50 Split	46		500	
DO-T44	80 CT 100 CT	12 10	32 Split 40 Split	9.8		500	

DO-TSH Drawn Hipermalloy shield and cover 20/30 db DI-TSH

† DCMA shown is for single ended usage (under 5% distortion—100MW—1KC) . . . for push pull, DCMA can be any balanced value taken by .5W transistors (under 5% distortion—500MW—1KC)

† DO-T & DI-T units designed for transistor application only. Pats. Pend.
* DO-T37 thru DO-T44 newly added to series.

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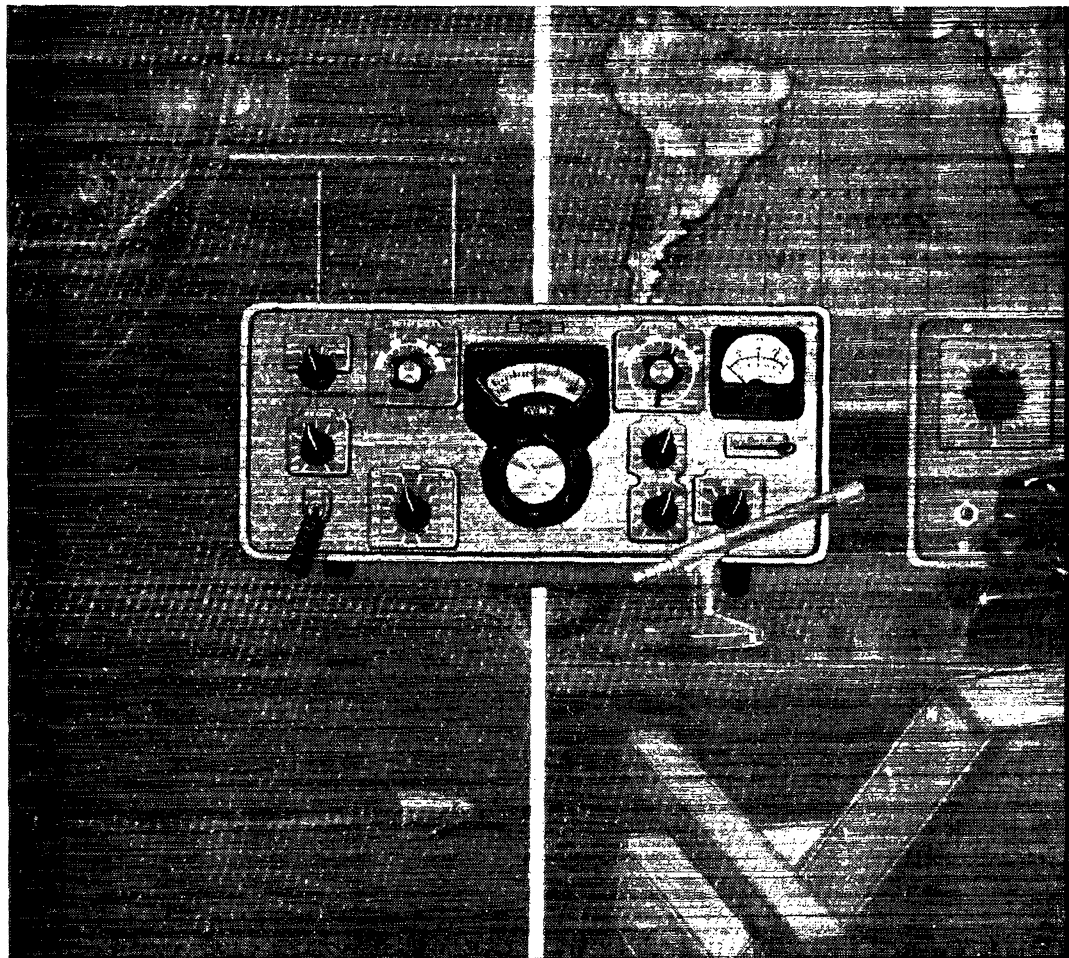
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Index
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—CONTENTS—

TECHNICAL —

Stability with Simplicity..George D. Hanchett, W2YM	11
Meter Reading by Sound.....Ken Blaney, W6PIV	14
Compression Tuning in the V.H.F. Range Mayer Savetman	16
A Dummy Load off the Mind....John Howard, K8MME	18
Switching Coaxial Feed Lines..Gene Hubbell, W9ERU	19
Screen Protection and More..John A. Evans, W9HRH	22
The "Ultimatic" — Transistorized, Part II Alvin F. Kanda, K0MHU, ex-KH60J	31
High-Frequency Crystal Filters for S.S.B. D. J. Healey, W3HEC	35
Technical Correspondence.....	42
Recent Equipment: Hammarlund HX-500 Transmitter.....	45

BEGINNER & NOVICE —

A Limited-Space Antenna....Lewis G. McCoy, W1ICP	23
--------------------------------------------------	----

MOBILE —

Two-Band Mobile Station.....S. B. Leslie, WSDQV	26
-------------------------------------------------	----

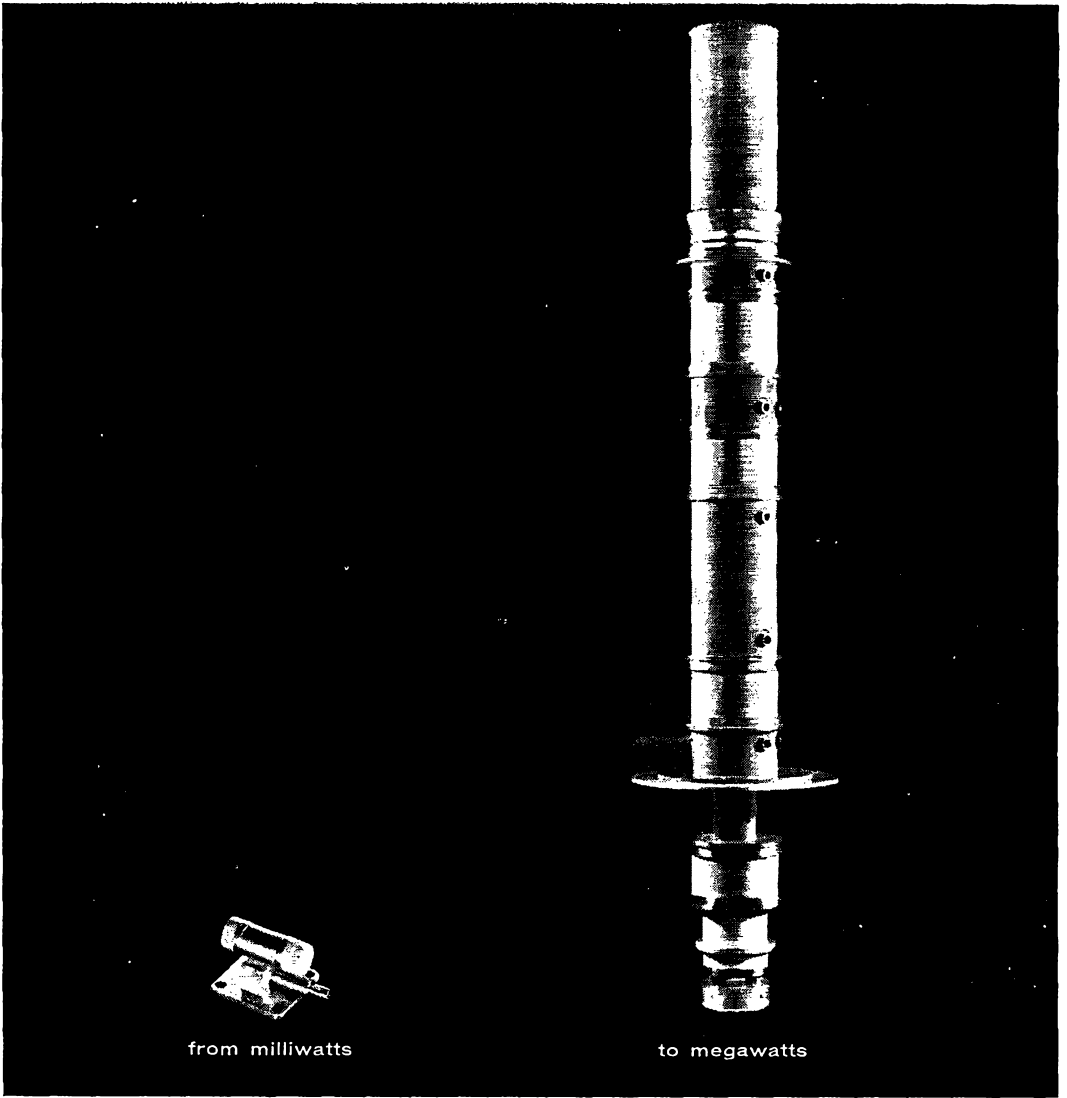
OPERATING —

Annual Simulated Emergency Test — Announcement...	49
June V.H.F. Party Results Supplement.....	49
26th ARRL International DX Competition — Official Results.....	52
RTTY Sweepstakes — Announcement.....	66
27th ARRL Sweepstakes — Announcement.....	72

GENERAL —

Project Hope.....	10
Home-built Stations.....	73
Operation Alert — 1960.....George Hart, WINJM	80

"It Seems to Us...".....	9	IARU News.....	74
Coming Conventions.....	10	World Above 50 Mc.....	76
Great Lakes Div. Convention... ..	10	Correspondence from Members..	84
Hamfest Calendar.....	10	Operating News.....	85
Our Cover.....	10	Station Activities.....	94
In QST 25 Years Ago.....	18	Feedback.....	152
New Books.....	25, 48	Silent Keys.....	170
Hints and Kinks.....	50	ARRL QSL Bureau.....	172
YL News and Views.....	63	Index to Advertisers.....	182
How's DX?.....	67		



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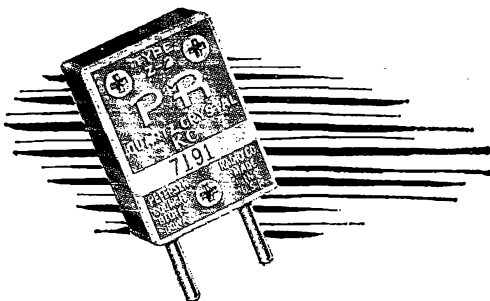
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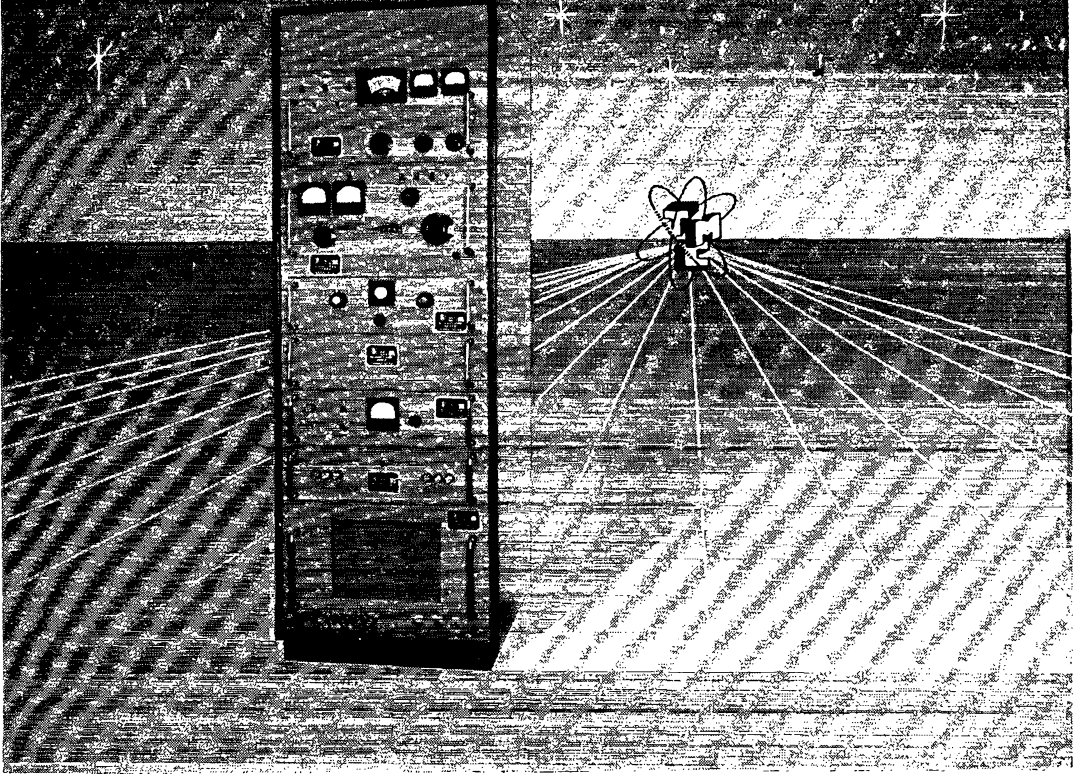
Section Communications Managers of the ARRL Communications Department

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

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FREQUENCY STABILITY:	1 part in 10^8 per day under normal fixed station operating conditions.
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OUTPUT IMPEDANCE:	72 ohms nominal.
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Bulletin 241

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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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SANFORD B. DE HART W4RRV
227 S. Purdue Ave., Oak Ridge, Tenn.
Vice-Director: Victor Canfield W5BSR
Box 965, Lake Charles, La.

Great Lakes Division

DANA E. CARTWRIGHT W8UPB
2979 Observatory Ave., Cincinnati 8, Ohio
Vice-Director: Robert B. Cooper W8AQA
132 Guild St., N.E., Grand Rapids 5, Mich.

Hudson Division

MORTON B. KAHN W2KRR
22 Birch Hill Rd., Great Neck, N. Y.
Vice-Director: Lloyd H. Manamon W2VQR
709 Seventh Ave., Asbury Park, N. J.

Midwest Division

ROBERT W. DENNISTON W0NWX
Box 631, Newton, Iowa
Vice-Director: Sumner H. Foster W0GQ
2315 Linden Dr. S.E., Cedar Rapids, Iowa

New England Division

MILTON E. CHAFFEE W1EFP
53 Homesdale Ave., Southington, Conn.
Vice-Director: Carmine A. Polo W1SJO
17 Park St., West Haven 16, Conn.

Northwestern Division

R. REX ROBERTS W7CPI
837 Park Hill Drive, Billings, Mont.
Vice-Director: Harold W. Johnston W7PN
2727 Belvidere Ave., Seattle 6, Wash.

Pacific Division

HARRY M. ENGWICHT W6HC
770 Chapman, San Jose 26, Calif.
Vice-Director: Ronald G. Martin W6ZF
1011 Terrace Drive, Napa, Calif.

Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
428 Maple Lane, Danville, Va.
Vice-Director: Joseph F. Abernethy W4AKC
788 Colonial Drive, Rock Hill, S. C.

Rocky Mountain Division

CLAUDE M. MAER, JR. W0IC
485 Race St., Denver 6, Colo.
Vice-Director: John H. Sampson, Jr. W7OCX
3618 Mount Ogden Drive, Ogden, Utah

Southeastern Division

JAMES P. BORN, JR. W4ZD
25 First Ave., N.E., Atlanta 17, Ga.
Vice-Director: Thomas M. Moss W4HYW
P.O. Box 644, Municipal Airport Branch,
Atlanta 20, Ga.

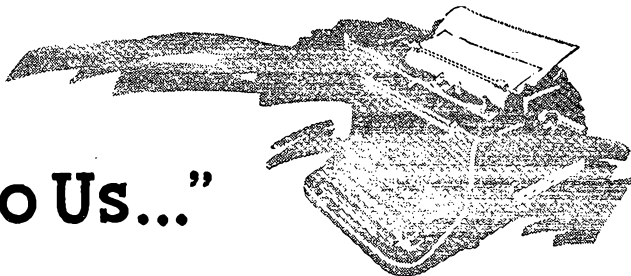
Southwestern Division

RAYMOND E. MEYERS W6MLZ
717 Anderson Way, San Gabriel, Calif.
Vice-Director: Virgil Talbott W6GTE
1175 Longhill Way, Monterey Park, Calif.

West Gulf Division

GRADY A. PAYNE W5ETA
5103 Linden St., Bellaire, Texas
Vice-Director: Robert D. Reed W5KY
4339 S. Peoria, Tulsa 5, Okla.

"It Seems to Us..."



20-METER COOPERATION

Amateur radio is a hobby. Most of us keep it a hobby most of the time. Occasionally, though, some of us get a little too involved in our own favorite phase of hamming and temporarily lose our perspective. This occasional blind spot can — and indeed it has at times — lead to feuding between amateurs enjoying different facets of the hobby, or different modes of operation.

There have recently been rumblings of discontent concerning twenty meters. Over the years, operators using a.m. and operators using s.s.b. had spontaneously developed an informal system on 14 Mc. under which the a.m. contingent occupied, roughly, the bottom half of the voice band and the sidebanders stuck pretty well to the top half. DX sideband worked above 14,300, and the foreigners with carriers worked below 14,200. Though generally accepted by most hams on the band, no one pushed it; the plan simply arose from the need for a workable arrangement, and by way of the spirit of cooperation so notable in amateur radio — admittedly, however, not without some preliminary skirmishing as s.s.b. grew.

Earlier this year this working arrangement was temporarily upset by expansion of the 20-meter phone band to 14,350 kc. Readjustment, to some extent still in process, has certainly not been easy, nor without its moments of heated discussions. Some amateurs expressed the desire to have FCC "do something." A few tried mob rule, landing with brute force on any stations using the opposite mode in what they consider "their" territory. Others thought the League should lay down an edict for band usage.

Whether or not one likes the principle of calling on FCC to solve what are really internal problems, in this case the question was moot as the Commission long ago declared that it doesn't look with favor on any further regulatory action to subdivide the amateur bands by various modes.

As for the League, no one person sitting in the editorial chair, even with a number of experienced staff people to guide him, is capable of coming up with a Utopian answer to practical operating problems. Such an

answer can come only from users of a band themselves, on a trial-and-error basis, until such experimental methods show one system or another to be the desired one.

We could be wrong, but from where we sit it seems to us that the ham spirit is getting results once again. There appears a trend to general agreement about where to fire up in the band for a.m., where to use s.s.b., and where to listen for DX on each mode, with at least 90% of the hams cooperating. We seem to have the lowest 100 kc. reasonably free for c.w.; from there up to 14,200 used by DX a.m. voice stations; the U. S. voice band divided very roughly in half, with a.m. at the bottom and sideband near the top; and some space at the 14,350 edge for rare sidebanders to get through.

True, we still have a few complaints that one group or the other is hogging the band, and indeed there may be a few stations still not operating in accordance with the unwritten agreement. The best way to handle these cases is for each group to suggest to its own non-conformists that cooperation between all amateurs is an essential ingredient in our continued efficient use of amateur frequencies. We should avoid at all costs the prospect of some operators "punishing" members of the other group heard outside the generally-accepted frequencies.

And while we're on the subject, we should also like to commend the amateurs outside the United States for their understanding and forbearance. We are well aware that the ARRL's request for expansion of the phone band here, and FCC's affirmative action, are not popular overseas. Yet most of the DX amateurs seem to be sympathetic with the seriousness of the phone QRM problem in the States which results from our having two-thirds of the total amateur population in this country alone. Our DX friends have been in general most gracious in accepting the new allocations and adjusting their own operations accordingly.

Truly, the 20-meter problem is an outstanding example of the friendly cooperation which has existed among the world's radio amateurs since the earliest days; we hope this spirit will long prevail.

COMING A.R.R.L. CONVENTIONS

October 7-8—Great Lakes Division,
Cleveland, Ohio.
October 14-15—Hudson Division, New
York City, New York.

GREAT LAKES DIVISION CONVENTION

Cleveland, Ohio—October 7-8, 1960

The Great Lakes Division ARRL Convention is to be held on Friday and Saturday, October 7-8 in Cleveland, Ohio. September *QST* incorrectly stated that the convention program and banquet includes Sunday. Group suppers and several hospitality shows are scheduled for Friday evening, October 7 with the main portion of the convention program to begin Saturday morning at 10 o'clock with a banquet concluding activities Saturday evening. For Great Lakes Division Convention registration and banquet tickets, write the Cleveland Amateur Radio Convention Committee, P. O. Box 5167, Cleveland 1, Ohio.



Illinois—The annual Chicago RTTY meeting will be held on Sunday, October 9, with the afternoon technical session being held in the cafeteria at the Hallicrafters Co., 1000 S. Kostner Ave., Chicago. The cafeteria will be open at 1030 for ragchewing. Dinner tickets, at \$4.50 each and limited to the first 75, are available from George M. Boyd, W9SPT, c/o The Hallicrafters Co., 4401 West Fifth Ave., Chicago 24. There is no charge for the technical session, which will feature equipment displays, short technical talks, and a question-and-answer period.

New York—The sixth annual v.h.f. roundup sponsored by the Syracuse V.H.F. Club will be held on October 8 at the Three Rivers Inn, 8 miles north of Syracuse on Route 57. Take Thruway Exit 38. Registration starts at 1030 and the formal program at 1330. Speakers include W1HDQ from *QST*, K2LMG from GE, and W2UKL also from GE. There will be an afternoon program for the ladies, and in the evening a banquet and floor show. Admission is by advance registration only, with tickets at \$5.50 per person from Howard S. Lawrence, K2TXG, 317 Clover Ridge Drive, Syracuse.

New York—The Northeastern DX Association will hold its annual dinner meeting on Saturday, October 8, at 1930 at the Hot Shoppes Restaurant and Towne House Motel in Albany. Dinner tickets are \$5.00, and any active DXCC member is welcome. A DXpedition movie will be shown as part of the program. The menu includes a choice of roast beef or turkey—please state your choice when making your reservations. Motel reservations are also available. All reservations must be in by October 1, and should be sent to O. J. Weiss, jr., K2UVU, 117 Shaker Rd., Albany 11.

Ohio—The Fall Fun-Fest of the Miami Valley V.H.F. Club will be held on Saturday, October 1, at the Engineer's Club at 110 E. Monument Ave., Dayton. The program includes technical talks, hidden transmitter hunts on 50, 144, and 420 Mc., morning and afternoon programs for the XYLs, and a big banquet. Banquet speaker will be W3ZM, U. S. allocations committee spokesman at the recent Geneva conference. Registration is \$1.50, banquet tickets are \$3.50 each, and the banquet tickets must be ordered and paid for by Sept. 29. Contact E. Gillespie, K8MDX, 1351 Alcott, Dayton 6.

OUR COVER

What hand and brain went ever paired
What heart alike conceived and dared
What act proved all its thought had been

—Robert Browning

No need for a question like that, sire. This happens all the time in our Technical Department. Specifically, this month's cover shows some of the coordination between hand and brain that was necessary in the design and construction of a small phasing-type sideband generator that is being worked on for the 1961 *Handbook*. Who recognizes those hands?

Project Hope—W8OLJ

In late September a fully-equipped hospital ship, the *Hope*, will sail from San Francisco for an extended itinerary through southeast Asia. Aboard will be doctors, dentists and nurses who are volunteering their time to bring American medical skills and techniques to the people of other nations in their own environment. Also aboard will be a 1-kw. s.s.b. amateur station, provided by Hallicrafters Company and operating under the call W8OLJ/MM, for the dual purpose of providing personal communications between personnel and their families back home, and bringing the public-service value of amateur radio to international attention in still another way.

Ralph C. Charbeneau, W8OLJ, of "Operation World-wide" fame, is amateur radio consultant for the project. Normal operating frequencies will be 14,345, 21,145 and 28,650 kc. Keep an ear on these frequencies anytime after late September, both for the pleasure of a contact with the ship and possibly to handle message traffic to relatives of personnel in your vicinity.

A special QSL card will be sent to all contacts. The address for QSLing is Project HOPE, Box 9808, Washington, D. C. This project is not government sponsored, but is being financed by contributions from American companies and individuals under the People-to-People program, so hams who desire to add their support may send it to this same address. However, QSLing will be entirely independent of any donations.

We expect to have more information on Project HOPE in future issues.

FLASH!

Effective September 15 voice bands in Canada were expanded to the following figures:

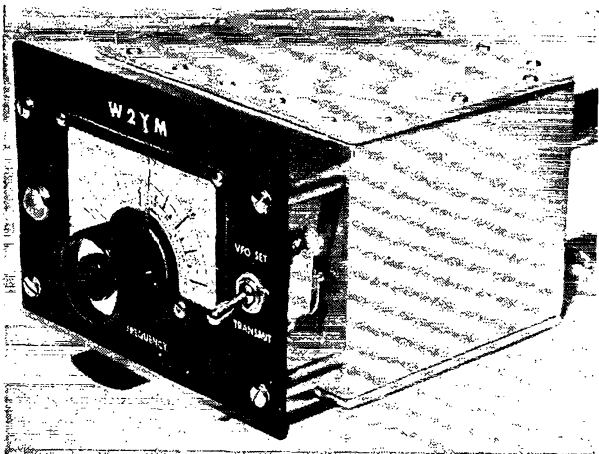
7150-7300 kc.
14,100-14,350 kc.
21,100-21,450 kc.
28,100-29,700 kc.

This action was taken by the Department of Transport responsive to a poll of Canadian amateurs. Details next month.

The panel of the v.f.o. is supported on metal pillars to provide space for the dial mechanism, since the tuning capacitor is firmly mounted on the front side of the shield box. Note the heavy ($\frac{1}{8}$ inch thick) top and bottom plates for stiffening the aluminum box.

An Easy-To-Build V.F.O. with Cathode-Follower Output

BY GEORGE D. HANCHETT,* W2YM



Stability with Simplicity

IN my 30 years as a radio amateur I have probably built as many v.f.o.s. as anyone else. Because most of them did not meet the standards that I wanted, I kept on seeking the ultimate. Although this v.f.o. may not be, strictly speaking, the ultimate, its performance has been exceedingly good; for this reason I thought others might be interested in this simple design.

Circuit Details

Examination of the circuit, shown in Fig. 1, reveals that basically this oscillator is of the hot-cathode Colpitts type. The 3.5- to 4-Mc. range is spread over practically all of the tuning dial. The effect of changing tube capacitance is minimized by use of a voltage divider consisting of three capacitors, C_4 , C_5 and C_6 , with the tube connected across two of them. The use of fairly large capacitors ($0.001 \mu\text{f.}$) at C_5 and C_6 almost completely swamps out the effect of the tube capacitances. The radio-frequency choke, RFC_1 , is used to obtain a d.c. path for the cathode current of the 12AU7-A oscillator. The output of this v.f.o. is obtained from a cathode follower (second triode unit of the 12AU7-A) to minimize the effect on the oscillator of changing output-circuit conditions. The liberal use of silver-mica capacitors assures fairly stable temperature characteristics.

Mechanical Details

As in any variable-frequency oscillator, the mechanical considerations are probably as important as the actual electrical circuit utilized.

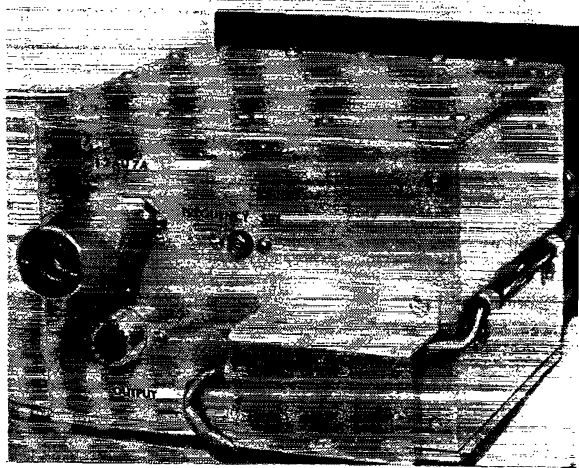
* Electron Tube Division, Radio Corporation of America, Harrison, New Jersey.

External connections, brought out through feedthrough-type capacitors, are covered with a small aluminum "awning" to prevent accidental shock. Wiring to the "zero-operate" switch and dial lamp is cabled and clamped to the side of the box.

There are certainly no complicated circuits or constructional features in this v.f.o., just straightforward application of time-tested principles — which probably explains why it works so well. We put it through its paces when W2YM brought it up to the QST lab, and can heartily recommend it to the most critical user.

As a clincher, several other units have been built to the same design and have duplicated the original's performance.

Therefore, considerable attention has been paid to the mounting of the oscillator components. The complete oscillator is built in a $4 \times 5 \times 6$ -inch aluminum utility box. The oscillator tube is mounted horizontally on the back of this box, together with the power and output connectors and the $25\text{-}\mu\text{f.}$ frequency-setting capacitor. The advantage of this mounting arrangement is that the heat developed by the tube does not have as much effect upon the circuit components as it would if the tube were mounted in a conventional manner inside the box. The tuning capacitor should be a high-quality, two-bearing capacitor. In this oscillator, a Hammarlund MC-140-S capacitor was used.



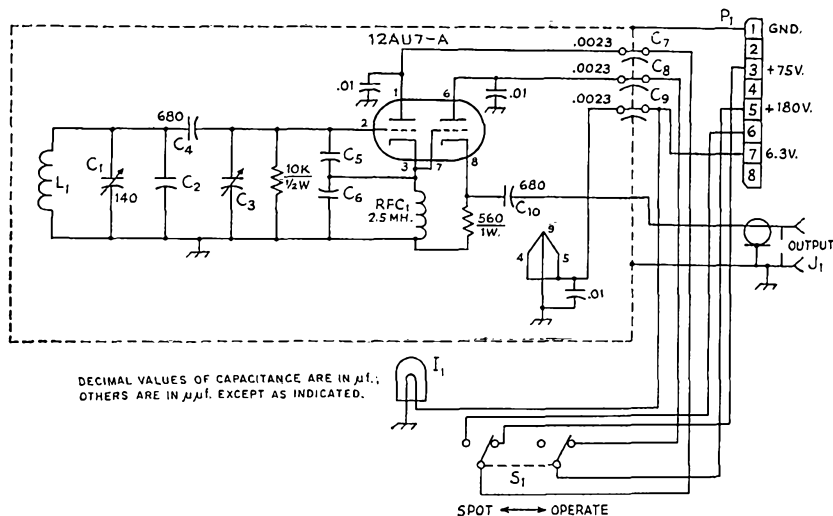


Fig. 1—The v.f.o. circuit. 0.01- μ f. capacitors are disk ceramic. Components outside dashed line are external to the case.

C₁—140- μ f. variable (Hammarlund MC-140-S).

C₂—Approximately 100 μ f.; see text.

C₃—25- μ f. air padder (Hammarlund APC-25).

C₄—680- μ f., silver mica.

C₅, C₆—1000- μ f., silver mica.

C₇, C₈, C₉—Feedthrough type (Centralab FT-2300).

I₁—6.3-volt pilot lamp.

J₁—Coaxial connector, chassis-mounting type.

L₁—14 turns No. 20, 16 turns per inch, 1-inch diameter (B & W 3015).

P₁—8-prong (octal) cable connector, male.

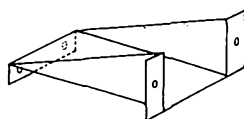
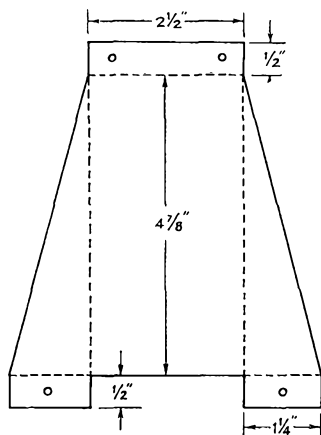
S₁—D.p.d.t. toggle.

Maximum rigidity of the oscillator circuit is obtained by use of a special aluminum bracket formed from one of the original box covers, as shown in Fig. 2. The box cover material is soft aluminum and can easily be bent with the aid of wood blocks and a vise. A hardwood block and hammer are used to make the bends square and sharp. The bracket is bolted securely to the front and back of the oscillator box; thus it not only supports the circuit components but also aids considerably in stiffening the box itself. To aid in fitting the variable capacitor, the holes for the mounting feet are slotted, and in assembly the shaft nut is first tightened to the side of the box and then the 6-32 screws for the feet are tightened. Special clamps to hold the coil are cut

from thin Lucite sheet in strips $\frac{1}{4}$ inch wide and $2\frac{1}{2}$ inches long. Holes are drilled at the ends of the strips so that they can be bolted to $\frac{1}{2}$ -inch standoff insulators and, in assembly, the coil is clamped between the two Lucite strips to provide a sturdy coil mounting. The silver-mica capacitors must be mounted so that there is no possibility of any motion. Again, half-inch standoff insulators are used as tie points, as can be seen in the top view. For further stiffening of the unit, new covers were cut from $\frac{1}{8}$ -inch aluminum panel stock and fastened to the box with liberal use of self-tapping screws.

Although the particular arrangement shown uses a National MCN dial mounted on a small panel and bolted to the v.f.o. box with $1\frac{1}{4}$ -inch metal bushings, any dial and panel arrangement can be used. The v.f.o. box is sturdy enough so that it could be completely supported from the panel.

Feedthrough-type bypass capacitors are provided for making power-supply connections to the



FORMED BRACKET
Holes drilled for 6-32 screw

Fig. 2—Mounting bracket for the tuned-circuit capacitor and inductor.

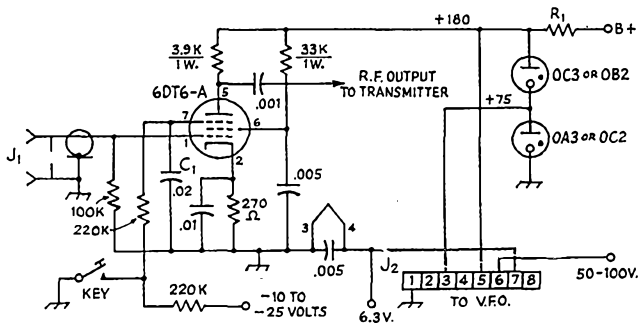
Fig. 3—Suggested circuit for keyed amplifier and voltage regulator. This circuit usually would be incorporated in the transmitter or be built as a separate unit. Capacitors may be ceramic or mica as desired.

C₁—Approximately 0.02 μ f., paper. Increase capacitance for softer keying, decrease for harder keying.

J₁—Coaxial connector, chassis-mounting type.

J₂—Octal socket.

R₁—25-watt slider type; value dependent on voltage of supply source. Adjust for 30 ma. through VR tubes with key open.



SUGGESTED VOLTAGE REGULATOR AND AMPLIFIER

v.f.o. This arrangement not only provides handy terminals, but also reduces the radiation from the v.f.o. The small aluminum bracket that covers these connections is used to minimize shock hazard.

The tolerances of the three capacitors connected between coil and grid, grid and cathode, and cathode and ground are such that some experimentation with the value of C₂ may be necessary. Combinations have been found where the value of C₂ is as low as 56 μ f. or as high as 120 μ f.

If the v.f.o. is installed in a well-ventilated location away from heat sources, no temperature compensation should be found necessary; however, if such installation is not possible, a combination of temperature-compensating capacitors and zero-coefficient silver mica capacitors can be used for C₂.

Voltage Amplifier

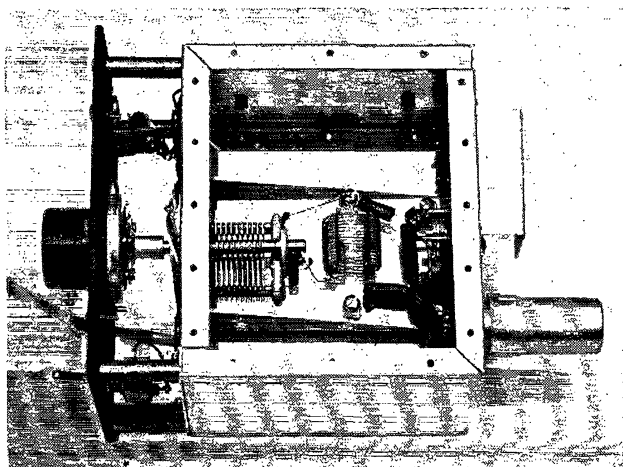
The output from the cathode follower is only 1½ to 2 volts, and it may be necessary to amplify this output to a level of 10 to 30 volts, depending upon the transmitter to be used. Almost any receiving-type pentode can be used for the amplifier tube. Because the amplifier stage is a convenient place to key the transmitter, a 6DT6-A is used as a combined amplifier and keyer tube in the circuit shown in Fig. 3. The 6DT6-A is similar to the popular 6AU6, but has

a high grid-No. 3-to-plate transconductance. It was originally designed for use in TV and f.m. receivers as a sound demodulator, and has the advantage of complete plate-current cutoff with only a few volts negative on grid No. 3. Also, because grid No. 3 is a high-impedance element, the key-click filter need be nothing more than a simple RC network. A 0.02- μ f. capacitor and a 220,000-ohm resistor are used in circuit. For "harder" keying the capacitor value should be reduced, and for "softer" keying it should be increased. The plate-load resistor shown provides an output of about 15 volts, the value required to drive the transmitter used by the author. If more output is required, the value of the plate-load resistor can be increased to approximately 5600 ohms. The highest output is obtained by use of a 2.5-mh. radio-frequency choke in place of the plate-load resistor.

Plate voltage for the v.f.o. is obtained from a regulated supply using a pair of VR tubes, as shown in Fig. 3. Voltages used are 75 volts for the oscillator and 180 volts for the cathode follower and amplifier. No appreciable shift in oscillator frequency is observed between key-up and key-down conditions. Lead No. 6 of the power cable may be connected to any convenient voltage source of 50 to 100 volts (in my station layout this voltage is obtained from the receiver)

(Continued on page 160)

The interior layout is very simple and clean. The tuning capacitor and coil are mounted on the central bracket, which also forms a bridge between the front and back of the box for further stiffening. The small padder for adjusting the frequency calibration is on the rear wall of the box.



The simple instrument described here by W6PIV not only enables a sightless operator to tune his transmitter to resonance, but also makes it possible for him actually to "read," with reliability, current values on the scales of milliammeters in many types of equipment.

Audio Device for the Sightless Ham

BY KEN BLANEY,* W6PIV

Meter Reading by Sound

VARIOUS gadgets have been devised to aid the ham without sight in tuning his transmitter, and many are doing very well with them. Most of these devices use a voltage picked up at an appropriate point in the transmitter circuit to change the tone of an audio oscillator in accordance with the change in voltage as the transmitter is tuned. Most sightless hams are able to memorize the particular tone that corresponds to normal transmitter loading.

More recent designs¹ have made use of transistors to reduce bulk and weight and thus render the instrument more convenient to use. However, transistors are sensitive to changes in temperature, and while the operator may have no trouble in determining resonance in his transmitter, he cannot be sure that transistor drift has not shifted the oscillator pitch corresponding to normal loading. Thus, he may be underloading or overloading without being aware of it.

The unit described here includes a simple comparator-type calibrator which automatically compensates for any drift due to temperature effects or component aging. Furthermore, it is not necessary for the operator to memorize audio tones. He can actually "read" current values to an accuracy of 5 per cent or better on a Braille-calibrated dial.

* 1727 38th St., Sacramento 16, Calif.

¹ Blett, "The 'Gimmick,'" *QST*, Nov. 1959.

Circuit

The system shown in Fig. 1 was developed by W6CKV and the author, and has been used successfully by several of their sightless friends. The operating voltage is taken from the drop across the shunted 0-1 ma. milliammeter commonly found in most transmitters, manufactured or homebrew. This voltage (0.03 to 0.1 volt depending upon the internal resistance of the meter) is fed into a transistor d.c. amplifier whose output voltage controls the frequency of an audio oscillator also employing a transistor.

The voltage comparator consists of a simple voltage divider operating from a single dry cell. Potentiometer R_2 is set at various points where its output voltages are the same as the voltage drops across the meter for various current readings. The Braille dial of the potentiometer is calibrated in any desired fractions of the full-scale meter value.

Then it is necessary only to adjust the comparator to obtain the same tone as produced with the meter connected, and read the comparator dial.

In the case of a multirange meter, the voltage drop across the meter terminals is the same for all current ranges, of course, so the operator must keep in mind the current range to which the meter is switched.

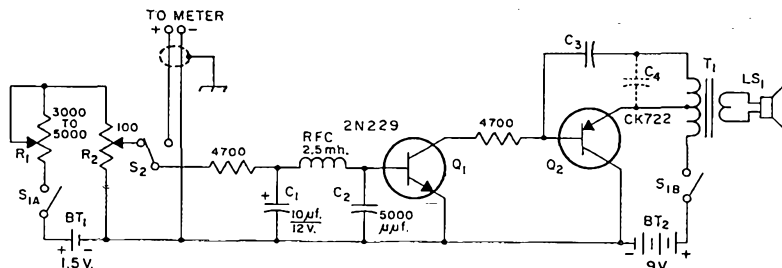


Fig. 1—Circuit of the audible meter reader. Resistances are in ohms and fixed resistors are 1/2-watt composition.

BT₁, BT₂—See text.

C₁—Electrolytic (see text).

C₂—Mica or ceramic.

C₃—0.002 to 0.1 μ f., paper or ceramic, capacitance depending on transformer used and tone desired.

C₄—Approx. 0.02 μ f., paper (see text).

LS₁—2-inch p.m. speaker.

Q₁—N-p-n transistor (Sylvania).

Q₂—P-n-p transistor (Raytheon). Sylvania 2N1265 is also suitable.

R₁—1/2-watt control, screwdriver-adjusted.

R₂—1/2-watt control, linear taper (Centralab WW-101 or similar).

S₁—D.p.s.t. toggle switch.

S₂—S.p.d.t. slide switch.

T₁—Transistor output transformer, push-pull to voice coil.

Construction

The construction of the unit is not critical. A typical layout for a $6 \times 3 \times 2$ -inch aluminum Minibox is shown in the sketch of Fig. 2. The cost of components should not exceed \$12.00 or so. Capacitor C_1 may not be needed. It was found necessary to use it with one of the transmitters we tried in order to eliminate hum in the speaker output. Also, C_4 was needed in only one unit in which a miniature Japanese transformer was used. Units having larger transformers did not require it.

The wire leads for the meter connections should be shielded, either individually or as a pair, to prevent r.f. pickup or radiation. The shielding braid should be grounded at both ends, but both meter wires must be kept insulated from ground, of course. An opening will be found somewhere in most transmitter cabinets through which the cable can be passed to the meter. A three-prong connector for the cable will be found convenient if the unit is to be used with more than one piece of equipment.

Calibration of the dial of R_2 is a simple matter. The transmitter is adjusted so that the meter reads full scale. R_2 is set in the full clockwise position (maximum resistance between BT_1 and the arm of the potentiometer). Then, while switching S_2 back and forth from one position to the other, R_1 is adjusted until the audio tones obtained in the two switch positions have the same pitch. For the remainder of the calibration, R_1 remains fixed at this setting. The meter readings are reduced in the desired fractional steps, each time matching the tone obtained with the meter connected and the tone obtained with the switch in the opposite position by adjustment of R_2 . The dial of R_2 is marked at each step. After the calibration is complete, a center punch can be used on the rear side of the dial to make raised markings on the front side which can be easily detected by Braille-sensitive fingers. In use, the matching of tones is surprisingly simple and adjustment is a matter of a few seconds.

Those who object to overloading the rig or detuning it for the short period of time required to get a meter calibration at full scale can disconnect the meter from the transmitter and obtain the deflection by means of a flashlight cell and a variable resistor of 1500 ohms or more in series connected across the meter. Alternatively, the calibration can be started with R_2 and the meter at half scale, and the points above half scale plotted by estimation. Be sure to use a potentiometer with a linear taper if you want dial markings equally spaced.

For the batteries, seven penlite cells were used, six of them being connected in series for BT_2 . However, a 9-volt transistor battery may be found more convenient for the latter. The drain on either battery is 1 ma. or less, so essentially shelf life may be expected.

Danger!

Before proceeding further, it should be emphasized that under *no* circumstances should the

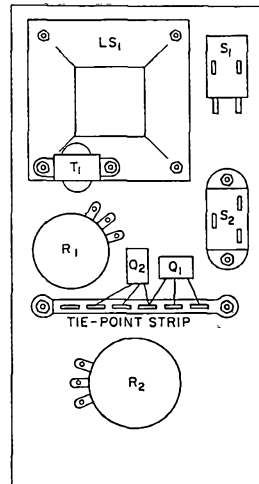


Fig. 2—Sketch showing suggested layout of component on one 3×6 -inch face of a $3 \times 6 \times 2$ -inch aluminum box.

unit be used with meters that are connected in portions of the circuit that are at potentials of more than a few volts to ground. The meters in most manufactured transmitters meet this requirement, but there are exceptions, and no attempt should be made to use the unit without first referring to the circuit diagram of your particular transmitter. Also, make sure that no revision of the original metering circuit has been made. Of course, the metering system of any home-made transmitter should be examined carefully to make certain that the meter is at a point of low voltage to ground in all positions of the meter switch.

Adjustment and Calibration

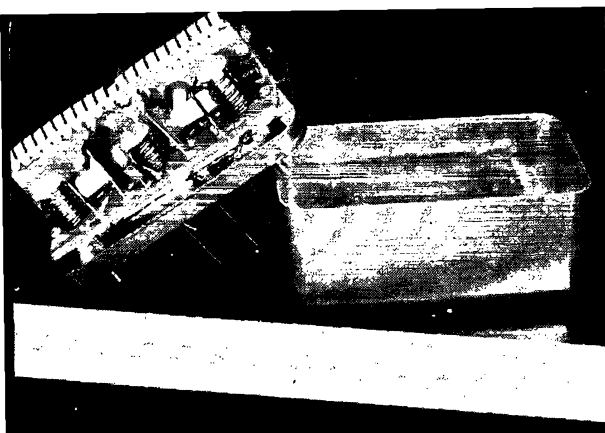
Before connecting the meter leads to the transmitter or other device, turn S_2 to the meter position and short the meter wires. Then change the value of C_3 , if necessary (and the value of C_4 too if used), to bring the oscillator frequency to a tone of a few hundred cycles. Then, with the meter cable connected to the transmitter, the tone should rise to 2000 or 3000 cycles when the meter is reading full scale.

Other Uses

A standard 1000-ohms-per-volt v.o.m. can be read accurately on voltage and current ranges by connecting the leads of the reader directly to the meter terminals. Calibrator R_1 may have to be readjusted to match the comparator dial, since the meter may have a different internal resistance than the one in the transmitter. Resistance values may also be checked but with less accuracy, since in this use, the meter usually reads backwards and the scale is not linear.

The unit cannot be used with a 20,000-ohms-per-volt v.o.m. since the input resistance of the reader is not sufficiently high to avoid a significant shunting effect across the $50\text{-}\mu\text{a.}$ meter.

(Continued on page 148)



A v.h.f. filter using compression-tuned coils. The nylon tuning screws thread into the insulating material of a printed circuit board. In this case the screws were turned out on a lathe, but they could just as well be made by tapping a piece of polystyrene, screwing it onto a threaded rod and cementing it in place.

How to Squeeze a Coil with a Screwdriver

BY MAYER SAVETMAN*

Compression Tuning in the V.H.F. Range

Most every v.h.f. man knows about squeezing and stretching coils to vary their inductance. This method of tuning keeps the losses low, but it's a nuisance and you're never sure the circuit is still "on the nose" when all shields and chassis covers are in place. The scheme described here gives a fine adjustment even when the coil is inside a box and the power is on.

EVERY radio amateur, experimenter, and technician at one time or another needs high-quality coils for use in resonant circuits, transformers, discriminators, or filters in the very-high-frequency range. Although both fixed and permeability-tuned inductors can be obtained through radio supply houses, these may not have a sufficiently high Q .

The best coil obtainable for the v.h.f. range is the simplest and least expensive—the air-core solenoid. At frequencies from 30 to 300 megacycles the quality factors of such coils are

* Electronics Division, Westinghouse Electric Corporation, Baltimore, Maryland.

high, and it is not unusual to obtain a Q greater than 200. The coil should be wound on a cylindrical form with heavy wire (No. 17 or better). The coil can then be removed from the winding form since it is rigid enough to support itself. Coils wound with heavy wire have greater Q than those wound with small wire. Also, coils wound with a large diameter have a greater Q than coils wound with a small diameter.

The inductance of a solenoid is directly proportional to its cross-sectional area and to the square of the number of turns. Inductance is also more or less (depending on the relative length and diameter) inversely proportional to length. An easy way to vary the inductance of a coil is to alter its length by squeezing or stretching it. As the length is increased the inductance decreases, and as the length is decreased the inductance increases.

The squeezing operation may be done mechanically by placing a screw through the coil and a nut on the end of the screw. Both the screw and the nut should be of a dielectric material such as nylon or polystyrene. Although nylon hardware can be obtained, it is easier and cheaper to make your own hardware from polystyrene rods and sheets readily available from radio supply houses. Polystyrene rods can be threaded by holding

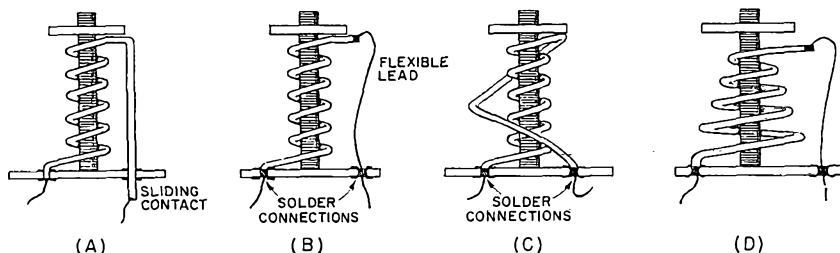


Fig. 1—(A), (B) and (C) show three ways of making connections to a compression-tuned coil. In (A) the lead from the moving end passes through a sliding contact in the insulating base. In (B) a flexible lead connects the coil with an eyelet in the base. Method (C) requires no sliding contact or flexible lead; the wire from the moving end is simply bent so as to flex with the coil. (D) shows a conical-shaped coil which flattens when compressed. In all cases, the threaded rod can be cemented to the bottom plate and the top nut used for tuning, or the "nut" can be cemented to the rod and slotted to take a screw-driver blade.

them in a vise and carefully screwing on a suitable die. A $\frac{1}{8}$ -inch diameter rod threaded with a 6-32 die works well with small coils, and $\frac{1}{4}$ inch rod is recommended for larger ones. Nuts can be made by tapping a hole through polystyrene sheet. In mounting the compression screw on the coil base, it is good practice to tap the base to accept the compression screw and to cement the threads as well to prevent turning. Alternatively, the "nut" can be cemented to the rod and used as a screw head.

Fig. 1 shows three possible mounting arrangements. One end of the coil should be soldered to an eyelet in the base. The other end can slide through a contact in the base or be bent to form a sort of toggle joint, or a flexible lead can be used. The nut is turned, squeezing the coil and thereby adjusting it to the desired inductance. A fixed capacitance connected across the coil will constitute an adjustable resonant circuit. The resonant frequency can be measured with a grid-dip meter.

Air coils other than solenoids can be used. For example, the conical-shaped coil of Fig. 1D flattens to a pancake when adjusted.

If a spring-type wire is used instead of soft copper wire, the coils will return to their original shape as the adjusting screw is loosened. Variable coils made of beryllium copper wire can be tuned many times without permanently deforming and can replace the greatest dust catcher of all, the variable capacitor. The price of this variable inductor is small compared to the capacitor, and because the inductance can be varied over a wide range, the band of frequencies covered by tuning the inductor is also wide.

Tuned transformers can be constructed as shown in Fig. 2. Two coils are used and they can be adjusted for required inductance and for required coupling. Tighter coupling is achieved by moving the coils closer to each other. The coupling governs the band width, and as the coils are moved closer the band width increases. As an illustration of typical values which can readily be obtained, a model was built and coupling was measured on a Q meter. The values of

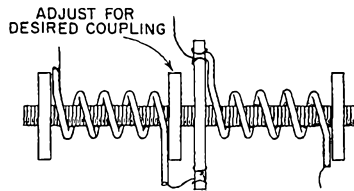


Fig. 2—A transformer with adjustable tuning and coupling using the compression principle. The nut just to the left of the central mounting plate sets the coil separation, and the end nuts are used for tuning.

coupling obtained were 5 per cent for a coil separation of about $\frac{1}{2}$ inch and 10 per cent for a coil separation of $\frac{1}{4}$ inch.

The solenoid is also suited for use in filters in the v.h.f. range. Design formulas for low-pass, high-pass, band-pass, and band-reject filters are given in many electrical engineering texts and in reference books. The advantage of using the air-core coil in filters is that high-Q resonant circuits mean sharper cutoffs and steeper attenuation curves. Also, these coils may be adjusted so that the circuits resonate at the proper frequency, and there is no need for more expensive tunable capacitors. One must be careful in the physical layout of the filter. The coils should not be too close to each other or undesired coupling will result. This coupling would mean less attenuation in the stop band. Adjacent coils should be placed at right angles to minimize coupling. At v.h.f., short lead lengths and good grounds are a must.

At the Electronics Division of Westinghouse Electric Corporation, filters for some applications were designed and built with these adjustable solenoid coils. It was found that they are stable and hold their inductance extremely well under tough environmental conditions, passing shock and vibration tests with flying colors. The photograph shows a v.h.f. filter with five tuned circuits. No tunable capacitors are used.

The experimenter will no doubt find more applications for adjustable air-core inductors. He and his equipment will become more flexible by using them.

EST

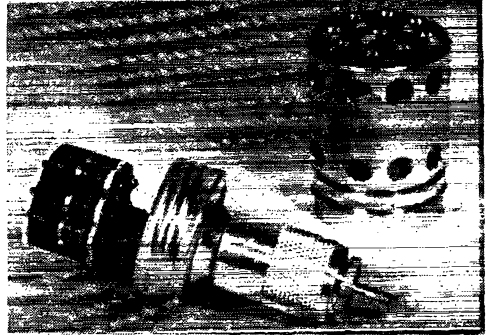
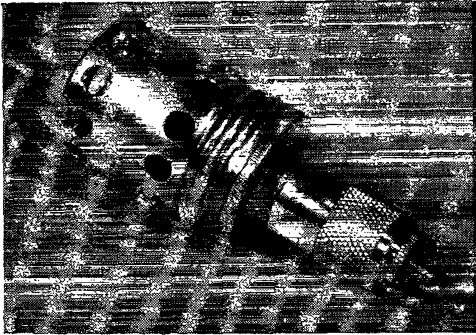
Strays

All amateurs who are members of the Naval Reserve are invited to participate in the Individual National Naval Reserve Radio Network (INNRRN) which meets each Friday night at 0100 GMT on 7375 kc. Net control is NCR, operating from the QTH of old NAA in Arlington. Using the general call NCX, NCR first sends general broadcast traffic to all hands (sometimes mentioning surplus electronic gear which is available in the Individual Craftsman Training program). Then, individual stations are invited to report in on c.w. What call sign should you use? It's simple. If you are a W, replace that prefix with NA; if you're a K, replace that with

NB; WA becomes NC; KN become NK; and WV becomes ND. For example, W1HZE would sign NA1HZE; KN1MJA would sign NK1MJA; WA2DIJ would sign NC2DIJ. Please note that these call signs are authorized for use only on this particular net.

If your procedure is rusty, don't worry about it. A couple of nights listening to one of the crack operators at NCR and you'll be right back in the swing of things. Come up on 7375 and meet a bunch of your Navy ham buddies.

Boss man on the net is Capt. Jim McCoy, USNR, W4OI, who has been around the Navy and ham radio for a long time.



The dummy antenna is enclosed in a 35-mm. film can mounted on a coax connector. The nine 1-watt resistors are soldered to copper disks with practically all of the wire leads eliminated.

A Dummy Load off the Mind

BY JOHN HOWARD,* K8MME

PRACTICALLY the same day that March *QST* arrived, the writer had been searching handbooks for verification of procedure for making a dummy load. The cover and accompanying article were a real surprise.

To absorb the transmitter's 7-watt output, EPT's configuration of nine 470-ohm resistors¹ was selected. The soft, foil-like flashing copper happened to be little more than arm's reach away and proved an ideal support. (For those who will follow suit and build similar loads: Be sure to burnish both sides of the copper disks and tin fully before assembling and soldering.)

To add a personal touch, there had to be some "modification." A trim little screw-top aluminum

can that is used to package a 35-mm. film cartridge was adopted as a housing for the dummy. A pattern of 1/4-inch diameter holes was drilled through the side and end. A hole was made in the screw cap to receive a coax reducer bushing, which threads into the coax fitting, making a very rigid mechanical joint. The housing serves as a flue to increase the flow of air when the dummy load is operated in its vertical position, as well as giving protection to the assembly of resistors inside.

The s.w.r. was practically 1:1 — almost as good as the antenna itself. After running the dummy for five consecutive periods of two minutes each while checking s.w.r. at different frequencies, it didn't go up in smoke. Resistance still checked out O.K. on a meter.

Thanks, EPT, for getting us away from the habit of snatching those light bulbs! QST

* Apartment C-107, 1336 Brookline Road, Cleveland Heights 21, Ohio.

¹ Tilton, "V.H.F. Dummy Loads," *QST*, March, 1960.



October 1935

... The editorial 25 years ago extended a welcome to the new Southwestern Division which elected its first director that fall and became a full-fledged ARRL division on January 1, 1936 . . . and in the next breath, the editorial congratulated the League itself on its 21st birthday, reached in 1935.

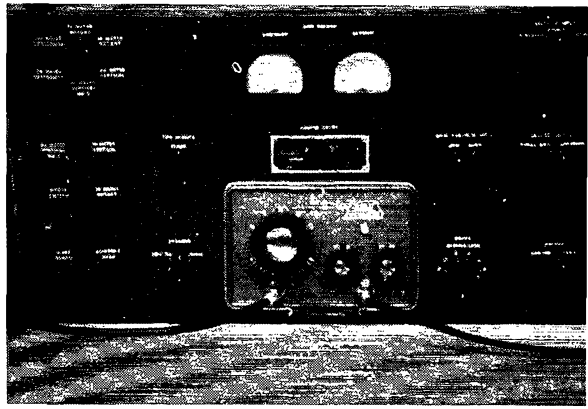
... The issue served up a technical smorgasbord that included articles on Mt. Whitney's 56 Mc. QSOs . . . improved equipment on the Arctic-sailing schooner *Morrissey* . . . a discussion on circuits in an oscillator-amplifier transmitter . . . reducing QRM on 56 Mc. . . a new portable for 56 Mc. . . a multi-purpose test circuit . . . and a self-powered v.t. voltmeter. . . There were four pages of hints for the experimenter.

... There's nothing new about s.s.b. — *QST* 25 years ago carried an article by James J. Lamb on background for s.s.b. phone — a simple explanation of modulation and detection principles from a non-mathematical angle.

... *QST* announced League endorsement of a revised R-S-T table, reporting strength on a nine-point scale rather than the five-point one originally given. The revised scale came from W2BSR, who suggested the original system. W2BSR's second suggestion that the letters R-S-T be dropped and reports limited to numbers only was also cheered by ARRL.

... On the light side, W6KBY reported a pair of sixes working in a San Francisco store with the calls GIN and FLZ. . . . and this quote from a junior op, who said, no, he hadn't cut his hand. "I picked up a pretty bug in the garden this morning and one end of him wasn't insulated." QST

Fig. 1—Control panel at W9ERU. At the left, from top to bottom, are switches referred to in the text as S_5 , S_4 and S_3 . In similar order at the right-hand end are S_6 , S_2 and S_1 . The other controls either side of the Micromatch and RME clipper-filter include remote-speaker switch, drive attenuator and a timer switch. The latter are not directly associated with the switching system.



*Easily Constructed Units for
Antenna and Equipment Control*

Switching Coaxial Feed Lines

BY GENE HUBBELL,* W9ERU

The author does not anticipate that many will want to duplicate his system of control switching. However, the basic idea of making up individual switching units to perform desired special functions is well worth attention.

ANTENNA switching, to make a variety of antennas readily available, has always been of great interest to the author. Even before the arrival of solid-dielectric cable, various arrangements of relays and remote-controlled

* Box 273, R. R. 4, Rockford, Illinois.

motor-driven switches were used at W9ERU. With coaxial feed system, radio-frequency power can be handled almost as easily as d.c. If the reader will refer to the photograph of Fig. 1 and the diagram of Fig. 2, the following description will give some idea of the possibilities.

Circuits

The s.p.d.t. switch S_1 selects either the GSB-100 s.s.b. exciter or the 32V-1 a.m./c.w. exciter, taking the output to S_2 .

S_2 is a three-pole double-throw unit. This switch connects the output of the chosen exciter either directly to the s.w.r. bridge, or inserts a high-power amplifier between the exciter and the s.w.r. bridge. In the "amplifier" position, one

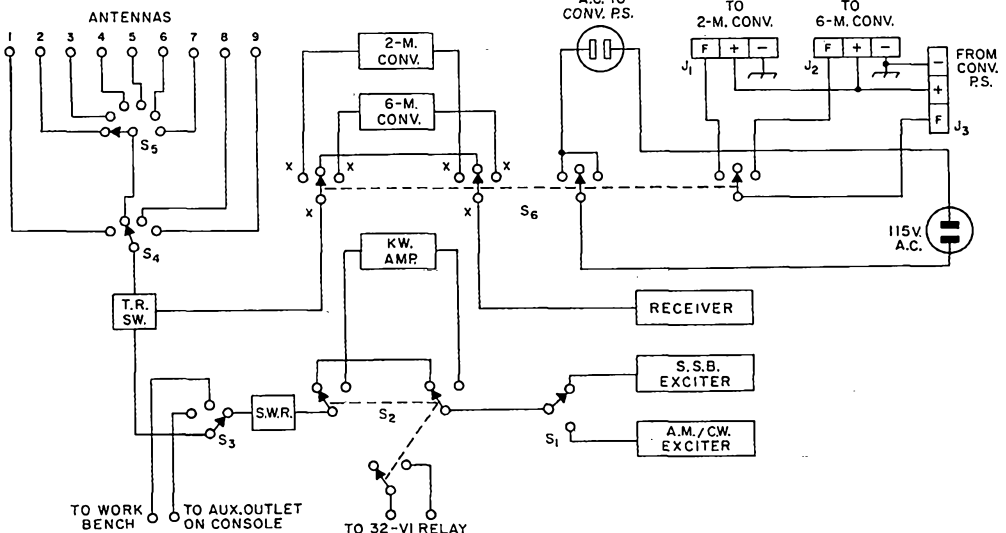


Fig. 2—Wiring diagram of the control panel at W9ERU. All connections between the various units and the switches (power wiring excepted) are made with coax cable terminated in standard coax fittings. The switches are described in the text. J_1 and J_2 , from which plate and filament power for the converters are taken, are 3-terminal female connectors. J_3 , into which the converter power-supply output is fed, is similar but of the male type. The power-supply input plugs into the a.c. outlet.

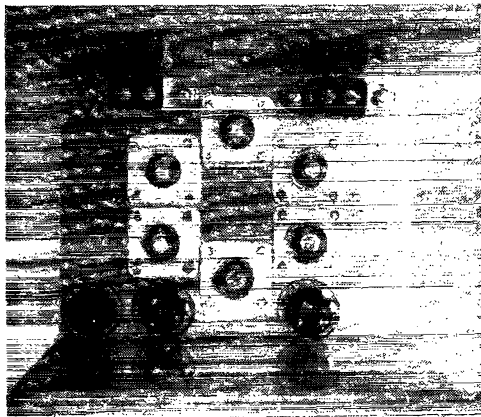


Fig. 3—An interior view showing the layout of connectors associated with S_6 of Fig. 2.

pole operates a relay at the 32V-1 which converts the latter from a self-contained transmitter to an r.f. and audio driver for a high-powered final.

The s.w.r. bridge is connected to one position of single-pole three-position switch S_3 . In the position shown in Fig. 2, the output of either the exciter or amplifier is fed, via the t.r. switch, to the combination of S_4 (single-pole four-position) and S_5 (single-pole six-position) by which it is possible to select any one of 9 different antennas. In the other two positions of S_3 , coax lines running to auxiliary outlets at the work bench and operating console are connected to the antenna switching system so that any temporary transmitter at either of these positions may be fed to the desired antenna.

On the receiving side of the system, S_6 provides for feeding the antenna either directly to the receiver or for inserting a 2- or 6-meter converter ahead of the receiver. In the "converter" positions, two poles of this switch turn on the converter power supply and apply filament power to the converter selected.

Components

Now that we see what can be done with suitable coaxial switches, the next order of business

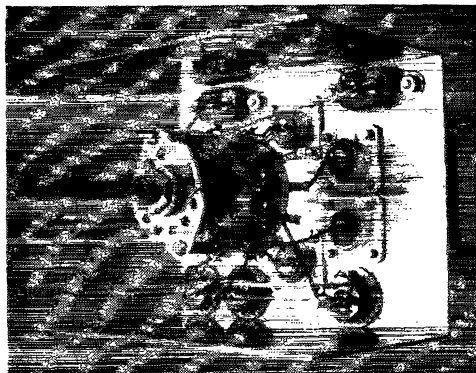


Fig. 4—This view shows how the switch S_6 (Fig. 2) is wired to the connectors before fastening the box cover in place.

is how to build them. All that is required is a small metal box, suitable coaxial jacks, and the right switch assembly. Since the voltages and currents at an impedance level of 50 to 70 ohms are very reasonable (if the s.w.r. is not too high!), we can use small ceramic switches, even for a kilowatt. Such switches are made by Centralab, Eric, Mallory, and others. The parts used in the switches previously outlined are those made by Centralab. The usual coaxial jack designated SO-239 by most companies, or 83-1R by Amphenol, will do the job for the second item, and there are various solutions to the box problem. Premier, Bud and Wyco make small two-piece boxes that are very suitable, and the three-piece box with two flat removable sides will also fill the bill. Tools needed, besides the usual soldering iron or gun, screwdriver, pliers and wire cutters, are drills, files and reamers to make holes varying in size from the small ones required for mounting screws up to the $\frac{3}{8}$ -inch size needed for the SO-239 jacks.

Typical Construction

Let's build one of the coaxial switches previously described—say, S_6 . We need 4 poles, and 3 positions. A Centralab type 2515 will work, with the adjustable stop set for 3 positions instead of the maximum of 5 provided. We will need 6 coaxial jacks to take care of the r.f. input and output connections at points marked "X" in Fig. 2. For the a.c. connections, we will need two chassis-mounting two-contact connectors.¹ For the filament and high-voltage connectors we will use one 3-prong chassis-mounting plug, Amphenol type 86-CP-3S, for J_3 , and Amphenol type 78-S3S for J_1 and J_2 . By arranging the above parts on a sheet of paper, we arrive at an approximate size for one face of the box we will need—about 4 by 5 inches. In the remaining direction we must have nearly 3 inches. A Premier PMC-1005 two-part aluminum box will be just right. And we must have some $\frac{1}{4}$ -inch 6-32 screws, 6-32 nuts, wire and solder.

Figs. 3, 4 and 5 show how we lay out the connectors and mount them, while Fig. 5 shows how we wire in the switch. Care must be taken to position the switch carefully so that the shaft and shaft bushing will pass through a hole in the other half of the box and can be secured properly with the nut provided. If we solder 2-inch lengths of No. 16 tinned wire to the SO-239 jacks, then bend them to pass through the lugs on the switch, we can manage this positioning without too much trouble. The other leads can be of any convenient size of hookup wire.

A word about mounting SO-239 jacks. If a $\frac{3}{8}$ -inch hole for the threaded end of the jack is drilled and reamed to size first, the jack can be

¹ The author used two TV power-input connectors (male) and recessed them in the panel. While this reduces the danger of accidental contact with the live connector supplying a.c. to the converter power supply, it does not eliminate it entirely. It would be preferable to use a female connector, such as the Cinch-Jones type S-302-AB. A matching male connector for the connection to the a.c. line is the C-J type P-302-AB. — Ed.

held in this hole while the four mounting holes are located, or even while they are being cut on a drill press. The four mounting holes in the flange of the SO-239 are usually small enough, and the metal soft enough so that a 6-32 screw may be forced to tap its own threads into the jack. This eliminates using nuts to secure the screws, and there is no need to tap these threads with another tool. If an occasional hole in the SO-239 flange is too large for a good fit, a tap or two with a small hammer, while the flange is held on a vise anvil, will close up the soft metal sufficiently. Of course, the four mounting holes in the box, required for each jack, must be drilled large enough to clear the 6-32 machine screws.

Fig. 6 shows a simple double-pole double-throw switch for coax line with an added on-and-off circuit connection for a.c. line-voltage control. A line cord passes through a grommet into the box; one side of the cord terminates at an a.c. receptacle, while the other side of the cord goes by way of a switch contact to the other terminal on the receptacle. The coaxial connections could be used to switch excitation to a linear amplifier or connect the exciter directly to an antenna. In the excitation position the amplifier would be connected to the antenna, while the a.c. switch provision would be useful to turn on the plate power to the amplifier.

Fig. 7 shows a single-pole six-position, remote-controlled motor-driven switch of the type used at S_5 . A small 115-volt a.c. motor drives the switch through a gear train at about one complete revolution in 10 seconds. A switch deck, outside the box, has a solid disk rotor contact with a small notch in it, making contact at any one time with 5 out of 6 fixed terminals. By applying a control voltage to any of these fixed terminals, the motor is caused to revolve the switch assembly until the notch in the disk rotor reaches this selected terminal when the control voltage is removed and the motor stops. If we have selected the right fixed terminal in relation to the coaxial-switch deck, we have connections properly made on the coaxial lines attached. Centralab makes a switch wafer (type FFI1) which can be adapted to this type of motor control. By using a control voltage and a small relay to open and close the a.c. line to the motor, we avoid using expensive well-insulated multiconductor wire, and can go to a low-voltage control. In the case of the switch illustrated, 12 volts d.c. is used for control voltage. Seven wires are needed for a 6-position switch. Solenoid-actuated ratchet-type switches may also be used in similar remote-control applications.

Such standing-wave-ratio checks as have been made on these coaxial switches were carried out with an M. C. Jones Micromatch and a flat 50-ohm dummy load. On frequencies from 3.5 to 29.7 Mc., only a very slight increase in s.w.r.

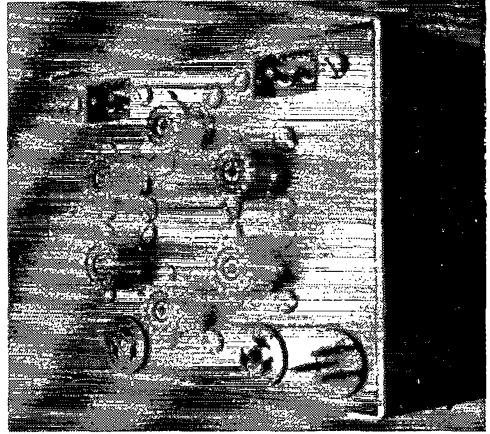


Fig. 5—The completed S_6 (Fig. 2) unit. The output of the converter power supply plugs into the male connector in the lower right-hand corner. Power-supply output for two converters is taken from the two female connectors at the bottom. The a.c. line plugs into one of the connectors at the top, while the power-supply input (115 v.a.c.) is taken from the other which should be a female connector. R.f. connections are made at the coax receptacles.

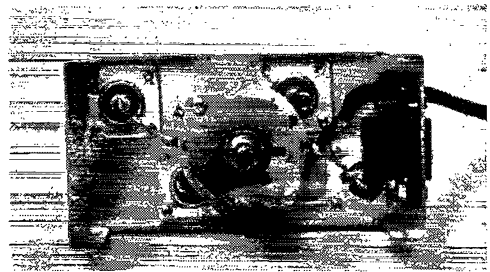


Fig. 6—This is a d.p.d.t. switch for coax with an auxiliary connection for closing an a.c. circuit in one of the two positions.

resulted from the insertion of the switch in the line. Circuit isolation is not quite so good. Signals do feed through from unused antennas to some extent. By tuning in a fairly strong local signal and rotating switch S_4 to a position where the arm does not touch any fixed position, we can get an idea of the isolation provided. On 14 Mc. it looks like about 40 db. on the 75A-1. Signal

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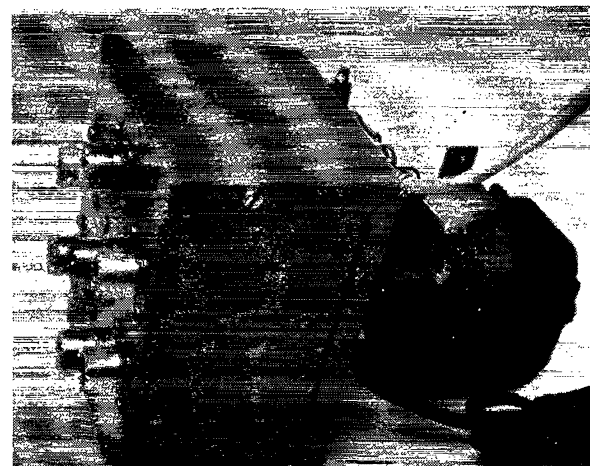


Fig. 7—The motor-driven switch used at S_5 (Fig. 2).

A Foolproof System Well Worth Its Cost

Screen Protection and More

BY JOHN A. EVANS,* W9HRH

WITH the replacement cost of high-power tetrodes at \$40.00 plus each, it is economically important to provide adequate screen protection. Much of the literature contains circuitry using a single relay in the screen supply lead as in Fig. 1. In theory, its operation is very simple and somewhat as follows: When the current through the relay coil reaches the pull-in point as a result of some adverse condition, the armature is expected to transfer the screen voltage to ground via resistor R_2 . If this sequence is followed, things are in fairly good shape as the resistor should draw enough current to hold the contacts closed in the grounded position. Then, with the screen at zero voltage, plate current will drop to a very low level — well under the plate dissipation rating of the tube. You should now have a chance to pull the main switch, run down the trouble and get back on the air.

But suppose you are modulating when the screen circuit opens and the plate current drops to a minimum. This results in no load for the modulator which, of course, is not good, except that the arc-over in the modulation transformer will alert you to the fact that something has happened. By that time it has! Since modulation transformers fall in the same price bracket as a pair of 4-400As, they, too, should be protected.

Relay engineers do not like this circuit anyway. Too much dependence is put on the inertia of the relay armature when the coil is energized.

* % Potter & Brumfield, Princeton, Indiana.

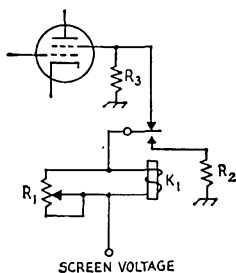


Fig. 1—A screen protective circuit which actually provides very little protection. Shunt resistor R_1 is set so that K_1 will throw if the screen current becomes excessive. If all goes well, the screen voltage will be grounded through R_2 which draws enough current to keep K_1 transferred. Unfortunately, there is no current through K_1 while its arm is moving from one position to the other. If the arm springs back before making contact, all you have is a buzzer! R_3 is a bleeder (about 10,000 ohms) placed at the tube socket. It provides a ground return for the screen and prevents high voltage from developing there when K_1 opens the supply lead.

It should be pointed out that when the movable contact breaks from its normally-closed position *there is no current through the coil*. The movable contact will tend to return to its normally-closed position and repeat the cycle. So you have only very marginal protection, if any — though you will probably have a pretty good buzzer.

The following describes a protection circuit which will take the entire rig off the air within milliseconds in the event of a screen overload. The circuit diagram, Fig. 2, includes a plate-circuit-relay, K_1 , and a variable shunt resistor, R_1 , in the screen supply lead. When the contacts of K_1 close, latching relay K_2 is energized and opens the main plate supply line either directly or through a master control relay. The latch mechanism will hold the relay and the supply line open until a pulse to the reset coil via S_1 returns the circuit to normal. Coil voltage for K_2 can come from a filament transformer or any power circuit that runs continuously.

The relay specified for K_1 is adjusted at the factory to pull in at approximately 9 ma. The shunt, R_1 , is used to vary this pull-in point to a

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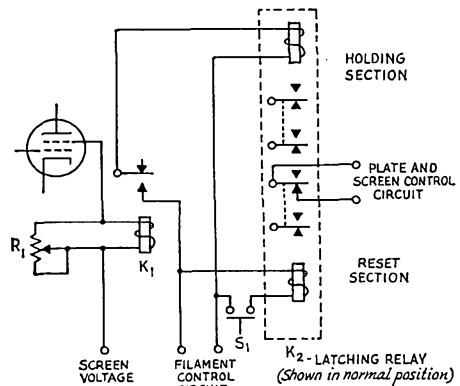


Fig. 2—The recommended circuit. Excessive screen current will operate K_1 , energizing the holding section of K_2 which removes screen and plate voltage from the transmitter. K_2 will remain transferred until S_1 is closed momentarily and a pulse of current through the reset coil returns the contacts to their original position. The screen is returned to ground through the power supply bleeder, but a separate bleeder such as R_3 in Fig. 1 can be added for insurance.

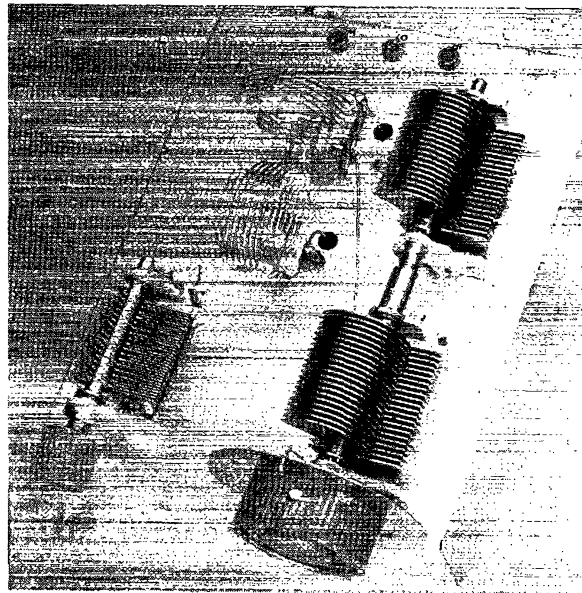
K_1 —S.p.d.t. plate circuit relay (Potter & Brumfield LB-5 with 2500-ohm coil).

K_2 —Latching relay (Potter & Brumfield KB17AG and DG series; available with coils for various control voltages, a.c. and d.c.).

R_1 —Sensitivity control for K_1 (see text).

S_1 —S.p.s.t. push-button reset switch, normally open.

The five-band coupler used with the antenna. The L_1L_2 assembly is toward the rear of the aluminum chassis. L_3L_4 is in front of it, mounted so the coupling between the two sets of coils is minimized. Pin jacks at the rear are for making connections to open-wire line.



Tunable System for 80 Through 10

Combining a vertical pipe and a horizontal wire, this simple antenna system is useful on five amateur bands. It includes a tuning and matching network that doesn't require switches or plug-in coils.

BY LEWIS G. McCOY,* WHICP

A Limited-Space Antenna

MANY amateurs are restricted in the amount of space they have available for antenna installations, some even being confined to roof-top areas. This poses a problem when 80- and 40-meter operation is planned. The minimum over-all length of a horizontal antenna that should be used, for reasonable efficiency at these frequencies, is about 60 feet. When you must also make allowance for space for guy wires, the average city-lot or apartment dweller quickly runs out of room.

The antenna system described here requires very little space—even the roof of a small house is adequate. The system will provide fairly good multiband coverage—80 through 10 meters—as the test model proved.

What It Is

The antenna is 60 feet long—approximately a 40-meter half wave—center fed. One half of the antenna is vertical, the other half horizontal. Open-wire line is used to feed the antenna, the line being coupled to the transmitter via a multiband antenna coupler. The coupler serves the dual purpose of coupling the transmission line to the antenna and reducing undesired har-

*Technical Assistant, QST.

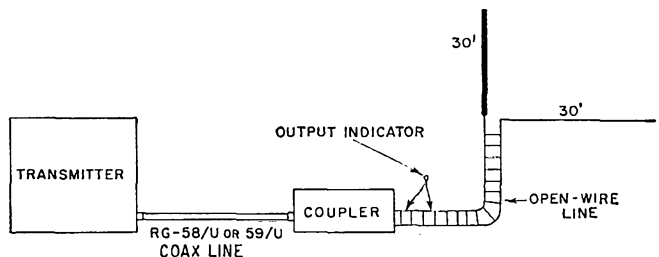
monic energy fed to the antenna. Fig. 1 is a drawing of the entire system.

The vertical portion of the antenna consists of three 10-foot TV mast sections. These mast sections are available from any radio-parts distributor and cost about two dollars per section. Either aluminum or steel sections can be used, although the aluminum is preferred as it is easier to handle. The masts are usually $1\frac{1}{4}$ inches in diameter and have one end swaged so they can be fitted together. Incidentally, with suitable guying these mast sections also make excellent low-cost poles for supporting horizontal antennas.

In addition to the mast sections you'll need about 200 feet of plastic clothes line for guying the vertical portion of the antenna. The actual length required will, of course, depend on the installation but 200 feet is adequate, in any event. The vertical should be guyed about 12 feet from the bottom and a few feet from the top.

If the antenna is to be installed on a roof you'll need three guy anchors. In our test setup three screw-in type clothes-line hooks were used to secure the guys. However, should you decide to mount the vertical in your yard, the guys can be anchored to posts or stakes driven in the ground.

Fig. 1—This drawing shows the set-up of the transmitter and antenna system.



The base of the vertical must be insulated, and a soda bottle works out just fine for this purpose. The diameter of the mast section is large enough to slide over the bottle neck. You'll need some form of base to hold the bottle steady. However, as most of the antenna thrust is in the downward direction, which tends to hold the bottle steady, a block of wood with raised sides, Fig. 2B, will do.

The horizontal portion of the antenna consists of a 30-foot length of antenna wire. One end is wound around the bottle, Fig. 2A, and the other

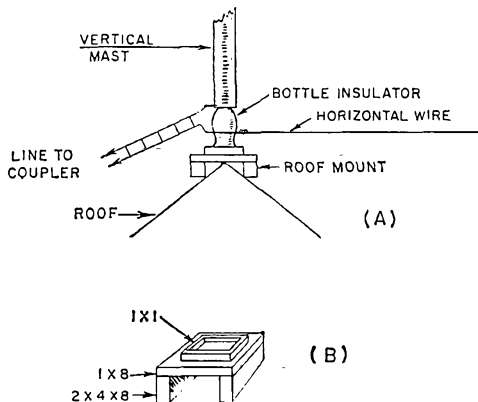


Fig. 2—Details for mounting the antenna are shown at A. At B is one method for constructing a mounting base.

should go to a strain insulator which can be supported by a guy line to any convenient anchorage.

TV open-wire line is used for the transmission line. The length of the line will, of course, depend on your installation. You may find it inconvenient to come through the wall or window of your shack with the open-wire line. If so, you can run the line to the nearest entrance to the shack and secure the line with a stand-off insulator, and then come into the shack with 300-ohm Twin-Lead.

Making the Installation

If you decide to install the vertical in the yard or away from the house it is a good idea to get the base of the antenna at least eight feet above the ground. This will get the feeder high enough so there won't be any danger of decapitating the XYL when she's hanging out the family wash

(also, it should be too high to be used for a clothes line!). A 4 × 4 post 10 feet long should work out well as a mount for the vertical.

Fig. 2 shows one method of making a simple base mount if the antenna is to be mounted on a peaked roof. The mount consists of two eight-inch lengths of 2 × 4 and a piece of one-inch lumber. The width of the one-inch stock will depend on the pitch of the roof. As can be seen in the drawing, the edges of the 2 × 4s rest on the roof slope and the one-inch stock is on the roof peak. When the vertical is mounted in place there is enough downward thrust to keep the block from creeping.

The guys can be attached to the mast by simply drilling holes in the mast, the holes being large enough to pass the plastic clothes line, and tying the line directly to the mast. Lay the vertical on the ground and measure off the length of the guys, which will, of course, depend on the anchor points. Also, drill a hole about 1/2 inch from the bottom of the mast and install a nut and screw. The head of the screw should be mounted inside the pipe with the threaded portion extending out. Use a lock washer and tighten up the nut. When you mount the vertical on the soda bottle it will be a simple matter to fasten one feed wire over the screw, using another nut to hold the end of the line to the vertical.

Before mounting the vertical, put a cork in the soda bottle; otherwise it is likely to fill up with water coming down the pipe. You can, of course, plug up the top of the vertical, but this isn't necessary. Any water coming down the pipe will escape around the bottle.

After the vertical is mounted in place and guyed, you can install the horizontal wire. Wrap one end of the wire around the bottle and secure the other end to a guy point, using an insulator at the end of the 30-foot length. If you don't have enough room to stretch out the wire straight, it can be run in an L or U shape. Try to avoid running the wire close to rain gutters or pipes. Also, the wire doesn't have to be horizontal; it can slope downward to a guy point if desired.

One side of the feeder goes to the base of the vertical and the other side to the horizontal wire. Don't worry about the length of line to the shack as it isn't critical. It can be as short as five feet or as long as required to reach the shack. (Well, that seems reasonable! — Ed.)

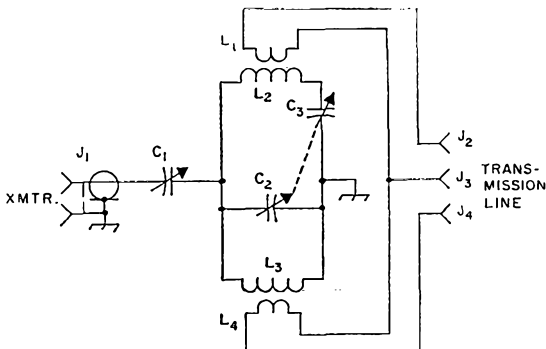


Fig. 3—Circuit diagram of the multiband antenna coupler. C₁—250- μ f. variable capacitor (Hammarlund MC-250-M).

C₂, C₃—325- μ f. variable capacitor (Hammarlund MC-325-M).

J₁—Coax chassis receptacle, SO-239.

J₂, J₃, J₄—Tip jacks.

L₁—1.6 μ h., 5 turns No. 18, 1 1/4-inch diam., 10 turns per inch, mounted inside L₂ (Illumintronic Air Dux 1010).

L₂—1.1 μ h., 5 turns No. 14, 1 3/4-inch diam., 10 turns per inch (Illumintronic Air Dux 1410).

L₃—3.2 μ h., 10 turns No. 18, 1 1/4-inch diam., 10 turns per inch, mounted inside L₄ (Illumintronic Air Dux 1010).

L₄—2.1 μ h., 6 turns No. 14, 1 3/4-inch diam., 10 turns per inch (Illumintronic Air Dux 1410).

The Antenna Coupler

The antenna coupler circuit shown in Fig. 3 is a multiband type that covers 80 through 10 meters without band switching. Coupling from the transmitter is controlled by C_1 . Two links are provided, L_4 for coupling to the feeder on 80 and 40, and L_1 for 20, 15 and 10.

The coupler is built on a $2 \times 7 \times 9$ -inch aluminum chassis. Arrangement of the components is not particularly critical but it is a good idea to follow the general layout of the unit shown in the photograph. C_1 must be insulated from the chassis, so standoff insulators, $\frac{1}{2} \times 1$ inch (Millen 31001), were used to support the capacitor. Before drilling the holes for mounting C_2 and C_3 , connect them together with a shaft coupler. Set both capacitors at maximum capacitance (plates fully meshed) and tighten up the lock screws on the coupler. With the capacitors coupled together it will be easier to find the correct dimensions for the four screw holes when mounting the capacitors on the chassis.

The four coils are mounted on terminal strips and are supported by their own leads. The three leads from the links to the antenna terminals are run through rubber grommets through the chassis top and back to three tip jacks at the top rear of the chassis.

Adjustment Procedure

It is a good idea to set up the coupler with a dummy load first so you can get the "feel" of the tuning. A 60-watt lamp bulb is good for this purpose with Novice-power transmitters. Connect the screw portion of the base to J_3 and the base tip to J_4 . Use a length of 50- or 70-ohm coax line to connect the coupler to the rig. Set your rig for 80 meters and apply power. First, resonate the final amplifier for a dip. Next, tune C_1 to about mid-range and then adjust C_2C_3 for an indication in the lamp load. Once the bulb lights, readjust C_1 and then C_2C_3 again for maximum brilliance of the lamp. You'll probably have to adjust the transmitter amplifier tuning to keep it in resonance as you make the adjustments. Make a note of the capacitor settings and then proceed to the other bands, using the same method of adjustment. When setting up on 20, 15 and 10, change the antenna lead from J_4 to J_2 . The lead to J_3 doesn't need to be changed.

The same procedure can be followed with the antenna connected to the coupler. The capacitor settings won't be *exactly* the same when you connect the antenna but should be fairly close. However, you will need some type of indicating device to show when the coupler is correctly tuned. If you have an s.w.r. bridge it should be installed in the coax line between the two units. The coupler is then adjusted so that a match is indicated on the coax line.

If you don't have an s.w.r. bridge then you can use a dial lamp as an output indicator. The dial lamp should be connected across a portion of one of the feeders. The method for doing this is shown in Fig. 4. Use two lengths of wire about two feet

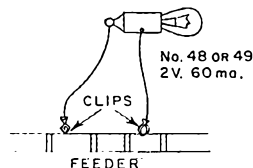


Fig. 4—Dial-lamp output indicator.

long. Clip the leads to one of the feeders, placing the clips about a foot apart. Adjust the coupler so that the dial lamp lights up. Keep one thing in mind in making this adjustment: for any one distance between clips, the brighter the light, the more power there is going up the feeders to the antenna. If the bulb should get too bright, reduce the separation of the clips on the feeder wire. This will reduce the pickup from the line.

This coupler was tested with a rig running 100 watts input. This is also about the maximum power the coupler will handle without the capacitors arcing over from the high r.f. voltages present. Any readers desiring a higher-power version of the coupler can find such a unit described in the 1958 or 1959 editions of the *Handbook* in the chapter on transmission lines. QST

NEW BOOKS

Guide to Mobile Radio, by Leo G. Sands, published by Gernsback Publications, Inc., 154 West 14th St., New York 11, N. Y. No. 77 in Gernsback Library Series. $5\frac{1}{2}$ by $8\frac{1}{2}$ inches, 160 pages, paper cover. Price, \$2.85.

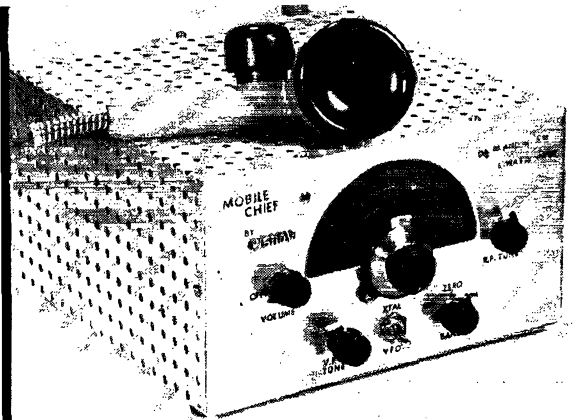
The "Guide to Mobile Radio" was written to introduce the technician to the field of commercial mobile radio. It contains information on general types of systems, such as industrial, railroad and citizens' radio, paging and dispatching. Also included are data on base station operation, receivers and transmitters, power supplies, antennas systems, remote control and portable equipment, maintenance and licensing. Chapters containing material of interest to radio amateurs include those on portable equipment, power supplies and noise elimination.

TV and Radio Tube Troubles, by Sol Heller. Published by Gernsback Library, Inc., 154 West 14th St., New York 11, N. Y. 224 pages, $5\frac{1}{2}$ by 7 inches, paper cover. Price, \$2.90.

A very high percentage of equipment failure is caused by vacuum tube faults, and this book is intended to help speed up trouble-shooting along with presenting service data on tubes. It should make a handy trouble-shooting manual for the technician or amateur who has had little experience with service work. Although devoted primarily to TV problems, several chapters deal with troubles encountered in radio receivers. The symptoms are dealt with in paragraph form (such as "station drift" and "filament-to-grid coupling") and are followed by suggestions for determining the cause. Information on tube replacements and substitutions is also given. — E. L. C.



KØRLV's automobile license number is 8873.



Front view of the two-band station showing how it compares in size with a familiar T-17 mike. The homemade receiver dial is in the center of the panel flanked by the volume control/power switch and the knob which tunes the combined transmitter output and receiver input circuit. Below are the v.f.o. tuning control, the crystal/v.f.o. switch and the band switch with its central zeroing position.

BY S. B. LESLIE,* W5DQV

Two-Band Mobile Station

This little station, complete except for power supply, takes up no more space than many a ham-band converter. W5DQV has built a superbet receiver with crystal filter and an 8-watt a.m. transmitter with v.f.o. into just 1/6 of a cubic foot. Furthermore, it doesn't even look crowded!

A One-Package Transceiver for 75- and 40-Meter Phone

THIS little rig offers a complete flea-powered station for 75- and 40-meter a.m. phone in a compact 8 × 8 × 4½-inch package. It includes a superbet receiver with crystal filter, a.v.c., noise limiter and speaker, as well as a v.f.o.- or crystal-controlled transmitter with modulator. Power input runs about 8 watts. Results will depend on band conditions and the antenna used, contacts of 10 miles or so being routine. While the rig was intended primarily for local mobile operation, contacts of 135 miles have been made. Installation, mobile or fixed, is simple, the only external attachments being a microphone, antenna and power. For mobile work a flat transistor power supply can be fastened to the rear panel, while for fixed operation any power supply giving the required 250 volts at 110 ma. and 12.6 volts a.c. or d.c. at about 1.6 amp. can be used.

Circuit Information

As shown in the schematic diagram of Fig. 1, a single tuned circuit is used for both transmitter output and receiver input. C_4 and L_5 or L_7 , as selected by band-switch section S_{1B} for 75 or 40 meters, form a conventional parallel-tuned plate tank for V_9 , the 6AQ5 final amplifier. Fixed antenna coupling links L_6 and L_8 , switched by S_{1A} , work well and eliminate the need for a large loading capacitor and its knob. In an arrangement similar to that used in the t.r. switch described by Sabaroff,¹ the grid of mixer V_{1A} , the

pentode sections of a 6U8A, is connected to the tank circuit through C_3 . When receiving, the output circuit functions in reverse as an input circuit. When transmitting, the voltage divider formed by C_3 and the input capacitance of V_{1A} , reduces the r.f. output voltage to a value safe for the mixer grid. Peaking C_4 for maximum signal strength on reception also resonates the transmitter final; hence, no tuning or output indicator is needed.

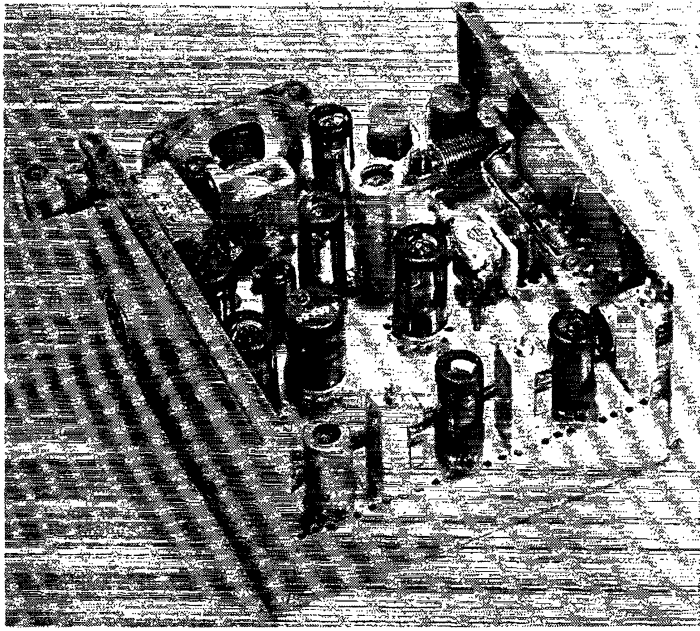
An i.f. of 1650 kc. was chosen for the receiver so that one oscillator range would serve for both 75 and 40 meters. The receiver oscillator, V_{1B} , uses the triode section of the 6U8A and tunes from 5450 to 5650 kc. Thus, when C_4-L_5 is tuned to 75 meters the receiver covers 3800 to 4000 kc., and when C_4-L_7 is tuned to 40 meters it covers 7100 to 7300 kc.

Following the mixer are the first of three 1650-kc. i.f. transformers and a simple band-pass crystal filter. A.v.c. voltage developed by the detector section of V_4 , a 6AL5, is applied to the grids of V_2 and V_3 , the two 6BJ6 i.f. amplifiers. The other half of the 6AL5 functions as a shunt-type noise limiter. Audio from the detector goes through gain control R_1 to amplifier stage V_{5A} , one section of a 12AU7. The audio output stage, V_6 , uses a 12AQ5 to drive a built-in 3½-inch speaker through half the primary of a center-tapped output transformer.

When transmitting, the final amplifier plate and screen currents flow through the other half of the output transformer primary, and the same audio system becomes a modulator. V_{5B} , the other half of the 12AU7, provides additional amplification as well as button current for a carbon

* 122 East Third St., Okmulgee, Okla.

¹ Sabaroff, "A Novel Electronic Transmit-Receive Switch," *QST*, June, 1957.



Top view of the transceiver with cover plate removed. The receiver i.f. strip runs along the near edge of the chassis from front to back. The rearmost tube is the 6A15 detector, and ahead of it are the three i.f. transformers and the two 6BJ6 i.f. amplifiers. From left to right across the front panel are the r.f. tuning capacitor, plastic dial and volume control. The receiver tuning capacitor is front and center with its trimmer soldered directly across it. Note how the pilot lamps are mounted on a bracket attached to this capacitor and the wire pointer is soldered to the capacitor shaft. Directly behind the tuning capacitor is the 6U8A mixer-oscillator. To its left is the 12BY7A v.f.o., and behind that is the 0A2 regulator tube. Beside the speaker on the far side of the chassis are the 6AQ5 final amplifier and the 40- and 75-meter coils. Along the back of the chassis are the 12AU7 and 12AQ5 audio stages and the output transformer. The black cans in front of the audio tubes contain the relays, and the crystal socket is just visible between the farther relay and the speaker. On the back panel are the coaxial antenna connector, the power connector (which ought to be a male fitting for safety's sake), and the microphone jack.

microphone connected in its cathode circuit.

The transmitter r.f. section uses a 12BY7A oscillator, V_7 , to drive V_9 , a 6AQ5 final amplifier. S_2 connects the grid of V_7 to either tuned circuit $L_3C_6C_7$ or a crystal socket. The v.f.o. tunes from 3500 to 4000 kc., and crystals in this range can be used for output on both bands. By now you will have noticed that there is no v.f.o. dial or tuning capacitor. A calibrated v.f.o. dial is not needed or even desirable. Such a dial would take up lots of room and would seldom be used since most frequency setting is done by listening to the v.f.o. with the receiver. Therefore, the v.f.o. coil was wound on a slug-tuned form and mounted on the front panel, with a small knob fastened to the end of the slug screw. This makes a neat, efficient tuning system with little backlash. With band switch S_1 in the 75-meter position, the oscillator plate circuit consists of an untuned choke, RFC_2 . On 40 meters, slug-tuned coil L_4 makes a broadly-resonant circuit which does not require any readjustment across the band. The 0A2 regulator tube, V_8 , provides a stable 150-volt supply for the oscillator screen.

Changeover between receive and transmit is controlled by the push-to-talk switch on the microphone. This switch closes the oscillator and final amplifier cathode leads, causing these stages to draw current. Relay K_1 will then transfer

since its coil is in series with the oscillator plate lead. This silences the receiver by removing plate voltage from all stages except the oscillator and by opening one lead to the speaker voice coil.

A central position on the band switch provides for zeroing the v.f.o. In this position S_{1D} removes the short across the coil of K_2 and connects the final amplifier cathode to ground through the coil and grounds the cathode of the v.f.o. S_{1B} shorts the output circuit of the final, and S_{1C} grounds the oscillator plate through C_5 . K_2 will throw and substitute a resistor for the coil of K_1 . Since the contacts of K_1 cannot transfer, the receiver will remain operative, and the v.f.o. signal, greatly attenuated by C_5 , can be picked up.

The tube types used were determined by those on hand. This also accounts for the rather peculiar filament hookup. S_3 , a switch on the volume control, is hooked across two terminals of the power connector. These terminals can be used to control the primary circuit of whatever power supply is used. Incidentally, it would be safer practice to use the male power connector specified in the parts list in place of the receptacle shown in the photos. This would make it impossible to have voltage appearing at exposed terminals.

Construction

The homemade chassis measures $8 \times 8 \times 1\frac{1}{2}$

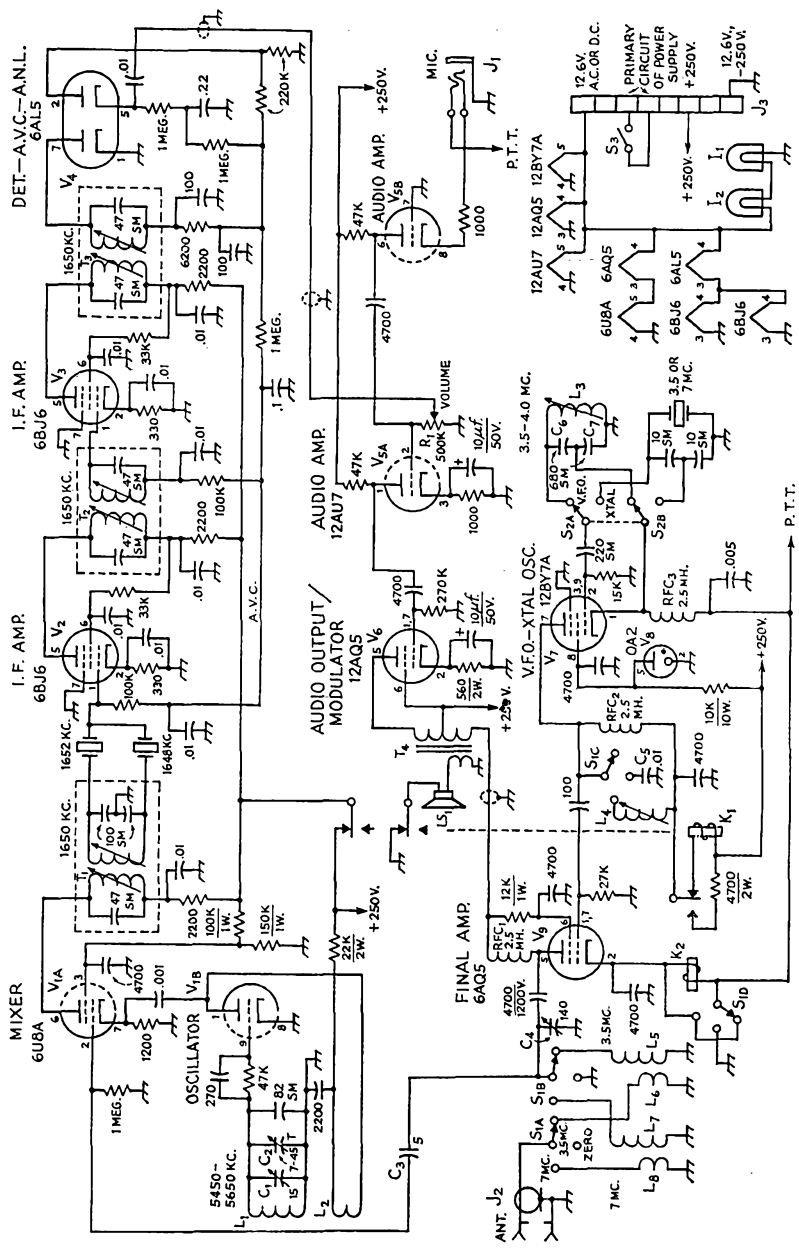


Fig. 1—Circuit diagram of the two-band mobile station. Decimal values of capacitance are in μf ; others are in μmfd , except as indicated. 0.22- μf . capacitor is tubular paper; other fixed capacitors are disk or tubular ceramic except those marked as silver mica and those marked with polarity which are electrolytic. Resistances are in ohms, and resistors are $\frac{1}{2}$ watt unless otherwise specified.

inches, and the front and back panels are $4\frac{1}{2}$ inches high. 1/16-inch aluminum was used for these parts to give them the necessary strength. The cover was made from Reynolds perforated stock. Three shield partitions were used below chassis. One isolates the i.f. strip from the rest of the rig, and the others shield the v.f.o. and the band-switch sections. All metal work on the original was done in the shack, but your local tinsmith will be glad to help if you don't want to tackle this part of the job.

The receiver tuning dial consists of a half circle cut in the front panel as shown and backed

up by a piece of sheet plastic about $\frac{1}{8}$ inch thick. This plastic should be scoured several times with very fine steel wool to give it a ground-glasslike surface on which dial calibrations can be drawn with ink. I used green plastic and white ink, but you can pick your own colors. The dial pointer is simply a piece of No. 12 wire soldered to the capacitor shaft. Two dial lamps are mounted on a bracket secured by the capacitor mounting nut. The vernier drive is Lafayette Radio part No. F-346.

Careful study of the photographs and captions will reveal the placement of most components.

- C₁—About 15- μ mf. variable (Hammarlund HF-35 with all but two rotor plates removed).
- C₂—7.45- μ mf. neg. temp. coef. ceramic trimmer (Centralab 822-BN or similar).
- C₃—5- μ mf. ceramic.
- C₄—140- μ mf. variable (Hammarlund HF-140).
- C₅—0.01- μ mf. ceramic.
- C₆, C₇—680- μ mf. silver mica.
- L₁, L₂—6-volt pilot lamp.
- J₁—3-conductor mike jack.
- J₂—Coaxial chassis fitting (SO-239).
- J₃—8-pin male chassis connector (Amphenol 86-CP8 with 12-001-03 adapter plate).
- K₁—D.p.d.t. relay, 5000-ohm coil (Potter & Brumfield GB11D with 5000-ohm coil usable).
- K₂—S.p.d.t. relay, 400-ohm coil (Potter & Brumfield RS5D with 335-ohm coil usable).
- L₁—18 turns No. 24 tinned, 3/4-inch diam., wound 32 t.p.i. (B & W Miniductor No. 3012) cemented over poly rod.
- L₂—6 turns B & W No. 3012 cemented next to ground end of L₁.
- L₃—22 turns No. 22 enam., close-wound on 1/2-inch diam. slug-tuned form (National XR-50).
- L₄—About 25- μ hy., slug-tuned (similar to North Hills 120-E).
- L₅—28 turns No. 24 enam., close-wound on 3/4-inch-diam. poly rod.
- L₆—8 turns No. 24 enam., close-wound on ground end of L₅.
- L₇—18 turns No. 24 enam., close-wound on 3/4-inch diameter poly rod.
- L₈—6 turns No. 24 enam., close-wound on ground end of L₇.
- L_{S1}—3 1/2-inch p.m. speaker.
- R₁—500,000-ohm control, audio taper, with switch.
- RFC₁, RFC₂, RFC₃—2.5-mh. choke (National R-100 or similar).
- S₁—4 poles, 3 positions, 2 sections (Centralab PA-2011).
- S₂—D.p.d.t. toggle.
- S₃—S.p.s.t. switch, part of R₁.
- T₁, T₂—I.f. input transformer (Miller 12-W1). See text.
- T₃—I.f. output transformer (Miller 12-W2). See text.
- T₄—Audio output transformer, primary, 14,000 ohms c.t.; secondary, 3.2 ohms; 5 watts or more (Merit A-2904 or similar).

The relays shown were taken from surplus equipment, but any relays with the required contacts and coil resistance should work as well. The speaker will have to be submounted about 1/2 inch if it is the same size as the original.

The receiver oscillator coil is cemented over a piece of 5/8-inch diameter polystyrene rod which has been drilled and tapped at one end to take a 6-32 mounting screw. The 75- and 40-meter coils are wound on 3/4-inch poly rods 1 1/2 inches long. These coils are secured by passing their ends through small holes in the rod. A layer or two of plastic tape is then wound around the lower end of each coil, and the links are wound on top of this tape.

The i.f. transformers specified are for 1500 kc. and must be altered to hit 1650 kc. This is done by removing the 100- μ mf. capacitors that come with the transformers and replacing them with the silver mica capacitors shown in the diagram. The 1648- and 1652-kc. filter crystals are mounted in a dual crystal socket which is

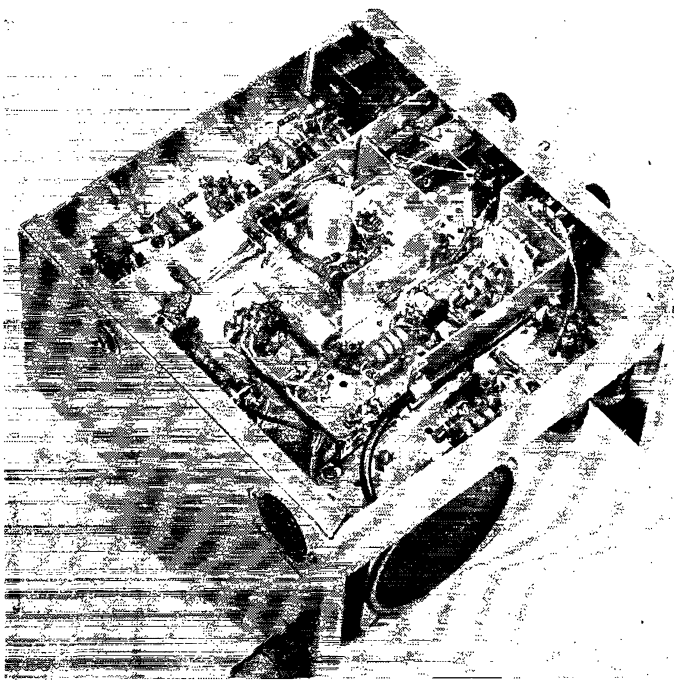
fastened to the i.f. strip shield partition. The socket should be spaced away from the partition so that the contacts are inside the i.f. compartment.

Sharp-eyed readers may notice that the transmitter crystal socket is not wired up to S₂ in the photos. After making provision for crystal control, I found no need of it and did not finish wiring this part of the circuit.

Tune Up and Operation

Before turning on the power recheck all wiring to make sure there are no mistakes. Then apply power and see if all filaments light up and if the proper voltages are present at the various tube sockets. If all seems well, get out the grid-dip meter and check the range of the receiver oscillator which should cover 5450 to 5650 kc. Adjust C₂ until this range is centered on the tuning dial. Now align the i.f. on 1650 kc. You will have to beg or borrow a signal generator to do this properly so that the dial calibration for the two bands

Bottom view. The i.f. strip components are in the shielded compartment along the far side of the chassis, and the filter crystals can be seen in the upper corner. Across the partition from the crystals is the slug-tuned v.f.o. coil, and next to it the v.f.o./crystal switch. Behind them, shielded by another aluminum partition, is the mixer-oscillator compartment in which the oscillator coil can be seen mounted on a polystyrene rod. A third partition separates the front section of the band switch, which handles the r.f. coils and links, from the rear section which switches the oscillator plate circuit. This shield also continues back to isolate the oscillator components on the left from the final amplifier on the right. The piece of coax running through the amplifier compartment connects the band switch with the antenna jack. Toward the rear of the chassis is the relay wiring and the audio circuitry.



will coincide. Tuning C_4L_5 to 75 meters with the band switch in that position should now bring in lots of signals. Switching S_1 and tuning C_4L_7 to 40 meters will start things going on that band. It will be necessary to repeak C_4 occasionally as you tune across the dial. This little receiver will give a good account of itself and is quite adequate for its intended purpose, local mobile work.

Next, check the frequency of the v.f.o. coil, L_3 , with the grid-dip meter. It should tune from 3500 to 4000 kc. with some to spare. Change the v.f.o. coil or capacitors as needed to cover this range. For 40-meter operation, peak the oscillator plate coil, L_4 , on 7250 kc.

Operation is simplicity itself. Just select the desired band, peak C_4 , tune in a signal, repeak C_4 , set the v.f.o. and away you go. You can tell

your approximate frequency by how far the v.f.o. knob projects from the panel. Mine is out about $\frac{3}{4}$ turn for 7200 kc. and about 3 turns for 3800 kc. This will vary from rig to rig so you will have to calibrate yours against the home-station receiver. While frequency setting there will be many strong birdies, but you should have no trouble picking the right one as it is much stronger than the others. With a little practice you can set the v.f.o. any place in either band in just a few seconds. Remember, though, you are depending on received signals to set your frequency, so don't play the band edges too closely.

This little rig does its job well and has about as much XYL appeal as can be expected from a piece of home-brew gear. I hope you get as much enjoyment out of yours as I have mine. **QST**

Strays MEMO

Trouble with TVI? Louis Epstein, K9REN, 4708 North Sawyer Ave., Chicago 25, has a list of television receiver manufacturers who will supply high-pass filters. K9REN will send a copy of the list to anyone whose request is accompanied by ten cents and a self-addressed stamped envelope.

How's your QSL bill? W4LQC/8 suggests that many high school shop teachers are glad to have their students print QSL cards and the cost is only the price of the card stock. He says teachers welcome projects that will be used rather than just serving as "busy work."

Back Copies and Photographs

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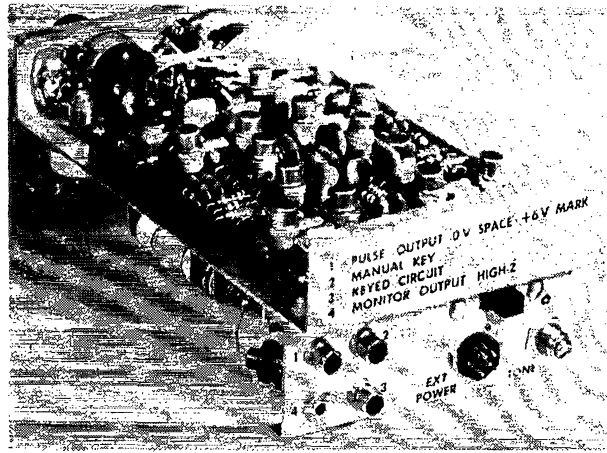
Members of the Pictured Rocks Radio Club of Munsing Mich., in photo at right, attended the presentation of an award to 16-year-old Ralph LaCombe (center of group). Ralph climbed through a cellar window to rescue two young boys trapped in a burning home. One was Melvin Meldrum, son of Harold Meldrum, W8ENX. Both youngsters died later despite Ralph's heroic work in carrying them alive out of the Meldrum house. The Michigan hams, in addition to commending Ralph, are raising money and collecting household items for W8ENX, who lost both his son and his home.



Pictured above is K2USA's solar-powered station set up to commemorate the 100th anniversary of the U. S. Signal Corps. The Fort Monmouth group has a special QSL card to confirm contacts.



Rear-end view. Ready-made plug and cable assemblies provide a variety of terminations for the phono jacks J_1 , J_2 and J_3 grouped with the monitor output jack at the left. To the right are the external power connector and monitor tone control below the automatic/manual switch S_3



Semiconductor Version of the "Key with a Brain"

BY ALVIN F. KANDA,* KØMHU, ex-KH6OJ

The "Ultimatic"—Transistorized

Part 2 of Two Parts

ARMED with information on the basic subcircuits (see September *QST*), let us now dig in and see how these circuits are utilized.

Time Base

The waveforms appearing at the collectors of Q_1 and Q_2 in the time-base generator are shown in Figs. 3A and B. The swings negative are sharper and therefore are selected after differentiation (Figs. 3C and D) for use in triggering the dot and dash generators. The pulses originating from Q_1 are used to start a character and those from Q_2 used to end a character. The spacing between successive "start" and "stop" pulses equals 1 dot length and is variable from about 200 to 20 milliseconds, which figures out to be from 5 to 50 w.p.m. based on 12 dot lengths per letter and 5 letters per word.

Dot Generation

When the keying levers, S_5 , are idle, Q_9 and Q_{10} are "off," with their collectors at the 1 level, driving the gates Q_7 and Q_8 to conduction and thus shorting the ends of R_{15} and R_{16} , which prevents the "start" pulses from triggering the dot and dash generators. The "stop" pulses, however, are connected to both generators, driving Q_4 and Q_6 to the 0 state. Since the base of the keyer Q_{15} is connected to the collectors of Q_4 and Q_6 , Q_{15} is at 1 and the relay is unenergized. When the dot lever is actuated, the collector of Q_9 goes to 0, taking Q_7 out of conduction and thus letting a "start" pulse through to the base of Q_3 , which flips over and actuates the dot generator. The collector of Q_4 goes to 1, driving Q_{15} to conduction and energizing the relay until the succeeding "stop" pulse (1 dot length later) flips the generator back to the idle state. The next start pulse occurs one dot length after the stop pulse when the mark/space trimmers, R_{60} and R_{61} , are adjusted for a unity mark/space, thus assuring the proper intercharacter space.

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Dash Generation

Since a dash is 3 times as long as a dot, it can be seen that a "start" pulse and the second "stop" pulse following it can be used to trigger a flip-flop and generate a dash, provided the first "stop" pulse can be suppressed. When the dash lever is actuated, the collector of Q_{10} goes to 0, taking Q_8 out of conduction, thus letting a "start" pulse through to the base of Q_6 , which actuates the dash generator. The collector of Q_6 goes to 1, driving Q_{15} to conduction and energizing the relay. At the same time, the positive voltage swing of the collector of Q_5 going to 0 is coupled by C_9 to the base of the normally 0 Q_4 , thus actuating the dot generator. The collector of Q_4 goes to 1 and adds to the base current of Q_{15} already being furnished by the dash generator. The collector of Q_5 goes to 0, bringing the anode of CR_3 to 0. The first "stop" pulse will then trigger the dot generator to its idle state, but will be shorted out by CR_5 before reaching the dash generator. The combination of R_9 and C_8 delays the rise of the voltage at the anode of CR_5 to assure the shunting of the first "stop" pulse. By the time the second "stop" pulse arrives, the voltage level at the anode of CR_5 is at 1, the diode is nonconducting, and the second "stop" pulse goes "on" to trigger the dash generator "off." CR_3 prevents actuation of the dot generator by the dot lever during the generation of the dash. Without this protection, any dots triggered after the first dash-actuated dot would prevent subsequent "stop" pulses from terminating the dash.

Letter and Word Space

The space of 3 dot lengths between letters is made by leaving the lever in the idle position until one "start" pulse following the end of a letter has gone by, and then selecting the starting character of the next letter. The ideal word spacing of 6 dot lengths cannot be obtained with

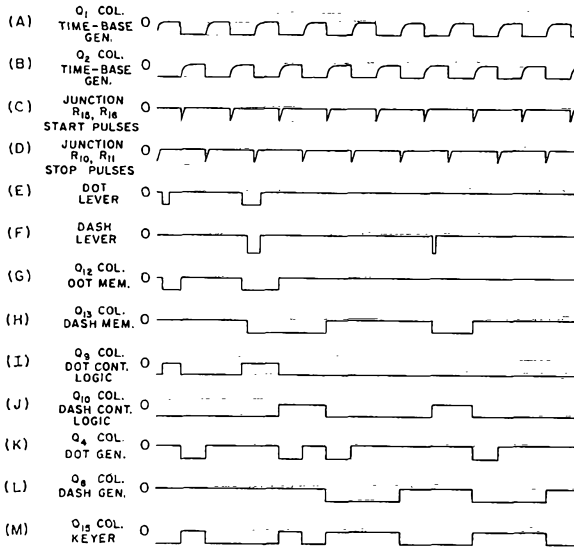


Fig. 3—Waveforms for the word "eat." All forms shown are in reference to common p-n-p emitters, Fig. 1.

this system but spaces of 5 dot lengths or 7 dot lengths are made by letting 2 or 3 "start" pulses go by, respectively. The resulting timing error is about 17 per cent, which is probably better than that obtainable manually.

Memories

The circuit described thus far can be used as a keyer but will not be of the self-initiating variety since if either lever is momentarily actuated in the time interval between two "start" pulses, nothing will happen unless the lever is held until a start pulse passes through the open gate. What is needed is a device to remember this momentary lever actuation, and to hold the gate open until a "start" pulse triggers the desired character. The flip-flop meets these requirements and is used for the dot and dash memories. In the idle state, Q_{12} (Q_{13}) is at 0 and Q_{11} (Q_{14}) at 1. When the dot (dash) lever is actuated, Q_{11} (Q_{14}) is forced to the 0 state and the collector of Q_{12} (Q_{13}) goes to 1, which drives Q_9 (Q_{10}) to conduction if the opposite memory is idle, thus opening gate Q_7 (Q_8). A negative pulse is derived from Q_4 (Q_6) as the dot (dash) starts and applied to the base of Q_{12} (Q_{13}) via diode gate CR_6 (CR_7) to clear or reset the memory to its idle state.

If the opposite memory happens to be on, Q_9 (Q_{10}) is not driven to conduction until the clearance of the opposite memory. If the dot memory happens to be actuated while the dash memory is on, means must be provided to prevent clearance of the dot memory when the dash starts. (Remember that a dot is generated when a dash is generated.) This is done by returning R_{31} to the collector of Q_9 which is at 1 as long as the dash memory is actuated. CR_6 is then reverse-biased and nonconducting when the dash starts, thus preventing the dash from resetting the dot memory. As soon as the dash starts and its memory is reset, the collector of Q_9 goes to 0.

Thus when the dot starts, CR_6 will conduct and the dot memory will be reset. In the reverse situation where the dash memory is actuated while the dot memory is on, the situation of the dot clearing the dash memory does not exist but R_{32} is returned to the collector of Q_{10} to keep the circuit symmetrical. Figs. 3E to 3M show the waveforms observable for the word "eat" at the levers, memories, character generators, keyer, and control-logic circuits.

Character-Control Logic

The dot and dash control-logic circuits, one of which is redrawn in Fig. 4, comprise the "brain" part of the key which does the following:

- 1) Assures that only one gate is open at a time under all conditions.
- 2) When the levers are actuated in rapid succession, the gate associated with the lever actuated first is opened first.
- 3) When a gate is being held open by a memory, actuation of the opposite memory does not open its gate until the generation of the previously-selected character.
- 4) When a gate is being held open by its associated lever with its memory reset, actuation of the opposite memory closes the open gate and opens its associated gate which can be then held open by the lever. Release of either lever will revert the output to the character associated with the still-closed key.

The tables in Fig. 4 define the input signals and summarize all possible input conditions of the control circuit and the resulting output or decision which controls the gate. Note that the 0011 input combination does not occur and that the 1011 combination is undesirable but is sometimes induced if both levers are actuated simultaneously or if the gain of the transistor in the opposite logic circuit is too low.

The outputs of the dot and dash control-logic circuits are not directly connected to their

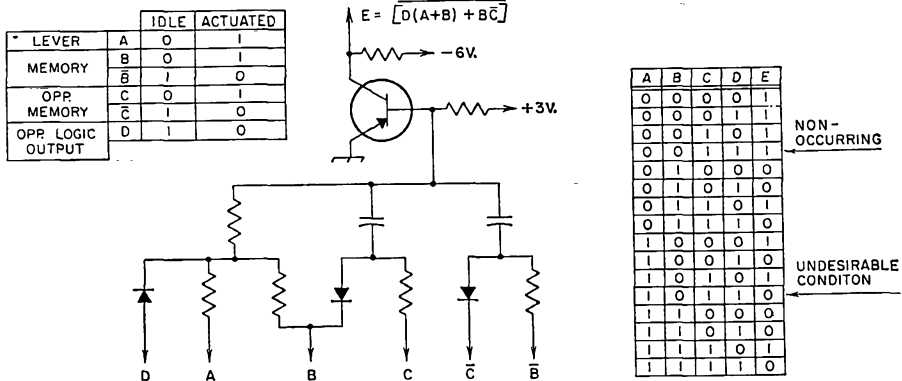


Fig. 4—Operational summary of dot (dash) control logic.

gates but are applied to networks $R_{25}-C_{26}$ and $R_{28}-C_{27}$, respectively. When a gate is being held open by a memory, the network delays the closure of the gate when the memory is cleared. Without this delay, the memory is cleared and the gate is closed before the character generator is completely triggered by the start pulse and no character is generated.

Monitor

The base of Q_{17} is shorted to its emitter by the normally-closed relay contacts when the key is idle, thus preventing the circuit from oscillating. Whenever the relay is energized for a character, the short is removed and the circuit oscillates.

Construction

Most of the circuitry is contained on two etched-circuit boards as can be seen from the top and bottom views of the key. The smaller $1\frac{1}{4} \times 2\frac{1}{2}$ -inch board holds the monitor, and the $4 \times 5\frac{1}{2}$ -inch board contains the rest of the circuit excluding the relay, switches, controls, batteries, and connectors which are chassis-mounted. The many small parts involved makes the etched-circuit approach very attractive as it solves the mounting and wiring problem simultaneously. The resulting wiring ease and lack of a rat's nest was well worth the extra effort of preparing the circuit master drawing.

The main deck, front and rear panels, and cover are folded from 1/16-inch aluminum. The base plate, which is attached to the cover, is 3/16-inch aluminum to give the unit weight. The chassis slides into the cover-base-plate assembly and is held by screws through the base plate to the bottom lips of the front and rear panels.

Keying Levers

The twin levers S_6 were fabricated from parts obtained from two inexpensive beginner-type straight keys.⁴ Referring to the view showing the lever mechanism, the lever bearings are mounted inside a channel bent out of 1/16-inch aluminum. The front ends of the levers were

sawed off near the contacts, and new Lucite paddles were screwed to what was the rear of the levers, using the threaded holes formerly occupied by the contact space-adjustment screws. These space-adjustment screws are now used as adjustable contacts which are supported on the channel on nylon pin jacks modified by drilling and tapping down their axes to accommodate the 10-32 threads of the screws. The tapped holes in the lever that were used for the tension-adjustment screws were filled to hold smaller-diameter, lighter springs and the tension-adjusting screws were relocated on the channel. The left-over sawed-off shafts of the front panel controls were used as a brace across the open end of the channel and for a common lever stop located behind the lever contacts.

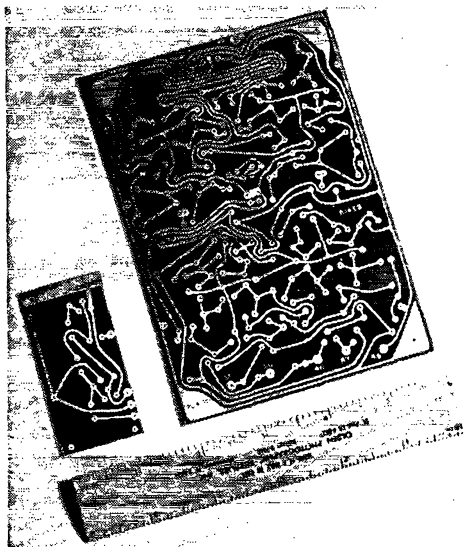
Cost vs. Performance

To save a lot of catalog thumbing and addition, the cost to duplicate this keyer, less circuit boards⁵ and chassis, runs up to about \$74.50 using the following readily-available semiconductors: $Q_1, Q_2, 2N169$ (G.E.); $Q_3-Q_6, Q_9, Q_{10}, 2N362$ (Ray.); $Q_7, Q_8, Q_{11}-Q_{15}, 2N363$ (Ray.); $Q_{16}, Q_{17}, 2N233$ (Sylv.); $CR_1-CR_4, CR_6-CR_{15}, 1N90; CR_5, 1N100$.

Realizing that cost would probably be the biggest stumbling block for prospective builders, the bargain Lafayette Radio SP-146 was investigated for use in place of the 2N362 and 2N363. Two lots of 13 each were obtained and one unusable transistor was found in each batch. The betas of the remaining transistors as measured in the W2TGP tester⁶ ranged from 16 to 249 with an average of 72. If one is lucky enough to get a 75-per-cent yield (13 good ones out of 17), the savings over the 2N362s and 2N363s would be about \$6.40. Using the "file" of transistors accumulated in the process of developing the circuit, the minimum common emitter d.c. betas for proper operation of the various subcircuits were found to be: dot and dash generators and control logic, 30; dot and dash memories, gates,

⁵ The author will make available the main circuit board with parts-placement diagram for \$3.75 postpaid in U.S.A.

⁶ Priebe, "Checking Transistors," *QST*, April, 1958.



Etched maze of the monitor and main circuit boards.

and keyer, 20; time-base generator, 75; monitor, 12. Although the dot and dash memories and generators are identical flip-flops, the character generators require higher-gain units because of the less-efficient trigger input circuit containing the series 4700-ohm resistors. The high gain requirement for Q_1 and Q_2 is dictated by personal preference for the high 10-to-1 speed-control range. (The lower speed limit of 5 w.p.m. is useful for checking and demonstrating the functions of the key. For instance, a good demonstration of the memories is to make an *a* or an *n* at 40 w.p.m. and then sit back and hear it come out at 5 w.p.m. A top speed of 40 w.p.m. or better is desirable to present a challenge to the user.

By sacrificing speed-control range, less expensive n-p-n's with lower gains can be used. The 100K value of the speed control, however, will not supply sufficient base current to saturate the transistors at the low speed settings and could be replaced by a lower value for more spread in control. A rough rule of the thumb for the maximum value in kilohms that the speed control should have is $(\beta \times 2.2) - 10$. For instance, if you have a couple of 2N1101s (saving of \$2.48 over 2N169s) with betas of 25, the value of R_{59} should not exceed 45K. The speed-control range is the ratio of the maximum value of R_{59} plus R_{58} to the minimum or R_{58} . The value of 10K for R_{58} is fixed by the choice of R_1 and R_2 , so the speed-control range for transistors with betas of 25 is 55K/10K or 5.5 to 1. The value of C_1 and C_2 in μ f. can then be calculated by dividing 145 by the desired maximum speed in w.p.m.

A few more dollars can be saved by substituting fixed resistors for the adjustable R_{60} , R_{61} , and R_{63} after their values have been determined by substitution. The procedure for setting R_{60} and R_{61} is covered in a following section. The value of R_{63} depends on the tone you wish.

In packaging the circuit on etched boards,

subminiature capacitors were chosen to make the job easier. Unfortunately, the prices of these components run comparatively high. If the circuit is being wired conventionally, inexpensive regular-size capacitors may be used.

Another cost-cutting possibility is to eliminate the 13 transistor sockets (\$4.05) on the main board by soldering the transistors in place as was done for the monitor board. But this is not recommended unless the transistors are prechecked to see if they meet, or preferably exceed, the minimum beta requirements mentioned.

Transistor Mounting

If sockets are not used, the transistors should be spaced from the board to allow heat-sinking each lead with a pair of needle-nose pliers while soldering. The monitor 2N233s are soldered in place with the flat sides of their cases glued to the board, thus exposing the leads on the component side of the board for heat sinking. The diodes, incidentally, should also be soldered in place while heat-sinking their leads.

Testing and Adjustment

To trim the mark/space over the speed range requires an oscilloscope. The scope should be internally synchronized and be connected to the pulse output terminals. If the keyer is operating properly, a string of dots (dashes) should be observed when the dot (dash) lever is actuated. With the dot lever closed and the speed control fully clockwise (zero resistance, maximum speed), R_{61} should be adjusted for equal mark and space. Now turn the speed control fully counterclockwise. Unless your scope is direct-coupled, there will be some droop in the waveform, but the length of the pulses should be distinguishable. Adjust R_{60} for equal mark and space. If this is impossible, switch Q_1 and Q_2 or, if you have soldered them in place, rewire R_{60} across the other section of R_{59} and then adjust R_{60} .

The next step is to adjust the relay. Wire a battery in series with a current-limiting resistor and connect the series combination across the keyed-circuit terminals with the scope across the resistor. The voltage and resistance are not critical, the purpose being to get an observable picture of the relay-contact action. With proper adjustment of spring tension and contact spacings, waveforms similar to that obtained at the pulse output terminals should be observed except for a 10-millisecond delay at all speeds. In general, the normally-closed contact adjusts the pull-in current, the normally-open contact the drop-out current, and the spring tension adjusts both pull-in and drop-out currents.

With the relay properly adjusted, the monitor can be used to check to see if the memories and control-logic circuits behave as described in the circuit explanations.

Battery Requirements

The current drain on the 6-volt battery BT_1 should be about 17 ma. with the key idle and

(Continued on page 152)

Design Procedure Plus a High-Performance Unit Using Surplus Crystals

Here's a two-in-one special—enough information on b.f. crystal filters to design one for most any frequency, band width and shape factor, and also a ready-to-build 5.5-Mc. filter for s.s.b. transceiving.

High-Frequency Crystal Filters for S.S.B.

BY D. J. HEALEY,* W3HEC

MANY articles have appeared in *QST* describing crystal filters for s.s.b. operation.¹⁻⁵ However, none of these supplied a design procedure and also gave the precise performance of the resulting filters. This article describes a particular type of filter that was built for a homemade transceiver.

The theoretical shape of the selectivity characteristic attainable with simple crystal filter arrangements was calculated first and found to be inadequate for good sideband suppression. The effect of mismatch when filter sections are cascaded without vacuum-tube isolation improved the steepness of the selectivity characteristic, but at the expense of ripple in the pass band. By inserting a small resistance between two sections of a three-section filter, the ripple was reduced without greatly affecting the shape factor (ratio of the bandwidth at some high attenuation to the bandwidth at low attenuation) of the selectivity curve. A filter constructed according to this design from FT-243 surplus crystals performed as predicted.

In filters such as the one used in the transceiver described by W3TLN⁶ it is not unusual to obtain spurious responses as close as 15 kc. to the pass band which are suppressed by only about 20 db. In the filter described in this article the spurious responses are attenuated more than 50 db. even with a crystal whose principal spurious frequency was only 7 db. down from the main response.

Simple Filter Sections

Fig. 1 shows the equivalent circuit of a crystal neglecting its spurious modes. This circuit has the reactance vs. frequency curve shown in Fig. 2.

*Shawan Road, Cockeysville, Md.

¹Weaver and Brown, "Crystal Lattice Filters for Transmitting and Receiving," *QST*, June and August, 1951.
²Good, "A Crystal Filter for Phone Reception," *QST*, October, 1951.

³Burns, "Sideband Filters Using Crystals," *QST*, November, 1954.

⁴Morrison, "Cascaded Half-Lattice Crystal Filters for Phone and C.W. Reception," *QST*, May, 1954.

⁵Vester, "Surplus-Crystal High-Frequency Filters," *QST*, January, 1959.

⁶Vester, "Mobile S.S.B. Transceiver," *QST*, June, 1959.

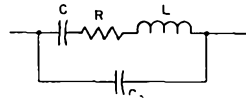


Fig. 1 — Equivalent circuit of a crystal. C and L are the motional capacitance and inductance of the crystal, and R represents the frictional loss. C₀ is the electrode and holder capacitance shunting the crystal.

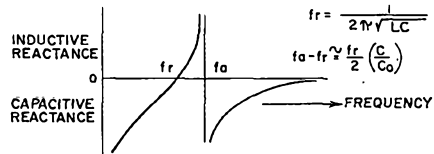


Fig. 2 — Reactance vs. frequency characteristics of a crystal. The series-resonant frequency, f_r , is that of C and L. The anti-(parallel) resonant frequency, f_a , is that of the circuit formed by C and L in one branch and C₀ in the other.

L and C are series resonant at f_r , and f_a is the antiresonant frequency of C₀ and the LC combination. By utilizing crystals in a lattice structure as shown in Fig. 3, a selective filter is obtained. The lattice is a bridge, and it is obvious that maximum unbalance of the bridge will occur when one arm has an impedance which is capacitive while the other arm is inductive. When the impedances are equal, the bridge will

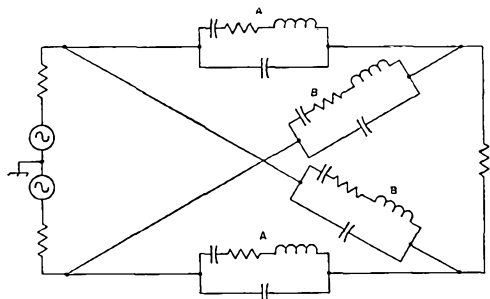


Fig. 3 — Equivalent circuit of a full lattice crystal filter. The series crystals, A, are the same frequency, as are the shunt crystals, B. Note that the lattice could be redrawn as a bridge circuit.

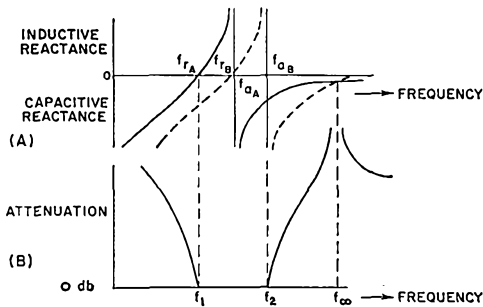


Fig. 4 — (A) Reactance characteristics of crystals A and B in the lattice of Fig. 3. In the type of filter described in this article, the series-resonant frequency of the higher-frequency crystal, f_{rB} is made equal to the antiresonant frequency of the lower-frequency crystal, f_{aA} . (B) Attenuation curve of a filter using the crystals of (A). In the pass band between f_1 and f_2 the series and shunt reactances are opposite, the bridge is unbalanced, and nearly all of the input signal appears at the output. At other frequencies the reactances are similar, and the bridge approaches balance and shows little output.

be balanced. The reactance frequency curves of the crystals can then be used to indicate the regions of the pass band and the stop band. Fig. 4 shows what happens when the antiresonant frequency of one pair of crystals is made equal to the resonant frequency of the other pair. It is observed that the pass band of a simple lattice is limited to the region between the antiresonant frequency of the higher-frequency crystals and the resonant frequency of the lower-frequency crystals. For the case where the reactance curves in the stop band are equal only at zero frequency and infinite frequency, analysis of the circuit shows that the frequency

difference $f_2 - f_1$ corresponds to the bandwidth at which the attenuation is approximately 7 db.

The resistive component of the crystal may be transformed to an equivalent parallel resistance shunting the crystal which is essentially constant for the small frequency range of concern. If all crystals have the same Q and inductance, then the equivalent resistance shunting the crystals is the same, and if one considers the resistive bridge thus formed, it is balanced under these conditions. The loss resistance can then be neglected except as it modifies the termination of the filter and affects insertion loss. The point is that the filter behaves essentially as though its elements had infinite Q .

Identical results can be obtained with half as many crystals in a half-lattice circuit. As shown in Fig. 5, this is the equivalent of a full lattice in which the impedances of the elements are one half those of the half lattice. The basic circuit, Fig. 5B, shows two crystals and an ideal transformer having unity coupling. A practical transformer which does not have unity coupling can be represented by the circuit of Fig. 5C. Leakage reactance appears in series with the crystals of the lattice and will lower their resonant frequencies. In narrow-band filters, this can be prevented by connecting a capacitor which resonates with the leakage inductance at the center frequency of the filter in series with the center tap⁷ as in Fig. 5D. This allows a simple center-tapped coil to be used for the ideal transformer.

Designing An S.S.B. Filter

In building a filter for a transceiver, an intermediate frequency of 5500 kc. was selected. This choice is satisfactory for 100-db. suppres-

⁷ Kosowsky, Patent No. 2,913,682.

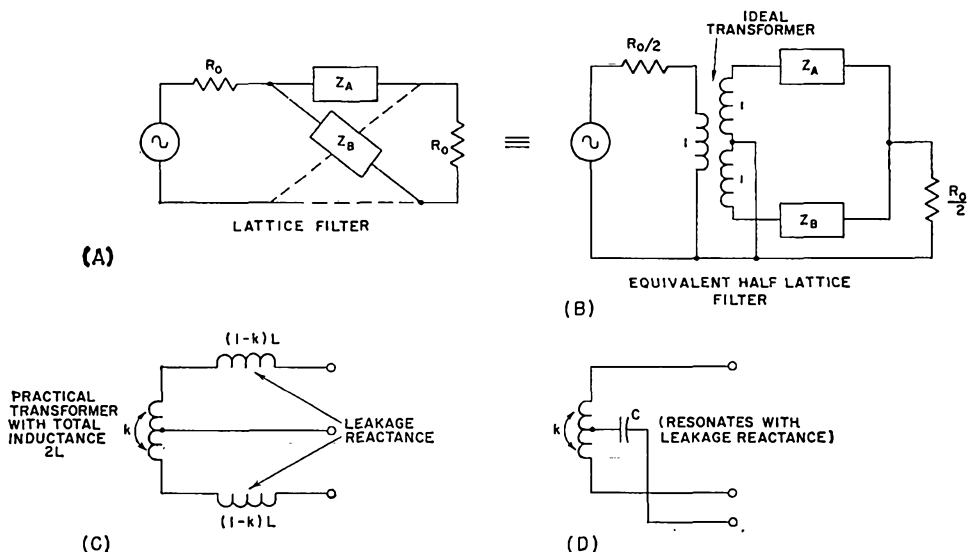


Fig. 5—(A) Basic circuit of a lattice filter and (B) an equivalent half-lattice filter. The transformer is an ideal one with unity coupling between windings. (C) Diagram of a practical transformer showing the leakage inductance which results from a coupling coefficient, k , less than unity. (D) How the leakage reactance may be tuned out by inserting capacitor, C , in the center-tap lead.

sion of spurious signals in the receiver except on 15 meters. There a 5th-order intermodulation product falls in the pass band so that with a simple mixer the spurious response is only attenuated 75 db. However, by using a simple balanced mixer, the desired suppression of 100 db. is realized. The balanced mixer also reduces the preselection requirements on other bands.

Since the pass band is on the order of twice $f_a - f_r$, this frequency difference must be about 1500 c.p.s. for a filter capable of passing the voice frequencies. The second formula in Fig. 2 shows that $f_a - f_r$ depends on the ratio of the capacitance shunting the crystal to the motional capacitance of the crystal. For AT-cut crystals (the ones you get for \$2.95), this ratio is about 250 minimum. Therefore, AT-cut crystals above 750 kc. meet the requirements, and capacitive terminations are feasible. For example, the shunt capacitance, C_o , of a typical AT-cut crystal is about 3 $\mu\mu\text{f}$. If it is desired to terminate a half-lattice filter with a circuit capacitance of, say, 15 $\mu\mu\text{f}$., this will reflect as a total shunt C of $15/2 + 3 = 10.5 \mu\mu\text{f}$. across each crystal. Under such conditions, AT-cut crystals can be used for amateur s.s.b. applications at any frequency above 2625 kc.

Surplus FT-243 crystals (BT-cut) are available for 5500 kc., and their use is economically attractive. BT-cut crystals, however, have C_o/C ratios around 4000 minimum, which is too high to allow the desired pass band to be obtained. The pass band can be widened by paralleling inductance with the crystals. This will raise their antiresonant frequencies and leave their resonant frequencies unchanged. One must be cautious in doing this since the inductance will also be antiresonant with the total effective capacitance of the crystal at some lower frequency, f_∞ in Fig. 6. If this new frequency of infinite at-

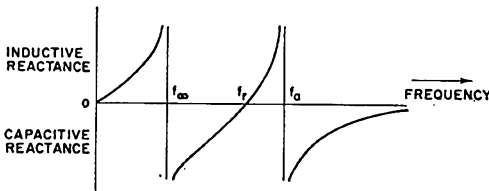


Fig. 6 — Reactance vs. frequency characteristics of a crystal and inductance, L_o , in parallel. f_r , the resonant frequency of C and L , the motional capacitance and inductance of the crystal, is the same as in Fig. 2. f_a , however, is higher than the antiresonant frequency of the crystal alone, since L_o decreases the effective inductance across shunt capacitance C_c at frequencies above f_r . L_o is also antiresonant with the total effective capacitance of the crystal at some lower frequency, f_∞ .

tenuation is too close to the center frequency of the filter, the pass-band characteristics may be distorted.

Measurements made on an FT-243 crystal resonant at 5502.195 kc. showed a motional capacitance, C , of 0.0038 $\mu\mu\text{f}$. and a shunt capacitance, C_o , of 14.7 $\mu\mu\text{f}$. The spacing between the resonant and antiresonant frequencies is

therefore $\frac{5502195}{2} \left(\frac{0.0038}{14.7} \right)$ or 711 c.p.s. To provide a desired spacing of, say, 1422 c.p.s., the effective shunt capacitance must be reduced to one half the value of C_o . This would require the addition of a *negative* capacitance of $14.7/2 = 7.35 \mu\mu\text{f}$. If an inductance, L_o , in parallel with capacitance, C_o , is considered, the susceptance of the parallel combination is given by

$$B = 2\pi f \left(C_o - \frac{1}{4\pi^2 f^2 L_o} \right) \\ = 2\pi f C_o \left(1 - \frac{f_\infty^2}{f^2} \right)$$

where f_∞ is the antiresonant frequency of L_o and C_o . (The capacitive contribution of the motional capacitance and inductance below their resonant frequency is small enough to be neglected.) For the case above, it is desired to reduce the susceptance of C_o alone, $2\pi f C_o$, by a factor of one half. This means that $1 - \frac{f_\infty^2}{f^2}$ must equal $1/2$, so L_o and C_o must be antiresonant at 0.707 times the filter frequency, or about 3889 kc. for the 5500-kc. filter. Higher values of f_∞ will also work as long as they are not too close to the center frequency.

For convenience, the filter was built with input and output coils which resonate with 56 $\mu\mu\text{f}$. plus about 10 $\mu\mu\text{f}$. tube and circuit capacitance. This is equivalent to about 33 $\mu\mu\text{f}$. across each crystal, or a total effective C_o of 47.7 $\mu\mu\text{f}$.. Since the effective C_o desired is only 7.35 $\mu\mu\text{f}$., $1 - \frac{f_\infty^2}{f^2} = 7.35/47.7 = 0.154$, and f_∞ is 0.92

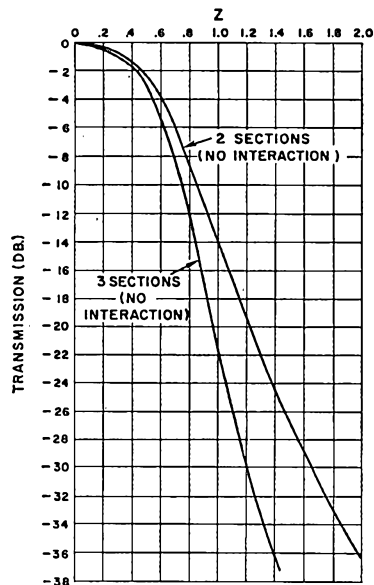


Fig. 7 — Theoretical selectivity characteristics of two and three cascaded identical filter sections when interaction due to mismatch between the sections is ignored. Z is the normalized frequency variable defined in the text. It is proportional to the frequency difference from the center of the pass band.

times the filter frequency, or 5060 kc. This new frequency of infinite attenuation, due to resonance between the coil paralleling the crystal and the total capacitance, is sufficiently removed from the center frequency so that it has negligible effect on the pass-band shape. Design equations for narrow-band capacitor-only filter circuits should therefore be sufficiently accurate for a filter built around FT-243 crystals at 5500 kc.

For narrow-band filters of this type it is convenient to describe the selectivity characteristic in terms of a normalized frequency variable, Z

$$\text{Let } f = f_0 + Z \left(\frac{f_2 - f_1}{2} \right)$$

where f_1 is the resonant frequency of the lower-frequency crystal, f_2 is the antiresonant frequency of the higher-frequency crystal as modified by the circuit, and $f_0 = \frac{1}{2}(f_1 + f_2)$, the center frequency of the filter.

Fig. 7 shows the selectivity characteristics of two- and three-section filters (each section being two crystals in a half lattice) when the effects of mismatch between sections⁸ are neglected. Note that these are normalized curves, plotted in terms of the variable Z . The equations from which these and the other response curves were obtained are given in the Appendix.

If we consider only two sections and a 6-db. bandwidth of 2400 c.p.s., the upper curve of Fig. 7 tells us that $Z = 0.7$ corresponds to 1200 c.p.s. In these plots, Z is proportional to the separation from the center of the pass band. If we assume a low audio cutoff of 300 c.p.s., the carrier must be $1200 + 300 = 1500$ c.p.s. from the center frequency. Therefore, the carrier must lie at

$$Z = \frac{1500}{1200} \cdot 0.7 = 0.875.$$

At this frequency the carrier attenuation would only be about 10.5 db. The undesired sideband

would extend from $Z = 0.7 \frac{1800}{1200} = 1.05$ to

$Z = \frac{4200}{1200} \cdot 0.7 = 2.45$. The corresponding sideband suppression would vary between 15.4 and 43.2 db.

⁸ The classical method of filter design uses the notion of a characteristic impedance for a filter section. When several filter sections having the same characteristic impedance are cascaded, the over-all selectivity characteristic should be the product of the characteristics of the individual sections (or the sum of their responses in decibels). The difficulty is that the image impedance required to terminate the filter in its characteristic impedance is not realizable with ordinary resistive terminations. As a result, there is reflection at the termination which is a function of frequency, and the filter section does not provide the correct image impedance for an identical section which may precede it. In practical filters a match is obtained only on the average over the frequency range of interest. The input impedance, therefore, varies from the image impedance value, and it is this variation which causes a practical multisection filter to have a response which is different from that which would be expected from the characteristics of the individual sections.

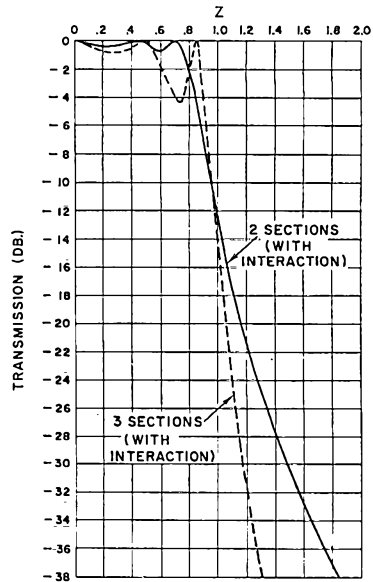


Fig. 8 — Theoretical selectivity characteristics of two and three cascaded identical filter sections when interaction is taken into account. These curves are steeper than those of Fig. 7, but there is considerable ripple in the pass band.

This is not adequate for our purpose, so three sections must be considered. Here, the 6-db. down frequencies correspond to $Z = 0.617$. Carrier rejection would be 11.6 db. and sideband suppression varies between 17.9 and 58.4 db. This still does not meet our requirement, which is 30- to 40-db. suppression of the undesired sideband with a low audio cutoff of 300 c.p.s., and about 20-db. carrier rejection due to filter selectivity.

Fortunately, the interaction which occurs due to mismatch between cascaded identical filter sections will help us achieve this goal. Fig. 8 shows the selectivity characteristics of two- and three-section filters when effects of mismatch are taken into account. As can be seen, these curves are much steeper than those of Fig. 7.

Consider as before a 6-db. bandwidth of 2400 c.p.s. For three sections, 1200 c.p.s. corresponds to $Z = 0.91$, and at the carrier frequency $Z = 0.91 \times \frac{1500}{1200} = 1.138$. At this value of Z , the rejection is 26.5 db. At the low audio end of the undesired sideband, $Z = 0.91 \times \frac{1800}{1200} = 1.36$ and the attenuation is 40.5 db. Thus the three identical crystal filter sections satisfy our requirements.

If we build three sections and reduce the interaction of one section, the attenuation characteristic becomes that shown in Fig. 9. The large pass-band ripple of Fig. 8 is reduced, and by allowing some interaction but not the full

interaction of one section, the pass band can be made nearly flat. In Fig. 9, $Z = 0.8$ when the response is 6 db. down. If we again consider a 2400-c.p.s. bandwidth and 300-c.p.s. audio cut-off, $Z = 0.8 \times 1500/1200 = 1.0$ at the carrier frequency; the corresponding attenuation from Fig. 9 is 19 db. The undesired sideband extends from $Z = 1.2$ to $Z = 2.8$, so sideband attenuation will range from 30.3 to greater than 60 db. Such a filter will meet the requirements as well as provide a flat pass band. The shape factor for 30 db./6 db. is 1.49 and for 60 db./6 db., about 2.5.

Since $Z = 0.8$ 1200 c.p.s. from the center frequency, these values can be substituted into the equation which defined Z . Solving for $f_2 - f_1$ gives a value of $2 \times 1200/0.8$, or 3000 c.p.s. The resonant and effective antiresonant frequencies of each crystal should therefore be separated by half this amount or 1500 c.p.s. The resonant frequencies of the two sets of crystals should also differ by 1500 c.p.s. Table I lists the measured characteristics⁹ of the crystals actually used. Crystals 1-3 are resonant near 5502.2 kc.; crystals 4-6 are near 5503.9 kc., giving a separation of 1700 c.p.s.

The impedance of a filter such as this is given by the expression

$$R_o = \frac{1}{2\pi C_o'} \frac{f_1}{f_1 f_2 - f_2'}$$

C_o' is the shunt capacitance of the crystal plus the reflected circuit and tuning capacitance or about 47.7 $\mu\text{mf.}$ as shown earlier. f_1 is the resonant frequency of the lower-frequency crystals, 5502.2 kc. f_2 is the antiresonant frequency of the higher-frequency crystals, which is 5503.9 kc. plus about 1500 c.p.s. or 5505.4 kc. f_o is 5060 kc. as calculated above. Putting these values into the equation gives a value of 3920 ohms for R_o . In a half lattice the termination should be $R_o/2$ or 1960 ohms.

⁹ Shunt capacitance C_o can be found using a Q meter or other standard capacitance-measuring technique. The transmission method described by Vester in *QST* for January, 1959, can be used to get the resonant frequency f_r . It is very difficult to get an accurate measure of f_a with this method because the null tends to be lost in the noise level of the equipment. To get around this, additional capacitance can be added across the crystal, moving the null in toward f_r where there will be more transmission on the high-frequency side. Motional capacitance C can then be calculated from the formula

$$f_a' - f_r = \frac{f_r}{2} \frac{C}{C_o + C'}$$

where f_a' is the new antiresonant frequency with capacitance C' in parallel with the crystal, f_r is the resonant frequency, and C_o is the shunt capacitance of the crystal. The C_o/C ratio is then calculated and substituted into the formula of Fig. 1 to find the $f_a - f_r$ spacing. Actually, in designing filters similar to the ones to be described, it is only necessary to make the relatively simple measurements of f_r and C_o . The C_o/C ratio can be taken as 4000 for FT-243 crystals in the 5500-kc. region.

¹⁰ A simpler expression can actually be used for the filter under consideration. $R_o = \frac{1}{2\pi f_o C_o''}$ where f_o is the center frequency of the filter, and C_o'' is the effective capacitance required (7.35 $\mu\text{mf.}$ in this case) so that the correct $f_a - f_r$ is exhibited by the crystal.

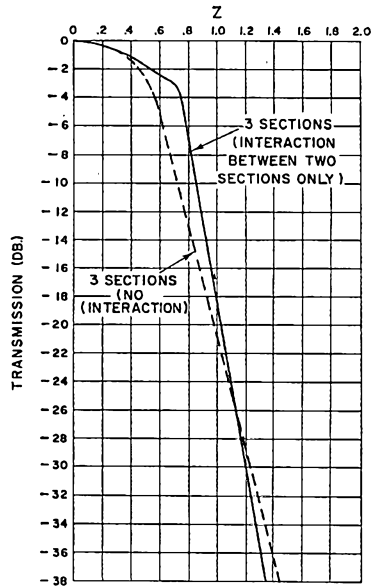


Fig. 9 — The solid curve shows the selectivity of a three-section filter with interaction between two sections only. This design is an excellent compromise between those of Figs. 7 and 8. The dashed curve drawn for comparison is for a three-section filter without interaction.

2000-ohm terminations are used with the filter that was built. Slight variations in the terminations from these values will affect the selectivity only a small amount and can be used to get almost flat pass-band response.

The effective parallel resistance of the coils is about ten times the filter impedance and has negligible effect on the filter characteristics.¹¹

Fig. 10 is a diagram of the complete filter. The first two sections are connected "back to back," and full interaction takes place. The 300-ohm resistor between sections two and three reduces interaction and smooths the pass-band response as shown above. The leakage reactance between the two halves of L_2 and L_3 is tuned out by the capacitors connected in series with the center taps of these coils. L_1 and L_4 , the input and output coils, resonate with the calculated value of terminating capacitance at 5060 kc. and effectively reflect the needed inductance across the crystals. The 2000-ohm resistors complete the termination called for by the design equations.

All the crystals were purchased as 5500-kc. FT-243s and etched to the desired frequencies

¹¹ The input and output coils will have little effect on the impedance of the filter if $2\pi Q f_o L$ (or $Q/2 f_o C$) is large compared to $R_o/2$. Q and L are the Q and inductance of the coil, C is the capacitance across the coil, f_o is the center frequency and $R_o/2$ is the terminating resistance. This requirement is usually met in h.f. filters such as the one described. At lower frequencies such as 450 kc., the required $R_o/2$ is higher. Then the terminating resistor must be chosen so that it and the effective resistance of the coil in parallel will give the desired termination.

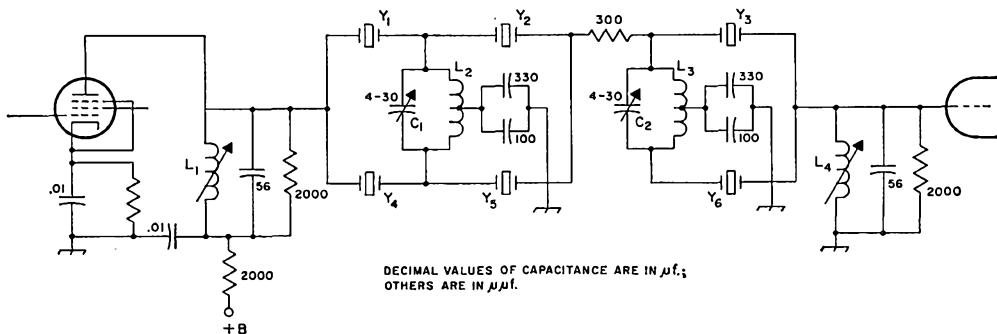


Fig. 10—Circuit diagram of a filter designed according to the methods of this article. Resistances are in ohms, and resistors are 1/2-watt composition; capacitors are disk ceramic except as noted.

C₁, C₂ — 4-30- μ f. mica trimmer.

L₁, L₄ — 50 turns No. 38 enamel, close-wound on 17/64-inch diam. ceramic slug-tuned form (CTC LS-6, National XR-81 or similar).

L₂, L₃ — 60 turns No. 38 enamel, close-wound on 17/64-inch with hydrofluoric acid. It is best to wash each crystal with soap and water and measure its frequency before etching. The crystals in each set of three should be as close to each other in frequency as possible, and the separation between the two groups should be about 1500 c.p.s. A simple comparator circuit¹² will allow two crystals to be checked simultaneously and compared, using an oscilloscope and audio oscillator to measure the frequency separation.

Tuning the filter is quite simple since all four adjustments can be peaked for maximum output at a fixed alignment frequency. This frequency should be on the high side of the pass band and can be the carrier frequency used for lower sideband transmission (5505.5 kc. in the case of the filter described). Using the carrier frequency it is only necessary to unbalance the balanced modulator to obtain a c.w. alignment signal. Of course, a signal generator and r.f. probe-equipped v.t.v.m. can also be used. C₁, C₂, L₁ and L₄ are simply adjusted for maximum output.

A slightly better shape factor can be had by detuning the carrier oscillator to a lower alignment frequency corresponding to about the 4-db.-down point on the high-frequency side of the pass band. Fig. 11 shows the measured per-

¹² Clark, "Hints & Kinks," *QST*, December, 1959.

inch ceramic form (CTC LS-6, National XR-81 or similar with powdered-iron core removed), center tapped.

Y₁, Y₂, Y₃ — All same frequency (near 5500 kc.).

Y₄, Y₅, Y₆ — All same frequency and 1500 to 1700 c.p.s. different from Y₁, Y₂ and Y₃.

formance of the filter when aligned at 5505.2 kc. The 6-db. bandwidth is 2750 c.p.s., somewhat greater than the 2400-c.p.s. design figure because the average spacing of the crystal pairs used was 1700 c.p.s. instead of 1500 c.p.s. At 30-db. down, the bandwidth is 3950 kc., so the 30 db./6 db.-shape factor is 1.44. This agrees well with the theoretical value of 1.49 from Fig. 9.

The spurious crystal responses occur as indicated in Table I, but the over-all filter exhibited more than 52-db. attenuation at the nearest spurious frequency (5516.800 kc.). The others could not be measured since they were attenuated more than 60 db., which attenuation level was beyond the capability of the measuring setup used.

It should be noted that this filter is better used to pass the lower sideband than the upper one. When aligned at the 5505.5-kc. carrier frequency, the filter provides 20 db. of carrier attenuation with a 6-db. down audio pass band which extends from 300 to 2800 c.p.s. The undesired upper sideband is attenuated more than 40 db. for all audio frequencies above 350 c.p.s.

If the filter is aligned at 5505.2 kc. and the carrier set at 5505.6 kc., carrier suppression is 19 db. for a 6-db. audio pass band of 300-3050 c.p.s. Upper sideband suppression is better than 40 db. for audio above 300 c.p.s.

The cutoff on the low-frequency side of the band is somewhat less steep than on the high side. This is believed to be due to the use of less than ideal coupling coils between the filter sections. Using an alignment frequency of 5505.5 kc. and a carrier frequency of 5502.2 kc., the upper sideband audio

TABLE I

Measured characteristics of the crystals used for the filter described in this article. f_{r1} and f_{r2} are spurious frequencies.

No.	f_r (cps)	C (μ f.)	C ₀ (μ f.)	atten.		f_{r2} (cps)	f_{r2} (db.)
				f_{r1} (cps)	f_{r1} (db.)		
1	5502195	0.00330	14.7	5516800	9	5559800	12
2	5502227	0.00356	12.3	5519900	13.5	5552000	15.5
3	5502212	0.00290	12.7	1	> 15 ²	1	> 15 ²
4	5503960	0.00334	12.3	5523000	9	5547200	9
5	5503927	0.00348	14.0	5536200	7	5570200	7.5
6	5503860	0.00311	13.8	1	> 20 ²	1	> 20 ²

¹ These frequencies were not recorded.

² Attenuation greater than figures shown.

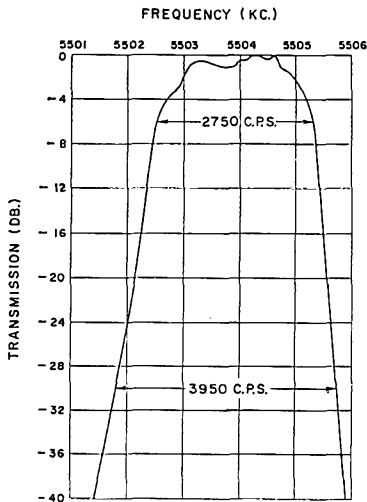


Fig. 11 — Measured selectivity characteristic of the filter described in this article when aligned at 5505.2 kc. The 6-db. bandwidth is 2750 c.p.s., and the 30 db./6 db. shape factor is 1.44.

pass band is 450-2950 c.p.s. for 20-db. carrier suppression. Undesired sideband attenuation is greater than 30 db. for audio above 350 c.p.s. and greater than 40 db. for audio above 750 c.p.s.

When the filter is aligned at 5505.2 kc. and the carrier is placed at 5502.1 kc., the audio pass band is 400-3200 c.p.s. for 20-db. carrier attenuation. Lower sideband suppression will be more than 30 and 40 db. for audio frequencies above 300 and 700 c.p.s., respectively.

Appendix

The selectivity curves presented in this article were plotted from the equations below. All are in terms of the normalized frequency variable Z defined in the text.

The selectivity characteristic of the simple one-section (two crystals in a half lattice) filter is given on page 194 of Herzog.¹³ In decibels this can be written.

$$\text{attenuation (db.)} =$$

$$10 \log_{10} \left[1 + \left\{ \frac{[q_3 \sqrt{q_2^2 - 1} + q_2^2 \sqrt{q_3^2 - 1}] (S_3 - Z) [Z^2 + (2q_{1u} - 1) Z + 2q_{1u} (q_{1u} - 1)]}{2q_{1u} (Z + q_{1u}) (Z - q_2) (Z - \alpha)} \right\}^2 \right]$$

¹³ Herzog, *Siebschaltungen mit Schwingkristallen*, Dietrich Press, 1949.

In this equation the q parameters correspond to the normalized frequencies at which infinite attenuation occurs. q_{1u} is a normalized frequency below the pass band, while q_2 and q_3 correspond to frequencies which may be either below or above. S_3 is a parameter which depends on q_{1u} , q_2 and q_3 . To obtain good rejection away from the pass band, the q_s should be large. In particular, if $q_2 = \infty$, and $q_3 = \infty$, then $S_3 = 0$. For the filter under consideration, q_{1u} is the normalized frequency where infinite attenuation occurs due to the inductance used across the crystals. If q_{1u} is also taken as infinite, the equation simplifies to

$$\text{attenuation (db.)} = 10 \log_{10} (1 + 4Z^4).$$

The attenuation at $Z = -2$ given by this equation is 18.1 db. The attenuation computed from the more complicated expression for the same Z with $q_2 = q_3 = \infty$ and $q_{1u} = 294$ (which corresponds to f_∞ for the filter described in this article) is also 18.1 db. Thus the effect of the added coils is trivial near the pass-band region.

If we assume that identical filter sections can be cascaded without affecting their basic selectivity characteristics: e.g., sections isolated with vacuum tubes to eliminate interaction due to mismatch, then two sections should produce the following response

$$\text{attenuation (db.)} = 10 \log_{10} (1 + 4Z^4)^2$$

and three sections should have the characteristic

$$\text{attenuation (db.)} = 10 \log_{10} (1 + 4Z^4)^3.$$

These are the equations which are plotted in Fig. 7.

If an actual circuit employing cascaded identical filter sections is analyzed it is found that the expression for two sections is

$$\text{attenuation (db.)} = 10 \log_{10} [1 + 16Z^4 (2Z^2 - 1)^2]$$

and for three sections

$$\text{attenuation (db.)} = 10 \log_{10} [1 + 4Z^4 (4Z - 1) (4Z^2 - 3)^2]$$

These selectivity characteristics are plotted in Fig. 8.

Three sections with the interaction of one section reduced yield the following characteristic

$$\text{attenuation (db.)} \cong 10 \log_{10} [1 + 16Z^4 (2Z^2 - 1)^2] + 10 \log_{10} [1 + 4Z^4]$$

This is plotted as Fig. 9.

QST

Strays

Members of the Grace Methodist Church in El Paso, Texas think theirs may be the only church-owned amateur radio station — W5AYV. First graduate of the church radio class was KN5CIH. More youngsters are training. W5AYV is now on Novice bands only and will schedule on any band between 2 and 4 P.M. MST Sundays.

Switchcraft, Inc., noting the suggestion in May QST (page 83) that colored adhesive bandages can be used for identifying various cables and outlets, points out that they have been merchandising for two years a product called 'Colored Tape.' The tape is specifically designed for identifying different connectors.

● Technical Correspondence

S.S.B. TRANSCEIVER MODIFICATIONS

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Technical Editor, *QST*:

There are a few changes and additions which have been made to the Mobile S.S.B. Transceiver (June, 1959 *QST*) over the past year which some of the fellows may be interested in.

Referring to Fig. 2 of the article, the value of the 8- μ f. capacitor connected from the plate (Pin 1) of V_{4A} to ground should be changed to 0.1 μ f. This eliminates a transient noise from the speaker when going from receive to transmit.

Better carrier suppression can be realized by rearranging the wiring of relay K_1 to ground the grid of V_{4A} when in the transmit mode. That is, the one extra contact on K_1 which is not shown connected to anything should be connected to Pin 2 of V_{4A} . There is enough carrier leakage from the V_{4B} side of the tube to make this worthwhile. In my case, the relay armature was connected to ground through the shield on the V_{4A} grid lead. You can optimize this ground connection for your particular layout by pulling the two i.f. tubes, V_2 and V_3 , and empirically determining the connection for minimum stray carrier leak-through.

It wasn't realized at first, but the peak reading a.g.c. circuit for the receiver function also will serve to give a.g.c. action for the transmit mode (this has been dubbed a.l.c. by some of the equipment manufacturers). This was accomplished without adding any more relay contacts. First, the two i.f. tubes were replaced with 6BA6s and a.g.c. was applied to both of these tubes. With this change you get slightly better a.g.c. action on the receiver and set the scene for adding the transmitting a.g.c. You will note that the a.g.c. circuit responds to the peak value of the audio signal applied to it. If we examine the signal appearing at the grid of the Class AB₁ final amplifier we will find an audio signal appears when the input voltage reaches the point which will cause grid current to flow. At this level the grid acts as an envelope detector of the drive signal. This audio signal can be rectified by the a.g.c. circuit in much the same way as the receiver audio, and the resulting d.c. applied to control the gain of V_2 and V_3 . This lowers the transmitting drive to the point where the final is just reaching the grid-current region on voice peaks, allowing you to operate the final at peak efficiency at all times without overdriving it. Circuitwise, all that is required is to

add a 0.1- μ f. capacitor from the "r.f. ground" side of the final tank coil to the input of the a.g.c. circuit, along with a resistor in series with the bias supply. Also, R_4 is now connected to the "REC +300-volt" connection, rather than to the "full time" +300 volts. This removes the a.g.c. delay when in the transmit mode.

The circuit changes are shown in the accompanying figure (Fig. 1). The parts added to the original circuit are all marked with asterisks. The screen resistor for V_3 (R_1 in Fig. 2, June 1959 *QST*) should now be adjusted to give some a.g.c. action on transmit voice peaks.

You might have some questions as to the adequacy of this a.g.c. since some small grid current must flow in the final to make the circuit operate. I made some measurements using a random-noise generator to simulate the voice, in order to see how much "other sideband" it cost me to operate the final at full efficiency. The rig gave 40-db. suppression with an audio input which drove the final to about 20 db. less than maximum output. It had 37-db. suppression for audio inputs which were 20 db. above that required for maximum power output. In other words, the loss of suppression due to the a.g.c. was so small as to be barely measurable on the S meter of my 75A3.

A number of inquiries have been received on the VXO crystal. I loaned the original 30-Mc. crystal to W3BWK to make copies of. These are available now from the Piezo Crystal Company in Carlisle, Pa. Incidentally, I have built an all-band version of the transceiver for use in the home shack and in this rig a different VXO crystal is used on each band. The coverage on all bands is quite satisfactory except for 75 meters, where the total range per crystal is only about 15 to 20 kc. In each case, the VXO crystal was chosen to be 8550 kc. above the band to be covered. These crystals were also obtained from W3BWK — he knows the processing tricks for making a good VXO crystal.

On the FT-243 crystal filter, after making a number of them I have decided that a more reasonable bandwidth to strive for with the cheaper crystals is about 2.1 kc. For this, the spacing between the crystal-pair frequencies should be approximately 1.2 kc. This bandwidth gives better receiver selectivity anyway and the transmitter fidelity is still good. Several fellows have had trouble eliminating the off-frequency (15 kc. to 25 kc.) filter spurious responses with the selection of crystals available to them. One VK has reported that he eliminated these spurious responses in the filter by cascading three half-lattice sections, this giving much lower probability of the spurious responses in one section coinciding with a spurious in both other sections. A W2 reported that fine polishing of the crystals with an optical grinding compound reduced the extraneous crystal responses considerably. Other variations on the filter have appeared in recent issues of *QST*.

The original mobile rig has been operating in the car for almost three years now with no maintenance or tube replacements, so apparently the design is fairly reliable.

— Ben Vester, W3TLN

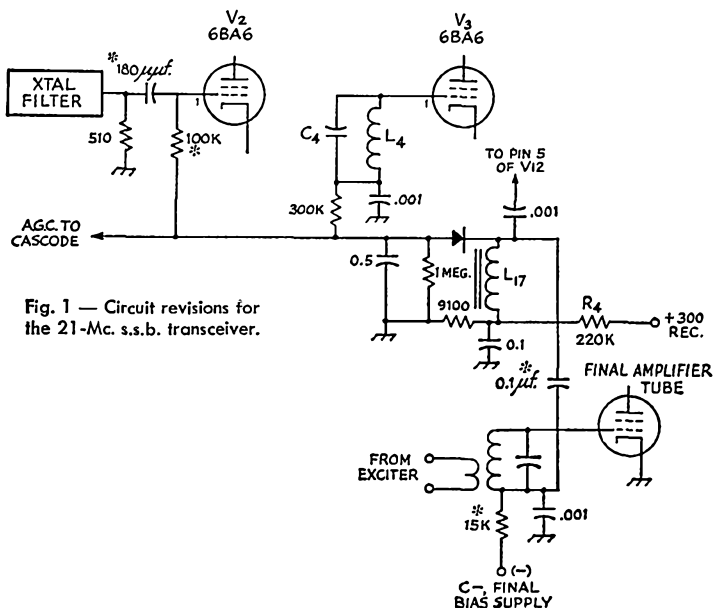


Fig. 1 — Circuit revisions for the 21-Mc. s.s.b. transceiver.

LOW-PASS FILTERS AND SPURIOUS RADIATIONS

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Technical Editor, *QST*:

Use of a low-pass filter is generally considered good practice even with a transmitter designed to minimize TVI, and if a multiband antenna is used, some form of antenna coupler is usually advisable to keep the s.w.r. in the coax line low for the sake of the filter capacitors. It is fairly generally recognized that the length of coax between the transmitter and the antenna coupler may in some cases play a critical role in the spurious-radiation problem, but the *Handbook* and Grammer's excellent article in February, 1950 *QST* fail to mention that the low-pass filter itself behaves like a considerable length of line in its pass band. It is enough, in fact, to make a joke of the manufacturer's recommendation that the line be kept short with respect to a quarter wave.

At the operating frequency a properly-adjusted antenna coupler will, of course, terminate the coax so the length is immaterial. The usual series-tuned primary in the coupler will present a large inductive reactance to all harmonics (at least up to the self-resonant frequency of the primary coil), and at subharmonic frequencies the coupler will have a large capacitive reactance. If the transmitter has the usual π -network output, these large reactances will cause no trouble (with a short coax link) since the spurious currents will prefer to flow harmlessly to ground through the low reactance of the output capacitor. But if the coax link is nearly an odd number of quarter waves long, the high reactances presented by the coupler will be transformed into low reactances of the opposite sign at the transmitter output.

Thus harmonic currents may find a lower impedance to ground through the coax link and antenna system than via the π -net output capacitor, and so be "sucked out" to be radiated. And in the case of "subharmonics"¹ a small inductive reactance reflected to the transmitter may just happen to resonate with the π -net output capacitor. The resulting tank circuit can easily have a high enough Q to make the drop in the π -network coil negligible, so substantially the full subharmonic voltage present at the final plate will appear in the antenna coupler. The subharmonic problem is likely to be particularly troublesome with a transmitter like my Apache with π -network interstage coupling, since the π net is just a low-pass filter.

This problem was brought forcibly to my attention when W2BHD (about 10 miles away in Northport) broke in on a 14-Mc. phone QSO with W4BHG to tell me he had heard me calling "CQ 20" on 7120 kc. It soon developed that the spurious signal was cut way down (by over 20 db.) if I either returned the antenna coupler to work on the other side of resonance or if I removed the low-pass TVI filter. The antenna was a 40-meter dipole center-fed with 600-ohm line. An apparently permanent cure was to put in additional coax between the filter and coupler to make the effective length, including the filter, a half wave at 7 Mc. and hence an even number of quarter waves on 14, 21 and 28. I did not feel it necessary to go to a half wave on 3.5 Mc. since only the v.f.o. operates on 1.75 Mc. in the Apache, and the antenna would be very ineffective, anyway. Harmonics, if present, would show up as reflected power on the s.w.r. indicator.

In order to use this scheme it is, of course, necessary to know the effective length of the filter. Mine is a Johnson 250-20, which I measured to be 0.168 λ at 7.0 Mc., or the equivalent of 15.5 feet of coax (23.6 feet of open line). I found that the various bits of connecting coax I had used between the π net and the coupler (not forgetting the coax inside the transmitter cabinet to the output capacitor, and that inside the "Monimatch") added up to 13.8 feet. By adding 16.1 feet to the length of lead between the filter and Monimatch I brought the total to a half wave at 7.15 Mc. The extra cable is coiled neatly on the underside of the operating desk top.

Users of other models of filter may be able to obtain data on the electrical length in the pass band from the manufacturer. Otherwise an estimate of the length may be

¹ I.e., energy at a submultiple of the output frequency fed through the final stage from the oscillator or a frequency multiplier.

made. In the case of a filter with n identical sections, with cut-off frequency f_c megacycles, the effective length would be $206 \frac{n}{f_c}$ feet of coax. Actual filters have m -derived half sections at the ends which introduce an error in this simple formula which may be 15 or 20 per cent high.

I wish to express my appreciation to W2BHD for getting me started on this.

— H. Kuper, K2CU

IS THERE A UNIQUE DESIGN FOR A MAXIMUM-GAIN YAGI?

626 East Main St.
Moorestown, New Jersey

Technical Editor, *QST*:

A question often asked in antenna work today is, "What is the best design for a Yagi antenna?" Various designs for "maximum-gain" Yagi antennas, most of which seem to work about as well as any other maximum-gain Yagi design, have been offered. This makes one wonder if there is one "best" design.

There has just come to our attention a report of work done at a government laboratory which answers this and a number of other interesting questions.¹ This report, which is devoid of mathematics and is very easy and interesting to read, shows why two or more experimenters can derive different antenna designs and yet obtain something reasonably close to the same gain — in other words, why there is no unique design for a "maximum-gain" Yagi antenna.

A second item of interest in the report was the authors' description of a method of increasing the spacing beyond the usually accepted maximum of 0.25 while still maintaining the maximum possible gain. Third, the report gave information which will simplify the adjustment of multi-element Yagi antennas.

According to the report, there is no unique design which will yield the maximum gain. The gain of a Yagi antenna is a function of the ratio of the phase velocity, v , of the wave along the antenna to the velocity of light, c . The phase velocity in turn is a function of the element length, diameter, and spacing. For any given antenna length, there is a value of the ratio v/c for which the gain will be maximum. *It does not matter what combination of element parameters is used to obtain this ratio.* It is thus possible for two or more workers to derive different designs with different element parameters, with each design having the v/c required to give maximum gain. This also implies that if one of the element parameters, such as diameter, is changed in a maximum-gain design, then one or more of the remaining parameters, element spacing or length, will also have to be changed to readjust the v/c ratio to its optimum value. Ehrenspeck and Poehler state without presenting experimental evidence that within limits (which are not stated) it is possible to obtain an optimum design with ratios of element diameter to wavelength as high as 0.048, or almost 5 per cent.

We do not wish to imply that it is necessary to measure phase velocity in order to adjust an array, as this is not practical in the field. The phase velocity information is useful in explaining antenna performance and in determining what adjustments should be made to an array.

Wide-Spaced Arrays

As is well known, the antenna gain is a function of its length. It is therefore desirable to make the antenna as long as possible. However, to minimize structural problems it is desirable to use as few elements as possible; this indicates that the spacing between elements should be as wide as possible. As the spacing between the driven element and directors is increased beyond about 0.25 λ the gain of the antenna begins to fall. This is because the coupling between the driven element and the directors decreases, thus reducing the effectiveness of the directors. However, by inserting an additional element approximately 0.1 λ in front of the driven element the authors were able to use spacings up

¹ Ehrenspeck and Poehler, "A New Method for Obtaining Maximum Gain from Yagi Antennas," ASTIA Document No. AD160761, available from the Office of Technical Services, Washington 25, D. C. This paper also was published in the October 1959 issue of the *IRE Transactions on Antennas and Propagation*.

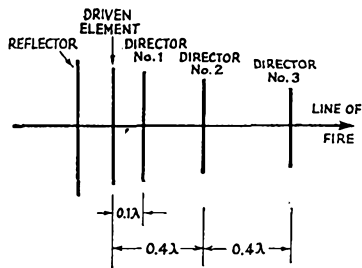


Fig. 2

to 0.4λ and retain high gain. This is shown in the drawing (Fig. 2).

Simplified Adjustment Procedure

Because of the large number of elements, and hence variables, in a high-gain antenna design, the adjustment procedure may become quite involved. The report gives useful information which will simplify the adjusting procedure: Because of the method of operation of the Yagi antenna the directors have no effect on the reflector; thus in setting up an array one may start with just a driven element and reflector, and adjust this combination for maximum gain. Once this adjustment is found it will not be altered by the addition of directors or by their adjustment. This simplifies the adjustment of the antenna by reducing the number of possible combinations of the reflector and director spacing.

Ehrenspeck and Poehler conclude their paper by describing a method for designing a Yagi. We will not present it here since it involves a large number of graphs.

— John J. Nagle, K2PDR

REFLECTION FROM SATELLITES?

354 W. Birch St.
Oxnard, California

Technical Editor, *QST*:

I have just read the article by Raphael Soifer, K2QBW, in the July, 1960, issue, titled "High Frequency Satellite Scatter." I first became aware of this phenomenon (or a possibly related one — *Ed.*) while listening to DX in the f.m. broadcast band. Most of my observations were made during the past nine months from a location near the Cal Poly Campus in San Luis Obispo, Calif. Using a good f.m. receiver and a 5/5 antenna with rotator I was able to receive signals from Sacramento (about 200 miles north) to San Diego (about 250 miles south).

When listening to a station just barely discernible in the noise it would suddenly take on a rapid fade (like airplane or mobile v.h.f. flutter) and the signal strength would rise greatly until the signal was extremely strong. After one or two minutes the effect was reversed and the signal faded back to its original level in the noise. The "opening" was several times traced with the beam from Fresno to San Diego and was found to make the trip in about five minutes. I haven't figured it closely but it seems to be too fast to be any plane. I arrived at the conclusion that it must be satellites and more or less forgot about it. More recently I have received short bursts here in Oxnard from KEAR in San Francisco (300 miles airline northwest).

The phenomenon cannot be confused with meteor bursts though it has some resemblance to them. The longest meteor burst I have ever heard on f.m. lasted about two or three seconds but, as Mr. Soifer noted, the satellites give bursts of one or two minutes' duration.

— James R. Kaness, K6HEC

THE CASE FOR NARROW A2

33 Fifth Ave.
New York 3, N. Y.

Technical Editor, *QST*:

I think 2-meter men are overlooking a very good bet for extending their coverage: the DX potential of A2 emission. Let us analyze what such a signal consists of. Assuming 100

per cent modulation, an m.c.w. signal may be broken down into three separate components: a carrier of, say, 100 watts, transmitting no modulation or information, and two c.w. signals of 25 watts each. These are formed by the sidebands having degenerated, in the case of A2, into two side frequencies, one spot on either side of the carrier assuming a constant-frequency tone. As the tone is keyed, the side frequencies go on and off, using up spectrum space in proportion to the keying speed in bauds. In other words, they have properties identical to c.w. signals. Indeed, they are c.w. signals.

Since they are c.w. signals, the total bandwidth taken up by an m.c.w. signal is equal to $5b + 2f$, where 5 is the constant for signal fading, b the keying rate in bauds and f the frequency of the modulating tone. By comparison, an A1 signal takes up only 56 cycles of space. For 20 w.p.m., the c.w. signal takes up about 100 cycles of bandwidth. Wait just a minute! Most of the receivers on the market only go down to 500 cycles as a lower limit on pass band. This is true of the 75A-4, the Hallcrafters and National lines, and most of the Haunmarlund line. 500 cycles is the smallest bandwidth the receiver will chop down to. Therefore, and this is important, *the total amount of noise the receiver will admit is fixed by the 500-cycle pass band, and any further reduction in the bandwidth of the transmitted signal below 500 cycles can have no effect on the signal-to-noise ratio.* This is because the only determining factors on the S/N are the amount of signal present and transmitting information, and the amount of noise present in the pass band. If all the signal components which transmit information can be squeezed into 500 cycles of space, then the S/N will be the same as that produced by a c.w. signal of the same power.

Getting down to cases, 100 watts carrier power of m.c.w. contains 50 watts (the two sidebands) of information, 100 watts of c.w. contains 100 watts of information. A 100-watt rig on m.c.w. produces half as much communications power as a 100-watt rig on c.w. does. If the m.c.w. signal can be squeezed into the 50-cycle "sharp" pass band of the receiver, then it will be lower in S/N than the c.w. signal only by a factor of two, or 3 db. In other words, low-pitched m.c.w. is 3 db. down from c.w. in theoretical advantage. How low in pitch? Well, by applying that $5b + 2f$ formula, we find that, for 20 w.p.m., a tone of 200 cycles will be permissible. For 30 w.p.m., 180 cycles is the highest allowable tone, if we are to keep our pass band within 500 cycles.

Narrow m.c.w. (n.m.c.w.), then, is 3 db. worse than c.w., but let's compare it with a.m. phone. First off, we are keeping our modulation at 100 per cent at all times, instead of only on peaks. This results in 3-db. advantage in useful sideband power for n.m.c.w. (or any kind of m.c.w.). By reducing the bandwidth from 6 kc. to 500 cycles (assuming the receiver is now used in the "sharp" position), we cut down the noise by a factor of 11 db. Our useful signal is 3 db. stronger than a.m., our noise 11 db. less, giving n.m.c.w. a 14-db. advantage over a.m. This checks, for as we recall, A1 has 17 db. over A3, and we proved earlier that A1 has only 3 db. over n.m.c.w. 17 minus 3 is 14, so we're right!

For the use of n.m.c.w., instead of c.w., we are paying 3 db. in S/N ratio. What are we buying for the 3 db.? 0.5A2 has two main advantages over A1, to wit:

a) *Complete stability of copying note:* Transmitter drift, or h.f. oscillator or b.f.o. instability can not change the copying note. Stability is guaranteed.

b) *N.m.c.w. is completely compatible with receivers adjusted for both c.w. and phone reception.* No matter whether the receiver is on c.w. or phone, a call on n.m.c.w. is copiable either way. This can be very important when fishing for DX, as in a tropospheric opening. You can call CQ and be sure that you will be heard by either the station with his b.f.o. off or the station with his pass band too sharp to copy phone. If he's listening on your frequency, he'll hear you. If his b.f.o. is on, he'll copy you as a c.w. station; if he is set up for phone, he'll copy you as an m.c.w. station. This compatibility feature is very useful when you are fishing for DX rather than skedding a specific station. A sked can be synchronized to one mode of reception. Random work cannot, and *unless you are on n.m.c.w. you might risk losing the chance to contact those whose receivers aren't set up for your mode.* Note, too, that n.m.c.w. retains the binary (it's there or it isn't) feature that makes c.w. useful in aurora work. If you have a stability problem, n.m.c.w. may be your answer to successful aurora work.

(Continued on page 164)

• Recent Equipment —

Hammarlund HX-500 Transmitter

THE name Hammarlund is a familiar one when it comes to receivers and components, but most hams do not associate it with packaged transmitters. Thus the release of the new model HX-500 transmitter has a somewhat special interest for those who keep an eye on the equipment parade. The HX-500 has a number of novel features, and its operating capabilities should satisfy operators with widely-varied tastes — from the teletype enthusiast to the dyed-in-the-wool c.w. man, with most types of phone in between.

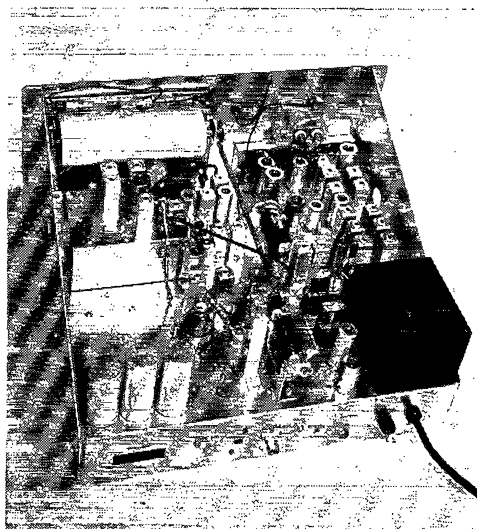
Hammarlund has included in the HX-500's two-tone gray cabinet a self-contained transmitter which will cover the five amateur bands from 80 through 10 meters and is capable of transmitting either upper or lower s.s.b., double sideband with carrier (a.m.), c.w., f.m. and f.s.k. Its power output on s.s.b., c.w., f.m. and f.s.k. ranges from 70 to 100 watts, and on a.m. the carrier output is 17 to 25 watts. VOX and antitrip circuits are included.

A large slide-rule dial, with eight calibrated scales on a rotating drum, indicates the frequency of operation in 10-kc. steps. Each range is 500 kc.: 3.5-4.0, 7.0-7.5, 14-14.5, 21-21.5, 28-28.5, 28.5-29, 29-29.5 and 29.5-30 Mc.

The assortment of types of emission in the HX-500 would seem to indicate the phasing method of s.s.b. generation, but the fact is that the filter method is used with an LC filter operating at 60 kc. How do you get f.m. or f.s.k. when using the filter method? Simple — Hammarlund generates f.m. signals by using a reactance tube to modulate the transmitter's basic frequency-determining oscillator at 60 kc. By generating true f.m. (not phase modulation, as in the case of phasing rigs) it is also easily possible to add the f.s.k. feature — something that is not inherently a feature of the p.m. output of a phasing exciter.

Beyond going into more details of the HX-500's circuit, a look at the block diagram in Fig. 1 will aid in visualizing the operation of the various stages.

The low basic frequency, 60 kc., insures extremely stable operation — stated to be better than 10 cycles after warm up. A reactance tube modulator, V_4 , is used for generating f.m. and f.s.k. emission and functions by being effectively tied across the tank circuit of the 60-kc. oscillator. When modulation is applied to the reactance modulator it produces a frequency shift in the oscillator at an audio rate. The circuit is designed to limit the maximum audio shift to about 3000 cycles. A variable cathode resistor provides the means for adjusting the frequency deviation and compensating for component aging and tolerances. This is a front-panel control labeled FSK — FM/ Δ f. The amount of frequency shift

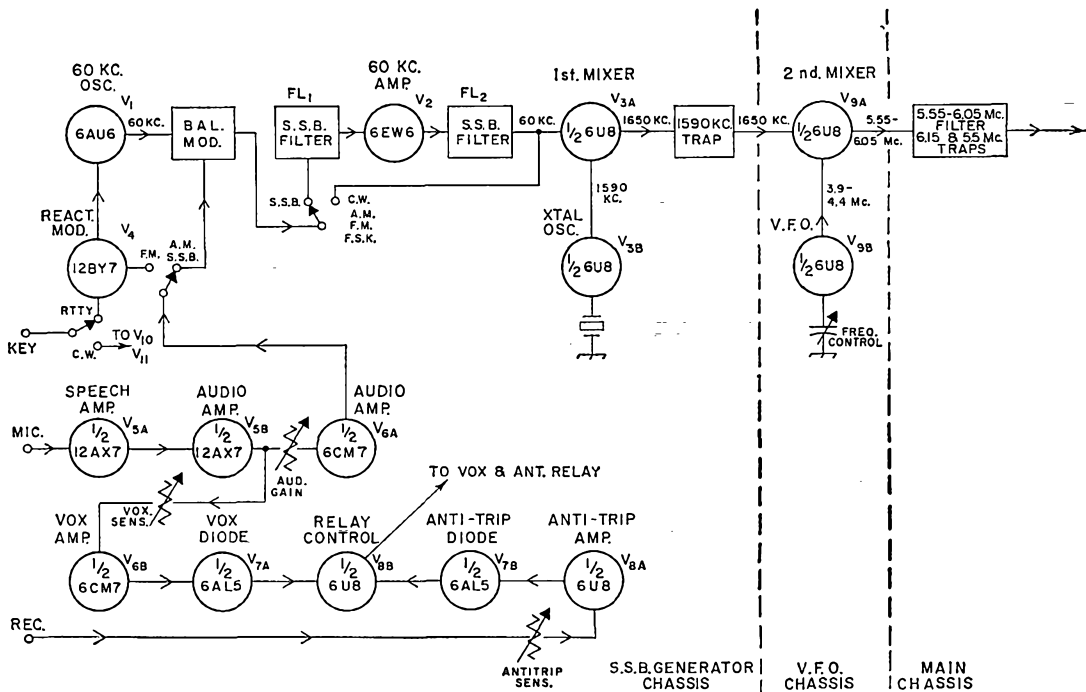


Components are grouped on two subchassis in the HX-500 transmitter, with the assemblies interconnected by removable coaxial cables. The s.s.b. generator chassis is at the upper right in this photograph and the v.f.o. chassis is just below and to the left of the drum dial. The main chassis supports the power supply and the remainder of the r.f. components. The variable capacitor is for final plate tuning; a perforated cover (not shown) fits over this capacitor and the final-amplifier tubes to the left.

can be set up to a maximum deviation of about 2000 cycles for f.s.k. In actual operation the f.s.k. system is keyed by the teletype machine through connection terminals provided at the transmitter's rear apron. If a key is inserted in the front-panel key jack and closed while the transmitter is in the f.s.k. function the carrier will be shifted about 40 cycles, thus providing a convenient way of sending (with the hand key) station identification as required in amateur rules and regulations. In all other emissions the reactance modulator is switched out of the oscillator circuit.

Following the fundamental 60-kc. oscillator, V_1 , is the balanced modulator, which makes use of two semiconductor diodes in its circuit. For a.m. and s.s.b. emission, audio from the speech section (V_{5A} , V_{5B} and V_{6A}) is also fed into the balanced-modulator circuit. The balanced-modulator output may then be switched either to the sideband filters for s.s.b. or directly to the first mixer, V_{3A} , for other types of emission. Carrier suppression is rated to be 50 db. or more.

When in the s.s.b. mode, the signals are passed through a filter, an amplifier and then another filter where the undesired sideband is removed. The first filter (PL_1 in Fig. 1) is actually composed of a series of three separate tuned circuits,



top coupled through small capacitances. The second filter, FL_2 , has five similarly-coupled tuned circuits, plus a special bifilar "T" rejection filter. The trap's notch is set for maximum rejection of the unwanted sideband at 250 cycles from the nominal carrier frequency. The 60-kc. amplifier, V_2 , is inserted between the filters to compensate for any losses and to isolate these two filter circuits for optimum performance and waveshape. The choice between lower and upper sidebands is provided for by changing the operating frequencies of the filters, by switching additional tuning capacitance in or out.

Depending upon the mode of emission, signals either from the sideband filter, FL_2 , or from the balanced modulator are fed into the pentode section, V_{3A} , of a 6U8 operating as the first mixer. Here, 1590-kc. energy from the crystal-controlled oscillator V_{3B} (the triode section of the 6U8) is mixed with the 60-kc. signal to produce the first i.f. of 1650 kc. A 1590-kc. trap in the plate circuit of V_{3A} rejects any oscillator signal that might feed through. Also located in the first-mixer plate circuit are additional tuned circuits for further shaping of the 1650-kc. pass band.

As the dotted lines in Fig. 1 indicate, the HX-500 is constructed on several subchassis. Signals from the first mixer leave the s.s.b. generator chassis by way of a detachable coaxial cable which plugs into the v.f.o. and second mixer chassis.

The v.f.o., the triode section of V_{9B} , has a 500-kc. frequency range, 3.9 to 4.4 Mc., which is combined with the 1650-kc. signal from the first

mixer to give a second i.f. of 5.55 to 6.05 Mc. Good v.f.o. frequency stability is insured by use of a ceramic coil form, temperature-compensated components, and a high- C oscillator circuit. Also, the mechanical isolation of the v.f.o. on a separate subchassis adds to its stability, which is rated at 100 cycles after warm up. Frequency control for the transmitter consists of a panel FREQUENCY control knob which is directly coupled by a gear arrangement to the v.f.o. tuning capacitor. The FREQUENCY knob is calibrated in kilocycles and can be read to 200 cycles. One revolution of the knob covers 20 kc. on all hands.

Output from the second mixer, V_{9A} , is fed via a detachable coaxial cable to a pair of broad-band amplifiers, V_{10} and V_{11} , located on the main chassis. However, before going into these amplifiers the signal passes through a series of filters and traps to do away with any spurious frequencies that might be present. The band-pass amplifiers also function as the keyed stage when in the c.w. mode, and are biased off during receive or standby. The panel R.F. LEVEL control varies the bias on the amplifiers and is adjusted to suit whatever drive is required for the following stages.

It will be noted in Fig. 1 that an automatic level control (a.l.c.) line runs from the final amplifiers, V_{15} and V_{16} , to an a.l.c. rectifier, V_{17B} , and then to the band-pass amplifiers. This represents the path of a control bias with an amplitude corresponding to the transmitter's output. A small amount of output from the final amplifier is sampled and rectified by the a.l.c. rectifier. This bias is then applied to the grids of the band-pass am-

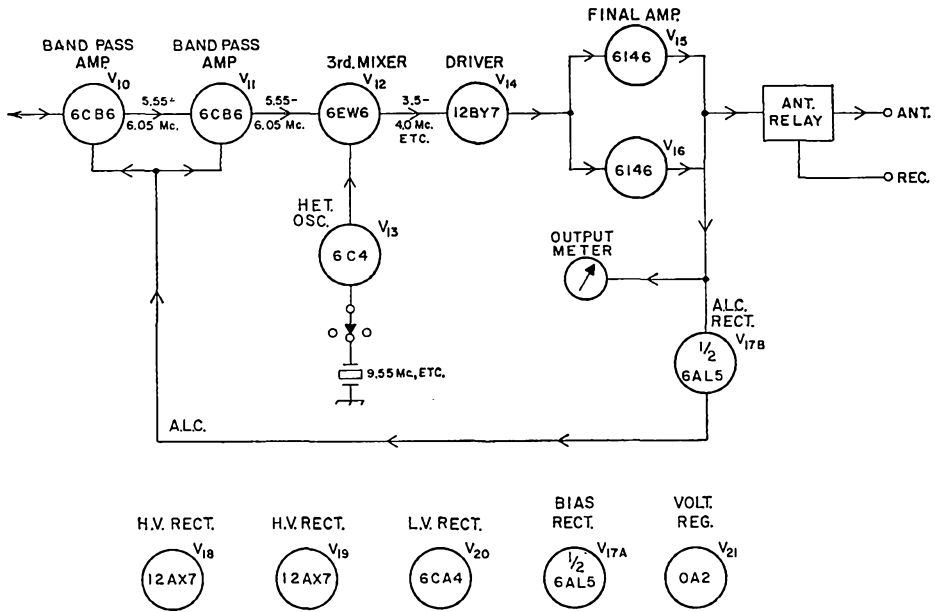


Fig. 1—Block diagram of the Hammarlund HX-500 transmitter.

plifiers giving a sort of a.g.c. action. When the transmitter output exceeds a predetermined value, a.l.c. control voltage is developed and limits the output of the band-pass amplifiers. This regulating action automatically prevents over-driving of the final amplifiers.

After leaving the broad-band amplifiers, V_{10} and V_{11} , the 5.5–6.05-Mc. signal is converted to the third i.f., which falls in the desired amateur band — between 3.5 and 30 Mc. The conversion is done in the third mixer, V_{12} , which receives the proper injection from the crystal-controlled heterodyning oscillator, V_{13} . The correct crystal for the oscillator is switched in, along with several other circuits located throughout the transmitter, by the panel BAND SELECTOR switch. Eight crystals are used, four being necessary to cover the 10-meter band.

The signal which has now been converted to the desired frequency is amplified in the 12BY7 driver, V_{14} . Its grid and plate circuits are tuned by the panel DRIVER TUNE control.

Parallel-connected 6146s operating Class AB₁ are used in the final amplifier. The plate circuit of the amplifier is tuned by the panel FINAL TUNE control. The amplifier circuit is neutralized and the tubes contain suppressors to prevent parasitic oscillations. These tubes and nearby components are cooled by a fan blower attached to the top lid of the cabinet. The pi-network output circuit is designed for a fixed load of 50 ohms; there is no loading control on the transmitter.

The output-meter circuit shown in Fig. 2 can be used as an aid in tuning the driver and amplifier to resonance and also to monitor the transmitter's relative output while on the air. The meter circuit is somewhat unusual in that it uses

two diodes instead of the customary single rectifier. The 1N34A crystal diode, CR_1 , is tapped down on a resistor voltage divider where it rectifies the r.f. voltage from the final amplifier. The d.c. is filtered in an RC filter network and appears across the silicon diode CR_2 . This diode does not conduct until the voltage across it reaches about 0.6 volt, above which CR_2 conducts heavily and acts as a sort of "current brake" as far as the d.c. meter is concerned. With this current limiting, the output meter follows a more logarithmic scale as the output increases. The output meter can be electrically set by the METER SENSITIVITY control located on the front panel.

All necessary power for the HX-500 is generated in the power-supply section of the transmitter. Close to 800 volts d.c. is supplied by the high-voltage section, which uses a pair of 12AX4 rectifiers. A special 12-volt winding on the power transformer supplies the necessary heater voltage for these tubes. Another section of the power supply furnishes intermediate voltages of 215,

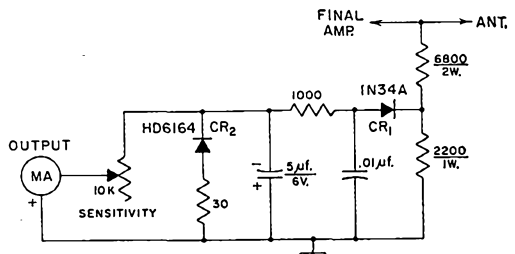
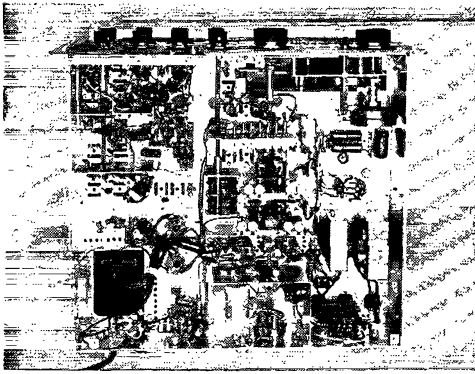


Fig. 2—Two diodes are used in the output-meter circuit. CR_2 , a silicon diode rectifier, conducts only after the voltage across it reaches a little over one-half volt.



This view of the HX-500 shows the compact arrangement of the various components and wiring, as exposed when the bottom plates are removed. The s.s.b. subchassis is in the upper left-hand corner in this photograph. The double-section variable capacitor in the center is the DRIVER TUNE capacitor and at its right are the capacitors and coils connected to the BAND SELECTOR switch, which runs the length of the chassis from top to bottom. The section of the band switch at bottom center is in the compartment that houses the final-amplifier plate inductance.

300 and 350 for use in the various stages of the transmitter. One section of a 6AL5 diode (V_{17A}) functions as the bias rectifier. Bias voltages are 50 and 100 volts. An 0A2 voltage regulator provides stabilized 150 volts to operate the reactance-modulator plate and screen, 60-kc. oscillator screen, v.f.o. plate, third-mixer screen, heterodyne oscillator (V_{13}) plate, and the screen of the 12BY7 driver. Power requirements for the transmitter are 105 to 125 volts, 50/60 cycles, at 400 watts.

The VOX and antitrip circuits for the transmitter are located on the s.s.b. generator chassis. All three controls associated with this circuitry (VOX DELAY, ANTITRIP SENSITIVITY and VOX SENSITIVITY) are on the front panel. Hammarlund

has provided the HX-500 with a built-in antenna relay which is tied into the VOX control system. In the transmit condition the relay connects the transmitter's output to the antenna terminal.

In addition to the operating controls on the HX-500 already mentioned there is also a CALIBRATE LEVEL control, which feeds a small amount of signal from the transmitter into the receiver for purposes of zero beating or finding one's own signal; a FUNCTION SWITCH, which determines the type of emission to be used; an OPERATION switch, with five positions: OFF, STANDBY, MOX, VOX and CALIBRATE; an AUDIO LEVEL control, which adjusts the gain of the speech amplifier; and the FSK — FM/ Δ F control, which determines the amount of frequency shift for f.s.k. or the frequency deviation for f.m. Also located on the front panel are the relative-output meter, key jack, monitor jack (to monitor the receiver with headphones), microphone connector, and low-impedance audio-input jack.

Located on the rear apron of the transmitter is a 14-terminal connector for making connections to the VOX relay contacts, negative 100 volts for receiver or amplifier blocking, remote key, f.s.k. relay, and receiver speaker; also, one pair of terminals is across a 10-ohm resistor from the final-amplifier cathode to ground, for metering purposes. Along with this 14-terminal connector is a coaxial antenna connector, a phono jack for carrying the antenna to the receiver, a fuse and the line cord.

The HX-500 instruction manual contains 31 pages of information including details for using the transmitter on the various emissions, detailed alignment procedures, and voltage and resistance charts for trouble shooting.

The HX-500 cabinet measures $19\frac{1}{4}$ inches wide, $16\frac{1}{8}$ inches deep and $11\frac{1}{2}$ inches high. When the transmitter is removed from the cabinet it will fit a standard rack. It weighs 80 pounds.

— E. L. C.

NEW BOOKS

Transistor Theory & Circuits Made Simple, by Harvey Pollack. Published by American Electronics Co., 1203 Bryant Ave., New York 59, New York. 6 by 9 inches, 124 pages, including index. Price, paper cover edition \$1.75.

This is a beginner's book that takes the subject of transistor theory and breaks it down into a form that can easily be understood. Transistor characteristics, background and basic amplifier and oscillator circuits are discussed in simple terms with a minimum of mathematics and complex schematics. The book describes many practical circuits and explains the operation of devices such as field-strength meters, 100-kc. oscillators and simple receivers.

The Practical Dictionary of Electricity and Electronics, by R. L. Oldfield, includes Handbook. Published by American Technical Society, 848 East 58th St., Chicago 37, Illinois.

$5\frac{3}{4}$ by $8\frac{1}{2}$ inches, 216 pages, cloth cover. Price, \$5.95.

This book is just what the title implies — a dictionary of electrical and electronic terms written in plain language and directed to meet the practical, down to earth needs of the technician, service man and radio amateur. Included in the book is a 38-page handbook section containing formulas, tables, symbols and circuit diagrams commonly used by those working in electricity and electronics.

Transistors, Theory and Practice, by Rufus P. Turner. Published by Gernsback Publications, Inc., 154 West 14th St., New York 11, N. Y. Second edition. $5\frac{1}{2}$ by $8\frac{1}{2}$ inches, paper cover, 160 pages, including index. Price, \$2.95.

In this second edition the book *Transistors* has been brought up to date, and information has been included on transistor limitations. There are also new bibliographies and tables. Although most chapter headings have remained the same, the material in them is the very latest. Two new chapters entitled "Related Devices" and "Care and Handling of Transistors" have been added. The book is directed to teachers, students and technicians alike and contains many practical circuits of interest to amateurs. — E. L. C.

Announcing 1960 Simulated Emergency Test

October 8-9, 1960

HOLD ON! Don't turn this page until you've read what it's all about. Just because you've never heard of the Simulated Emergency Test doesn't mean that it's of no concern to you. Come on out with the AREC gang and have some fun doing something useful, for a change.

We'll try to make it simple. The SET is the week end when we amateurs show the public and the various agencies we might serve in an emergency what we are capable of doing for them. It's not a contest, like the Field Day, and it's not part of a big government-sponsored project, like Operation Alert. It's our own activity, using our own amateur-sponsored and amateur-led organization.

This doesn't mean we ignore all other agencies in conducting the activity. We can't conduct emergency communications unless we have someone to conduct them *for*. So the Red Cross, civil defense, utilities, newspapers, fire departments, law-enforcement agencies and many others come into the picture to provide the content of the communications, while we in the Amateur Radio Emergency Corps do the communicating.

Here's how you can participate in the SET:

(1) Get signed up in the AREC, if you aren't already. Your local Emergency Coordinator is the man to see. If you don't know who he is, make some inquiries. Maybe you'll find you *have* no local EC, because no one locally has taken an interest in this type of work. If such is the case, it's time you get some local amateurs together and do something about this, and *right now* is the time to do it.

(2) Your EC, if any, may be planning to have the SET at some time other than the regular October 8-9 week end. If so, you will want to know when so you can plan to take part. If he

says he is not going to have an SET, give him a hard time, eh?

(3) During the test, you should originate a message to your SEC (that means *Section Emergency Coordinator*, you clown). Your message should be *short* (say about 10 words) and it should identify the group with whom you are working. It should also identify *you*, by call letters. There may be hundreds of people with your name, but your call is unique.

(4) Your EC has a report to make. Chances are he won't bother to send it in (we hope he will) unless he has something he feels is worth reporting. *You* can provide him with that by showing up, by going along with the spirit of the thing and by showing your interest in a continuing AREC organization in your community or county.

American National Red Cross and the Office of Civil and Defense Mobilization will be taking part in the SET also, on a national scale. If you go in for long-haul traffic handling, you can make yourself useful on the National Calling and Emergency Frequencies in addition to (not instead of!) participation in your local drill. There will be traffic from Red Cross chapters to national RC headquarters, from local c.d. directors to OCDM, and from ECs to ARRL.

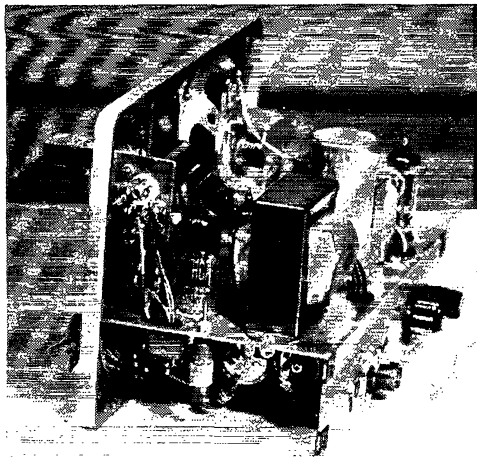
What? You don't know what the National Calling Frequencies are? Gad, we thought *everybody* knew that! Lessee now... Oh yes, here they are! For short and medium haul: 3550 and 3875 kc.: for medium and long haul: 7100 and 7250 kc.: for long haul and very long haul (if the bands are open): 14,050, 14,225, 21,050 and 21,400 kc.

See you in the SET, OM... Oct. 8 & 9!
— WINJ.M.

Supplement—June V.H.F. Party Summary

THE following scores are a supplement to the June V.H.F. Party Summary on page 58, September *QST*. The footnotes call attention to the certificate status in the respective sections. Columns indicate final score, number of contacts, the section multiplier, and the bands used.

<i>Connecticut</i>		<i>Maryland</i>		<i>San Francisco</i>	
KN10AV ¹	80- 16- 5-A	K3KHS	1320-110-12-A	K6VXI	230- 46- 5-A
<i>Northern New Jersey</i>		K3IEV	825- 75-11-A	<i>Illinois</i>	
W2PEZ	(10 oprs.) ²	W3JWY	108- 24- 7-A	W9RVC	2768-136-13-A
W2OR	(4 oprs.)	K3IIR	120- 30- 4-A	K9HDE	1200-100-12-AB
	31,632-620-48-ABC	K3JKQ	116- 29- 4-A	K9PEA	162- 27- 6-A
	12,090-465-26-AB	K3IIP	96- 32- 3-AB	W9KBP	140- 20- 7-AB
<i>N.Y.C.-L.I.</i>		W3BLH	90- 30- 3-A	<i>Indiana</i>	
W2YHP	4686-213-22-AB	K3BPZ	88- 22- 4-A	W9MHP	840- 70-12-AB
K2MGA	3040-190-16-A	W3BQM	84- 42- 2-A	K9MZV	657- 73- 9-AB
WA2FBA	496- 62- 8-B	W3IQR	63- 21- 3-A	<i>Wisconsin</i>	
K2OGT	390- 39-10-A	K3IEZ	48- 24- 2-A	W8LIM/9	(W8LIM, K8OQZ, K9YHE)
<i>Western New York</i>		<i>Eastern Florida</i>		840- 60-14-AB	
K2SZJ	(K2s IXJ DBB, W2-SFU) 10,434-282-37-AB	K4PPX	660- 60-11-AB	<i>Ontario</i>	
W2MAU/2	(9 oprs.)	<i>Georgia</i>		W8ELA/3	(VE3s ELA CIB)
	4075-159-25-ABC	W4GIS	66- 22- 3-AB	1666- 98-17-AB	
		W4FWB/4	(4 oprs.)	<i>Manitoba</i>	
			3611-157-23-AB	VE4YW ³	39- 13- 3-A
		<i>Santa Clara Valley</i>		¹ With three Novice entries. KN1MQW is Novice Certificate Winner; ² Multiop Award Winner; ³ Section Certificate Winner; ⁴ W4YMD, opr.; ⁶ With three multiop entries, WA6CID is Multiop Certificate Winner.	
		K4YIP ²	629- 37-17-A		
		<i>Tennessee</i>			
		W4AZD/4	(5 oprs.) ²		
			2730-130-21-AB		
		<i>Virginia</i>			
		W4AO ^{3,4}	12,516-284-42-ABCD		
		W4VVE	304- 38- 8-AB		
		K3CEZ/4	(8 oprs.)		
			4200-1722-4-ABC		
		<i>Northern Texas</i>			
		K5UJM	2196-122-18-A		
		<i>East Bay</i>			
		K6RNQ ²	1573-111-13-AC		
		<i>Los Angeles</i>			
		W6UFJ/6	(W6UFJ, WA6s FCY FXJ) ⁵		
			102- 34- 3-B		



W9AMH's modification to the Sixer. The L-shaped bracket for mounting the 6C4 oscillator tube is visible in the foreground behind the front panel.

When tuning up, simply adjust the slugs in the new coil, L_{201} and L_{202} , until the output indicator shows maximum brilliance. The output will be somewhat greater than before, since the two stages provide more drive to the final amplifier.

— Harry A. Perry, W9AMH

— — —

THE overtone crystal oscillator in my Heathkit HW-29 six-meter transceiver worked somewhat erratically. After some experimentation I found that when the value of the oscillator grid resistor was raised from 10,000 to about 40,000 ohms the oscillator settled down to stable operation.

— Chester L. Smith, K1CCL

SENSITIVE METER PROTECTION

To protect sensitive instruments from damage while transporting or handling, connect a shorting wire across the meter terminals. In the case of a v.o.m., switch the meter to the lowest current range and short out the test leads. If the meter pointer is set into motion by vibration or shock, a small current will be induced in the meter which tends to oppose the original movement of the pointer. This electrical damping will keep the pointer from swinging freely and damaging the instrument.

— Richard Niessen, K2SRA

CIRCUIT CHANGE FOR THE HEATHKIT MT-1 MOBILE TRANSMITTER

RECENTLY I constructed the Heathkit MT-1 mobile transmitter. I noticed that the plate of the 6CL6 v.f.o. buffer tube would glow a dull red if the transmitter were left on for more than a few seconds. All voltages and resistance measurements were checked against the instruction manual and were found to be correct. However, I

did notice one thing — the 6800-ohm, 1-watt screen resistor was dissipating more than one watt. With a 100-volt drop across the resistor (which is normal according to the instruction manual) the calculated dissipation was 1.4 watts. The maximum allowable screen current for the 6CL6 is around 7 ma. and the current through the resistor in my case was about 14 ma.

Checking similar equipment using this tube, I found that a 68,000-ohm resistor was typical in circuits of this kind. Not having a resistor of this value in my junk box, I substituted a 33,000-ohm, 1-watt unit. Now the plate of the 6CL6 runs cool and I still have more than adequate drive on all bands.

— Richard M. Bender, W3SY

S.S.B. WITH THE 10B AND VALIANT

IT may interest other Valiant owners to learn that the Central Electronics Exciter 10B makes a nice s.s.b. exciter for the Johnson Valiant transmitter. Only one minor change in the Valiant is necessary. Replace the sideband input coupling capacitor C_{101} with a 0.01- μ f. ceramic capacitor. Also, the 10B output inductance should have its 10,000-ohm swamping resistor removed.

— Dorothy C. Saunders, W4UF

RANGER OPERATING CONVENIENCE

A SIMPLE external metering circuit which facilitates tuning the Johnson Viking Ranger is shown in Fig. 3. This circuit replaces the high-voltage jumper wire on the Ranger auxiliary power plug X_{13B} .

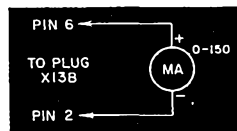
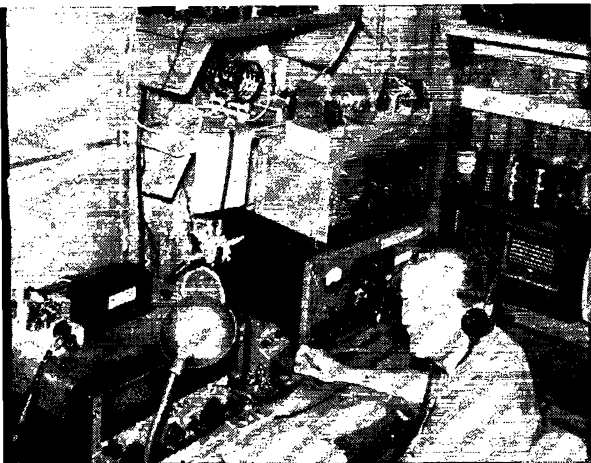


Fig. 3

During phone operation, the milliammeter (M_1) indicates 6146 plate current. The Ranger meter switch can remain in the final-grid-current position continuously. Tuning of both grid and plate circuits is accomplished more quickly because the necessity for back-and-forth meter switching is eliminated. Continuous monitoring of plate current will prevent many unintentional overloads and prolong 6146 life.

The meter may be mounted in any convenient location near the transmitter. Precautions should be observed to prevent accidental physical contact with the meter terminals since approximately 500 volts d.c. is present at any time the Ranger OPERATE switch is moved to PHONE or CW. However, because of internal wiring, the outboard circuit will not function in the CW mode of operation.

— John W. Browning, W8DDF



That grin belongs to W0NWX, who shown here at VP1JH set an all-time high record in ARRL DX Contesting with 1,377,918. The gadget on top of the Ranger has two code wheels made of clear plastic. Pushing the left button on the small control box in front of the receiver causes the gadget to key the Valiant with "599200". Pushing the right button sends "de VP1JH." Bob assures the gang that signals really were 599 down there.

1960 DX Contest

Shatters Score Records

Official Results— 26th ARRL International DX Competition

AT LAST, the ARRL DX Contest has been described to a tee! Perfecto! Read this jazz by VE2AEW from *Skywave* of the South Shore ARC about our beloved DX Contest.

That DX Rat Race

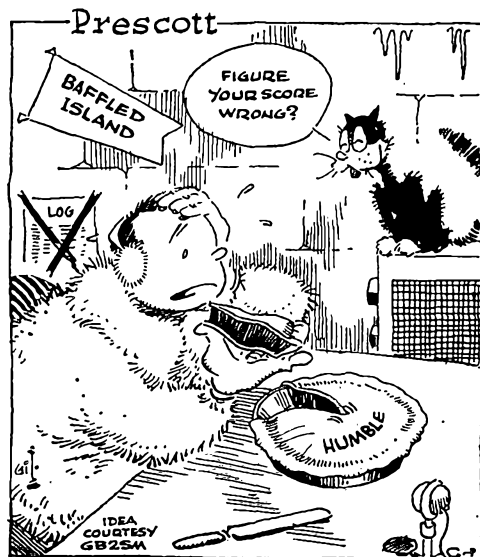
So u want to try it es u find a big pile up es wud like to get ur feet wet so u luk fer a DX call in there but nobody is using it es u don't know which way to point ur beam es by es by sum lid slips and lets it out so u see if you can hear him es sure nuf he's down in there so u pile on but he won't answer u es when the pack shuts up there he is handin out numbers so u go lukin fer the guy he's working so's to get a slant on his freq es he still won't answer u so u figger now he must be listening on the side so u go lookin fer some guy handin out numbers over there and u wonder if he's in ur pile or the next one es go back to the DX quick to see if he gives the guys call but the pack jumps him B4 he gets to it es when the pack shuts up there he is handin out numbers es u finally figger its only to the Texas galons es the California kilowatts so u move over to another pile es start all over again */*!#''%*???

But, ah yes, you notice that the ardent DX Contester jumps right back in for more of the same punishment . . . something like a fighter getting off the canvas after giving a close look-see at a left hook. It's a free-for-all, true, but fun for all too! . . . which all leads us into the specifics of the 1960 Contest.

How about the conditions? Anyone tuning across the DX bands realizes that the sunspot cycle is definitely on the downward trend. But all is not lost. W3DHM noted: "Conditions on 10 meters are certainly on the decline, but 40 was great." "Biggest thrill was the 7 Mc. DX, although it was very hard for me to come by," de K3DFK. ZE8JJ commented: "Conditions taken as a whole over the entire contest were good, even bordering of excellent over the first half." W3LEZ spoke for this side of the pond, noting conditions quite in reverse: "First week end lousy; second week end tremendous." On phone K2GXI miked: "Conditions pretty good,

there being more activity on 15 than last year, but 10 was poor to Europe during the second week end." WA2HUY glowed optimistically: "Next year I'm looking forward to operation on 40, 20, 15, and 10 with good conditions — sunspots or not!" Better not miss out on 80 and 160 though.

The "by a whisker" department found W3QQL ducking under the wire: "The FK8AH pile-up was the climax to the whole affair. I was lucky to get him 12 minutes before the contest was over." W3MFW (at W3ECR) sang these praises: "Congratulations to these outstanding signals/operators — VP1JH, VP5ME, VP6YB, KS4AZ, HZ1HZ, DU7SV, etc. They really make a contest enjoyable." K6BWX had his nominations: "For cleanest DX signal and operation I



Big smiles mark the boys at W3AOH who broke the magic million marker to set an all-time high multi-op W/VE score. Back row left to right: W3AOH, K3DKD, W3-VKD, W3UHN; front row left to right, W3MVQ, W3LMM, W3WGH, W3QJJ.



nominate XE1PJ . . . for the hardest call for an op to work with — ZD2JKO . . . biggest pile-up — HK0AI (and I didn't work him either)." W7PQE joins in: "Nominations — bravest operator JA1BRN with his two watts . . . quickest on the draw VP1JH, with a whole lot of other sharp operators as close seconds."

K3HLJ whooped: "Like help . . . for this contest you need a beam, kw., and a pound of coffee." Meanwhile W10KG suggested more s.s.b. operation: "Only 9% of my QSOs were with s.s.b. stations, whereas there are supposedly over 200 DX countries now on sideband."

The one-band efforts certainly deserve credit. Let's remember, however, that versatility is the thing! W3JTC (ex-SV0WP) snagged 132 countries on 14 Mc. On that band W6CUQ bagged 111, K4PDV 107, W6LRU 103, and W1HZ 103 in as many contacts . . . all single band efforts. PJ2AV scored 888 QSOs in 20 call areas on 14 Mc. Note that all of Maine's c.w. entries are from two-letter calls and all over 100-K. Who says the Old Timer's can't do it anymore?

KH6DJP enjoyed his new viewpoint from the W/VE side of the fence: "Got quite a kick out of many of the stations saying, 'Thanks very much for the new state and multiplier.' It makes one feel that all has not been in vain when somebody appreciates your efforts just a little bit." K4VNY introduces others who have a claim to fame: "I believe a lot of credit should go to the Russian fellows. They really went all out to put some rare spots on the air." "Glad to see so many South and Central Americans on." — W1QMM. "My Korea phone contact alone was worth the

participation." — K6BOB. And congratulations to Vic Clark & Co. who livened up the first week end from KS4AZ.

The DX Contest is an excellent way of picking up new countries for DXCC. Said W8OOR: "This effort plus a few recalcitrant QSLs should finally make DXCC!" (For the less erudite, *Webster's* is a must! — *Ed.*) In summation, VP3HAG sighed in relief to KP4AIU: "I'm tired, hoarse, but had a heckuva good time." To which KP4AIU concurred: "My sentiments exactly!" . . . and TF2WEN still needs a TF QSL; things are TuF all over, aren't they?

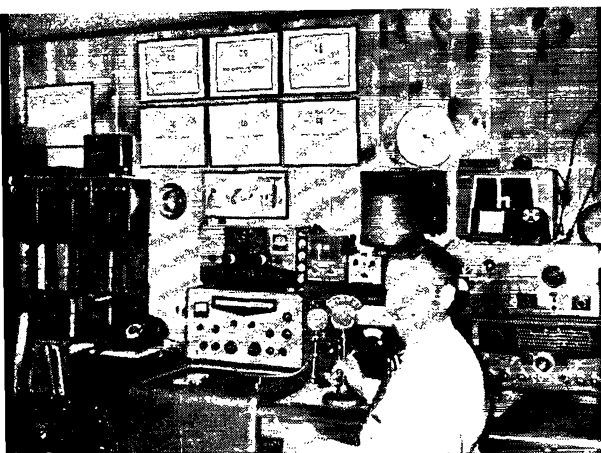
C.W. Highlights

The W/VE spotlight again shines on W3MFW, who keyed the W3ECR rig to the top score in the country with 860 QSOs, a multiplier of 351, and grand total score of 905,580. Maryland's W3GRF was second with 784 contacts, multiplier of 354, and grand score of 831,192. And for the second year in a row, Ohio's W8FGX was third with 827,526 points. Other single ops keying over a half million were: W4YHD 773,544, K2DCA 749,664, W3ALB 733,408, W3DHM 698,472, W2AYJ 652,365, K2DGT 621,900, W1JYH 618,696, W9WNV 602,301, W9IOP 581,833, W2EQS 566,772, W1LOP 543,444, W3VAN 522,567, W4RQR 512,451, W1BIH 500,408.

Nothing short of superb describes the multiple operator scores turned in. The first W/VE million-plus scores were turned in by no less than two entries! Two W3 multiple operator outfits turned the trick. Eight operators at W3AOH combined operating skill to score an

FK8AH stirred up noise on c.w. with this 6146 rig and 50 watts.





Here we have the top W/VE scorers for phone and c.w. On the left is W1ONK pausing from microphone duties that brought home 423,990 points. Below is W3MFW who from W3ECR was the highest scorer for the second year in a row. Note the southpaw action on the bug.



C.W. Call-Area Leaders

Single-Operator

W1JYH.....618,696	W9WNV.....602,301
K2DCA.....749,664	W0BTD.....247,725
W3ECR ¹905,580	VE1PQ.....170,880
W4YHD.....773,544	VE2YU.....174,303
W5CKY.....448,800	W0AIH/VE3...413,184
K6VTQ.....393,066	VE4XO.....51,975
KH6DLF.....90,375	VE6HG.....16,422
W7PGS.....324,324	VE7BBG.....8505
KL7CDF.....60,435	VO2NA.....5983
W8FGX.....827,526	

¹ W3MFW, opr.

all-time W/VE record . . . 1,210,612 points. A 403 multiplier, coupled to 1002 exchanges spelled this 90 hour marathon. A close second was W3MSK operated capably by four people to rack up 1,203,408 points with 976 contacts, and a 411 multiplier. Bouquets to these two multiple operator groups for being the first of the W/VE crowd to break the magic million. Now, who will be the first W/VE single op to do it . . . ? Five other multi-ops broke the 500-K level: W3BES 745,875, W6RWV 602,301, W4KXV 599,794, W3KFK 590,716, W3WVW 552,535.

The Canadians really came up with some terrific scores this year with W0AIH/VE3 setting the pace with 413,184 points . . . which by far must be a record single op Canadian score ever turned in. VE2YU scored 174,303, and VE1PQ chalked up 170,880. Multi-op VE2WVW scored 482,232.

Africa. Tops on that continent was ST2AR with 271,719 credits. Following right behind were: ZD2JKO 191,277, ZE8JJ 143,640, ZS6AOU 116,370.

Asia. JA1VX chalked up four years in a row now by scoring 210,273. Other highs were HZ1HZ 97,458 and UA0KZA 93,200.

Europe. European scores and activity dropped off considerably from last year, but none-the-less G4CP did a fine job in leading the continent with 394,200 digits. Others turning in fine scores and over 200-K were: UB5WF 388,734, GW3JI 299,460, ON4LX 237,850, G2QT 210,447, OE1-

RZ 208,919, OZ1W 207,552, F8VJ 205,326.

North America. An epic performance of record shattering magnitude . . . sure to be a classic for which future DX Contestants may shoot . . . was etched upon the channels of DX Contest records. Bettering XF1A's 1957 1,281,702 record, ARRL's Midwest Division Director W0NWX pounded VP1JH brass for 1,377,918 points, an all-time contact total of 4037 (first to break 4000), and tying Juan's multiplier of 114 . . . va-va-voom! Hats off to W0NWX (VP1JH)! Others high flying on this continent: KP4AO 701,136, VP5ME 575,343, VP7NT 525,063, and multi-op KS4AZ 518,568.

Oceania. Contest stalwarts VK2GW and ZL1MQ lead this area with 341,670 and 287,763 points respectively. FK8AH created many pile-ups as he scored 107,484. Meanwhile the ever-popular DU7SV scored 119,760, as Midway's KM6BQ came through with 146,205, and four operators put KG6FAE in business with 337,392 points.

South America. VP3YG was tops here with 481,500, pursued closely by: PY1ADA 469,854, YV5GO 389,781, CE3AG 374,070, ZP9AY 216,540, HC2IU 181,720, CX2AZ (multi-op) 295,920. This was quite an increase over last year's scores from South America . . . this healthy rise in activity was certainly welcome.

Phone Highlights

The W/VE phone footlights rest on W1ONK who stood head and shoulders above the other phone DXers with 423,990 points via 673 QSOs and a 210 multiplier during his 86 hour microphone binge. Clobbering 100-K were: W3DHM 318,150, W1PDF 266,994, W3ALB 222,855, K2GXI 180,363, W9EWC 216,656, W9NZM 159,720, W8NXF 151,662, K1JTC 136,456, W8ZOK 134,505, W1FZ 134,332, W2ZX 132,800, K2DGT 118,503, W2PUN 118,008, W3ECR

Phone Call-Area Leaders

Single-Operator

W1ONK.....423,990	W9EWC.....216,656
W2ZX.....132,800	K0LFY.....43,000
W3DHM.....318,150	VE1PQ.....37,380
K4QIJ.....105,276	VE2ACU.....56,753
W5ALB.....38,885	VE3EHR.....100,440
W6AED.....70,560	VE4SD.....28,575
KH6CJJ.....6789	VE5RU.....70,446
W7CBY.....7956	VE6TP.....13,585
KL7CDF.....17,802	VE7CE.....7434
W8NXT.....151,662	VO2NA.....3388

117,747, W1AUF 110,544, K4QIJ 105,276, K4ZCP 102,714, VE3EHR 100,440.

Michigan multi-ops W8NWO and W8NGO had a battle royal with 244,728 and 238,572 respectively. Others over 100-K: W1ETF 157,035, W3KQF 145,080, W3GRF 123,924.

The DX gang put on quite a show in handing out phone contacts in grand style. Top DX phone score was VP2DX with 506,250. Here's how the other DX stations over 50-K shaped up: KP4AIU 279,488, ON4OC 244,288, EA3JE 193,068, VP3HAG 177,072, YN4CB 172,746, HK0AI 169,050, TI2RO 119,534, DJ1BZ 114,534, VP2AR 109,620, OH5SM 106,050, ZL1MQ 90,540, HK3LX 86,240, G2DYV 85,491, CO2DD 85,260, TG5HC 82,404, HP1AC 79,991, ON4GM 77,428, LA1JG 76,986, OZ5JT 64,872, LA4TE 60,114, LU1DAB 58,135, PA0HBO 55,620, ON4LX 52,250, VR2BC 51,435. GB2SM earned a multiple operator certificate for England with 178,059.

The Clubs

The club totals look like a carbon copy of last year's results with the first four finishers exactly in position as last year. It was the usual nip and tuck affair between the Frankford and Potomac Valley crews, but Frankford's phone scores were just too much to offset the slight lead that Potomac made on c.w. Third and fourth place was another repeat with the Northern California DX club again beating out the Southern California DX Club by a whisker. Others over a million were the Order of Boiled Owls, Connecticut Wireless Assn., and the Ohio Valley Amateur Radio Assn., in that order. In all, 36 clubs participated, with 30 c.w. and 13 phone club certificates stashed away.

Disqualifications

The calls listed in this paragraph are all deemed ineligible for score listings or awards. Under contest rules 13 and 14, the following have been disqualified because of log discrepancies in their entries: *C.w.* — W1GET, W2SSC, K5DGI, W6TT; *Phone* — W2SSC. In each of the following cases disqualification was under contest rule 14 in view of non-observance of FCC rules as reported by at least two accredited Official Observers, or by a single FCC citation. Such violations as out-of-band operation, key clicks, phone splatter and spurious emissions were the criteria for these disqualifications: *C.w.* — W1BB, W1HGT, W3BB, W3DQG, W4YUU, W9IRH; *Phone* — K1HRM, W2CGJ, WA2DGG, K2LWR, W2OKM, K2TAP, W4BVV, W7PGS W8ZL. K0RNZ.

Twenty-Sixth ARRL International DX Competition

Operator of the station first-listed in each section and country is winner for that area... The multiplier used by each station in determining score is given with the score — in the case of U. S.-Canada this is the total of the countries worked on each frequency-band used; in the case of non-W/K/KH6/KL7/VE/VO entries it is the total of the U. S.-Canada districts worked on each band... The total number of contacts is listed next... The letters A, B, and C approximate the input to the final stage at each station; A indicates power up to and including 150 watts; B indicates over 150 watts, up to and including 500 watts; C indicates over 500 watts... The total operating time to the nearest hour is given for each station and is the last figure following the score... Examples of listings: W3ECR 905-580-351-860-C-78, or final score 905,580; multiplier 351; 860 contacts; power over 500 watts; total operating time 78 hours... Stations manned by more than one operator are grouped in order of score following single-operator listings in each section or country tabulation; calls of participants at multi-operator stations are listed in parentheses... In sections or countries where three or more multiple-operator entries appear, the top-scoring station is being awarded a certificate.

C.W. SCORES

ATLANTIC DIVISION

Eastern Pennsylvania		W3PN...163,761-169-323- B-44	
W3ECR ¹ ...905,580-351-860- C-78	W3HHA...153,216-168-304- C-80		
W3ALB...733,408-328-746- C-70	W3IMV...129,195-135-319- B-32		
W3DHM...698,472-327-712- C-91	W3EAN...121,176-153-264- C--		
W3OCU...412,126-242-569- C--	W8CTJ...108,750-145-250- B-27		
W3DBX...351,945-237-495- B-70	W3GHD...95,202-129-246- B--		
W3BIP...289,506-226-427- C-61	W3QMZ...79,236-124-213- C-37		
W3KT...284,481-219-433- C--	W3GHS...75,516-124-203- B-21		
W3LEZ...230,280-202-380- C--	W3SOH...48,990-96-170- A-35		
W3MWC...217,620-195-372- B-65	W3EUV...47,376-94-168- C-15		
W3CGS...215,340-194-370- C-58	K3JRK...38,916-92-141- C-27		

G4CP puff-puffs on the pipe in hand . . . and puffing away to lead the pack in Europe on c.w. with 1752 QSOs for 394,200 points . . . but never satisfied, England's leader is aiming for 2000 contacts next year.



W3AEM	25,875-75-115-BC-24
W3ARK	24,804-78-106-B-10
W3QLW	22,911-63-119-A-34
W3ADZ	20,085-65-103-AB-9
K3GFV	15,795-65-81-B-48
K3DPQ	15,312-58-88-B-20
W3EER	14,418-54-89-A-35
W3CAA	11,088-48-77-A-9
K3ATL	8,894-46-63-AB-24
W3ORU	4,620-35-44-C-9
W3INH	4,551-37-41-B-10
K3DFK	4,383-34-43-A-25
W3DYL	2,968-28-36-C-10
W3NOH	2,553-23-37-A-3
W3CMN	2,430-27-30-B-9
W3GRS	918-17-18-A-9
W3BES (W3s BES GYP)	745,875-325-765-C-96
W3KFK (W3s KFK QKV)	590,716-281-682-C-96
W3EQA (W3s EQA GRS)	281,748-212-443-C-60
W3GHM (W3s GHM NOH)	155,556-173-298-B-43
W3BYX (W3s BYX DAO)	113,316-142-266-B-96

Md.-Del.-D. C.

W3GRF	831,192-354-781-AC-80
W3VAN	522,567-279-625-C-75
W3MFF	398,526-251-523-C-9
W3EIS	364,395-255-477-BC-69
W3MSR	360,126-247-486-C-68
W3IYE	260,604-228-381-C-60
W3DRD	256,710-215-398-C-67
W3KLA	161,304-188-286-B-55
W3FRZ	130,950-150-291-BC-64
W3JTC	129,492-132-327-C-68
W3KA	87,750-125-234-C-19
W3KDP	82,128-118-232-C-9
W3QQL	82,026-147-186-B-31
W3MVB	76,125-125-203-BC-78
W3EKN	69,732-117-200-C-47
W3RNY	42,129-93-151-C-25
W3GAU	36,358-98-125-C-6
W3WU	20,400-68-100-B-20
W3BKE	18,972-62-102-B-20
W3EPR	17,028-66-83-C-22
W3JO	6,027-41-49-A-29
W3IWS	5,016-38-44-B-9
W3MEU	2,625-25-35-A-17
K3DUB	48-4-4-A-7
W3BFO/3	12-2-2-A-9
W3MSK (4 ops.)	1,203,108-411-976-C-93
W3WV (W3s PVV WV K3GUR)	552,535-295-625-C-9
W3BVN (K2JXX W3BVN)	147,870-159-312-C-35

Southern New Jersey

K2DCA	749,664-342-734-C-85
K2DNA	242,403-201-102-B-79
W2GGL	167,376-176-317-BC-57
K2GHM	149,298-167-298-C-75
K2QIL	132,756-148-299-B-40
W2SDB	100,620-129-260-C-38
W2HDW	90,576-111-272-A-35
W2PAU	82,344-146-188-C-35
W2EXB	58,968-168-181-A-13
W2DAJ	57,942-111-174-B-43
W2QKJ	51,306-90-190-B-50
W2QDY	39,420-90-146-A-10
W2BUI	38,982-89-146-A-21
K2OEA	18,630-69-90-A-8
K2OPR	16,482-67-82-A-10
W2NSJ	15,738-61-85-B-26
W2PYS	12,300-50-82-AB-22
K2YIB	7,176-39-62-B-15
W2SQM	6,600-40-55-A-9
W2ABL	5,100-34-50-B-13
W2ZX	4,212-36-39-C-9
K2BG	3,780-30-42-B-10
K2MPV	3,741-29-43-B-15
W2ZGS	3,321-27-41-B-10
K2INQ	2,511-27-31-C-7
K2AIM	2,070-23-30-B-9
K2HBY	627-11-10-A-6
W2BLV	576-12-16-A-5

Western New York

W2SAW	236,412-198-398-B-50
K2LWR	230,919-191-403-B-61
W2FBA	202,476-188-359-B-27
W2BJH	161,582-173-312-C-53
W2VUY	137,676-154-298-B-68

W2UVE	131,370-145-302-C-62
W2QJM	64,419-109-197-B-24
W2AKMY	57,474-103-185-A-45
K2EVP	46,452-98-158-B-33
W2TQR	38,181-83-143-A-10
K2FG	35,640-90-132-B-28
W2FXA	31,590-81-130-A-20
W2DGG	25,608-66-130-A-9
K2CD	24,000-64-125-B-15
K2GKM	22,311-67-111-C-9
K2KNV	21,939-71-103-B-19
W2DOD	16,191-63-87-B-20
W2QQ	14,310-53-90-B-30
W2VUF	13,936-67-70-B-20
W2AHUV	13,160-56-79-A-22
K2LGG	8,556-46-62-B-50
W2BEX	5,472-38-48-A-10
W2TVT	3,528-28-42-B-18
W2ACJO	3,510-26-45-A-9
W2TKO	3,276-26-42-A-9
K2HUK	2,349-27-29-A-9
W2PDB	2,160-24-30-B-4
K2ZCD	810-15-18-B-11
K2SSX	168-7-8-A-1
W2AAU (W2s AAU PSQ K2AOQ)	153,825-175-293-C-50

Western Pennsylvania

W3MBN	162,486-177-306-C-50
W3RNO	162,024-157-344-C-60
W3TXQ	18,915-65-97-B-27
W3YQG	10,335-53-65-A-37
W3LPT	4,968-36-46-C-5
W3JHT	2,304-24-32-A-40
W3KQJ	480-10-16-A-3
K3HLJ	360-10-12-A-4
W3WBH	243-9-9-B-8
W3AOH (8 ops.)	1,210,612-403-1002-C-90

CENTRAL DIVISION

<i>Illinois</i>	
W9WNV	602,301-301-667-C-74
W9ERU	416,521-277-538-C-67
W9WIO	128,928-158-272-C-38
W9FJY	101,355-145-233-C-25
W9WTS	95,931-171-187-B-36
K9BGL	84,822-134-211-A-68
W9PVA	64,746-109-198-B-31
W9IVG	59,400-120-165-C-34
W9ZRG	54,900-122-150-C-9
W9MIZP	53,818-106-170-B-38
W9MNY	51,198-106-161-B-9
W9MRY	47,983-105-153-A-56
W9DRD	38,445-87-148-C-9
W9CQC	37,505-84-133-B-28
W9PNE	27,984-88-106-B-34
K9LSN	24,382-73-113-A-45
W9KFC	22,932-78-98-C-15
K9MFI	19,330-70-93-A-9
W9QLD	10,650-50-71-B-22
W9DQG	8370-45-62-A-26
W9LNG	5880-40-49-A-10
K9JLR	4968-36-46-A-29
K9OSG	4830-35-46-B-7
W9ALI	3870-30-43-C-7
W9YDQ	2736-24-38-B-9
K9SPQ	2592-27-32-A-10
W9VPD	2310-22-35-C-6
K9DCF	2187-27-27-B-6
W9ZYD	1950-25-26-A-23
K9PYB	1930-25-26-A-9
W9CLH	1633-23-21-A-9
W9CMS	1368-19-24-B-10
K9PZF	1080-15-24-B-10
K9TTE	675-15-15-A-4
W9BZW	432-12-12-B-7
W9REC	432-12-12-A-6
W9RMQ	432-12-12-A-14
K9ISP	297-9-11-A-1
K9JAV	264-8-11-A-7
W9NUI	75-5-5-AB-4
W9NLF	27-3-3-A-4

Indiana

W9IOP	581,833-301-645-C-79
W9YSX	232,143-223-347-C-27
K9CUC	163,590-174-320-BC-62
W9TKV	49,377-103-155-B-38
K9RZV	3744-32-39-B-8
K9SNX	1638-21-26-B-15
W9UTQ	855-15-19-B-6
W9TDU	546-13-14-C-9
W9DFK	330-11-8-B-4
K9YDR	192-8-8-B-4
K9IGP	12-2-2-A-9



Top DX scorer on phone was DX . . . yes, VP2DX; that's W8VDJ who spent his winter vacation in Dominica during the DX Contest to post 506,280 points with 1875 exchanges. This sure beats the February cold of Ohio!

Wisconsin

W9LNM	487,377-297-547-C-70
W9QYW	133,962-166-269-B-9
W9WJH	111,438-151-246-C-30
W9MBF	96,348-148-217-B-36
W9IHN	63,000-105-200-B-26
K9ENB	22,116-76-97-B-24
W9NH	21,978-74-99-C-25
W9NLJ	16,320-64-85-A-9
W9CBE	5002-37-41-B-6
K9KGF	768-16-16-A-3

DAKOTA DIVISION

<i>North Dakota</i>	
W8SDN	55,263-109-169-A-30
K8QWY	2886-26-37-A-7
K8OSV	2496-26-32-A-22
K8OSW	2275-25-31-A-22
<i>South Dakota</i>	
W8BLZ	80,883-129-209-C-35
W8FOQ	624-13-16-A-6
W8LNI/8 (10 ops.)	17,271-57-101-C-9
<i>Minnesota</i>	
W8JSN	51,948-111-156-A-48
W8VAF	21,630-70-103-B-25
W8VIP	7137-39-61-B-9

DELTA DIVISION

<i>Arkansas</i>	
K5EJQ	9063-53-57-A-24
K5GOE	108-6-6-A-2
K5GRT	75-5-5-A-3
<i>Louisiana</i>	
W5KC	341,520-232-495-C-80
W5BUK	157,776-173-304-C-70
W5LJT	38,304-96-133-A-40
K5PGV	33,366-83-134-A-25
K5TFA	21,087-71-99-B-9
W5EKF	21,420-68-105-B-30
K5UYL	8568-51-56-A-9

Mississippi

W5CKY	448,800-275-544-C-53
K5QNF	9672-72-62-C-13
K5OTI	912-16-19-A-9
<i>Tennessee</i>	
K1LPW	396,144-252-524-B-70
K1RKG	5616-36-52-A-12
W4ODR (4 ops.)	89,598-137-218-C-56

GREAT LAKES DIVISION

<i>Kentucky</i>	
W4JBQ	48,597-97-167-C-28
K4CIA	6888-41-56-B-8
W4OMW	3531-31-38-B-10
K4YFC	1660-22-25-B-5
W4CNE	1556-18-29-C-9
<i>Michigan</i>	
W8UPN	387,543-247-523-C-55
W8DUS	152,928-177-288-C-65
W8NJP	147,294-167-294-C-50
W8SYR	73,125-125-195-C-45
W8NGO	39,270-100-119-B-22
K8LSG	26,322-82-107-B-35
W8MCC	23,625-75-105-C-22
W8OOR	22,557-73-103-A-35
K8IUZ	22,032-68-108-AB-27
K8QJH	17,520-73-80-A-40
W8UCI	13,359-61-73-B-18
W8SS	11,715-55-71-A-30
W83PO	10,152-47-72-A-27
W8CLH	9984-52-61-A-27
W83CU	7200-40-60-C-18
W8ZL	6966-43-54-B-50
K8JCB	6519-41-53-B-33
K8MPD	5610-34-55-B-25
K8MRO	2610-29-30-A-12
K83CO	2016-24-28-C-17
K8OWR (K8s CPM OWR)	864-16-18-A-3

Ohio

W8FGX	827,526-340-792-C-80
W8ZJM	357,124-254-470-B-65
W8EY	317,400-230-460-BC-55
W8EPT	212,868-196-361-B-49
W8ETU	143,856-162-296-C-50
W83OI	118,500-158-250-C-18
W8KKB	79,134-121-218-C-36
W8BMX	59,684-113-176-C-55
K8LEO	53,040-85-208-C-37
K8DEO	49,170-110-149-C-23
W8AJW	48,150-107-150-A-9
K8MTI	45,000-100-150-B-52
W8FGZ	36,288-72-168-B-11
W8DWP	29,232-81-116-AB-36
W8NPN	28,004-83-114-B-38
W8UMA	20,928-64-109-AC-38
K8RCA	18,711-63-99-B-30
W8NWR	17,670-62-95-A-40
W8KMF	17,199-63-91-A-36
W8GMC	15,372-61-84-A-24
W8GFH	13,311-51-87-C-9
W8FEM	10,854-54-67-A-15
W8ENH	10,584-49-72-B-15
W8ELB	8418-46-61-B-25

CLUB SCORES

	Score	C. W. Winner		Phone Winner
Frankford Radio Club	8,722,750	W3ECP ¹		W3DHM
Potomac Valley Radio Club	8,381,174	W3GRF		
Northern California DX Club	2,405,829	W6KCY		W6AED
Southern California DX Club	2,218,570	K6YQ		
Order of Bolled Owls (N. Y.)	2,059,578	W2AJJ		
Connecticut Wireless Assn.	1,505,906	W1YJH		
Ohio Valley Amateur Radio Assn.	1,379,391	W8PFX		
Rochester DX Assn.	931,044	W2FBA		W2FUN
The DX Club of Greater St. Louis	855,441	W0BDU		K2LFY
Niagara Frontier DX Assn.	767,754	K2LWR		K2GXI
Southeastern DX Club (Ga.)	707,685	W4FIJ		
Ridgewood Amateur Radio Club (N. J.)	691,902	W2EQS		
South Jersey Radio Assn.	682,777	K2DNA		W2ZX
El-Ray Amateur Radio Club (Mass.)	678,660	W1OCU		
Hamfesters Radio Club (Ill.)	668,646	W9WNV		W9WNV
The DX Club (Pa.)	608,069	W3BIP		W3IMV
South Lyme Beer, Chowder & Propagation Society (Conn.)	492,790	W1VG		
Westpark Radiops (Ohio)	464,848	W8YPT		W8ZZC
Greensboro Radio Club (N. C.)	449,838	W4PLL		
San Diego DX Club	429,474	W6CAE		
Catawba Valley Amateur Radio Club (N. C.)	388,536			
Miami Valley Amateur Radio Contest Society (Ohio)	382,713	W8ZLM		
Chicago Suburban Radio Assn.	286,431	W9WFS		
Milwaukee Radio Amateurs' Club	192,084	W9QYV		W9RH
Merrimac Valley Amateur Radio Assn. (Mass.)	172,247			
Lake Success Radio Club (N. Y.)	154,524	K2YOR		
Springfield Amateur Radio Club (Ohio)	128,806	W8OKB		
Four Lakes Amateur Radio Club (Wis.)	128,026			
Waltham Amateur Radio Assn. (Mass.)	94,113	W1LJO		
Lafayette Amateur Radio Club (La.)	63,021	K5PGV		
South Shore Amateur Radio Club (Que.)	73,011			VE2CB
Massillon Amateur Radio Club (Ohio)	51,003	W8NP		
Central High School (Sioux City, Iowa) Radio Club	32,645	K0QVR		
Amateur Radio Club of the University of Arkansas	19,095	K5EJQ		K5GOE
Sandia Base Radio Club (N. Mex.)	13,626			K5UYF
Five Towns Radio Club (N. Y.)	2,332			

¹ W3MFW, opr.

K8HTM.....7440-40-62-B-35	W2AWF.....137,592-147-314-BC-58	K2VUI.....16,884-67-84-B-23	K0OVR.....3348-31-36-A-20
W8GMX.....5814-34-57-A--	K2IRO.....125,856-138-304-C-60	W2HQL.....12,444-61-68-C-11	K0UAF.....2496-26-32-A-15
W8DZG.....5544-33-56-B-27	W3VCB.....92,544-128-241-C-42	W1ICO.....7749-41-63-B-11	K0UAE.....75-5-5-A-6
W8AJH.....4428-36-41-A-18	W2BBV.....21,582-66-109-C-12	W2NCG.....7298-41-60-A-10	W0LNI (10 oprs.)
W8TPS.....2940-28-35-B-13	K2YAZ.....14,628-53-92-A-9	W2BOT.....6633-33-67-A-18	2100-25-28-C--
W8UEX.....2574-26-33-A-6	W2IP.....2100-20-35-B-18	WA2DES.....3402-27-42-A-15	
W8CYG.....2376-22-36-B-15	W2PKY.....1071-17-21-A-10	W2JB.....2592-27-32-AB-16	
K8KKG.....2349-27-29-A-15	WA2EFY.....102-6-7-A-6	K2IVE.....2574-26-33-A-5	
K8IPS.....2340-26-30-A--		K2TAP.....2160-20-36-B-3	
W8NHO.....2046-22-31-A-37	<i>N. Y. C.-L. I.</i>	W2SNV.....1369-17-26-B-20	
W8YGR.....1944-24-27-A-8	W2AYJ.....652,365-327-665-C-66	WA2EFN.....969-17-19-A-4	
K8KBE.....1890-21-30-A-8	K2DGT.....621,900-300-691-C-96	W2NHH.....360-10-12-A-10	
W8LUZ.....1694-22-24-C-4	W2IRV.....251,934-211-398-B-50	W2CWD.....297-9-11-A-4	
W8VZE.....756-14-18-AB-7	W2OBX.....187,128-184-339-A-45	W2TUK.....189-7-9-A-1	
W8NXX.....741-13-19-A--	K2YOR.....153,576-162-316-C--	K2IEG (W2DTJ, K2IEG)	
W8JAQ.....516-12-15-A-5	W2HMJ.....124,620-134-310-AC-33	37,392-82-152-C--	
K8KMY.....192-8-8-A-9	W2ZKS.....86,715-141-205-C-35	K2OPD (W2JCU, K2OPD)	
	W2AZS.....63,024-104-202-C-38	624-13-16-B-50	
	W2ESO.....60,759-129-157-ABC-13		
	W2RMD.....35,607-83-143-B-30		
	W2MDD.....23,958-66-121-A-14		
	W2WGM.....22,374-66-113-C-17		

HUDSON DIVISION

Eastern New York

W2HO.....292,662-213-458-C-67



LABRE's ex-president PYIADA doesn't get a chance to relax like this during the contest, keying skillfully for 45 hours to South America's second high c.w. score with 469,854. Note the second operator in the lower center!

MIDWEST DIVISION

Iowa

W0FDL.....175,593-187-313-C-68
 W0HNA.....82,368-132-208-C-53
 W0CXN.....7440-40-62-C--
 W0BSY.....7290-45-54-A-26

NEW ENGLAND DIVISION

Connecticut

W1LOP.....543,444-276-657-C-71
 W1BH.....500,408-284-588-C-55
 W1VG².....405,838-262-517-C--
 W1OJR.....259,290-201-430-B-63
 W1CKA.....177,354-167-356-B-55
 W1TX.....165,996-174-318-BC-45
 W1N1.....146,782-158-311-C-51
 W1IKB.....96,558-133-242-B-34
 W1TSS.....85,527-129-221-B-41
 W1MLL.....59,514-91-218-C-45
 W1AV³.....51,168-104-164-A-16
 W1NLM.....39,093-83-157-B-50
 W1AJQ.....31,200-80-130-A-27
 W1OPB.....28,080-65-144-C-20
 W1ICP³.....9441-44-76-A-29
 W1OBB.....8892-52-57-B--
 W1ZYZ.....4374-27-34-A-9
 K1KNS.....3240-30-36-B-18
 W1LWQ³.....1425-19-25-B-4
 W1EZM.....792-11-24-A-5
 K1MOT.....242-2-4-A-2

Maine

W1CV.....279,225-219-425-C-84
 W1EQ.....234,840-190-412-C-72
 W1EF.....119,232-138-288-A-38



Top Canadian phone scorer is Ontario's VE3EH, who believes in simple all band antennas for quick band hopping . . . 100,440 points makes his contention mighty convincing.

Eastern Massachusetts

W10GU . . . 393.120-252-554-BC-76
 W1AQE . . . 105.735-133-265-A-33
 W1LJO . . . 77.256-111-232-A-45
 K1DBR . . . 44.832-96-157-A-49
 K1DBR . . . 33.813-87-131-A-52
 W1HZ . . . 31.827-103-103-C-14
 W1NS . . . 28.952-77-126-A-15
 W1CTW . . . 17.493-49-119-C-9
 W1NJL . . . 91.08-46-66-A-20
 K1HRM . . . 77.49-41-63-A-5
 W1AOL . . . 69.09-47-49-B-10
 W1JVZ . . . 59.67-39-51-A-27
 W1PLJ . . . 36.54-29-42-A-20
 W1UQP . . . 35.52-32-37-B-16
 K1DCB . . . 20.79-21-33-AB-13
 K1KTH . . . 18.63-23-27-A-20
 K1DSA . . . 12-2-2-A-1
 K1DIR (K1s CLT DIR) . . . 100.710-135-250-B-44
 W1KBN (5 oprs.) . . . 53.424-106-168-AC-38

Western Massachusetts

W1JYH . . . 618.696-312-661-C-70
 W1EOB . . . 151.272-191-264-C-30
 W1ZD . . . 101.748-139-244-C-32
 W1AEW . . . 69.520-110-212-B-69
 W1ZQP . . . 10.800-50-72-B-16
 W1DGL/1s . . . 3.015-29-35-A-4
 K1ITU . . . 24-2-4-A-2

New Hampshire

W1IUU . . . 352.431-229-513-AC- -
 W1FZ . . . 179.358-179-334-C- -
 W1NHJ . . . 64.602-111-194-B-41
 W1OCV . . . 1452-22-23-A-11

Rhode Island

W1AWE . . . 31.356-67-156-A-45
 K1IFE . . . 8322-38-73-B-17
 W1RFQ . . . 3780-28-45-A-4

Vermont

W1QMM . . . 71.004-122-194-C-50

NORTHWESTERN DIVISION

Alaska

KL7CDF . . . 60.435-85-237-C-38
 W17DEM . . . 3-1-1-A-1

Idaho

W7GXE . . . 2691-23-39-B-23
 K7DAS . . . 336-7-16-A-8

Montana

W7JLD . . . 2640-20-44-A-27
 K7CTI . . . 105-5-7-A-2

Oregon

W7GUI . . . 54.144-96-188-B-32
 W7PLI . . . 2970-27-38-A-20
 K7AWH . . . 1071-17-21-A-14

Washington

W7PQE . . . 206.400-192-361-C-65
 W7DYQ . . . 121.764-146-278-B-53
 W7CMO . . . 57.680-103-188-C-30
 K7CHH . . . 51.585-95-181-A-41
 W7CAB . . . 17.289-51-113-B-38
 W7IEU . . . 10.800-50-72-B-61
 K7KGP . . . 9954-42-79-A-60
 W7JEN . . . 8712-44-66-C-18
 K7APJ . . . 7128-36-66-A-18
 W7AEA . . . 30.45-29-35-C-4
 K7HFP . . . 1938-17-38-A-16

PACIFIC DIVISION

Hawaii

KH6DLF . . . 90.375-125-241-C-45
 KH6QH . . . 59.085-101-195-A-60
 KH6DJP . . . 31.524-74-142-A-36
 KH6AXX . . . 12.282-46-89-AB-38
 KH6DDZ . . . 1106-14-27-A-10
 KH6DDB . . . 810-10-27-A-39
 KH6DMW . . . 486-9-18-A-6

Nevada

W7KEV . . . 78.000-131-200-B-39
 W7VII . . . 3225-25-43-C-7
 W7TVF . . . 1836-18-34-C-16

Santa Clara Valley

W6KEV . . . 240.948-194-414-C-66
 W6HOC . . . 231.762-214-361-C-50
 W6SR . . . 207.861-193-359-C-85
 W6ATO . . . 126.351-139-303-C-72
 K6HOR . . . 104.148-132-263-BC-47
 W6UFP . . . 81.534-127-214-C- -
 W6PYM . . . 46.800-100-156-C-40
 W6JKJ . . . 35.424-82-144-B-25
 K6UYZ . . . 27.306-74-123-C-32
 K6BWX . . . 25.347-71-119-A-67
 W6UOV . . . 24.840-69-120-C-21
 W6QDE . . . 14.151-63-89-C-18
 K6IEC . . . 9471-41-77-A-21
 W6ADTA . . . 6912-48-48-C-20
 W6RFF . . . 2808-24-39-BC- -
 K6BOB . . . 1530-15-34-B-15
 W6HRS . . . 1122-17-22-AB- -

East Bay

W6KG . . . 377.541-237-531-C-92
 W6BSY . . . 143.148-158-302-C-60
 W6PQW . . . 76.818-118-217-C-60
 W6IPH . . . 57.570-101-190-C-34
 W6ZSS . . . 44.640-93-160-A-60
 W6KEK . . . 30.456-72-141-C- -
 W6GEB . . . 24.750-66-125-A-43
 W6KGQ . . . 6732-34-66-B-20
 W6FLT . . . 5760-32-60-C-12
 K6LGH . . . 5640-40-47-C-10
 W6EJA . . . 1536-16-32-B- -
 W6LDD (W6s JHV LDD) . . . 297.540-228-435-C-96
 W6RCC (W6s RCC TI) . . . 150-5-10-C-2

San Francisco

W6WB . . . 215.340-194-370-C- -
 K6ANP . . . 70.308-124-189-C-88
 W6MUF . . . 54.075-103-175-C-30
 W6ERS . . . 38.715-87-149-A-75
 W6GQK . . . 29.862-79-126-C- -
 W6LTX . . . 16.830-55-102-C-22
 W6RZS . . . 5394-31-58-B-12
 W6WLX . . . 387-9-15-A-8

Sacramento Valley

W6ONZ . . . 168.503-167-339-C-57
 W6GRX . . . 137.700-150-360-C-62
 W6NRZ . . . 92.964-127-244-C-64
 W6BLZ . . . 74.124-116-213-C-81
 W6BIL . . . 54.336-36-53-C- -
 W6AF . . . 3864-28-46-C-18
 K6CNV . . . 1530-15-34-A- -

San Joaquin Valley

K6RTK . . . 77.682-121-214-C-48
 W6BVM . . . 35.840-80-150-C- -
 W6BHY . . . 21.750-69-105-C-15
 W6BFOL . . . 15.300-30-51-A-13
 K6ROU . . . 3750-25-50-AB-20
 K6OZL . . . 2304-21-32-A-15
 W6AFKF . . . 1536-16-32-A-11
 K6SMZ . . . 1530-17-30-B-4
 W6USV . . . 693-11-21-A-3
 W6PMW (10 oprs.) . . . 5568-32-58-A-90

ROANOKE DIVISION

North Carolina

W4PLL . . . 331.326-277-466-C-59
 K4QIU . . . 180.540-177-340-BC-40
 W4GXB . . . 102.165-139-145-C-34
 W4AHT . . . 52.728-104-169-B-40
 W4MKT . . . 33.235-85-131-C-25
 K4VNY . . . 12.324-52-79-B- -
 K4YEP . . . 3993-33-37-A-10
 W4LYV . . . 2418-26-31-C- -

South Carolina

K4YYL . . . 20.085-65-103-A-31
 K4PIA . . . 2106-26-27-A-6

Virginia

W4YHD . . . 773.544-334-772-C-90
 W4RQR . . . 512.451-291-587-C-65
 W4KFC . . . 438.572-268-543-AC-38
 W4JAT . . . 418.770-270-517-C-64
 K4GMX . . . 219.372-202-362-C-70
 W4PRO . . . 174.420-171-340-C-36
 K4ZKI . . . 76.544-128-200-B-33
 W4ZM . . . 71.796-33-193-A-23

W4JGF . . . 61.803-109-189-B-36
 W4WBC . . . 59.166-114-173-BC-21
 W4PNK . . . 45.477-93-163-C-20
 K4OMR . . . 37.248-97-128-C-34
 W4PHL . . . 24.642-74-111-B-36
 W4IALJ . . . 22.470-70-107-B-32
 K4NAA . . . 20.064-66-102-C-20
 W4KMS . . . 8352-48-58-B-16
 W4AKP . . . 6336-33-64-B-10
 W4HOS/4 . . . 4512-32-47-B-14
 K4IKF . . . 48-4-4-A-1
 W4KXV (W4s KXV RIM) . . . 599.794-299-670-AC-96
 K4MJZ (K4s MJZ MXF) . . . 83.328-128-217-C-44
 W4DVT (W4s DLA DVT) . . . 2987-29-35-A-9

West Virginia

W8UMR . . . 45.864-98-156-A-18

ROCKY MOUNTAIN DIVISION

Colorado

K8SLD . . . 162.027-153-353-A-84
 W8CDP . . . 35.532-84-141-B-27
 W8TW . . . 12.393-51-81-A-29

Utah

W7BAJ . . . 12.240-51-80-A-34
 W7POU . . . 8550-38-75-A-36

New Mexico

W5FJE . . . 121.121-143-283-AC-64
 W5CK . . . 104.058-141-246-B-48
 K5UYF . . . 41.454-94-147-B-23
 W5LEF . . . 14.469-53-91-B-28

Wyoming

W7PGS . . . 324.324-231-468-C-54
 W7ABO . . . 19.116-69-108-B-35

SOUTHEASTERN DIVISION

Alabama

K4HPR/4 . . . 115.632-146-264-C-68
 W4KAC . . . 54.240-120-152-C-33
 K4BQU . . . 4320-32-45-A-20
 K4KQN . . . 3162-31-34-A-16

Eastern Florida

W4DQS . . . 491.550-200-565-C-80
 W4HUE . . . 362.946-251-482-C-72
 K4TML . . . 342.702-276-114-C-38
 W4AZK . . . 240.660-210-382-C-38
 W4EIE . . . 77.490-126-205-C-56
 W4UHC . . . 67.965-115-197-AB-28
 K4PDV . . . 48.471-107-151-BC-50
 W4YK . . . 32.625-87-125-AC-12
 W4NYF . . . 24.402-83-93-C-29
 K4ZRU . . . 11.502-64-71-A-25
 W4OTK . . . 3172-26-42-B-13
 W4ZQK . . . 3132-29-36-A-24
 W4EEQ . . . 2673-27-33-B-10
 W4KPB . . . 1914-22-29-A-22
 W4IEH . . . 972-18-18-C-8
 W4ORE/4 . . . 48-4-4-A-2

Western Florida

W4HQN . . . 137.172-161-284-C- -
 W4BGO . . . 134.475-163-275-C-26

Georgia

W4YWX . . . 307.824-212-484-C-80
 W4CYA . . . 277.992-234-396-B-71



Southern Rhodesia's Z8JJ again copped the sheepskin for his country with 143,640 . . . one of the top c.w. scores from Africa. The rig is a 40 watt 807 and AR7E receiver.

QST for

W4FIJ...264,495-231-383- C-82
 W4DXI...247,104-216-382-BC-74
 W4MCM...99,696-134-248- B-56
 K4BVD...53,424-106-168- A-27
 K4TEA...45,552-104-146- A-35
 W4PDP...37,674- 91-138- B- -
 W4JII...36,960- 80-154-AB-25
 W4ZKU...32,208- 88-122- A-30
 W4LDD...2268- 27- 28- A-35

SOUTHWESTERN DIVISION

Los Angeles

K6VTO...393,066-261-502- C-72
 W6TPJ...283,977-227-417- C-83
 W6HJT...206,460-186-370- C-61
 W6APH...79,758-126-211-BC-63
 W6ID...57,300-100-191- B-27
 W6FKZ...43,320- 95-152- C- -
 K6AGR...29,970- 74-135- C-36
 K6CJF...16,008- 58- 92- A-32
 W6YVO...15,834- 58- 91- B-30
 W6RCV...15,100-50-102- B-33
 W6WDH...12,876- 58- 74- C-18
 W6ES...10,062- 43- 71- A-30
 W6CYV...10,011- 47- 71- C-12
 K6OCY...7920- 40- 66- C-19
 W6NEX...6327- 37- 57- B-27
 W6AM...2430- 27- 30- C-10
 K6PXQ...2376- 22- 36- A-20
 K6UFX...2079- 21- 33- C-11
 W6AYF...2046- 22- 31- B-13
 K6ICS...1488- 16- 31- A-10
 W6EOL...1476- 18- 28- A-15
 W6UFI...120- 5- 8- A- 3
 W6CTO...48- 4- 4- C- 1
 K6CQF...3- 1- 1- C- -
 W6RW (5 oprs.)
 602,301-301-667- C-90
 K6EVR (W6UED, K6EVR)
 408,726-261-535- C-75
 W6ANN (W6s ANN DFY)
 162,024-172-314- C-59
 K6KII (K6s KII OXC)
 160- 8- 8- A- 3

Arizona

W7ATV...50,718-107-158- C-33
 K7BWH...13,260- 52- 85-BC-30
 W7ENA...5376- 32- 56- A-26

San Diego

W6CAE...118,629-147-269- C-35
 W6RAN...104,676-143-244- C-49
 W6CHV...90,420-137-220- B-57
 K6ECC...80,010-127-210- B-25
 W6CUQ...80,919-111-243- C-38
 W6EPZ...70,143-103-227- C-34
 W6LRU...14,094- 54- 87- A- 7
 W6JH...5670- 35- 54- B-12
 K6LLE...4704- 28- 56- A- 9
 W6BGF...2880- 30- 32-AB-13
 W6WSW...429- 11- 13- B-34
 W6YZD...297- 9- 11- B- 4
 W6AGR...198- 6- 11- A- 3
 W6WSV...126- 6- 7- B- 8

Santa Barbara

W6ULS...184,518-153-402- C-52
 W6AGO...65,688-119-184- C-25
 W5GSE/6...37,146- 82-151- C- -

WEST GULF DIVISION

Northern Texas

K5KBH...221,562-198-373- C-78
 W5ZSX...117,810-154-255- B-60
 W5QF...56,052-108-173- A-38
 W5OLG...39,198- 94-159- C-60
 W5KLB...22,680- 63-120- B-40
 W5MTL...13,509- 57- 79- A-23
 K5ATD (K5s ATD BQ)
 81,270-126-215-AC-40
 K5KOR (K5s HWK KOR)
 27,360- 76-120-AB- -

Oklahoma

W5DQV...90,450-134-225- C-38
 W5SNZ (W5SNZ, K5s QNO QNZ)
 7503- 41- 61- A-23

Southern Texas

K5JNY...366,996-257-476- C-75
 K5JZY...249,333-217-383- B-75
 W5ZD...238,158-202-393-BC- -
 W5PM...95,580-135-236- C-52

W5MCO...14,628- 53- 92- A-42
 K5LGH...4080- 34- 40- A-11
 K5LLJ...216- 8- 9- A-39

CANADIAN DIVISION

Maritime

VE1PQ...170,880-160-356- B-56
 VE1ZZ...140,452-148-317-AB- -
 VE1EK...72,450-115-210- A-39
 VE1IM...51,106-101-170- B-41
 VE1EP...6864- 44- 53- C-12
 VO2NA...5983- 37- 53- B-40
 VE1DB...2520- 20- 42- B-11
 VO1AW...561- 11- 17- A-10

Quebec

VE2YU...174,303-181-321- B-60
 VE2AY...112,827-143-263- A-51
 VE2BV...55,080- 85-234- B-48
 VE2WA...45,450-101-150- B-20
 VE2UN...41,400- 92-150- B-31
 VE2AD*...7605- 39- 65- B-16
 VE2AEV...2700- 27- 34- B-20
 VE2AKF...396- 11- 12- A- 3
 VE2IK...36- 3- 4- A- 3
 VE2WW (VE2s UQ WW)
 482,232-284-566- B-88

Ontario

W0AII/VE3
 413,184-256-538- C-54
 VE3ES...106,860-130-274- A-51
 VE3BG...30,345- 85-119- C-18
 VE3DCI...30,015- 87-115- B-30
 VE3BGA...12,012- 44- 91- A-29
 VE3DGW...9072- 42- 72- B-27
 VE3RIT...8928- 48- 62-AC-36
 VE3AHU...3465- 33- 35- B- 6
 VE3MZ...1512- 18- 28- A- 6
 VE3DFE...192- 8- 8- A- 5
 VE3JU...144- 6- 8- A- 1
 VE3RM*...3- 1- 1- A- -
 VE3UOT (VE2NI, VE3CKA,
 VOIDS)...92,745-135-229- C-48
 VE3BWW (VE3s BYE BWW)
 53,460-110-162- B-41
 VE3ATZ (2 oprs.)
 2736- 24- 38- A-38

Manitoba

VE4XO...51,975- 99-175- B-38
 VE4SX...3861- 33- 39- A-12

Alberta

VE6HG...16,422- 46-119- A-39
 VE6BY...10,716- 47- 76- B-14
 VE6TP...5712- 34- 56- B-11

British Columbia

VE7BGG...8505- 35- 81- A- -
 VE7YE...4452- 28- 53- B-20

AFRICA

Canaries

EA8CG...60,396- 42-481- A- -

Spanish Morocco

EA9AP...123,066- 53-775- A-30

Algeria

FA3DU...9520- 28-116- A-17
 FA9VJ...4904- 12-139- A- -

French West Africa

FF8BF...30,303- 37-274- A-12

French Equatorial Africa

FQ8AF...51,870- 39-459- A- -

Belgian Congo

OQ5IG...48,555- 39-415- A-12
 OQ5KJ...35,836- 34-353- A-29

Sudan

ST2AR...271,719- 57-1589- B-65

Egypt

SU1MS...15,760- 20-266- A-14

Northern Rhodesia

VQ2GW...43,092- 36-399- A-15
 VQ2MS...17,526- 23-254- A-15
 VQ2W...2436- 14- 58- A- 5
 VQ2JG...1071- 7- 51- A-54

Tanganyika

VQ3CF...68,931- 37-621- A-27



VR2DK proved mighty popular with the c.w. gang . . . shown here at the rig, modified BC347A and G-40A.

Kenya

VQ4FK...110,823- 41-901- A- -

Nigeria

ZD2JKO...191,277- 53-1203- A-49
 ZD2GUP...16,641- 43-129- A- 5

Southern Rhodesia

ZE8JJ...143,640- 45-1064- A-47
 ZE2JS...117,796- 49-807- A-65
 ZE5JU...91,920- 40-766- A-42

Union of South Africa

ZS6AOU...116,370- 45-868- A-46
 ZS6AVP...33,048- 27-410- A-22
 ZS1O...14,880- 32-160- A-34

Swaziland

ZS7M...3536- 13- 91- A- 4

ASIA

Formosa

BV1USB...17,172- 27-212- A-40
 BV1USC...3990- 15-133- C- -

Saudi Arabia

HZ1HZ...97,458- 37-878 A-31

Japan

JAI1VX...210,273- 57-1231- C-45
 JA6AC...64,125- 45-477- A-29
 JAI1YL...41,670- 45-315- A- -
 JA1CE...40,992- 28-486- A-47
 JA2JW...40,698- 42-333- A-30
 JA7AD...38,646- 38-339- A-30
 JA3IS...27,420- 30-306-AB-26
 JA3JM...22,170- 30-247- A-20
 JA1CJN...13,824- 18-261- A-48
 JA3BB...11,172- 28-133- B-14
 JA5FQ...10,500- 28-125- A- -
 JA7KY...7752- 19-136- A-14
 JA3FV...6030- 15-134- A- 2
 JA2WB...5610- 17-110- A-25
 JA1BWA...4608- 12-128- A- -
 JA1BTG...3510- 10-117- A- -
 JA1AB...3471- 13- 90- A- -
 JA1BLZ...3456- 12- 96- A- 6
 JA8LN...2520- 7-120- A-24
 JA1BUN...2167- 11- 66- A- -
 JA2DN...1989- 13- 51-AB- 6
 JA2AJI...1782- 9- 66- A- -
 JA3KM...1323- 9- 49- A-11
 JA2AAF...1316- 7- 64- A- 9
 JA3BG...1112- 8- 47- A-14
 JA3EK...1010- 10- 34- A- 3
 JA1DKA...576- 6- 32- A- -
 JA1GU...294- 7- 14- A- -
 JA1BNW...243- 3- 27- A- -
 JA8GR...234- 6- 13- A- -
 JA1ACA...165- 5- 11- A- 1

JAI1EL...81- 3- 9- A- 4
 JAI1CJQ...36- 3- 4- A- -
 JAI1DCY...24- 2- 4- A- -
 JA6AKW...24- 2- 4- A- -
 JAI1WV...9- 1- 3- A- -
 JAI1BOK...3- 1- 1- A- -

Lebanon

OD5LX...11,004- 28-133- A- 6

Asiatic Russian S.F.S.R.

UA0KZA...93,200- 20-1554- A- -
 UA9VB...50,868- 36-471- B-50
 UA0KKA...18,684- 27-232- B-38
 UA0GF...11,508- 14-274- A- -
 UA0AG...8586- 18-161- B- -
 UA9KPN...7248- 16-151- A- -
 UA0FG...3924- 12-109- A-34
 UA0KZB...3888- 16- 81- B-50
 UA0KUA...3552- 16- 76- B- 9
 UA9OB...2340- 13- 60- A- -
 UA0VC...630- 9- 24- A- -
 UA9KKB...492- 6- 28- B-20
 UA9KYA...180- 6- 10- A- 3
 UA9KCO (3 oprs.)
 121,680- 40-1014- A-73

UA9KFC (5 oprs.)
 39,132- 36-364- B-37

UA9KUV (3 oprs.)
 14,768- 26-192- B-35

UA0KDA (2 oprs.)
 12,222- 14-291- A- -

UA9KCA (3 oprs.)
 10,926- 18-203- B- -

UA9KDD (3 oprs.)
 8772- 17-172- A- -

UA9KOG (3 oprs.)
 8484- 14-202- B- -

UA9KAC (4 oprs.)
 5838- 14-141- B- 7

UA9KAG (2 oprs.)
 3516- 12-100- B-36

UA9KEC (2 oprs.)
 2688- 14- 64- A- -

Turkoman

UH8KAA...16,524- 18-316- A-19

Uzbek

UI8AD...3819- 19- 67- A- -

Tadzhik

UJ8KAA...3458- 13- 90- B-12

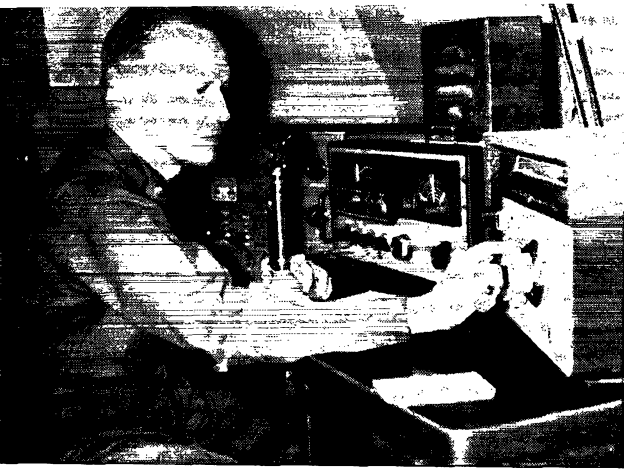
Kazakh

UL7HB...6912- 12-192- B- -

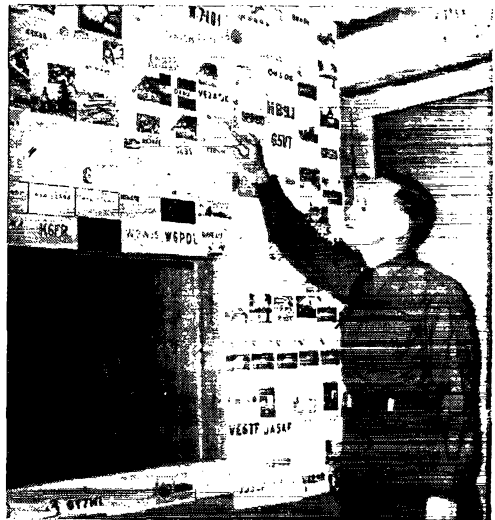
UL7KKB (4 oprs.)
 4794- 17- 94- B-20

Hong Kong

VS6AE...9328- 16-196- A-16



K1DLQ, a major in the Army, put HL9KR in business in the phone contest giving a new one to many enthusiastic callers. Right: Eric inspects the shack wallpaper, and above finds HL9KR handing out coveted Korea contacts.



EUROPE		G5UR..... 39,336- 44-298- A-50		Czechoslovakia		SL5AX (SM2COL, SM4AFJ) 11,989- 19-211- A-24	
<i>Germany</i>		<i>Scotland</i>		OK1ZL.....117,282- 66-807- B-61		<i>Poland</i>	
DL9PF.....164,958- 57-966- A-54	GM3EOJ.....169,176- 56-1007- A--	OK1JX.....61,560- 54-383- C-28		OK3KPE ¹⁰ 61,560- 40-513- A--		SP6FZ.....116,052- 49-784- B-55	
DJ2IB.....164,528- 56-983- B-43	GM8SQ.....36,024- 38-316- A--	OK1RX.....45,320- 40-380- A--		OK3EA.....44,451- 33-453- A--		SP8HR.....20,381- 32-215- A-24	
DJ1BZ.....141,474- 57-833- B-66	GM3HXF.....6,213- 19-109- A-10	OK3AW.....26,107- 27-349- A--		OK1VW.....26,080- 40-219- A-21		SP8MJ.....20,268- 36-188- A-32	
DJ2BW.....72,816- 37-656- B-17	GM3UU.....4,797- 13-123- A- 7	OK1BW.....16,352- 32-172- A-28		OK2KFP.....7,760- 16-162- A--		SP6AA.....14,420- 35-138- A-22	
D17BQ.....44,748- 44-339- A--	GM3MCH.....3,780- 14- 90- A- 4	<i>Wales</i>		OK2QR.....5,733- 21- 91- A--		SP6YL.....11,200- 28-134- A-12	
DL1YA.....36,000- 50-240- B--		GW3JI.....299,460- 69-1449- A--		OK1LM.....4,914- 14-119- A--		SP6VC.....9,240- 22-140- A-22	
DM2ATL.....9,646- 26 125- A-19		<i>Hungary</i>		OK1WD.....4,914- 14-119- A--		SP6KB ¹²6,000- 20-100- A- 4	
DJ4VI.....9,477- 13-243- A-20		HA8KCU.....15,990- 26-205- A--		OK2AJ.....4,190- 10-141- A-14		SP9DN.....4,318- 17- 85- A- 56	
DJ2JO.....4,993- 27- 53- A--		HA5BW.....1,287- 13- 33- A--		OK1KS ¹⁴3,066- 21- 49- A--		SP6XA.....2,808- 18- 52- A-26	
DJ1IH.....2,652- 17- 52- A--		HA5BI.....1,053- 9- 40- A- 4		OK1BI.....2,784- 16- 58- A--		SP8LU.....2,223- 19- 39- A-10	
DL9YC.....1,776- 16- 37- A--		HA5KFR (3 oprs.)		OK1AEH.....1,521- 13- 39- A--		SP8HU.....1,661- 13- 43- A--	
DJ2AE.....96- 4- 8- B--		159,159- 53-1004- A--		OK1ZW.....1,104- 12- 31- A--		SP3HD.....592- 8- 25- B--	
		HA1KSA (4 oprs.)		OK2KAU.....546- 6- 30- A--		<i>Iceland</i>	
		119,901- 51-786- A--		OKINK.....36- 3- 4- A- 1		TF3MB.....50,727- 37-457- A-34	
		HA5KDQ (4 oprs.)				TF2WEN.....48,050- 31-519- A-22	
		46,560- 40-388- B--				TF3AB.....37,278- 38-327- A--	
						TF2WEZ.....14,628- 23-212- A--	
						<i>European Russian S.F.S.R.</i>	
<i>Spain</i>		<i>Switzerland</i>		<i>Belgium</i>		UA1QT.....33,120- 30-368- B--	
EA4CE.....42,066- 38-369- A-26		HB9QQ.....96,396- 58-554- A-25		ON4LX.....237,850- 67-1184- A-52		UA1CC.....6,486- 23- 94- B--	
EA1CP.....18,675- 25-249- B-12		HB9DX.....66,234- 38-581- A--		ON4GL.....161,510- 62-871- A-36		UA1KAS.....5,580- 15-124- B--	
EA3KT.....15,471- 27-191- A-18		HB9UD.....1,365- 13- 35- A-26		ON4WE.....9170- 14-219- A-12		UA3TI.....2,828- 14- 68- A-10	
EA5FU.....3,069- 11- 93- A--		HB9NL.....962- 13- 25- A--				UA1FL.....2,484- 16- 52- A--	
EA3CK.....1,950- 10- 65- A--						UA4KWB.....1,728- 16- 36- B-54	
						UA3TV.....1,620- 15- 36- B--	
						UA3RM.....1,287- 13- 33- B--	
						UA1KUB.....891- 11- 27- A--	
						UA3YR.....504- 12- 14- A-10	
						UA3TA.....18- 2- 3- A--	
						UA3KWA (multiopr.)	
						43,365- 35-413- B-96	
						UA1KAG (3 oprs.)	
						27,318- 29-314- B--	
						UA3KMB (3 oprs.)	
						90,399- 23-132-AB-16	
						UA1KAQ (3 oprs.)	
						4,032- 14- 96- A--	
						UA3KOE (2 oprs.)	
						1,910- 10- 64- A--	
						UA4KSA (3 oprs.)	
						1,133- 11- 35- A- 8	
						UA3KYA (3 oprs.)	
						56- 4- 5- A--	
						<i>Ukraine</i>	
						UB5WF.....388,734- 67-1940- B--	
						UB5KKB.....8832- 23-128- A-35	
						UB5EF.....8,450- 25-116- A-11	
						UB5QF.....5,985- 21- 95- B--	
						UB5KAW.....4,635- 15-103- A--	
						UB5JT.....3,792- 16- 18- A-24	
						UB5KEP.....1,632- 16- 34- B--	
						UB5KAD (3 oprs.)	
						98,176- 47-697- B-77	
						UB5KFF (3 oprs.)	
						55,040- 40-542- A-43	
						UB5KAU (3 oprs.)	
						930- 10- 31- A--	

UB5KBG (2 oprs.)
891- 11- 27-A- -
White Russian S.S.R.
UC2AA...152,163- 53-964- B-37
UC2KAA (2 oprs.)
17,875- 25-243- A-21
UC2KAB (3 oprs.)
5508- 17-108- B-33

Azerbaijan
UD6AM...11,418- 22-175- A-35
UD6KAB...8370- 18-155- B-33
UD6KEA...210- 5- 14- A- -

Georgia
UF6FB...4524- 13- 16- A- -
UF6PB...3399- 11-103- A- -
UF6KAF (3 oprs.)
103-A- - 61,425- 35-585- B-72
UF6KPA (3 oprs.)
3708- 12-103- A- -

Armenia
UG6AW...15,312- 22-236-AB- -
UG6KAA...5355- 15-119- A- -
UG6LA...1375- 11- 45- B- -

Lithuania
UP2AC...10,764- 23-156- B- -
UP2KBC (UP2s KBC ND NP)
3600- 16- 75- B-24

Latvia
UQ2KAA...8463- 21-137-AB- -
UQ2BP...4080- 17- 80- A-10

Estonia
UR2KAE...37,555- 29-443- B- -

Roumania
YO3FD...11,118- 17-218- A- -
YO6KBA...9144- 24-127- A- -
YO3AC...342- 6- 19- A- -

Yugoslavia
YU1YE...24,174- 34-240- A-15

NORTH AMERICA

Cuba
CO7PG...42,744- 39-367- A-12
CM8RM...25,760- 14-630- A- -
CO8EM...2925- 15- 65- A- 3

Guadalupe
FG7XF...57,660- 31-620- A- -

San Andres and Providencia
HK9AI...147,000- 50-980- B- -

Panama
HP1AC...180- 6- 10- A- -

Greenland
KG1BX¹³...25,380- 36-235- B- 7

Guantanamo Bay
KC4AP...7140- 17-140- A- 7

Puerto Rico
KP4AOO...701,136- 81-2886- A-75
KP4CC...485,292- 74-2186- B-65

Swan
KS4AZ (W4s JNE KFC, KS4AZ)
518,568- 68-2542-AB-2

Virgin Islands
KV4CG...28,204- 22-429- A- -

Canal Zone
KZ5TD...457,650- 75-2034- A-58
KZ5LC...310,824- 72-1439- A- -

British Honduras
VPI1JH¹⁴
1,377,918-114-4037-AB-86

Turks and Caicos
VP5ME...575,343- 81-2393- A-51

Barbados
VP6AF...58,050- 50-387- A-28
VP6YB (W8s TUO VPC)
11,609- 13-300- B- 7

Bahamas
VP7NT...525,063- 77-2273- A-53

Bermuda
VP9EO...204,300- 60-1135- A-37

Mexico
XE1PJ...102,186- 42-811- A-17
XE1POE...11,004- 28-131- A-15

Nicaragua
YN4AB...63,288- 27-782- A-65

OCEANIA

Philippines
DU7SV...119,760- 48-865- B- -

New Caledonia
FK8AH...107,484- 53-679- A- -

Marianas
KG6FAE (4 oprs.)
337,392- 66-1704- C-91

Midway
KM6BQ...146,205- 45-1083- A-28

Wake Island
KW6CQ¹⁵...7394- 21-118- A- 6

Australia
VK2GW...341,670- 70-1627- A-65
VK3MR...118,332- 57-692- A- -
VK2VN...36,846- 46-267- A- 8
VK2AB...16,182- 31-174- A-12
VK3RJ...11,736- 24-163- A- -
VK4XW...9015- 15-201- A-23
VK3ARX...7442- 23-108- A- 9
VK5JT...7429- 19-131- A- -
VK3HL...5460- 20- 91- A- 8

Fiji Islands
VR2DK...62,155- 31-673- A-37

New Zealand
ZL1MQ...287,763- 71-1351- A-43
ZL2PM...62,178- 43-482- A-21
ZL1AFW...29,070- 34-285- A-15
ZL3AM...25,825- 25-345- A- -

SOUTH AMERICA

Chile
CE3AG...374,070-74-1685-AC-42
CE1AD...260,208- 52-1668- B-40
CE3LV...53,724- 44-407- B- -

Bolivia
CP3CD...5226- 13-134- A- -

Uruguay
CX2AZ (CX2AZ, CX7CO,
CX9AJ), 295,920- 60-1644- A- -

Ecuador
HC2IU...181,720- 56-1083- A-58

Colombia
HK3TH...90,132- 37-812- B- -

Argentina
LU5DDF...126,763- 49-873- A-65
LU7AS...94,521- 49-643- B-37
LU7CW...5603- 13-146- A-15

Netherlands West Indies
PJ2AL...55,584- 36-520- A- -
PJ2AV...53,280- 20-888- A-24

Brazil
PY1ADA...469,854- 77-2034- B-45
PY5TH...41,667- 43-323- B-18
PY7VBR...15,540- 14-372- A-18
PY4AXN...963- 9- 36- B-10

British Guiana
VP3YG...481,500- 75-2141- A-52

Venezuela
YV5GO...389,781- 69-1883- B-66
YV5AGD...39,162- 61-214- B-21

Paraguay
ZP9AY...216,540- 60-1211- A-70

¹ W3MFW, opr. ² W3WJD, opr. ³ Hq. staff — not eligible for award. ⁴ W1WPR, opr. ⁵ K4MXXF, opr. ⁶ K5ABV, opr. ⁷ W2LHL, opr. ⁸ VE2AGM, opr. ⁹ VE3CQH, opr. ¹⁰ OK3WX, ¹¹ OK1AAU, opr. ¹² SP6RT, opr. ¹³ W9EHR, opr. ¹⁴ W0NWX, opr. ¹⁵ K6QPG, opr.

PHONE SCORES

ATLANTIC DIVISION

Eastern Pennsylvania
W3DHM...318,150-210-505- C-82
W3ALB...222,855-179-415- C-70
W3ECR...117,747-147-267- C-39
W3KT...82,320-112-245- C- -
W3IMV...65,205-105-207- B-32
W3EQA...56,964-101-188- C-40
W3EAN...37,179- 81-153- C-22
W3ZSS...32,076- 81-132- C-37
W3MQC...29,586- 68-145- C-27
W3GHS...20,340- 60-113- B-12
K3JRK...13,260- 52- 85- C-18
W3ORU...7790- 41- 64- B-10
W3MWC...7573- 47- 53- A-20
W3LEZ...7011- 41- 57- A-15
W3PHL...6630- 34- 65- C-28
W3GHM...6048- 36- 56- B- 7
W3CAA...5580- 35- 56- A-17
W3GHD...4950- 33- 50- B- -
W3AEM...432- 12- 12- B- 6
W3GRS...363- 11- 11- A- -
W3KQF (W3s KFQ QKV)
145,080-155-312- C-80

W2BUI...12- 2- 2- A- 2
WA2FFC...12- 2- 2- A- 2

Western New York

K2GXI...180,363-177-341- C-78
W2PUN...118,008-149-264- B-48
W2SNI...16,520- 59- 94- B-33
W2VUF...11,816- 56- 71- B-25
W2UVE...7965- 45- 59- B-30
W2TQR...7611- 43- 59- A- -
K2UNY...6270- 38- 55- A-12
W2QWS...4554- 33- 46- C-25
WA2CJO...1326- 17- 26- A- -
K2ITM...585- 13- 15- B- 4
W2MYN...90- 5- 6- A- 3
K2SSX...12- 2- 2- A- 1

Western Pennsylvania

W3MBN...10,800- 50- 62- C-12
W3ROA...8448- 44- 64- A- -

CENTRAL DIVISION

Illinois

W9NZM...159,720-165-331- C-70
W9WNV...32,319- 81-133-AC-26
K9BGL...29,250- 78-125- A-68
W9PVA...22,713- 67-113- B-32
W9JJV...20,790- 70- 99- C-37
W9IVG...16,632- 63- 88- C-26
W9GAI...7755- 47- 55- A-38
W9PNE...1932- 23- 28- A-13
W9QLD...882- 14- 21- B- 7
K9OSG...864- 16- 18- A- 6
W9VTV...645- 15- 15- C-26
K9ORC...363- 11- 11- A-12
W9LNC...300- 10- 10- A- 4
K9OCU...147- 7- 7- A- 3

Indiana

K9CUI...71,615-115-216-AB-70
W9YSQ...41,031- 97-141-AC-29
K9ECE...13,944- 56- 83- A-43
W9TKV...4080- 34- 40- B-15
W9CUC...1800- 20- 32- B-26
W9UEM...663- 13- 17- A- 5
W9TDU...144- 6- 8- C- -

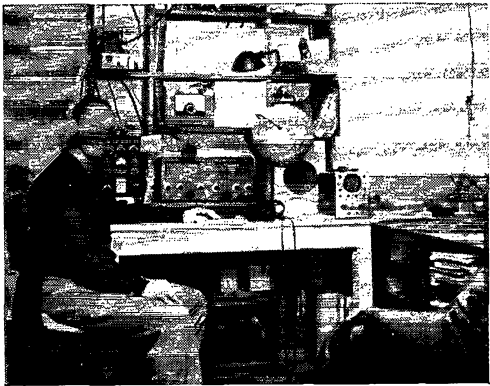
Wisconsin

W9EWC...216,656-176-411- C-72
W9BCV...27,015- 87-115- B-26
W9MBF...26,676- 78-114- B-30
W9RH...12,312- 54- 76- C-27
W9NLJ...2250- 25- 30- A- 8
W9QYW...1500- 20- 25- B- 8
W9SFK...882- 14- 21- C- -
K9ABP...432- 12- 12- A- 4

Mad.-Del.-D. C.
W3AYD...48,654-102-159-AB- -
W3DRD...35,340- 95-124- B-29
W3IYE...32,256- 84-128- C-37
W3NXX...990- 18- 19- A- 5
W3ML...240- 8- 10- C- 5
W3BVO...90- 5- 6- B- -
W3GRF (W3s FYH GRF)
W6HOH...123,924-138-300- C-40
W3GQF (7 oprs.)
23,506- 73-108-ABC-27

Southern New Jersey

W2ZX...132,800-160-278- C- -
W2DMR...44,814- 97-154- C-49
W2QKJ...10,074- 46- 73- B-40
W2SDB...7866- 46- 57- C-19
W2SZP...5832- 36- 54- A-35
W2ESG...5632- 32- 60- B-12
K2HBY...2300- 25- 44- A-21
K2MBT...2232- 24- 31- C- 6
K2UTR...1440- 16- 30- A-16
K2AIM...780- 13- 20- B- -
K2BQW...767- 13- 20- B-23
W2SDO...765- 15- 17- B-12
K2YEL...429- 11- 13-AC-12
K2OEA...300- 10- 10- A- 4
W2REB...180- 6- 10- B- 5
K2MPV...108- 4- 9- B- 3
W2ADA...75- 5- 5- A- 4



T12RO lived things up from Costa Rica in the phone section scoring 119,534 with this TBS rig and SX-71 inhaler.

K9ENB.....216- 8- 9- B--

DAKOTA DIVISION

North Dakota

W0JWL.....9114- 49- 62-AB-30

Minnesota

W0EKS.....7776- 48- 54- B-27
W0VAF.....7020- 39- 60- B-26
K00BP.....3483- 27- 43- A-16
W0VIP.....2484- 23- 36- B--
K0PAU.....192- 8- 8- A-11

DELTA DIVISION

Arkansas

K5GOE.....3960- 51- 66- A-30
K5EQJ.....147- 7- 7- A- 3
K5ILX.....12- 2- 2- A--

Louisiana

W5KC.....34,425- 85-135-AC-40
K5TTA.....2592- 27- 32- A--

Mississippi

K5LYC.....507- 13- 13- B- 4

Tennessee

K4LPW.....84,216-121-232- B-50
W4ODR (6 oprs.)
14,151- 53- 89- C-58

GREAT LAKES DIVISION

Kentucky

W4NWT.....33,375- 89-125- A-48
W4EPD.....2450- 25- 33- A-19

Michigan

W8WT.....36,354- 83-146- A-40
K8JOE.....4176- 29- 48- A-30
K80WR.....3552- 32- 37- A-12
K8JCB.....2418- 26- 31- B-27
K8CPU.....2352- 28- 28- C-12
K8OEZ.....1944- 24- 27- A- 6
W8IUP.....1134- 14- 27- A- 8
W8NWO (W8s NWO TWA)
244,728-206-396- C-94
W8NGO (4 oprs.)
238,572-188-423- B-90

Ohio

W8NXF.....151,862-157-322- B-63
W8ZOK.....134,505-147-305- B-60
W8BMX.....24,852- 76-109-AC-50
W8NCV.....24,840- 72-115- B-40
W8ZCC.....15,163- 59- 87- B-23
W8SMQ.....7425- 45- 55- B-17
W8PJN.....5565- 35- 53- B-20
W8GMC.....3861- 33- 39- A-15
W8NHO.....3696- 28- 41- A-38
W8MWE.....2925- 25- 39- A- 7
W8AJH.....2775- 25- 37- B-11
W8YPT.....2475- 25- 33- A-10
W8NNX.....2331- 21- 37- A--
K8HTM.....1702- 23- 25- A-26
W8DZG.....1674- 18- 31- A-18
W8NDJ.....975- 15- 22- A-17
W8VSJ.....756- 14- 17- B-10
W8EPH.....675- 15- 15- C- 5
K8KBE.....672- 14- 16- A- 9
K8DEO.....546- 13- 14- B- 5
K8IPD.....495- 11- 15- A-10
K8IPS.....36- 3- 4- A--

HUDSON DIVISION

Eastern New York

W2VRE.....27,156- 73-124- B-32
W2GBC.....22,685- 65-117- C-21
W2DVC.....14,457- 61- 79- C-30
K2UTC.....2880- 24- 40- A- 8
K2YAZ.....2592- 24- 36- A-10

N. Y. C.-L. I.

K2DGT.....118,503-133-297-AC-50
K2UXG.....11,250- 45- 88- A-26
K2KHR.....3510- 26- 45- A-10
W2WMG.....2001- 23- 29- B- C-10
K2YOR.....330- 10- 11- B- C- 4
W2TUK.....192- 8- 8- A- C- 1
K2DIL.....60- 4- 5- B- 2
K2DEM.....36- 3- 4- C- 1
K2VBJ.....12- 2- 2- B- 1
K2AIR (4 oprs.)
40,185- 95-141-AC-85

Northern New Jersey

W2BTG.....39,216- 83-152- B-40
W2DJT.....16,665- 55-101- A-39
K2HFC.....13,818- 49- 94- A-35
W2FFQ.....12,054- 49- 82- B-44
W20XG.....3192- 28- 38- A- 9
K2UFM.....2277- 23- 33- B--
K2RBD.....1860- 20- 31- A-17
K2RGS.....363- 11- 11- A- 5
W2AGBV.....154- 7- 8- A-10
W2EQS.....27- 3- 3- C--

MIDWEST DIVISION

Iowa

K0LFA.....6680- 36- 60- B-48
W0FDL.....2001- 23- 29- C- 6
W0DSP.....675- 15- 15- C- 8
K0LPI.....243- 9- 9- A- 7

Kansas

K0PIE.....33,768- 84-134- B-62
K0GVO.....2128- 28- 28- B-60
W0VFE.....1050- 22- 25- A- 6

Missouri

K0LFY.....48,000-100-160- A--
W0LBB.....27,864- 88-108- C-15
W0BTD.....14,976- 64- 78- A-30
W0MCX.....6669- 39- 57- B-40
K0RAL.....1449- 21- 23- B- 6
K0WQZ.....819- 13- 21- B- 3

NEW ENGLAND DIVISION

Connecticut

W10KG.....52,920-105-168- C-45
W1BIH.....37,557-107-117-AB-20
W1AW4.....15,600- 52-100-AC-20
W1ICP2.....6885- 27- 85- C--
W1OJR.....6536- 43- 52- A-20
W1DGL3.....2160- 24- 30- A--
W1ICV.....363- 11- 11- B- 8
W1ETF (WIETF, K1s ANV HTV)
157,035-145-361- C-85

Maine

W1DIS.....51,870- 95-182- C-36
W1COP.....6120- 40- 51- B-13

Eastern Massachusetts

W1ONK 423,990-210-673-ABC-86
K1JTC.....136,456-148-316- C-59
K1DIE.....18,113- 59-103- B-26
W1OCU.....8418- 46- 61- B--
W1AOL.....6864- 44- 52- B-10
K1IMD.....5928- 38- 52- B-30
W1SGH.....5920- 32- 63- A-24
W1RWU.....1568- 18- 29- B-11
W1UQP.....946- 13- 14- A-12
W1BB.....108- 6- 6- B- 4
K1DCB.....90- 5- 6- B- 2
W1NJL.....60- 4- 5- A-10

Western Massachusetts

W1AUF.....110,544-141-264- B-55
W1LIB.....22,320- 60-126- A-20
W1RF.....16,317- 49-113- A-20
K1CPD.....10,045- 49- 70- A-11

New Hampshire

W1FZ.....134,332-142-316- C--
W1KVG.....6615- 45- 49- B-21
W1IUU.....714- 14- 17- A--

Rhode Island

W1PDF.....266,994-163-546- C-75
W1PFN.....8064- 42- 64- A-12
W1SIK.....1140- 19- 20- C-14
W1LWB.....840- 14- 20- A- 9
W1QCO.....840- 14- 20- C--

Vermont

W1IMK.....2664- 24- 37- A-18

NORTHWESTERN DIVISION

Alaska

KL7CDF.....17,802- 43-138-BC-11

Montana

W7CBy.....7956- 39- 68- B-36
W7FNF.....4536- 27- 56- A-36
W7HLH.....1242- 18- 23- A-24

Oregon

W7HXG.....3596- 29- 42- C- 7
W7EUD.....2583- 21- 41- C-30
K7AWH.....240- 8- 10- A-12

Washington

W7PQE.....6634- 31- 72- A-22
W7UWT.....4448- 32- 47- A-14
W7JEN.....1125- 15- 25- C- 7
K7HPF.....120- 5- 8- A-10

PACIFIC DIVISION

Hawaii

KH6CJJ.....6789- 31- 73- A-20
KH6DLF.....819- 13- 31- C--
KH6DJP.....546- 13- 14- A- 5
KH6CTH.....3- 1- 1- A- 1

Nevada

W7VIU.....90- 5- 6- C- 1

Santa Clara Valley

K6ERV.....12,100- 50- 81- B-36
K6UXV.....8436- 37- 76- B--
W6TXA.....2736- 19- 48- B-20
K6BOB.....135- 5- 9- B- 4
W6HRS.....60- 4- 5- A--

East Bay

W6LDD.....47,709- 93-171- C-72
W6BSY.....9417- 43- 73- B-30
W6VNH.....8436- 38- 74- A-20
W6DFR.....3564- 27- 44- C-18
W6KG.....101- 15- 18- C- 5
W6KEK.....324- 9- 12- C--
W6MMH.....54- 3- 6- A- 4

San Francisco

K6OHJ.....22,680- 60-126- C-18
W6YEJ.....3915- 29- 45- A-18
W6ZKM.....2280- 20- 38- A-30
W6GGK.....765- 15- 17- B--

Sacramento Valley

W6AED.....70,560-112-210- C-59
W6EJC.....36,162- 82-147- A-48
W6GVM.....25,920- 72-120-AC--
W6SIA.....13,515- 53- 85- C-19
W6GRX.....1425- 19- 25- C-17

San Joaquin Valley

W6BVM.....1820- 20- 31- C--
W6TKF.....1785- 21- 29- A- 6
W6FOL.....1350- 15- 30- A- 8
W6USV.....180- 6- 10- A- 2

ROANOKE DIVISION

North Carolina

K4QLJ.....105,276-124-283-BC-42
K4ZCP.....102,714-114-303-AB-49
W4GXB.....12,354- 58- 71- C-23
K4VNY.....200- 8- 9- B-10

South Carolina

K4HHL.....27,306- 82-111- B-21
K4YYL.....720- 12- 20- A- 7

Virginia

W4ZM.....576- 12- 16- A- 3
K4IYE.....429- 11- 13- B- 4

West Virginia

W8UMR.....10,950- 50- 73- A-14

ROCKY MOUNTAIN DIVISION

Colorado

W0GAA.....47,628- 98-162- B-62
K0SLD.....4554- 33- 46- A-11
W0CDP.....612- 12- 17- B- 7

New Mexico

K5UYF.....11,475- 51- B-40
W5LEF.....1827- 21- 29- B-11
W5ONK.....324- 9- 12- B-12

SOUTHEASTERN DIVISION

Alabama

W4KAC.....11,832- 58- 68- C-26
K4KQN.....8326- 46- 61- A-28
K4IPF.....279- 9- 11- A- 6

Eastern Florida

W4USQ.....88,365-137-215- A-62
K4CTU.....42,000-100-140- B-18
K4JFU.....17,955- 63-100- A-42
K4LWI.....5922- 42- 47-AC-11
K4NYU.....3045- 29- 35- C-17
W4EEO.....585- 13- 15- B--

Georgia

W4PDP.....21,756- 74- 98- A-31
K4HMV.....6786- 39- 58- A-20
K4BYD.....1122- 17- 22- A- 7
W4ABZ (4 oprs.)
855- 15- 19- A-31

SOUTHWESTERN DIVISION

Los Angeles

W6MVK.....29,988- 68-147- C-29
K6LGF.....3276- 26- 42- C- 9
K6UFX.....2185- 19- 39- C-12
K6ICS.....1377- 17- 27- A- 9

Arizona

W7ENA.....960- 16- 20- A- 9

San Diego

W6RCD.....11,880- 55- 72- C-23
W6CHV.....4095- 35- 39- B-16
K6LLE.....1512- 18- 28- A- 5

Santa Barbara

W6AGO.....8883- 47- 63- C-11
W5JRE/6.....2016- 21- 32- B- 9

WEST GULF DIVISION

Northern Texas

K5KOR.....5742- 33- 58- A-30
W5MOY.....429- 11- 13- A-12

Oklahoma

W5ALB.....38,885- 77-160- B-47
W5ZZI.....765- 15- 17- A-18

Southern Texas

K5RQI.....4455- 33- 45- A-29

CANADIAN DIVISION

Maritime

VE1PQ.....37,380- 89-140- B-32
VE1IM.....26,196- 74-118- B-32
VO2NA.....3388- 28- 41- B-30
VE1AL.....1170- 14- 30- A- 5

Quebec

VE2ACU.....56,753-103-185- A-45
VE2CB.....54,720- 96-194- A-46
VE2AFC.....13,395- 47- 95- B-22
VE2IK.....7560- 45- 56- A- 9
VE2PD.....390- 11- 13- A- 5
VE2UN.....243- 9- 9- A- 5

Ontario

VE3EHR 100,440-135-248- B-76
VE3PV.....63,504-108-106- A-56
VE3PE.....39,858- 91-146- A-48
VE3BGA.....9900- 45- 74- A-27
VE3BDB.....3132- 29- 36- B-10
VE3DCI.....1518- 22- 23- B-14
VE3ES.....1296- 18- 24- A- 8
VE3BOG.....812- 14- 20- B- 3
VE3CAA.....429- 11- 13- A-12
VE3AUU.....360- 10- 12- A- 1
VE3CKW.....240- 7- 8- A- 4

Manitoba

VE4SD.....28,575- 75-127- A-60
VE4RP.....3612- 28- 43- B-17
VE4XO.....3564- 33- 36- B-15

Saskatchewan

VE5RU.....70,446-118-199- A-63
VE5CX.....17,820- 54-112- A-30
VE5QC.....9360- 48- 65- A-35

Alberta

VE6TP.....18,585- 59-105- B-17
VE6RP.....17,225- 53-109- B-24
VE6SF.....10,948- 46- 83- A-22
VE6IN.....3432- 26- 41- A-25
VE6HG.....2139- 23- 31- A-12

British Columbia

VE7CE.....7434- 42- 59- B-15
VE7BBG.....3630- 22- 55- A--

(Continued on page 154)



YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,* W1QON

HIS 'N' HER RIGS

If you read "It Seems to Us," August 1960 *QST*, then you have probably already done your rejoicing over the official new policy of the FCC pertaining to which call to sign in a family where two or more amateurs use one set of equipment. As stated editorially, "Happily the official view coincides with what has become a fairly widespread practice." All YLs/XYLs would do well to have the following FCC ruling in mind for immediate reference:

"Where more than one amateur station license and call sign has been issued for the same location, it is permissible to operate a single combination of transmitting and receiving equipment under each license, provided that each station licensee has full control of the station at all times during which his license and call sign are being used. In such circumstances, separate station logs should be maintained and each licensee will be held responsible for all operation under his license and call sign."

In the past a number of YLs have interpreted previous FCC rules on which call to sign to conclude that since it was the OM's rig they were using, it was necessary to sign his call at all times. This interpretation, while understandable on one hand, often created a problem of identification of the YL involved. Verification of YL QSOs by contest log-checkers and certificate custodians has been sometimes very confusing to say the least.

So with thanks to the FCC and apologies to the editor for the twist: "In other words, now it's official—Dad and Junior can use Mom's rig, using their own calls and their own log books."

21ST YLRL ANNIVERSARY PARTY

YLRL Vice President Lillian Beebe, W5EGD/3, urges all YLs who plan to participate in the Anniversary Party to read the rules very carefully before starting the contest, as there are some changes this year. Some of the comments concerning this year's AP, forwarded by the Vice President, are here summarized with the hope of making the 1960 Party more enjoyable to an expected record turnout of YLs.

The contest dates are earlier this year in order to give you time to participate whole-heartedly in the AP then rest up for Sweepstakes and some of the other contests in November. Although it is perhaps a hardship on YLs who work, the contest is again scheduled for weekdays. YLs at home should bear this fact in mind and operate during evening hours as much as possible.

In the past there have been many discussions on the

merits of a 24-hour vs. a 36-hour AP. Considered too long a period by most, the 36-hour contest has been changed to a 30-hour contest, with the hope that this will be the best solution for both U. S. and DX YLs. (Any portion of the 30-hour period may be worked—30 hours, 15 hours, 1 hour.)

The c.w. section is being held first this year. Don't be afraid of this portion of the party, even though you may not be exactly an A-1 c.w. operator. The stations you work will slow down to your speed, for they will be delighted to get your contact and happy that you are at least making an effort at c.w. operation.

ARRL sections are again used in scoring this year. A combined c.w. and phone score is required for the Corcoran Award, and the award will be given to a YLRL member only. Logs must be complete in every detail. Be sure you receive the correct exchange from stations worked. Logging incorrect or insufficient information may mean the difference between losing or winning. Decisions of the Vice President will be final.

Have fun and lots of it!

21ST YLRL ANNIVERSARY PARTY

CONTEST PERIOD

C.W. —

Starts: Wednesday, Oct. 19, 1960, 12 noon EST

Ends: Thursday, Oct. 20, 1960, 6:00 P.M. EST

PHONE —

Starts: Wednesday, Nov. 2, 1960, 12 noon EST

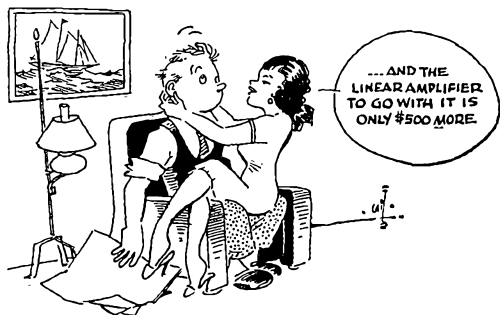
Ends: Thursday, Nov. 3, 1960, 6:00 P.M. EST

ELIGIBILITY: All licensed YL and XYL operators throughout the world are invited to participate. YLRL members are eligible for cup awards; non-members will receive certificates. Only YLRL members are eligible for the Corcoran Award. Contacts with OMs will not count. A special certificate will be given to the highest scoring novice operator and to the highest scoring technician operator.

OPERATION: All bands may be used. Cross-band operation is not permitted. Only one contact with each station will be counted in each contest.

PROCEDURE: Call "CQ YLAP".

EXCHANGE: Station worked, QSO number, RS or RST



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



The current President of the Ladies Amateur Radio Klub of Chicago, Roberta Kroulik, K9IVG, is a Registered Nurse and the wife of a surgeon, who is not yet a ham. Forty meters is Roberta's favorite band.



HR2RH, Rosa Hepburn, of Cortes, Honduras operates 20, 15, and 10 meters using a B & W 5100B transmitter and an HQ-150 receiver. The 20-year-old amateur is the only YL in her country. (Photo via W8QHW)



Six young ladies—all 12 years old, all Girl Scouts, and all hams! The YLs from Port Monmouth, N. J. became interested in ham radio when they were working for the Scout radio-television badge. Taught code and theory by K2STE, OM of troop-leader, Mrs. James Froelich, the girls are continuing studies for General Class licenses. Left to right: Kathy Froelich, WV2JUR, Nancy Kroner, WV2JUP, Sue Fabian, WV2JUO, Nancy Jorgenson, WV2JUL, Chris Trautvetter, WV2JUN, and Joyce Malone, WV2JUQ.



Mr. and Mrs. Tex DeBardeleben, newlyweds of Falls Church, Virginia. K4LMB is her call; W3CN is his. YLRLers will recognize the former Ethel Smith as the founder of the YLRL in 1939. Tex may be recalled as the brave man who chairmanned the YL and XYL program for the Tenth ARRL National Convention in 1958, with Ethel's help, of course.

Pat Radcliff, KØSPQ, of Pueblo, Colorado, (at right), recently received the first trophy awarded in the U. S. by the Cleveland Area Council of Amateur Radio Clubs. (The first trophy was issued to a KP4 OM in 1950.) The XYL of KØSPQ and the mother of four small harmonics, Pat has had her ticket just a year. She's on 10 meters mainly, with occasional jaunts to 15 and 40 c.w.



Members of the new UPYL net, left, organized in June, met in person for the first time at the Upper Peninsula of Michigan hamfest in August. The net meets Monday at 0800 EST on 3920 kc. W8HAV is co-ordinator. Members shown are front row: K8DWA, K8KIT, K8TGX, K8SUP, W8HAV, K8ILN. Standing: W8MMB, K8OMH, K8SRO, K8DTD, W8JXJ, K8PNA.





"Old San Antonio" will be the site of the 6th annual Birthday Party of the Texas YL Round-Up Net on Nov. 5. The Alamo YLs, hostess club, extend an invitation to all YLs to attend the festivities. (See Coming Events) Alamo YLs in the photo are l. to r. K5YCE, W5TSE, W5WXT, K5OPV, W5KQG, K5OPS, and K5OPT. (Photo by K5OZO)

G. L. Dosland, WØTSN, President of the ARRL, and his wife Mary, KØWKS, (ex-W5DEW) were honored guests, right, at both the YL breakfast and luncheon at the West Gulf Division Convention in June at Dallas. Some 95 YLs and YLSs enjoyed the YL program arranged by the Women Ham Operators of Texas under the direction of K5GMI, Ruth, and her OM W5QEO. Shown at the head table are Mrs. and Mr. Dosland and K5GRF and W5JCY. (Photo by W5OWP)



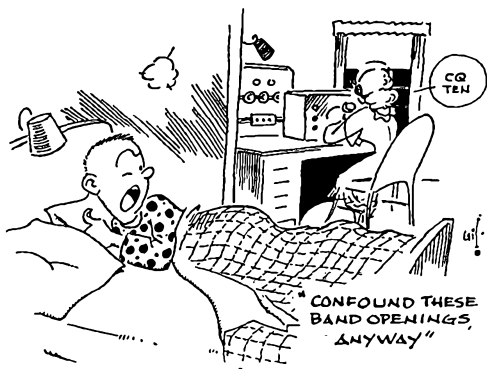
North, South, East and West

At the start of the air race in Torrance, Calif. (see page 66) Marian Frank, K6CPX, Chairman (left) was assisted by Bernie Hunt, XYL of K6KNP, in 40 meter operations throughout the five day race period. W6PMO, club call of the Associated Radio Amateurs of Long Beach, was used. OMs W6PGM, K6KNP, and W6GKM assisted the headquarters station in operations on 15 and 2 meters. (Photo by W6GAU)



Feminine fortitude to the fore! Four members of the Pincurl Net, below, set out the last week end in July on a radio safari to prove to their husbands that they could handle communications in the field without male assistance. Successful they were, contacting 150 stations in 11 states in 24 hours on 50.2 and 50.4 mc. Equipment for the trip to Charles Mound, Illinois, highest point in the state, included a gasoline generator, radio gear, camping supplies, two tents, and a forty-foot antenna, all toted and set up by the girls themselves. Considerable newspaper and TV publicity resulted, tying in nicely with our push for more YL publicity for ham radio. Posing at their "summit camp" are operators Eleanor Plumlay, K9IEF, Beverly Sipple, K9RRT, Micki Rosenbohm, KØGRQ, and Betty Moore, KØRTL.





report, ARRL section, U. S. Possession, VE district or country. Entries in your log should also state the band you were working at time of contacts, power, time, and date.

SCORING: (a) C.w. and phone sections will be scored as separate contests. (b) Multiply number of contacts by the total number of ARRL sections, U. S. possessions, VE districts, and countries worked. (c) Contestants running 150 watts input or less at all times may multiply the results of (b) by 1.25 (low power multiplier).

AWARDS: Highest c.w. score — gold cup. Highest phone score — gold cup. The top three scores in each contest will receive certificates. Highest c.w. and phone score in each ARRL section, U. S. possession, VE district, and country will receive a certificate. Highest combined c.w. and phone score, YLRL member, will receive the Corcoran Award.

LOGS: Copies of all logs must show claimed score and be postmarked not later than Nov. 19, 1960, and received by the Vice President of the YLRL, not later than November 30, 1960, or they will be disqualified. Send copies of logs to: Lillian Beebe, W5EGD/3, 923 Kent Avenue, Baltimore 28, Maryland. Include zone number in address. No logs will be returned.

COMING EVENTS

Texas YL Round-Up Net — 6th annual Birthday Party, Nov. 5. Alamo YLs of San Antonio, Texas hostess club. Belvedere Motor Hotel of San Antonio will be headquarters. Registration of \$2.25 for the luncheon should be sent by Oct. 25 to Ethel Chastain, K5OPS, 4338 Seabrook, San Antonio. (See photo on page 65).

Floridora YL Week — Jan. 8-15, 1961 has been designated as Floridora YL Week by the Floridora YLs. Details later on this new club event.

1960 AWTAR

The fourteenth annual All Woman Transcontinental Air Race covered a distance of 2509 statute miles, from Torrance, Calif. to Wilmington, Delaware. Starting at the Municipal Airport at Torrance on July 9 at 9:00 A.M. PDT, close to 160 Powder Puff Derby contestants had until noon on July 13 to cross the finish line at New Castle County Airport at Wilmington.

As said here before, the full story of the race would take pages to relate. Accounts of the famed air derby may be found in various flying publications, and anyone interested in women in aviation should find such accounts highly interesting.

For the ninth consecutive year amateurs throughout the country aided in the relay of information pertaining to the race and its contestants. Serving her third year as chairman of the radio net was Carolyn Currens, W3GTC, of Norristown, Pennsylvania.

Mrs. Betty Gillies, of San Diego served as chairman of AWTAR for the eighth time! An amateur herself (W6QPI), Betty supplied the following comments concerning this year's derby:

"The race was again a tremendous success. There were 85 entries of which six withdrew before the start, leaving a field of 79. Weather was typical — we had the good and the bad. The bad was mainly in the East, on the route between

Chattanooga and Roanoke through the mountains. Nevertheless, 77 of the 79 got to Wilmington, although one was late (the pilot had to leave the ship at Chattanooga to meet her husband in New York for a trip to Europe and the co-pilot brought the ship in). The two which didn't finish at all were held up by mechanical difficulties, one at Roanoke and one at Johnson City. Winners of the race, a handicap, were Mrs. Aileen Saunders of El Cajon, Calif., pilot, and Miss June Douglas of Fall River, Mass., co-pilot, who flew in a Cessna 172. The final results were computed for us by Remington Rand Univac on one of those fabulous mechanical brains (Univac Solid-State 90).

As always, the ham net was a tremendous help, and I don't know how we could have managed without it. W3GTC will have to fill you in on the details because I actually never was able to get into a "shack" and listen in to what was going on. All I know is that the results were great. Whenever I asked Carolyn where such and such airplane was, she always had the answer!"

From radio net chairman W3GTC comes the following summary of amateur communications set up for the race:

"First, the net operated very well, mostly on single sideband. I think there were three a.m. stations out of thirteen. Each year since 1958 I have tried to get all operations on s.s.b., but it is still not possible. Here is the list of as many operators and chairmen as I can give you: Torrance, Calif. — Associated Radio Amateurs of Long Beach; K6CPX,* chairman; W6PGM, K6KNP, and W6GKM. Needles, Calif. — K6JZD, chairman. Prescott, Ariz. — W7BSO, chairman. Winslow, Ariz. — W7REO. Albuquerque, N. M. — Mars Station, Kirtland AFB, K5LBM, chairman. Amarillo, Texas — Panhandle ARC, K5LIN, chairman. Oklahoma City, Okla. — Aeronautical Center ARC, Walter M. Hill, chairman. Fort Smith, Ark. — W5QHY and W5ANR. Memphis, Tenn. — ARC of Memphis, W4WTJ*, chairman. Chattanooga, Tenn. — Chattanooga Frye ARC, W4JVM, Chairman, with W4QT and W4BEV. Johnson City, Tenn. — Tri State ARC, W4WRH, chairman, W4GBT*. Roanoke, Va. — ARC of Roanoke, W4JQO, chairman. Wilmington, Del. — two radio clubs of Wilmington, K3HOC*, chairman, K3MAW. W3CUL* also assisted. (Asterisks denote a YL).

There were many others helping out — especially K3EMT, who spent many hours during the week on 20 meters for schedules to Torrance from Wilmington. Each year it seems to be a little easier and things go more smoothly. Next year the race starts in San Diego again." QST

Strays

The RTTY Society of Southern California announces another RTTY Sweepstakes from 1500 EST Friday November 4 to 2:00 EST Saturday November 5, thus giving thirty-three hours of operating time. Stations will exchange messages consisting of message number, origination station's call, check or RST report of two or three numbers, ARRL section of originator, local time (0000-2:00 preferred), date, and band used. Score one point for a message received and acknowledged by RTTY. For score, multiply total message points by the number of different ARRL sections (see p. 6) worked. Two stations may exchange messages again on a different band for added points, but the section multiplier does not increase when the same section is worked on another band. Each foreign country counted by ARRL for DXCC credit is treated as a new section for RTTY multiplier credit. Suggested congregating frequencies include 3620, 7140, 14,090, 21,090 kc. Logs should be mailed to Merrill L. Swan, W6AEE, 372 West Warren Way, Arcadia.



How's DX?



CONDUCTED BY ROD NEWKIRK,* W9BRD

Whereas:

The Map Scrutinizers of America, a spontaneous and diffuse DX group now numbering in the thousands, will be interested in another Pacific item uncovered by MSA charter member W9ZYD. It's an uninhabited 1.6-mile-long island about 22°S and 174°E called Conway Reef, a spot apparently isolated from adjacent blanket territorial jurisdictions. No ordinary old atoll, Conway featured a bush-sheltered cave of useful dimensions when last inspected in 1904. Need a country with a cozy built-in hamshack, OM? You'll have to jump W9ZYD's proxy claim.

— . . . —

Dr. T. R. van Dellen, in his "How to Keep Well" column syndicated by the Chicago Tribune, recently discussed results of an extensive British survey on the incidence of coronary heart disease, statistics compiled by Dr. J. N. Morris of London. Italics in the following excerpt are ours:

British death certificates showed . . . that coronary heart disease was commonest in light workers. . . . the majority [having] light jobs in which stress was marked. *Radio and telegraph operators were highest on the list, followed by priests and monks, dock and harbor officials, chemists, physicians, commercial brokers, Anglican clergymen and musicians. Occupations comparable to executives here were low on the list. Bureaucrats were far below the average for all men.*

There are few sources more conservative and unimpeachable than a batch of British death certificates, so these facts seem irrefutable. Dr. Morris researched in vocational terms, to be sure, and amateur radio, like any other hobby, is supposed to be releasing. But those mad DX pile-ups! Easy—easy does it, fellows.

— . . . —

DL1QT becomes the first to claim possession of valid QSLs for QSOs with ARRL DX Century Club members in all United States (sec p. 83, March 1960 QST). Helmut writes from assignment in Turkey where, since he cannot be active on the air, he finds solace in poring over his logs and records. The appearance of W0VKB in a recent new-members DXCC Honor Roll listing gave DL1QT North Dakota for his "WAS-DXCC" clincher. It's not "official", however, till he ships us a photo of all fifty QSLs, so someone else still has the chance to edge him out for "WAS-DXCC" No. 1.

What:

This month's correspondence critique praises 20 meters as usual, reflects widespread anticipation of another profitable 28- and 21-Mc. season, and discloses burning 40-, 80- and 160-meter DX ambitions among Jeeves's pen pals. As for late-summer action, K6CJF aptly likens our bands to Longfellow's famous little girl who had the little curl

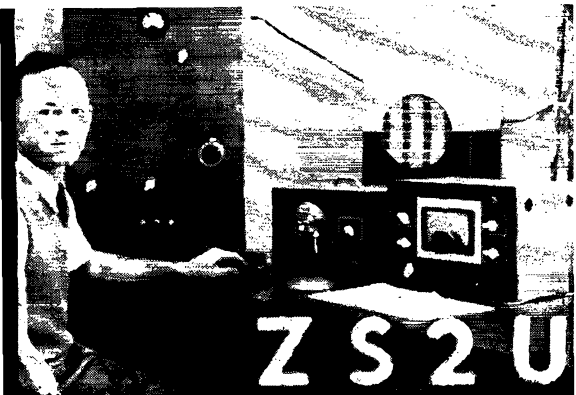
right in the middle of her forehead. (When she was good, she was very, very good, but when she was bad, she was horrid.)

10 phone is interesting to watch for comparison with last fall. So far, so good, according to K1s AOR EDV MEM, K2YFE, K4OSR, K6OZL, K9SPO, EL4A, ISWL, E, Edger and A. Hovey who report CRs 4AD 4AX 6AT 7AU 7FG, CT2AH, DL3RO/EP, EA8s CK DJ, EL4A, F08AF, HC1AM, HKs 3LX 0AI, HP1SB, JA5 2YF 3EK 9CQ, KA2GI, K6GPE, KR6CE, KV4CG, KZ2s AT MS UR, OD5CN, PJs 2AZ 3AD 3AI, PZ1BF, RA9s CAB CGB FH HAA KDK KHA SA WAA, RA0WAA, RB5KIA, RH8s ABN ALD, RJ8AAB, VPs 2GAQ 4RL 6EB 6JC 6TR, VOs 2JS 2SB 3PBD 4ASC 5GS 8AV, VS9AE, XEs 1CD 1JP 2R, YA1BW, YNs 1AW 4NK, YV3DQ, ZD2s AMS ATU JKO, ZETJV, ZP9AY, ZS3s RO Z, 5A2CV, 9M2GA, 9Q5s AU IG and 9U5JH. — Ten c.w. will go down fighting, if K2UYG, K4TEA, W8NOH and K0VMZ have anything to say about it: CN8DJ, CX2BT, KB6AZ (41) 18, LU1NE, 9Q5VF (113) 13-14, VP8EX (8) 13, YV4s AT BE, ZD2JKO (60) 12 and ZE5JU (75) 13 help them keep the ball rolling. Those numbers in parentheses represent kc. above the lower band limit; figures outside parentheses indicate approximate time in GMT whole hours.

15 c.w. finished summer coming on strong, W1s BDI OPB, K1s AOR JFF MEM, W2JDK, WA2KMY, K2s KYH UPD, K3s CUI GCS, K4s IEX MPE (68/45 countries worked on 10), TEA TKM, WA6FCX (71/32), K6s CJF OZL ROU, W7s POU YAO, W8s KX NOH, K8s JCB NHC QEX, K9s PYB SPO UKM, K0s VMZ WQI, EL4A, 11ER, VE2AOQ, ZS2U, A. Hovey and A. Rugg specify CEs 1BD 14, 2AT 4EC 23, CN8AC, CRs 5AR (50) 22, 6CW, CX1AA, DMs 2ARL 23, 3DA/ZN 3ZML (60) 23, EAs 6AM (48) 19, 9AP (90) 15, Fas 2VF 3CT (60) 16, 8TT, FG7XC, F08s AF HE (46) 16, GD3JZK, HA5TA (16) 23, HC1JU, HH2s JV (61) 1, NV, HKs 3TH 0AI, HP1SB, JA1CPY/mm, K66AJT, KV4AA, KX6CA, LU5ZY (40) 18, LZ1s KNE WD, MP4BDB (66) 18, OAs 3D 4H 4JR, OEs 1UA 3TL 3VP, PJs 3CJ (60) 22, 2ME 16, 3AI, Fernando de Noronha's PVLJ (75) 20, PZ1AU, SF2AR (61) 23, SV9s WI (29) 16, WQ WZ (33) 21 of Crete, TF3MB (60) 16, T12s LA, WA (135) 9, UA0s KID (60) 23, KZA, UB5s KED UG, WE UG6AW, UO5AA (60) 20, VPs 1JH 2ML 2VA 3VN 6AF 9EH 9C/p (35) 16, VOs 2MS 3HZ (55) 18-19, VS9MB (78) 20, WH6DJV, WP4s ATV ATY, XEs 1FA (69) 18, 2OK, VO5LF, VYs 3CD 5 ANK (85) 23, ZBs 1FA 1HC 2AK (29) 16, ZD2s ATU DCP (81) 16-17, ZHP (38) 13, JKO (15) 22, ZFs 5LB 6AY (80) 1, 9AY, ZS3D 18, 4X4FU (26) 19, 5As 2TZ 0,



*7862-B West Lawrence Ave., Chicago 31, Ill.



ZS2U has captured 165 countries and a flock of W/K/VEs with his neat Port Elizabeth layout, mostly on c.w. AI, a homebrew-forever type, uses an EF42 v.f.o., 6AQ5-6AQ5-807's rig at 60 watts; his receiver is a 6AB7-6SA7/6C5-6SK7-6SK7-6SQ7/6C5-6K6 2-Mc. tuner which backs up a set of crystal front ends on 7, 14 and 21 Mc. Infrequent ZS2U phone work presses the 6AQ5 driver into service as a 12-watt final. . . . ZS7P (right) is rare enough to tweak the ears of any DX hound. Peter regularly issues Swaziland sideband QSOs to North Americans at 1000-1100 GMT on 14,260 or 14,345 kc. with a GSB-100 and NC-300. A new rotary beam is in the works.

5TA (10, 70) 20-22 7G1A (49) 18, 9K2s AD (66) 18-22, AM, 9Q5s IG 15 and RV.

15 Novice notes dwindle down to dispatches supplied by KNs 3LJZ 3KHK and 5V20 concerning good luck with CT1DJ, GC3MBM, HH2WX, HPISB, KL7s CDF USA, KP4AO, KZ5CT, OD5CT, OK1ZX, ON4s JS PX, TI2LA, XE3CY, YV3AS, ZB1HC, plus DX-style Novices WH6s DKU DMU and WP4AUL. There are plenty of Gs and DJ/DLs, too.

15 phone still outdrows 20 when the skip is right. WIBDI, K1s AOR JFF MEM, W2JDK, K2s KYH TDI* UPD, W4s AXE* UWC*, K4s DFT IEX MPE TEA, WA6DNM, K6ROU, W7YAQ, K8s JCB QEX, K9SFO, EL4A, GC2RS, D. Edger, A. Hovey, A. Rugg and VERON fans got together with CE3s AGI DY TN WU, CN8CS, COs 5CN 7FH 7RO, CP5EC, CR4AS 21, CXs 4AV (270) 23, 9BA*, ELs 1D 4L* 6D, FA2TW (250) 21, FFs 4AB 4AC 7AB, GD3s ENK UB, HCs 4IE 7RP 8GI, HHs 2MC 4VB, HI8s DGC DGH GA JSM TBW, HKs 10I 3LX 3QA 3VV 6AC (249) 3, 6SE, HPs 1HC/1 3RL, HRs 1HP* 2HA 3MB, HZ1AB*, KGs 1AA 1FR* 4AD 4AO, KJ6BV*, KV4BM, KW6CS, MP4s BCV BDA* OAAs 1D 4H, OE5OW OD5s CL CT*, PJs 2AE 2MC* 3AI, PZ1s AR AW (315) 0, BK BP, SP9RF, SV0WK (425) 20, TG9s CD (173), TI, TIs 2LA 2RKL 5AX*, UAs 1KBB 3DA 3QC 9KOG, UO2AN, UR2BU (260) 22, VP2s 2AR 2GAQ 2LS 2SI* 3HAG 5BL 9BO, VOs 2AB* (428) 22, 4RF* (420) 22, 5AU (245) 20, VS5GS, W7AHW/KG6*, XE9NHD*, YV5s AGA ANG APX, ZB1VW, ZC4SS, ZPs 5OO 6BB*, 5A2TZ*, 6O1TUF 7G1A* 20, 9G1BA, 9M2GT, 9Q5s FV 15, FW KU and 9USJH 21. The asterisks (*) stand for single-sideband users.

20 phone favors K2s TDI* (100*), UPD* YFE, WA2EFN, K3GCS, listening KN3LJZ, K4s DAD IEX KYB, WA6AKF, W8KYD, K8s JCB QEX, K9SRR, K9s QHF (operating K9WBD), VMZ WQI*, EL4A, Messrs. Edger and Hovey with the radiations of AP2Q (155), BV1s US USB USE, CE2CO, CN2AQ, COs 2JL 8JK 8OK, GR6CA* (348) 22, CTs 2AH 3AV*, CX4AW, EA8s BC (200) 2, CP, FAs STT 9QW, FG7XH, FO8AU, FP8BH*, HH5MU, HI8DGH, HKs 3TH 4JC, HP1s KA ME SB, HR2s DK (173) 2, FG HA, HZ1AB* (315) 23, KA2HM*, KC4USN* (315) 3, KGs 1CQ* 1FR* 4AAI 4AD 4AE* (325) 2, 4AO 6AJT 6FAE*, KJ6BV* 11, KM6s BI BT, KR6s CS IN IW KA* 11, MA*, KW6s CL* (325), CV* (270) 4, KX6BT (270) 14, OA1D, OE1RZ, OK1IH* (260) 23, PJ3AD, PZ1BJ, TFW2EM, TG9s MT TI, TI2s AS EH VMB, UAs 1VB 1KAE of Antarctica, 3RG, UB5FJ*, UP2KCK, Vks 9RO 0PM, VP1s 1AB (230) 3, 1JH 1RT 2AB 2DA 2DU 5VL 7NE 9BN 9DC* (320) 0, 9QQ, VRs 1F 3D (185) 3, 4CW, VS4JT, VU2s NR* ZJ, Ws 2AYN/EP 3ZA/EP*, XE3D, YV1s FF WW, YOs 3RI 7CG, YS1s IM MS* (300) 15, YV5s AKE HU* (310) 23, 9G1s BQ* (340) 0, CW, 9N1s CJ* GW*, 9Q5s GA* RU and US*.

20 c.w., International Route 1 for all handom, finds W1s BDI OPB TS, K1s AOR JFF (80/61 worked/confirmed), MEM, W2s GVZ (261/258), JBL, K2s QXC UPD UYG, WA2s EFN (72), KMY (95/56), W3LOS (111/98), K3s CUI GCS, code-practicing KN3LJZ, W4PLL (251/242), K4s DAD (66), DFT IEX KYB LRO TEA (147/122), TKM, K5LLJ (45/31), W6s JQB RCV, K6s CJF (107/91), OZL (79/41), ROU STZ, WA6s AKF DNM (30/22), FCX (71/31), W7s DJU POU (65/44), YAO, W8s KX (190/180), NOH, K8s HPK JCB (134/114), NHC (67), QEX, W9JUN, K9s PYB (59/31), SPO SRR, K0s VMZ (85/42), WQI, EL4A, IIER, ZS2U and A. Rugg

quite busy with the likes of one AC3AZ, AP5B (50) 22, BV3HPT 8, CEs 1AD 1DD 1DN 4FX 5, 0AD, CMs 2QN (50) 4, 7JK, CNs 2AQ 2BK 2BP 8MB, CO2s BM EU WU, CPs 1BE 3CD 3CN (70), CR5AR, CTs 2BO (10), 3AV (42) 22, CXs 1 BO 2BT 2FD, DMs 2AFC 2AQB (57) 23, 3SMD 3YDA 3YVL 3ZBM 7EAM, DU1s 1OR 7SV (35), EA8s 8BW (70) 1, 8CP (49) 22, 9AQ, EL2U, ET2US (345) 9, FAs 2VF (80), 3CT 8RJ (85) 3, 8TT, FB8s CJ XX YY, FG7s XE (40) 23, XF, FO8AU (35) 19, FM7WK (35) 4-5, FK8AH 11, PO8s AJ (15), HV, FR7ZD, FY7s YF (50), YI11, GD3LY (26), HAAs 5BI 5DU 5FX 8CF 8CI, HC3s 1JU (27), 2CS (80), 4IE 5CN 5LS, HE2BAI, HH2s JV OT (20) 4-5, RD, HKs 3TH (30) 20, 4JC 9AI, HP18s 3, HZ1HZ, IS1s DKL ZUI (5), IT1s AGA (40), ZND (1), JAs 6AWD 6ZLD 7LA (82), 9FV 0MK, JT1AA, K4s ORQ/EP (15) 2, 6LJR/KG6 7, KA6s 2RF 2JF 2JL 2JS 2LR 2RT 8PB, K6GTB, KGs 1BB (40) 1CW, 4AA 4AD (93), 4AN 6AIG 6AJT 6CY, KM6s BI BJ BT, KR6s CGA 1W LJ (25), KV4s AA CI/mm, LA8YD/p of Jan Mayen, LXs 1AC 3HD, LZs 1AF 1KNE 1KFC (60) 23, 2KSK, OEs 1UA 4KB (62) 0, 5AW 7FW, OA4FN (8) 4, ODSAR 23, OX3s JI MT UD, OY7ML (22), FI1ZWP of Holland, PIs 2AE (23), 2CQ 3AD, PZ1BP, RAEM of Moscow, SM1BVQ (50) 23, SP1LH/mm near ZDI, SL5AB of Sweden, ST2AB (50) 23, SU1AL 23, SV0WZ of Crete, TFs 2WPF 3AB, TI2s CMF DL DN PZ UAIKAE of Antarctica, UA9s DB 2 (68) KCA KCT KYB OU, UA9s BN BZ CE EC FE FG FR JU KFM KID KZA (11), LN, UB5s CT IF KEF KKE (85), MZ WI ZV, UC2s AR (5) 3-4, BL LE WP, UD6s AM (20) 23, BB KAB, UF6FB (1) 1 UG6AW (20) 23, UH8KBA, UI8AC (72) 12, UL7s HE KAA KBH, UM8s KA (29) 23, KAB, UN1s AB AB, UO5PK, UPOL-8 of the polar north, UP2s AC AT KCB KNP, UQ2s DO 1-5, KAY, UR2s AO BA FG, UT5BK, VE4CA/SU (60) 23, VE8s AP AV MC TU, VKs 1JE (15), 8TF 9GK 9KK (70) 11, 9NT 9RO 9VM (20) 11-12, 9XK 0WH, VP1s 1JH 2VA 3YX (15), 6AF 6AP 6GV 6LN (30), 6PR 7BK 9BN 9DL 9EX 9KK 9QQ, VOs 2EW 22, 3HZ 4HT (65) 21, VRs 1B (60-90), 10-11, 2DK 2DX 3KD 4CW (18) 11, VSs 1ED 1JV 4BA 6EN, VU2NR (65) 1, Ws 2AYN/EP (2) 1, 8UTQ/3V8 (8) 23, XE3BL, XZ2s BB 11, TH, YN1s 1OC (9), 4AB 5AN, YOs 2BU 3FH (70), 3IA (55), 3IF (35), 3RI (5), 3WL 6X1 9IF, YVs 4AU 4BT 5AFR (55) 23, 5AKU 5ANE 5ANI 5EZ (28) 22, ZBs 1FT 1HC 2AD 2, 2I (82), ZCs 4AK (60) 23-0, 4BC 4CP (25) 0, 4SS (25) 0, 5AE (29) 9, ZDs 2DCCP (81) 16, 2GUP (80) 22, 2JKO 2JM 6NJ (85) 5, ZK1AK, ZLs 3VB of the Chathams, 4JF 4 of the Campbells, ZP5YA, ZS7s M R, 4S7EC 12, 4X4s JU KP 6O2s AB (35) 20, GM, 9Q5s LL (15) 23 and PAs.

40 c.w. can't match dazzling 20 but KN3KHK, K4LRO, W6RCV, K6s CJF EAY, WA6DNM, W7s DJU YAO, K8s CJB NHC QEX, W9JUN, K9RHN, K0VBU, EL4A, ZS2U, ISWL and s.w.l. Rugg have a gala time with CE1DN, CN8BP, CO7AA, DU7SV 11, EA7JZ (14) 5-6, FF8BF (8) 22, HCs 1IE 4IE, HKs 5CR 7MM, HP1SB (1) 7, IT1AGA, JAs 1BOK 1BTH 1DIC 1DNI 1DUH 1EUR 1VL 2AEY 2AJ 2AJJ 2AW 2XW 7XF 8QO 0MV all around sun-up, K3CKT/KH6, KG4AD, KV4CI (5), LZ1KGZ, OR4TX of Belgian antarctica, Pys galore, UAs 3GM 9XP 0KKS, UI8GG, UL7FA, UM8KAB, UP2KBC, KR9XK 3, VR2DK (10) 2, VSSPM (5) 2, VU2CQ (46) 14, YUs en mass, YVs 4CI 5AL and a hatful of VK/ZL colleagues.

40 phone is holding its own with W3CYZ, K4DAD, K5VRX, E. Edger, EL4A and ISWL capturing CE2MH, EL1H, FF4AB Gs and DLs, HH6S, IT1SMO, KH6s ATT DHI WAG, KZ5BK, LU8ZA, LZ1UF, PYs

1YV 2CEI 2QT 4CP 5LP, TF5TP, TG5HC, UB5LV, UP2KNP, YV5s ABH AQJ, XEs 1PLR 2SG, ZD1AW, 4X4FA, 9G1s CC CW and DM.

80 c.w., still a traffic man's stronghold, features CO2QR, DJ3 1VC 5FS, DL7BG, EA4BS, EL4A, HPIAP, OKs 1AAE 1KAY 1KCR 1KEI 1KNG 2QR 2VET, UA3BS, UN1AI, ZB1FA and ZP9AY on its low edge. October often is a lively 3.5-Mc. month because noise levels are favorably low in both northern and southern hemispheres. Preceding 80-meter items come courtesy A. Rugg and ISWL of London.

160 c.w.'s hard core of persistent personnel were interested to hear W1BB's report that W2TR was logged in Europe in midsummer. ISWL's 1.8-Mc. communique says DL2AH, GD3s FBS UB, G16TK, GM3s FSV KBZ/p, GWs 3ALE 8KFA 8PG and OK1KFG have keys plugged in and final amplifiers loaded for the anything-can-happen 160-meter season now getting under way.

Where:

Asia — Malayan Amateur Radio Transmitters Society secretary 9M2DB advises that QSLs for VS1-VS4-VS5-ZC5 stations can go via MARTS, Box 777, Singapore, and those for 9M2s to MARTS, Box 777, Kuala Lumpur, Federation of Malaya. K4ZKI says VS1FZ handles that Singapore bureau. Operator Bob of VS9MB writes W1TS perspective: "Although, of course, QSL cards are nice to receive, the most important aspect is the QSO." Are W/K/Vs too inclined to let the tail wag the dog?

Ws 1UED and 2GVZ chorus QSL information for K4ORQ/EP. W/Ks can send cards to Hal at MAAG-RSG, APO 205, New York, N. Y.; all others should mail theirs to Amateur Radio Club of Iran, P. O. Box 951, Tehran, Iran. K4ORQ also assists in distributing cards incoming to ARCI for other EP stations. W4OSG writes from Formosa that "The correct mailing address for BV1Us is USTDC-MAAG, APO 63, San Francisco, Calif., and self-addressed stamped envelopes are appreciated. U. S. postage is just fine, too. GMT, please, to facilitate log checking." Grant adds that QSLs for BV1s USC and USE can go via BV1US. From HL9KT (W9QPI): "I am answering cards as fast as possible but we are still snowed under with paperwork. Really appreciate the IRCs and self-addressed stamped envelopes; these merit answers first, and our policy is to answer cards as received. Wish everyone would use GMT!" West Gulf D X Bulletin "Where" comments: VS9AZA is declared ungood.

W3ZA (OD5CT-W3ZA/EP) holds the calls MP4s BDD MAG TAI and QAQ for various Gulf stops. VS9ARF (G3MJI) inherits Aden VS9 bureau duties from departing VS9AHM. W1WDD is another who seeks a TA3US QSL after years of fruitless effort. Peter, with 240 confirmed, has a pleasant surprise in store for the lucky DX operator who happens to become his DXCC-250 clincher. "Sent out about 2000 QSLs from Japan," testifies KA2CB, returning to New England and K1GAA. "If anyone still needs a deserved card, my Vermont address will be okay."

Africa — ZD1CM's QSL chores are handled by W3KVQ. Ed labors similarly for CT3AV, VP2AR, VU2RM, ZD1AW and 4S7WP — s.a.s.e., by all means. ZD2JM notifies K9EAB he has signed on for a three-year Lagos hitch. Cliff will continue to serve as Jolin's Stateside QSL agent, s.a.s.e. required. ZD2JM's direct address: c/o Assistant in Chief (Radio), P&T Hq. Lagos, Nigeria. VERON's D Xpress confirms that 60Is are ex-15s as in the case of 601TUF (ex-15TUF); 602s are ex-VQ6s. In most cases the suffixes remain the same. WGDXC understands that W8UTQ/3V8 retains XW8AH logs and will entertain QSL inquiries concerning his Laos tenure c/o U. S. Embassy, Tunis, Tunisia. "An incoming mailbag was lost last week," laments EL4A. "About a hundred hams will have to reapply for Liberia confirmations. Say, the omission of Greenwich Mean Time on QSLs can drive one nuts. Ridiculously ill-chosen phonetic-alphabet indicators also are exasperating on phone." Q as in cucumber?

Oceania — "Please be advised that I'm no longer in the employ of Matson Navigation Co. aboard SS Monterey," communicates WA6DFH. "I may not return to Tahiti to use my F08AX call but I've enjoyed sending out more than a thousand QSLs over the past two years." George welcomes QSL inquiries at his WA6DFH address with full data (GMT) and s.a.s.e. K4TKM needs tracers on K6GNL/KW6, worked four years ago, and ex-ZL1FG. W4GSJ seeks the current whereabouts of the KM6AX he worked on phone around that same time.

Europe — Antarctic OR4TX, according to informant W6RCV, can be reached via UBA (Belgium), Box 634, Brussels, or through Yvonne Pearson, 85 rue Tilmont, Brus-

sels, both Belgium. G3LB recommends a photograph-personalized QSL for maximum returns. "The cost is but a fraction of the amount an amateur usually invests in his equipment, and the results justify it." W7DJU echoes Arthur's sentiments: "Since I stopped sending out cards with pictures, letters, etc., my incoming mail from DX has stopped in its tracks. Proves to me if you don't do something a little special, your returns may suffer."

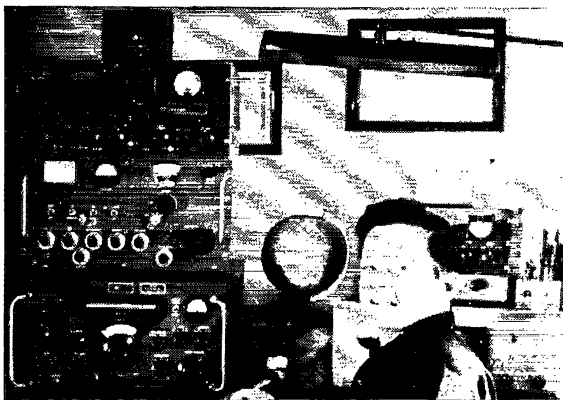
TF2WEN (W4WTK) was up to his ears in unclaimed QSLs destined for TFs 2BJ 2BWT 2CWO 2DDA 2KA 2VCC 2WB 2WC 2WD 2WZ 1Z 3AP 3PI 3WDY 4BDH 4WDH 4WN 5TP 5WAK 5WDD 5WDK 5WWDV 6G1 6WEI; also TF2Ws BC BD BG BH BS BY BZ CC CD CF CJ CK CN CO CP CQ CR CS CT CV CW CX DA DC DE DF DG DI DJ DK DN DO DP DR DU DW DX DY EA EC ED EG EK FC UE and VB. Parties concerned please claim same with stamped self-addressed envelopes to ARRL, attention K1LVW. "I am now QSL manager for 11ER," states K4KYB. "The usual self-addressed stamped envelopes are requested for prompt returns." Think you've got QSLs? SM5WI asked K2QXG if anyone issues certifications for collections of W/K cards in 3-, 4- and 5-ft. stacks.

South America — K4HPR advises, "Ex-CE0ZC, CE3-G1, now attends medical school in Birmingham and says he will be very pleased to send CE0ZC QSLs to those whose contacts are still unconfirmed." Cesar's Alabama address follows. Ex-VP4WD (G3TA) tells K3GEK, "Any stations who need my cards for QSOs from Tobago will receive them after receipt of their QSLs." Jack is available through his Call Book QTH or via RSGB. Notes from W8NAN and others indicate that it's time to mention the QTH pattern for far-south LU-Z-stations. That "Z" stands for Argentine antarctic locations and offshore points near by. The last letter of the call is the key to various bases in the area. Representative LU-Z-Call Book listings will give you the idea.

Hereabouts — FP8BM QSL manager K2VZJ protests to W1TS the heavy income of QSL requests sans s.a.s.e. Transportation must be provided if you want that St. Pierre pasteboard. Listener Andy Rugg is one of the many who commend QSL results accruing from W2SAW's foreign-mint postage approach. Check with the latter for details. K1MEM, W2JDK and K6TPL volunteer clerical services for deserving rare DX stations in QSL distress. W1QLT of XE0LT/XE5 writes that special cards for his Alacran reefs QSOs began disseminating last month. John, W1GPX and party, studying reef formation and growth, hope to have more power and DX time available when they return to the breakers next summer.

Diligent and generous reportorial effort by W1s BDI OPB TS UED QWC, K1s AOR LVW MEM, W2s GVZ JBL JDK, WA2KMY, K2s QXG TDI UPD UYG, W3LOS, K3CUI, KN3LJZ, K4s GMR HPR IEX TEA ZKI, W6RCV, WA6FCX, K6s OZL ROU STZ, W7CWE, W8s KX NH, K8s NHC QEX, W9JJN, K9RHN, K9WQI, KH6BXU, ZS7P, KL7AZZ, A. Rugg, Hamfesters Radio Club, International Short Wave League, Japan DX Radio Club, Kanawha (W. Va.) Radio Club, Newark News Radio Club, Northern California DX Club, Ohio Valley Amateur Radio Association, Polar Bears Radio Club of Sweden, VERON of Holland and West Gulf DX Club produced the following individual specifications:

ex-CE3GI-CE0ZC, C. Guzman, 348 22nd Ave. S., Birmingham 5, Alabama
CE4EC, M. Espinoza E., Box 20, Rancagua, Chile
CE6EJ, E. Huckle, P.O. Box 416, Temuco, Chile
CO2DD J. Calvo de Dios, Box 6996, Havana, Cuba
CP6FJ, C. Tamplin, P.O. Box 55, Santa Cruz, Bolivia
CX8AN, O. Spera, Box 777, Montevideo, Uruguay
EL2U, c/o Liberia Air Taxi, P.O. Box 183, Monrovia, Liberia
ET2KY, R. Kelly, ASEA Det., APO 843, New York, N. Y.
FB8CP, P.O. Box 152, Diego Suarez, Madagascar
FG7XH, Box 335, Point-a-Pitre, Gadeloupe
FM7WK (via W4ZKE)
F08AX (see preceding text)
FP8BM (via K2VZJ)
HA1KZA, Kossuth u. 48, Zalaszentgrot, Hungary



KA7AX cruises 20, 15, 10 and 6 meters in this cozy Kyushu cockpit when off duty as Far East Network radio engineer. Bob is W6UUX on our side, also ex-JA2AX-JA7AX-KA9AR.

HC1AM, Box 2977, Quito, Ecuador
 HC1ARE/HK8, Box 289, Quito, Ecuador
 HI8DGC, Avenida Generalissimo Trujillo No. 1, San Cristobal, D. R.
 HK3JK (via LCRA)
 HK3UA, Box 13233, Bogota, Columbia
 HK6AC, Box 524, Armenia, Colombia
 I1ER (via K4KYB)
 I1IRIF (to I1RIF)
 JA1CRT (S. Kusama, 127 Eifuku-cho, Suginami-ku, Tokyo, Japan)
 K1CRB/XV5 R. Wallace, Box 28, APO 143, San Francisco, Calif.
 K3CKT/KH6 Box 458, Kekaha, Kauai, Hawaii
 K3JZT/KG6 (via W3KT)
 K4ORO/EP (see preceding text)
 K7GMZ/EP (see preceding text reference K4ORO/EP)
 K26AJT P.O. Box 145, Agana, Guam
 KX6BT APO 435, San Francisco, Calif.
 KZ5GM Box 185, Margarita, Canal Zone
 OR4TX (see preceding text)
 PJ2CQ J. Schrier, c/o Naval Base Parera, Willemstad, Curacao, N. A.
 PZ1AW, W. Hekkenberg, c/o Surinam Aluminum Co., Moengo, Surinam
 PZ1BJ, P.O. Box 32, Paramaribo, Surinam
 TF2WFF, 607th AC&W Sqn., Box 174, APO 81, New York, N. Y. (or to K1APM)
 TG9CP, Box 115, Guatemala City, Guatemala
 TI2LT, P.O. Box 26, San Jose, C. R.
 UA2KAA, Pioneer's House, Kaliningrad, U.S.S.R.
 UB5AO, V. Shpilevoy, Radio Club, Dnepropetrovsk, Ukrainian S. S. R.
 VE8AP, Naval Radio Stn., Aklavik, N.W.T., Canada
 VK8NT, Box 40, Darwin, N.T., Australia
 VK6JM (to VK2AZM)
 VP2DU (to VP2DA)
 VP2VA (to W8NWXX)
 VP5VI, Box 215, Kingston 10, Jamaica
 VP8EM, J. King, Box 107, Port Stanley, Falkland Islands
 VP8EX (via RSGB)
 VQ2MS, M. Serrao, Box 435, Luanshya, No. Rhodesia
 VQ4RF (via W4MCM)
 VQ5EK, W. Campling, Box 391, Kampala, Uganda
 VR4CW, Box 49, Honiara, Guadalcanal, Solomons
 VS9AR, c/o ISWL, 12 Gladwell Rd., London N. 8, England
 W2AYN/EP, Cdr. B. F. Borsody, USNR, USOM-Iran, APO 205, New York, N. Y.
 WA6KMT/KL7 (via W7DDT)
 WP4AVW, 1509A Messick Circle, Ramey AFB, Aguadilla, P. R.
 XE1XX, S. Sanchez, Box 726, DX Section, Guadaluajara, Mexico
 XZ2BB, Saw Oo, Box 449, Rangoon, Burma
 YA2BC, P.O. Box 130, Kabul, Afghanistan
 YN6HH, Corinto, Nicaragua
 YO9IA, Box 91, Ploesti, Roumania
 YU1GA, Zauaj Jovina 26, Belgrade, Yugoslavia
 YV3DL, P.O. Box 382, Barquisimeto, Lara, Venezuela
 YV4BH, F. Salazar, Box 3172, Caracas, Venezuela
 YV5ANI, Box 11163, Caracas, Venezuela

ZC4AM (via RSGB)
 ZD1CM (via W3KVQ)
 ZD2JM (W/Ks via K9EAB)
 ZF5HZ, c/o U. S. Embassy, Asuncion, Paraguay
 ZF5OQ, c/o U. S. Embassy, Asuncion, Paraguay
 6O1TUF, Box 16, Mogadiscio, Somalia Republic
 9O5HW (to DL4HW)
 9O5US, c/o U. S. Embassy, Leopoldville, Republic of Congo
 9U5s JH KU, P.O. Box 76, Kitega, Ruanda-Urundi
 9U5VS Box 62, Kigali, Ruanda-Urundi

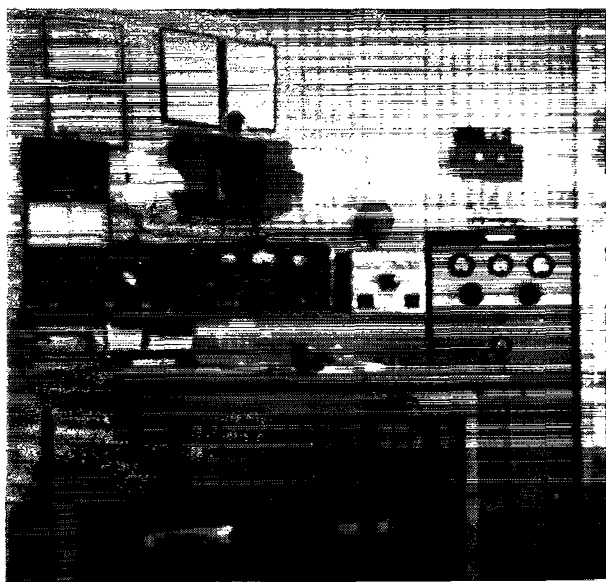
Probably some duds in the forerunning. If so, too bad — it's all in the game.

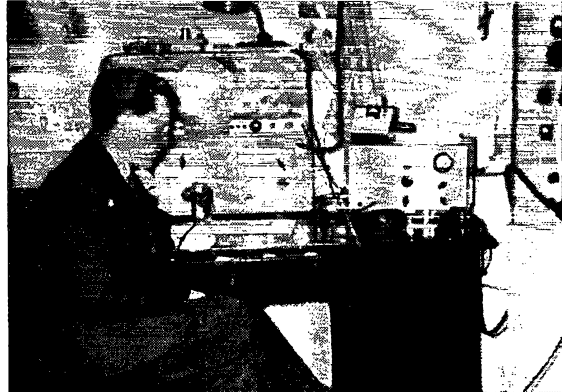
Whence:

Asia — "At present there are three BV1 stations on the air," declares W4OSG of the BV1US staff. "These also function as MARS stations and are operated by U. S. military amateurs. BV1US is located in Taipei, BV1USC in Kao-hsiung, and BV1UE in Hsin-chu. All have c.w., a.m. and s.s.b. equipment. It is understood that other BVs are active." KL7AZZ tells of one of these: "I was BV3HPT's 35th QSO, so possibly he will be quite active. He operates with 50 watts, and his weak signal possibly indicates need for antenna improvement." K1CRB writes W1-LVQ from Vietnam where he hopes to fill a log or two with K1CRB/XV5 contacts. "There are seven or eight hams here in Saigon on government assignment." The authorization will be similar to that arranged by Yanks in Korea, Iran, etc. KA2CB returned to K1GAA/1 in August after "An excellent tour over there. DX wise, 149/127 — to be perfectly honest, I hated to leave! I believe I'll be even rarer DX as K1GAA/1, for in Japan I never heard Vermont on phone. Managed to pack five log books with KA2CB QSOs." W7DJU helped wandering G3JZI break the DX ice with his new label, VS6EN, on 20 c.w. AP2CR tells K6BX he expects improved 20-meter sideband results this autumn. "Your West Coast gang comes through very well around 1500 in autumn and winter. I currently attempt skeds with W7VEU on Wednesdays and Fridays at 1400-1500 GMT, 14,285 kc." VS9MB staffman Bob writes W1TS of Gan Radio Club doings in the Maldives: "There now are four members — officer-in-charge Jim, Tony, Keith and myself. We are awaiting our DX-100 and shouldn't take long to assemble it. A triband three-element rotary beam also is on order to supplement our four dipoles. The receiver is an AR-88." Bob is 32, has spent 14 years with RAF, and expects to depart Gan around the end of the year HL9KT's W9QPI admits, "We haven't been too active lately because of extensive rewiring and modernization of our gear. We've found that U. S. amateurs, particularly the Sixes, are quite polite on the air. But there are exceptions who persist in calling us during QSOs, especially on c.w." Asian addenda via WGDXC and FEARL (M): G3OFI hopes to revisit Qatar, Trucial states, Muscat & Oman, and Yemen one of these days. A Bhutan DX excursion seems out of the question for 9N1s. It's a 24-day round trip via shank's mare. KG6ICD crewmen hint another possible Marcus ruckus come January. KA2s BM, CB, DE, GI and JG are closing down for Stateside return, while KA2s BS, HL, JL and JM prune and tune shiny new beams.

VP3AD watched the birdy while visiting at W1BB this summer. "Dad" and Stew conferred on their favorite subject, prospects for the pending 160-meter DX season. At right is a view of VP3YG's DXCC installation at Georgetown. Des apparently is British Guiana's busiest c.w. man with 35 watts and an SX-28, 14 Mc. preferred.

(Photo via K2UYG)





YU1AG, Belgrade, is a world-wide favorite on 20 meters where Djuro has managed DXCC on c.w. and phone. (Photo via W7DJU) YU3EL, right, runs a well-worked homespun 150-wattor and 12-tube superhet in Ljubljana. (Photo via W9WNV)

Africa — VQ4ERR, according to a press dispatch forwarded by GC2RS, was prominent among the many hams in Africa who sleeplessly volunteered emergency communication services during summer Congo difficulties. Amateur frequencies were widely depended upon to supplement missionary networks and other point-to-point circuits. Unlike the U. S. A., where the emergency-aid potentials of ARRL's well-organized traffic networks are officially recognized and utilized, most licensing authorities in Africa have never encouraged training and facilities for the event of such disasters. Radio Society of East Africa and VQ4ERR look forward to governmental enlightenment in this field so that amateur radio in that part of the world will be better prepared to serve effectively in future emergencies of any kind. ZD2JM intends to keep his three-807s 150-wattor, Regfon receiver and "G5RV dipole" available in Lagos through 1963. KØHNC and OZ3Y understand that VQ4HT was to terminate his 15- and 20-meter c.w. VQ1HT activity in mid-September. "DXpeditions to the Indian Ocean area seem to be quite a fad," muses K2UYG, noting that GW3ITD, W4BPD, W8AIW and others intend to startle the DX crowd with DXotic prefixes this fall. "ZS6IF plans to be ZS6IF/ZS9 around the clock on 7005, 14,010 or 21,015 kc. around the clock from November 5th through 14th," advise Ws 4PLL and 8KX. Local observations by EL4A (W7VCB): "Everyone doing a fine job here with Congo emergency traffic. . . . ZD1AW says he may have to QRT in a few months because of a transfer. This would leave ZD1CM in great demand. . . . EL4A may move diggings a few miles and hang up some 200-ft.-high sky hooks. . . . Our West Africa net is quite lively on 7025 kc. each Sunday morning with ELs FF4s ZD2s and 9G1s checking in. . . . Forty meters really holding up fine here. I can work a pageful of 7-Mc. W/Ks almost any morning. A siege of malaria and some hunting excursions into the bush held down last month's QSO total to about 800." ZS7P says you're mostly likely to catch up with FR7ZD at 0300-0500 and 1200-1400 GMT, 14 Mc. WGDXC Ruanda-Urundi rundown: 9U5DM likes 21,120 kc. a.m., 1700-2200 GMT; 9U5VS frequents 21,270 kc., same mode and time; 9U5KI haunts 21,240 or 21,265 kc., a.m., around zero hours GMT.

Oceania — Those 20-meter sideband schedules between Rabaul's VK9NT and WØEBG/WØLIL have quite a story behind them. WØEBG, a WW-II reconnaissance pilot, was preserved from harm for many months by Nakanai natives after being shot down over New Britain in 1943. Fred recently revisited the area and reports: "We have established the Airmen's Nantambu Memorial Foundation for the purpose of providing scholarship and educational aid to the indigenous people of New Britain as a memorial to the assistance given by them to personnel of the United States Air Force in World War II. The project will be administered through one of the mission groups in the Rabaul area. Considerable interest in this project appears to have developed among amateurs as a result of our schedules with VK9NT." W7CWE learns that VK8TF anticipates another VKØTF tour next year. VK9VM regularly skeeds K2QXG on 14,070 kc., Fridays at 1100 GMT. Thereafter Ian willingly runs off a string of W/K QSOs. KC6TM says that KC6KR, employed in government communications on Koror, is the only native Micronesian now active on amateur bands. More will follow if Fr. Tom has his way with numerous youngsters in his tutelage. VK5BP and KL7AS revise our geography concerning last month's scheduled VK5BP/8 DXpedition. It's a 2,000-mile round trip, including only 400 miles of paved roads. "We decided to go by train." West Gulfers provide more Pacific patter: VK8s AE AS EW GU NE OW PL ST TF ZG and ZDW are getting used to their new Northern Territory prefix in Alice Springs and Darwin.

. . . KC6AQ of the Western Carolines can be found working KG6NAB on Thursdays, 1130-1300 GMT, between 14,265 and 14,305 kc. . . . USS *Hope*, with W80LJ/mm aboard, should soon dock in Indonesia, a very rare country by choice. . . . VR1s E and F, of Tarawa and Ellice, are new "local" QRM for Funafuti's VR1D.

Europe — Scandinavian Activity Contest results for '59, issued by SRAL (Finland) list veteran ARRL Hq. DX chaser W1VG as top U. S. scorer (c.w.). Other call-area leaders are W2EQS, W3DBX, K4IEX, K5LIA, K6DDO, W8DWP, K9EAB and WØGDH; VE3HB and VO2NA led the Canadian contingent. OHØNC, LA4ND, OZ4FF and SM5CCE scored highest home-country totals on c.w.; OH5QN, LA6CF, OZ5JT and SM3AZI cleaned up on phone. Where were the Yank phone contesters? Not a single W/K/VE/VO mikeer applied. Reminder: The first week end of December is RSGB 21/28-Mc. Telephony Contest time. Participation details will appear here next month. That "DXCC2" No. 30 accredited to OK1GT last month more properly belongs to club station OK1KTI. Misinterpretation on our part. K2RYP writes from Crete: "SVØWT's new station building is up and our BC-610 and SP-600 soon will be moved in. We are now working 15 and 20 meters with a three-element beam fixed on the U. S. A. SVØs WC WN WO and WZ also are active here, WO being particularly workable on s.s.b. Myself, I will be returning to the States around December of this year." TF2WFF (K4APM) tells W1WQC he can be found on 14,030- or 21,030-kc. c.w., 14,186- or 21,245-kc. sideband, almost every week end commencing 2100 GMT on Fridays. Artist-sculptor-linguist LZ1AF calls K3CUI's attention to Radio Sofia's amateur program beamed our way on 9700 kc. at 0100 and 0400 GMT the first Friday of every month. LZ1AF has been hamming for twelve of his 28 years, and helped pioneer postwar amateur radio in Bulgaria from club station LZ1KAB. "My own usual operating time is somewhere between 2000 and 0500 GMT, 14 or 7 Mc., c.w. only." K3CUI notes in Russia's *Radio* magazine, UA3CR DX editor, that U.S.S.R. single-sidebanders congregate at 0800 GMT on the first Sunday of each month, usually between 14,330 and 14,340 kc., led by UAs 1DZ 3CR and UB5KAB. K2TDI encountered excitement in a QSO with IM1RIF of Montecristo island. The latter reported a ship sinking afire, so Gene called his local Coast Guard who immediately relayed the distress message to proper Italian coastal authorities. In the IRTS (Eire) *News* we see that EIs 2X 4AD 4R 6X 7BD 9V and s.w.l. associates scored 580 QSOs with all continents during their May multiband DXpeditionary visit to the Basketts as EIØAA. Indeed, such a ball was had by all that they'll probably do it again.

Hereabouts — "DXCC2" No. 31 falls to W8NJC, noted Michigan DXer, second Eight to meet the simple stipulations on p. 69, July 1959 *QST*. Ws 2BAK 2SKE 3ASK and 4ETT pool talents to run a neat string of VOA ham programs. Up-to-date details are available at the address Amateur Radio, Box 922, Washington 4, D. C., and shortwave reception reports are welcomed. WA2-KMY has a candidate for the legendary Fastest Thing in The World: a contest c.w. QSO between TI2PZ and KH6IJ. W8KX opines that a DXpeditionary-type enterprise to Nicaragua and/or Guatemala would meet with wide favor among the c.w.-only gang. Walt grids for stepped-up DX competition from neighboring Grand Rapids W8s EW FEI and NOH. Maxim Memorial Station W1AW checked in for K6BX's Certificate Hunters Club diploma. Say, in addition to his Directory of Certificates and Awards as previously mentioned here, K6BX offers a quarterly *DX-QSL Newsletter* that could lead you to elusive confirmations. W6KG signs on as DX editor for a prospective ham-type periodical engineered by W2NSD. WIs GPX and QLT are convalescing from their rugged



GB3LAS, operated on the Isle of Man in April under Cambridge University Wireless Society auspices, QSO'd 850 stations in sixty countries, 400 contacts with W/Ks. Here G3LAS carries a pile-up at Douglas.

Mexican reefs jaunt as XEØQLT/XE5. Next July they'll have a 100-watt c.w. rig along for better coverage on 20 and

40 meters. This year's QRP effort was mobbed by QRM Western Washington DX Club hosted a lively Northwest DX Get-Together at Seattle in late August W2GKE, K2s LSU and OQA rolled up a flock of midsummer St. Pierre contacts from FP8BM W7POU offers Utah skeds to DX stations on 14- and 21-Mc. c.w. G3LZQ ZS6VK and VK7HK recently made the grade with Herb K4TEA, W8NOH and others suggest you check with Casa do Radio Amador Gaucho, P.O. Box 1119, Porto Alegre, R.S., Brazil, for specs on the C-20-S certifications awarded to North Americans who show proof of 30 contacts with PY3 stations.

Ten Years Ago in "How's DX?" — The JØKER is wild in the opening discourse for October, 1950, and we see a very miserable Jeeves walking the plank The DX market is bearish but reported DX is interesting enough. Twenty-c.w. features CS3AA, EK1AR, EZ4Y, FL8AC, HL1CB, MI3s AB IM, MS4FM, PJs 1UF 5FN, PKs 5AA 5JT 6CS 6LN, SUI1UU, TA3AA, VK1s PG YM, VR5GC, VU7AH, YI2UW and ZC6AB The cream of the 14-Mc. phone crop: FN8AD, PKs 1DX 4KS 6CS 6SC, VK1-ADS, VS7GR, 3V8s AT and BB ZD4AB is the only fancy item noted on 10 phone but, at the other end of the dial, CE3AG and FP8AC enliven 3.5 Mc. while VR2BZ and ZK1AZ/mm frolic on forty Among the miscellany: MD9AA produced Yemen QSOs for a handful of lucky Ws. Saarländers appear with their new and distinctive 9S4 calls. W8NKU acts as QSL representative for undercover Netherlands Antilles PJ brethren. SSA of Sweden announces the 4th All-European DX Contest for November-December consumption Pictures of several KR6s, HK6JH and W9LM's fruitful antenna farm decoratively complement the commentary. QST

27th ARRL Sweepstakes — Nov. 12-13 and 19-20

Sweepstakes time again rapidly approaches. If you are located anywhere in the League's field-organization territory (see page 6), you are cordially invited to take part in this popular annual operating activity. Any amateur bands, phone or c.w., may be used. The total operating time allowed each contestant is 40 hours. Phone entries are compared only with other phone entries — c.w. scores only with other c.w. scores — in your particular section, in the competition for awards. Special Novice certificates are also issued. The week-end periods starting Saturday afternoon (2300 GMT) on the 12th and 19th of November mark the open season for SS contacts.

A complete announcement of the contest, including the rules governing participation, will appear in November *QST*. The rules will be the same as those of the 1959 SS. Amateurs in remote ARRL Sections who do not receive the next issue before the Sweepstakes may refer to November, 1959, *QST* for contest details.

Contest reporting forms will be sent to all amateurs who request them by mail or radiogram. It is not necessary to use these forms if the report form prescribed in November 1959 or in the next issue of *QST* is followed. CU SS?

Strays

Here is the October schedule for the Eastern MARS technical net.

AF-MARS Eastern

(Sundays 1400 EST: 3295, 7540 and 15,715 kc.)

- Oct. 2 — Introduction to Solid State Devices; the Diode.
- Oct. 9 — Transistor Parameters.
- Oct. 16 — Transistor Circuits.
- Oct. 23 — Tunnel Diode Applications.
- Oct. 30 — Transistor Applications.

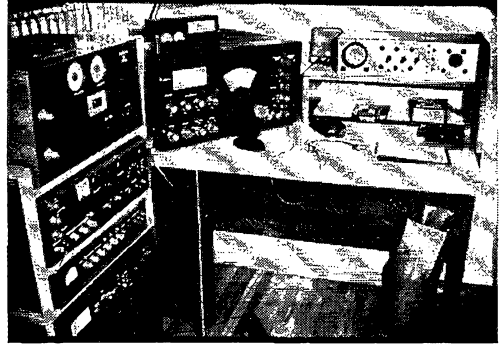
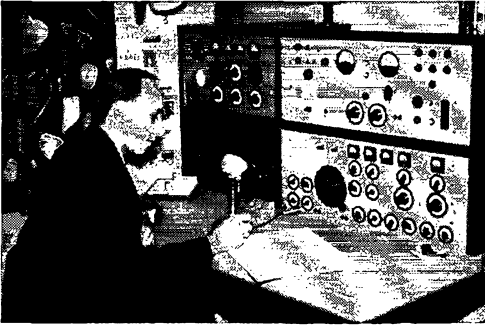
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The first USAF-MARS Midwest Conference was held Aug. 21 at the Officers Club at Richards-Gebaur Air Force Base in Missouri. Key personnel among the 112 attending included the Chief, MARS, USAF; the MARS directors of Continental Air Command, Air Defense Com-

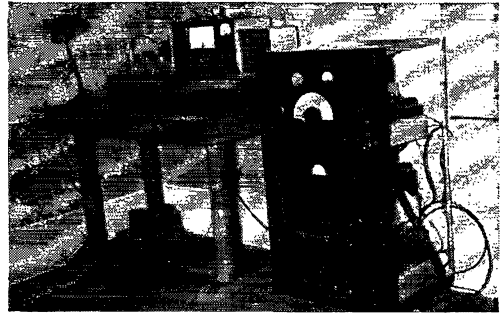
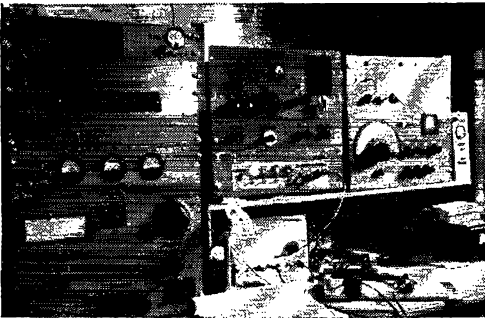
mand, Air Materiel Command, Military Air Transport Service, the Central Technical Net, Forbes and Schilling AFBs and the 33rd Air Division. Also present were the State Coordinators of Indiana, Illinois, Iowa, Nebraska, Missouri and Kansas with four Zone Directors and numerous Net Managers and NCS.

Capt. Charles R. Rinehard, AFØZKQ discussed the question "Where Are We Going?" Capt. Bernard Yoffee, MARS Director of ConAC, answered specific questions on the entire MARS program. Lt. Col. George D. Meserve, W1FL/AFØWYK, State Coordinator of Kansas, organized the conference. Lt. Col. Zed W. Barnes, Deputy Chief of Staff, Communications-Electronics of the 33rd Air Division, welcomed the conferees. Members plan a similar meeting in 1961.

Home-built Stations



This pair of pictures displays some of the neatness for which our German friends are renowned. To the left is the home-built setup of ex-DJ2JB, who is now living in New Jersey and eagerly awaiting the time when he can obtain his U. S. citizenship and get back on the ham bands. His rig operated phone and c.w. on 80 through 10 meters at 250 watts. At the right is the station of VE3CTP, ex-DL1JZ. He runs 500 watts sideband, and even the high-voltage transformer and key are home built. The receiver uses separate converters for each band.



At the left above is another example of some of the fine construction done by VEs. This one is VE3AHU and, of course, he built nearly everything in the photo except the key and the mike. His transmitter ends up with an 813 modulated by a pair of 807s, while the receiver is an item that started out as a simple job but ended up with 16 tubes plus four separate crystal-controlled converters. At the right above is the station of W9UXW. His 11-tube receiver was built almost completely from his junk box, the only stuff he had to purchase being the band switch, some coil forms, and some decals. The cabinet was made from transcription aluminum, and even the dial is home made. The transmitter ends up with an 813, and it rests in a home-built rack. In addition, W9UXW built most of the relays and wound most of the transformers himself.



At the center of the "fourth largest city in Colorado," a city of 56,000 men and boys, 28,000 tents, and one burro, was KØBSA, the voice of the Fifth National Jamboree, Boy Scouts of America. Here, doing his share in snagging 784 QSOs with hams in 46 states and 14 countries, is one of 469 hams who signed the guest book—Steve Wood, K4FJO, of High Point, N. C.

Pedro, that one burro mentioned above, had his (hind) quarters ten feet from KØBSA, and ARRL Assistant Secretary W1UED, who was there, declares that the audio from that donkey was worse than the QRM on 75!

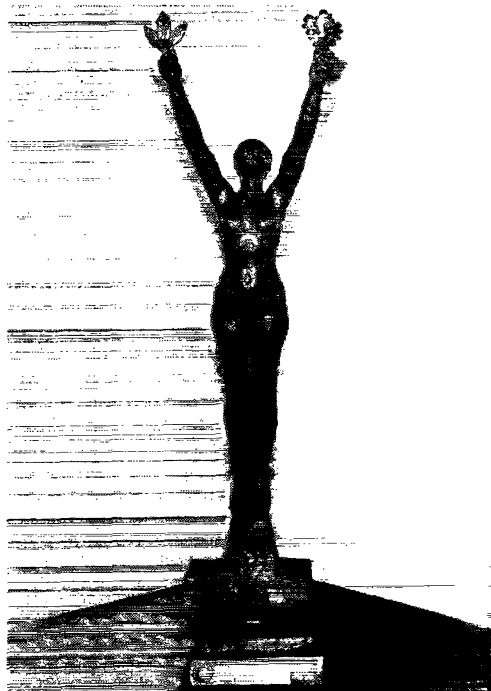
I.A.R.U. News



THE photograph on the right may seem a little unusual for an IARU column. It is. On the other hand, readers of *QST* of about a decade ago will remember that it is a bronze statue, about four feet high, which was especially sculptured at the order of Jorge Delcasse, LU5CQ, given by him to the Radio Club Argentino and by it donated to the custody of IARU Headquarters to be awarded ten years later to the member society of IARU judged, at that time, to have contributed most to the development of coordination between amateurs. The statue has considerable significance, we were informed by the RCA; the feminine figure symbolizes the friendly spirit which exists in communications between amateurs of the world; she carries in her right hand leaves of laurel symbolizing the triumph of courage and in her left hand leaves of oak, symbolizing amateur friendship and co-operation.

Last fall, as a result of a vote among the societies of the IARU, the trophy was awarded to the Radio Society of Great Britain, on nomination of the New Zealand Association of Radio Transmitters, primarily for its work in establishing the Region I Bureau of the IARU during the past decade. It was a great pleasure of the Union Secretary, WIBUD, to make the official presentation at the 1960 Fourth Region I conference, at Folkestone, England, this past June (the statue itself was on the way via ocean freight).

Speaking of the fourth Region I IARU conference — it has been the pleasure of your Secretary to attend all but one of the series — it was the usual cooperative affair of a five-day gathering of representatives of European member societies of the Union. Fifteen societies were represented, with three more (E.D.R., O.V.S.V., and R.E.P.) being represented by proxy. The arrangements were excellent, the hospitality of the Mayor and city of Folkestone most gracious, and the discussions profitable. These resulted in a number of actions, including a thorough examination of the effects of the Geneva conference, advance planning for contact by member societies with their officials as the next conference approaches, and a host of matters having to do with mutual operation by European amateurs: Contest rules, awards and certificates, provision for a news bulletin, actions with respect to clarification of "Fox Hunting" contests (Hidden Transmitter Hunts to us on this side of the Atlantic), f.s.k. standards, etc. Secretary WIBUD was provided an opportunity to speak for approximately thirty minutes on some of the prospects with respect to the formation and conduct of the next world conference and some speculation on when it might



take place (roughly what was conveyed to the League's Board of Directors in May). A delicious banquet ended the sessions and was notable, as usual (from the American point of view), for the great number of toasts proposed and the resultant responses, which approached short addresses in most cases.

The photograph on page 75 includes most of those present.

EMERGENCY WORK BY AMATEURS OVERSEAS

Amateurs the world over are alike in their readiness to assist the local or national government, the Red Cross, and members of the general public in all sorts of emergencies, civil or natural. Here are reports from two International Amateur Radio Union societies on the work done by their amateurs during the serious emergencies of the past few months.

Belgium and the Congo

What is believed to be the most extensive emergency operation ever set up by the radio-amateurs has been in progress since the beginning of July.

When the Congolese armed force mutinied, the

The World Above 50 Mc.

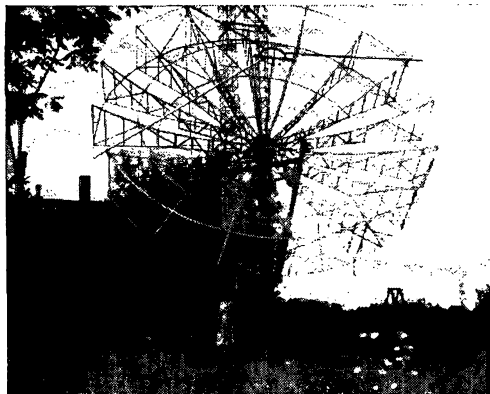
1215-1300 2300-2450 3300-2500 4650-5925 10,000-10,500 21,000-22,000 30,000-7

CONDUCTED BY SAM HARRIS *, W1FZJ

PRACTICALLY all of my twenty some odd years of amateur activity have been spent on the v.h.f. bands. During that time, all of my v.h.f. activity, and all of yours too, has been ably reported for posterity in this column by Ed Tilton, W1HDQ. I have learned over the years to rely heavily on Ed's mature interpretation of the various problems which arise in the v.h.f. field. My efforts in this column will be directed toward maintaining the same high standards. I'm certain I'll have Ed Tilton's cooperation in my efforts. If I am to be successful, I will need yours. Please don't hesitate!

Speaking of hesitating, I hesitate to bring up such a controversial subject as tuning above 145 Mc. Nevertheless, the complaints received would indicate that many Technicians feel they are being neglected because the DX workers on the low end of the band are not tuning above 145. Surely, it must be recognized that the modern amateur-band-type communication receiver makes it impossible to tune more than $\frac{1}{4}$ Mc. or so at a time. Nevertheless, a dyed-in-the-wool DX worker will look for DX wherever it may be found. If there is DX to be worked above 145 Mc., the DX man will tune above 145 Mc. He certainly is not going to the trouble of moving his receiving equipment up to 145 Mc. in order to talk to a Gonset across town. You must remember that this is not a controversy about where he is going to tune, but rather a controversy about what he wants to hear when he tunes. It is perhaps unfortunate that some of the most consistent stations operating in the lower portion of the two

* P. O. Box 334, Medfield, Mass.



W8L1O's 20-foot parabola, on a polar mount. Small girl beneath dish is XYL, Idah.

meter band are operated by people who have worked twenty to thirty or more states and whose prime ambition in life is to work all 50. The likelihood of them finding a new state above 145 Mc. is at present very small. It should probably be pointed out that the same stations do not answer calls from people on 144.3 Mc. either. They certainly have nothing against you as a Technician, but only against you as a state they have already worked. This condition is certainly not confined to two meters. It exists on any band where a DX precedent has been established. For instance, a W1 in Vermont is worth 50 W1's in Massachusetts. In any event, complaining never solves any problems. If you feel there is anything to be gained by having the stations on the low end of the band tune above 145 Mc., you must make your portion of the band more attractive to him than his portion. Don't make it too attractive, however, or he may move up there transmitter and all.

Project Moon Bounce, Echo 1.

We have received numerous reports on the reception of signals purported to have been reflected from Echo 1. Unfortunately, Echo 1 was launched during the peak of the Perseids Meteor Shower and the majority of the reports received are directly attributable to meteor reflection. The likelihood of stray reception of amateur signals reflected from Echo 1 is very small. In fact, the path-loss for Echo 1 is approximately 5 db. greater than the path-loss for a moon-bounce transmission. For amateur type communication, reflection from Echo 1 offers no advantages over the moon and has several disadvantages. The prime one of these is the rapidity of transit, which introduces considerable doppler shift as well as very difficult aiming problems. It is certainly safe to say that if you cannot receive moon-reflections, you will not be able to receive Echo 1 reflections.

Project Moon Bounce on 1296 Mc. at the R.S.V.H.F. Society has just been converted over to single sideband. I was privileged, after considerable effort, to finally hear a weak and wavy signal saying "Hello down there." Schedules are being maintained with W8L1O of Dorset, Ohio, and W6HB in San Carlos, California. Other schedules are invited.

Speaking of W8L1O, Jack of Dorset, Ohio, has constructed since the first of July a complete 1296 moon-bounce receiving station. A 20-foot homemade parabolic reflector mounted on an equatorial mount (see photo) represents an all

out effort on the part of Jack and anyone else he could scare up. The dish is built to a $\frac{1}{4}$ -inch tolerance and exhibits a gain and beam width consistent with a dish of this size. The receiving setup consists of a homemade version of the Microwave Associates paramp used at W1BU. Reception of W1BU at Dorset, Ohio, is adequate to allow rebroadcasting on 40 meters so that we can hear our own signals coming back. To date no voice transmissions have been accomplished. The exciter for the transmitter at W8LIO is under construction and will probably be on the air by the time you read this. Plans are to use an RCA 7650 in the final running about 300 watts output. While Jack is no newcomer to the v.h.f. region, this is the first v.h.f. project on which he really bore down. It is obvious that prospective moon bouncers should look to Jack for advice on how to do it yourself.

New South American 50-Mc. Beacon

Beginning early in September we will have what should be a reliable indicator of DX possibilities to the region around Lima, Peru, about 12 degrees south of the equator. OA4AGI will be running a kilowatt transmitter 24 hours a day on c.w., on 50.04 Mc. The antenna has 12 db. gain, and will be aimed this way. Though no formal observing program has been set up for amateurs in connection with this station, ARRL would be glad to have reception logs.

The operator will attempt contacts when conditions appear favorable, but he may not always be on hand. The beacon station is located about 20 miles from his working site.

Strange-Signal Reports, 50 Mc.

Three new reports have shown up in the Strange Signal Department. The first of these from Keith Knowlton, K1JPH, who reports hearing the signal many times during May and June. While the signal can be peaked, it always peaks on different frequencies but covers the entire band. Keith has peaked the signal as low as 50.45 Mc. and as high as 52.75 Mc. with signal strength varying from 40 db. over nine to 60 db. over nine on his HQ-170C. Frequently he has noticed a peculiar "popping" off to either side of the peak. No carrier, "cause neither b.f.o. nor v.f.o. will beat against the signal.

Another report from Joey Cooper, K4PZJ, Memphis, Tennessee, gives us the southern view of strange signals heard since the middle of June. Joey and other six-meter operators in his area have noticed that the carrier and its regenerations appear almost every time the band opens, and cover close to two megacycles. It has a slight constant oscillation.

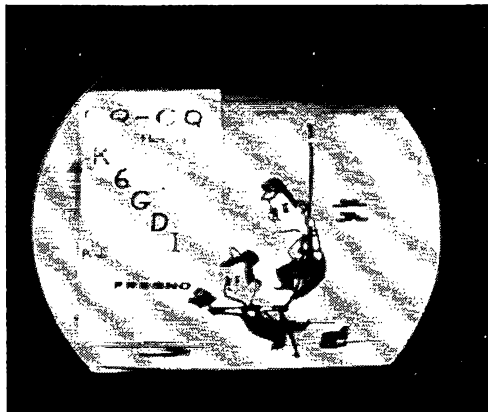
From the midwest and Missouri, Bob Golsong, K0SHN, reports that on August 2 the signal peaked to the south at 50.8 Mc. He finds that the "loud beeping tone peaks where the signal is the strongest" but the "loud rushing sound is just off to the side of the peak signal."

W0AIA, K9RIC and K0SHN all peaked the signal on the same night and at the same time and found it to be the same direction and frequency for all three of the stations. They find that it will cover a six-meter signal but no heterodyne is heard.

Miscellaneous Activity

Despite remarks of K7DNK/VO concerning no activity on 50 Mc. in that area, we learn from VO1EC that there is considerable activity; in fact as many as seven VO stations operating 50 Mc. at the present time. These stations as listed are VO1DW, AE, AO, EC, AU, CZ and AK, most of whom have been active during the spring and summer openings. The best of the openings from VO-land were, in all probability, the ones during the evenings of August 3 and 4, when the boys way up thar worked stations in W1, 2 and 3 call areas, and heard one W4 plus one W8.

Berry made the same complaint we all seem to be making, but knowing that such comments "cannot possibly be di-



Amateur TV is not confined to Ohio. It abounds in California also.

rected at me," do nothing about it. In his own words: "A good number of the W stations were involved in a real pile-up just inside the band edge trying to work VO1DW on his frequency, while VO1AO on 50.7 and VO1EC on 50.4 had relatively few contacts. It would appear that good operating practice and close listening would have produced more contacts." We agree a hundred per cent, but also know that feeling when a seldom-heard area comes through on 50 Mc. A fella is just scared to death to tune that receiver after hearing the call area he's never heard before. The band might be loaded with other stations from this new area, but just what if it isn't? And what if he gets away? Now is the time, when DX is scarce, to try to get into the habit of tuning, tuning, tuning, *past* the DX station already in contact with someone else, and see if *you* can't be the one to dig up a brand new station for your very own.

VO1DW is hard at work on a two-meter rig, while VO1EC already has one ready to go running five watts. While the boys do not feel there is much DX to be expected on 144 Mc. at their location in Newfoundland, VO1DW is mightily interested in the possibility of working with the Gs on two meters.

Another of our esteemed neighbors VE2AIO assures us that there has been and will continue to be serious activity on 50 Mc. in the Montreal area. As has happened to many of our v.h.f. enthusiasts, Geoff became "fed up" with the low frequencies, came to six meters, and is once again rarin' to go. He is running 25 watts output c.w., a.m. and s.s.b., with v.f.o. control to a 5-element beam at 55 feet.

Geoff started consistent operation on 50 Mc. during April of this year, but as he says "found life difficult on c.w.", and had much better luck on a.m. Wonder what the difficulty was! He prefers c.w. or s.s.b. to take advantage of weak signal circuits but does work a.m. and will move up in frequency for anyone tuning only around his own frequency. This may be going too far Geoff, how will we ever get the boys to *tune* if you're a gonna do things like that?

High power, to the tune of 100-watt output amplifier, is in the works at VE2AIO, and will eventually grow in power output. On May 15 Geoff had a contact with K6QOZ and on August 1 heard W7RUX at 1950 EST and also W5IVV, both working into the middle west. Both had pronounced flutter.

VE2AIO operates between 7:30 and 11:00 P.M. every evening and between 0800 and 1000 A.M. week ends around 50.090-50.100 Mc. VE3RM operates at 50.028 during skeds with Geoff every Saturday and Sunday morning. Very glad to hear of the activity in Canada, particularly as we can't get it over the air very frequently.

According to K4PZJ activity has improved in the Memphis area during the last two weeks of July; band openings helped, as during this time Joey worked twenty, count 'em, twenty states and Puerto Rico.

Word from W3RUE, Ted Fabian, reports contact with VE8BY on August 7 at 0145 EDST on 50.016. Only other DX stations at that time were VE4CV and a VE3. Signal of the VE3 was so fluttery that Ted could not get the call.

Said it sounded like a combination of aurora and back scatter.

KL7FLC is now operating from drift station Bravo at 50.04 Mc. They are operating on a 24 hour basis using automatic keying. Tests on 144 Mc. will be on request only.

KL7AUV reports reception of the Ice Island signal between 2300 and 2330 Alaskan time, Aug. 17, by KL7DKN. KL7AUV worked KL7FLC at 2200 Aug. 19, for about 17 minutes, and he was heard by KL7CDG around 2330 on the 20th. Also on the 19th, W7RT, Seattle, heard the automatic transmission of KL7FLC for about 5 minutes beginning at 2345 PST. The signal was S9, with only a trace of aurora flutter, but it lasted only a short time. The signal was strong when John first heard it, however, so it may have been in for some time.

VE8BY, Yellowknife, NWT, reports reception of KL7FLC at 0620 GMT Aug. 20. He was calling CQ at the time, and was S9. KØUDZ was heard calling KL7FLC, but no contact was heard. Beam headings were due west for KL7FLC and southeast for KØUDZ. So far, VE8BY has worked VE 3, 4 and 5 and W 2, 3, 7, 8 and Ø. His work has all been done when aurora was present, but signals are not badly affected by auroral propagation.

Gib sends us more reports on activity from VE8BY. Gib? Everybody knows who that is, W6BJJ of course. On July 28 Pete worked a few VE4's, then W8's and 9's, next VE5's and finally W7. Period lasted from 0330 to 0630 GMT, July 29. He worked VE5VL on A3, and K9DMZ, K7EGN and K7CBS on c.w. Pete, VE8BY, is running a 2E26, 5-element beam 55' up at Yellowknife. His frequency is approximately 50.015 Mc.

No skip signals were heard in Fresno that night as far as can be learned. Looks like some of us are just a-gonna have to change QTH to get that VE8 contact. Many thanks Gib, we'll be looking for both you and Pete.

Clubs and Nets

As usual the v.h.f. clubs around the country keep getting bigger, better, and newer ideas; activities which will keep the club members active and on their toes at all times.

The North East Oklahoma VHF Society is striving manfully to get all members mobile by having hidden transmitter hunts frequently. Several of the boys are converting commercial single sideband units for use on six meters; others are discussing (at the present time) the possibility of building transceivers for 3000 Mc. or thereabouts.

Jerry, K5ZGV, is working on a circuit for said transceiver. Sounds like this group is really go-go-Going.

The Lynchburg Amateur Radio Club of Lynchburg, Virginia, has completed its directory of Wide Band FM Nets, and anyone interested may obtain one from Tom McKee, K4ZAD, 508 Oakridge Ave., Lynchburg, Va. The directory has a number of choice bits of information concerning many phases of operating f.m. besides a list of stations, frequencies and QTHs.

The Houston Area Six Meter Net has also put out a directory which includes name, call, QTH and phone number of each of their members, and also information on the certificate issued by the club.

144 Mc.

144 Mc., not to be outdone by such upstarts as 120 Mc.

2-METER STANDINGS

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

WIREZ.....	32	8	1300	W6SWV.....	10	3	600
WIAZK.....	28	8	1205	W5UNH.....	6	3	1200
WIKCS.....	24	7	1150	W5YYO.....	4	3	1330
WIRFU.....	23	7	1120				
WIAJR.....	23	7	1130	W6WSQ.....	14	5	1390
WIMMN.....	21	7	1090	W6NLZ.....	12	5	2540
WIESK.....	20	6	1055	W6DNG.....	9	5	1040
WIIZY.....	20	7	1180	W6AJX.....	2	8	960
KICRO.....	19	6	800	W6ZL.....	5	3	1400
WIAFO.....	17	6	920	W6MMU.....	3	2	950
KIAFR.....	17	5	450				
WICLH.....	17	5	450	W7VMP.....	15	5	1280
				W7JRG.....	13	4	1040
W2NLY.....	37	8	1390	W7CJM.....	5	2	910
W2CXY.....	37	8	1360	W7LHL.....	4	2	1050
W2ORI.....	37	8	1320	W7JJP.....	4	2	900
K2GQI.....	33	8	1200	W7JU.....	4	2	353
W2AZL.....	29	8	1050				
K2IEJ.....	27	8	1060	W8KAY.....	38	8	1020
W2BLV.....	27	8	1020	W8SDJ.....	35	8	990
W2AMJ.....	25	6	960	W8PT.....	34	8	985
W2DWJ.....	23	6	860	W8IFX.....	34	8	980
K2HOD.....	23	7	950	W8LOF.....	33	8	1060
W2ALR.....	23	6	755	W8FQJ.....	33	8	1040
W2ALR.....	23	7	960	W8RMH.....	32	6	910
W2RXG.....	22	7	1090	W8SVL.....	30	8	1080
W2SMX.....	22	6	940	W8EHW.....	30	8	860
K2CEH.....	23	8	1200	W8LPD.....	29	8	850
W2LWI.....	21	6	700	W8WRN.....	28	8	680
W2LW.....	21	6	755	W8BAX.....	28	8	860
W2WZR.....	19	7	1040	K8AXU.....	27	8	1050
W2UTH.....	19	7	880	W8NOH.....	26	8	975
W2RGV.....	19	6	720	W8DZ.....	26	8	720
K2RLG.....	17	6	980	W8ILC.....	25	8	800
				W8WV.....	25	8	940
				W8GFN.....	25	8	840
W3RUE.....	32	8	1100	W8LCY.....	22	7	680
W3GKP.....	31	8	1180	W8BLN.....	21	7	610
W3SGA.....	30	8	1070	W8CTK.....	17	7	550
W3TDF.....	29	8	1050	W8NRM.....	17	7	550
W3KCA.....	28	8	1110				
W3SGA.....	22	7	700				
W3EPH.....	22	8	1000	W9KLR.....	41	9	1160
W3BYF.....	22	6	660	W9WOK.....	40	9	1170
W3LNA.....	21	7	720	W9GAB.....	34	9	1075
W3NKM.....	20	7	730	W9AAG.....	32	8	1050
W3LZD.....	20	7	650	W9RFX.....	32	8	1040
				W9ZIH.....	30	8	830
W4HJO.....	38	8	1150	K9AAJ.....	27	8	1070
W4HHK.....	36	9	1280	W9LVC.....	27	8	950
W4ZXI.....	34	8	950	W9EQC.....	27	8	820
W4LTU.....	34	8	1160	W9BFP.....	27	8	820
W4AO.....	30	8	1120	W9JL.....	26	8	910
W4MKJ.....	28	8	850	W9ZHL.....	25	8	700
W4UMF.....	28	8	1110	W9BPV.....	25	7	1030
W4VLA.....	26	8	1000	K9AQF.....	24	7	900
W4EQM.....	25	8	1040	W9LFF.....	22	7	825
W4WVN.....	24	8	850	W9KPS.....	22	7	690
K4EUS.....	24	6	765	W9CUS.....	21	7	800
W4JCI.....	23	6	725	W9OEV.....	20	7	850
W4VVE.....	21	6	720	W9PMN.....	19	6	800
W4RMU.....	20	7	1080	W9ALU.....	18	7	800
W4TLV.....	20	7	1000				
W4IKZ.....	20	6	720	W8BFB.....	32	9	1180
W4OLK.....	20	6	720	W8SMJ.....	29	9	1075
W4AIB.....	21	7	880	W8IHD.....	28	8	1030
W4CPZ.....	18	6	650	W8QDH.....	24	9	1300
W4RFR.....	17	7	820	W8RUF.....	23	7	900
W4MDA.....	18	6	750	W8IOP.....	23	6	830
K4YUX.....	16	8	830	W8TOP.....	21	7	900
W4LNG.....	15	6	1080	W8TGC.....	21	7	870
				W8RYG.....	20	8	925
				W8IC.....	19	7	1245
W5RCI.....	34	9	1215	K9AQI.....	16	6	1120
W5AJG.....	29	9	1360	W8IFS.....	16	6	1100
W5DFU.....	28	9	1300				
W5LPG.....	25	7	1000	VE3DIR.....	30	8	1330
W5OLK.....	25	7	1000	VE3ATB.....	28	8	1340
W5FYZ.....	23	9	1250	VE3BN.....	15	7	760
W5KTD.....	23	8	1200	VE3DER.....	17	8	1340
W5JWL.....	19	7	1150	VE3AQQ.....	17	7	1300
W5ML.....	16	5	700	VE3HW.....	15	7	1350
W5FSC.....	12	5	1390	VE2AOK.....	13	5	750
W5HEZ.....	12	5	1250	VE3BFB.....	14	6	515
W5CVW.....	11	5	1180	VE7FJ.....	2	1	365
W5NDE.....	11	5	625				
W5VY.....	10	3	1200	KH6UK.....	1	2	2540

220- and 420-Mc. STANDINGS

220 Mc.			
WIAZK.....	9	3	412
WIHDQ.....	11	5	450
WIOOP.....	12	4	400
WIRFU.....	15	4	480
WIUHE.....	11	4	385
W2AOC.....	13	5	450
K2AAX.....	8	3	230
K2CBA.....	10	4	325
K2DIG.....	4	3	140
W2DWJ.....	14	6	740
W2DZA.....	12	5	410
K2KIB.....	9	3	200
W2LRJ.....	10	4	250
W2NTY.....	10	4	200
K2PPZ.....	11	4	190
K2QJQ.....	10	4	260
W3AHQ.....	4	3	180
W3FEY.....	8	4	296
W3KKN.....	10	4	255
W3LCC.....	8	5	300
W3LZD.....	15	5	425
W3RUE.....	7	4	225
W3UJG.....	11	5	400
W3ZRF.....	5	4	112
K4TFU.....	8	4	400
W4UBY.....	7	5	320
W4UMF.....	11	5	420
W5AJG.....	3	2	1050
W5RHI.....	8	5	700
W6NLZ.....	3	2	2540
K6GTG.....	2	1	240
W6MMU.....	2	2	225
K7ICV.....	1	1	250
K8AXU.....	10	5	1050
W8JJC.....	9	5	475
W8LPD.....	6	4	480
W8NRM.....	8	4	390
W8PT.....	10	5	550
W8SVL.....	6	4	520
W8AAG.....	9	4	600
W9JCS.....	5	2	340
W9JFL.....	9	4	540
W9OVP.....	6	3	475
W9UED.....	4	4	605
W9UHL.....	10	5	500
K9DGU.....	5	3	425
K9TFT.....	6	3	515
KH6UK.....	1	1	2540
VE3AIB.....	7	4	450

420 Mc.			
WIHDQ.....	8	3	210
WIMFT.....	4	3	125
WIRFU.....	7	4	410
WIOOP.....	10	3	390
WIUHE.....	6	4	430
W2AOD.....	6	4	290
W2BLV.....	12	5	360
W2DWA.....	7	4	196
K2CBA.....	5	3	225
W2DZA.....	5	3	130
W2NTY.....	3	2	100
W2OTA.....	6	3	150
K2URF.....	7	3	175
K3EOP.....	6	3	250
W3FEY.....	5	2	225
W3RUE.....	7	4	320
W4HHK.....	3	3	550
W4VVE.....	6	4	410
W5HTZ.....	3	2	400
W5RCI.....	6	3	600
W6GTG.....	2	2	240
W6FZ.....	2	1	160
W8HCC.....	3	2	355
W8HRC.....	3	2	250
W8JLQ.....	4	2	275
W8NRM.....	3	2	390
W8RQI.....	4	2	270
W9AAG.....	5	3	375
W9GAB.....	9	4	600

and 1296 Mc., comes in this month with at least twelve changes in the "States Worked" column. The first reason for this upward trend in states worked was caused by a phenomenal two-day tropo opening which extended from the east coast to Nebraska, Kansas and Missouri. While this opening caught most of the New England 144-Mc. operators with their beams down for summer modification, our old standby, W1REZ, and K1GSR were in there pitchin' all the time. I guess Ray didn't get any new ones on this opening but he did open the way for Al, K1GSR, to contact W9QXP in Illinois at 0610 GMT, August 2, 1960 and then into W0BFB in Mitchellville, Iowa, at 0700 GMT and then W0EMS in Omaha, Nebraska at 0727 GMT. Signals from W9QXP, Jerry, peaking 5-8-9, W0BFB peaking 5-8-9, W0EMS running 4-5-9. K2KIB was hearing W0QDH, Kansas; W0BFB, Iowa; W0EMS in Nebraska. Jim managed to make a good contact with W9QXP/9. Jerry was on phone and reading 5-7 at Jim's house.

A little farther south, the fathers of amateur radio moon bounce, W3GKP, Spencerville, Maryland, and W4AO, Falls Church, Virginia, both contacted W0EMS in Omaha, Nebraska. Smitty was hearing W0BFB and W9QXP also. He reported W0EMS as being 5-5-9, c.w., naturally.

The same opening gave Mac, K2CEH, a new state when he managed to contact W0QDH, W0YMG and K0-AQJ, all in Kansas. He also contacted W0ZVY and K0HVP in Iowa.

Old Larry, W2ALR, not to be caught napping by such a close neighbor, also managed to work W0BFB and W0EMS. At least three of the reports received on this opening gave credit to Art, W8KAY, for his sterling efforts in alerting all and sundry. Certainly Art deserves a round of applause for his "QST-QST de W8KAY, look on such and such frequency for so and so." I am sure that many people would love to do the same service for Art if they could just hear something that he didn't hear first.

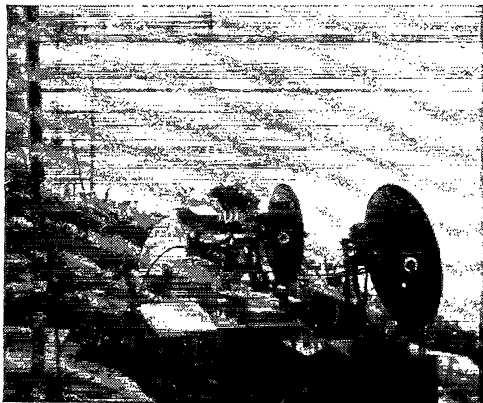
W9AAG, Woodhull, Illinois, started his activities on this opening on the evening of July 31. At around 11:00 p.m. (Heaven knows what time that is in GMT) Dallas noticed some carriers on strange frequencies and after swinging the beam identified W0YMG and W0ZJB. Naturally he worked them and arranged a schedule for the next morning at 7:00 a.m. At about 8:00 a.m. on August 1 a Confederate accent was spotted and finally identified as W5YYO at Borger, Texas. (Worked him too.) That evening W0EMS was raised and around 8:00 p.m. W3FPH was heard working W0DEN at Iowa City on phone. As nothing else east of Ohio was heard at the time, Dallas fired up on 432 Mc. working W9ZIH and W9OJI and between 10:20 and 11:20 CDST worked W8JLQ and W8RQI at Toledo, Ohio. Slipping back up to 144 Dallas then spotted W5TZ in Oklahoma and heard Ray, W1REZ, QSOing Jerry, W9QXP. Unfortunately, as usual, Dallas was caught in the middle of a good opening where everyone was hearing everyone but him.

An interesting sidelight on tropospheric propagation comes from Mac, W5MVL, El Paso, Texas. Mac has been keeping schedules over a couple of mountain ranges to Roswell, New Mexico. Schedules started on July 12 and improved nightly until on the 21 of July signals were running 10 to 15 db. over 9. This was the time of the month in which the KH6UK — W6NLZ 432 Mc. trans-Pacific transmission was made as well as the same date on which the 1296-Mc. moon contact was made. From that date on the signals over the mountainous path continued nightly to become weaker and weaker until on the second of August no contact could be made on c.w. Looks like those Easterners were borrowing your transmission path. Old Jess, W4AIB, Aiken, South Carolina, finally opened up the two meter band to W8BKI, Charleston, West Virginia. This 335-mile haul across the Alleghenies has been spanned several nights running and looks like a good summer time path anyhow.

Perseids and Shower

All the reports on the Perseids Meteor Shower are not yet in but apparently satisfactory to a number of people. (It is interesting to note that no 50 Mc. meteor scatter reports were received.) Jay, W5JWL, was glad to complete QSOs with W0AZT, W0MOX, W0ENC. Practically no signals received from the northeast-only station heard was K2LMG. Out in W6-land Mel, W6WSQ, managed a contact with W6LIT/0, Scotts Bluff, Nebraska. This was the first Nebraska — California 144 Mc. contact.

W7JRG and W8PT completed the first W7 — W8 144



Ernest Manly, W7LHL, operating the northern end of the 265-mile 10,000-Mc. circuit. The site was Green Mountain, Washington. W7JIP was on Marys Peak, Oregon, for the new record.

Mc. contact on August 12. Jack's signals were reported rock solid and a quick exchange of reports and calls which lasted about 45 seconds.

Jim, K2KIB, picked up W4HHK on the 10th of August and W4RMU in Florida on the 13th of August.

Comments from the New England Perseids schedulers are unanimous in proclaiming this year's shower a dud. Several schedules kept on 220 Mc. but no results.

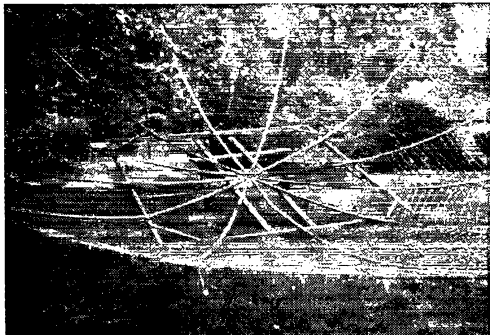
10,000 Mc. Record Broken

On July 31 W7JIP/7 operating on top of Marys Peak near Corvallis, Oregon, and W7LHL/7 on Green Mt. near Granite Falls, Washington, made a two-way contact on 10,000 Mc. at 0620 PST using A2. At 0624 PST they went to A3 and kept in contact until 0900 PST. This distance is 265½ miles. Ernie was assisted by W7PVZ, W7TWX, K7IPI, and his ten-year-old son, Jimmy.

220 Mc. and up

While the two-meter boys were making hay on the August 1 opening, W8PT was having a dandy phone contact with K2CBA on 220 Mc. With almost nightly openings across Lake Michigan and down into Ohio, Jack has really kept things humming on 220 Mc. and 432 Mc. (Not that he let anything slip by on 144 Mc.) No comment from Jack on the ideal 220-Mc. frequencies. He's too busy working 'em where he finds 'em to worry about where the band should be. Incidentally, the consensus so far on 220 Mc. seems to be that the band should be somewhere between 220 Mc. and 225 Mc. No definite preference anywhere in particular. Bob, W9GAB, complains that only moderate range signals up to 400 miles have been appearing on 432 Mc. weekly. Bob is conducting schedules with W8JLQ,

(Continued on page 158)



\$30.00 cash built this for Al, K2UYH.



W9HRI, one of the mobiles in Operation Alert at Eau Claire, Wis.

Working Together in Civil Defense

Operation Alert 1960

BY GEORGE HART, WINJM*

WE think OCDM must have the same troubles with Operation Alert that we have with our annual Simulated Emergency Test.¹ Things are tough, everybody is busy, there is more work to be done than can be done. Then all of a sudden someone remembers that it's almost time for another annual test and everybody tumbles all over everybody else trying to get things arranged in time.

We're just guessing, mind you. This year's OPAL was first mentioned to us in March, the copy of the standards arrived in mid-April and the test was held in early May. Both RACES and AREC participation were welcomed. We asked ECs whose groups took part, whether as AREC or RACES, to let us know what they did, informally. Believe it or not, at the time of writing this copy (early August) we are still getting reports of participation, most of them apologizing for being "a little late." That's the reason for the write-up being a little late, too; anyway, that's the best excuse we can think up at the moment.

And so to work? Well, it looks as though we heard from 28 states this year, two states better than last year. Of course *all* states took part, but 28 is the number we heard from. There was no amateur participation in the conelrad alert this

year. (Personally, we think they're still trying to dig out from under that avalanche of reports we amateurs sent them last year.)

Incidentally, there was some misunderstanding about the conelrad alert. Although we mentioned in *QST* that it did not apply to amateurs, that only the broadcast services were required to observe it, we afterward received a number of letters "reporting" amateurs who kept on merrily transmitting while the alert was in progress. Some harsh words were exchanged on the air, entirely unnecessarily in view of the facts. Next time we'll use larger print.

Some of the reports were complete and detailed. Some were quite sketchy. A few we picked up from club bulletins and miscellaneous publicity releases.

Eight states reported this year which did not submit reports last year: Ark., Ga., Iowa, Ky., Okla., Penna., Vt., Wash. Seven states and two Canadian provinces heard from last year have no reports in the file this year: Ala., B. C., Kans., Mc. Mo., Mont., Sask., S. Dak., Va. So we come out about the same, after all. Here's the roll call of states, with a brief summary of the OPAL activities in each:

Arkansas

Members of the Arkansas River Valley Amateur Radio Club participated in OPAL as the RACES group of Pope County C.D., relaying Radef information from high schools to state c.d. headquarters. Four members were active. — *W5KBH, EC Pope Co., RO and Secy.*

California

W6DEF, EC Redwood City, reports that weekly c.d. check-ins continue in stride and that only the RACES people were active in OPAL. C.D. officials did not participate.

Connecticut

The AREC and RACES of Cheshire took an active part in OPAL with four amateurs and nine RACES operators on deck. We also received a book of four messages from amateurs in Watertown, Harwinton, Torrington, Richfield and Terryville merely stating that they were on, no details.

The Guilford RACES station, W1KAT, was on for 10 hours on May 3, handling 25 messages. Four amateurs did most of the work.

Newington RACES was active under RO W1DXT, taking part in the area drill. Five amateurs participated.

Florida

The usual good turnout. We have a concise report from W4UHY, who is state c.d. director of communications.



At the Control Center of Pope County (Ark.) RACES are (l. to r.) W5WSM, K5OJB (rear), K5PMB and W5KBH (RO).

The state RACES network functioned on 40 c.w., 40 phone and 80 c.w. alternatively as conditions changed. The mobile communications center was parked in front of the state control center. County RACES organizations which were active included those of Orange, Pinellas, Brevard, Palm Beach, Osceola, Lake, Broward, Okaloosa, Manatee, Dade, Escambia and Volusia Counties. AREC and RACES worked in the closest cooperation; as an example, all 22 operators in Orange were AREC members, and this group did an outstanding job. W4UHY estimates that approximately 250 amateurs participated in those counties which reported, and close to 400 amateurs throughout the state. Operation at county level is all on v.h.f. Thanks to W4UHY for a fine statewide summary. We wish also to acknowledge individual reports from Orange County (W4NKD), Okaloosa County (31 amateurs under RO W4RKH and EC W4BPJ) and Broward County (K4PPX).

Georgia

EC K4BPQ tells us that Clark County took part in a widespread activity.

Hawaii

In the Hawaiian exercise, all inter-island messages between the c.d. agencies and most emergency reports and orders on the island of Oahu were handled by the amateurs in the state c.d. net in daily sessions from 0800 to 1800. Our report comes from KH6ARL, who lists twelve amateur participants.

Idaho

Believe it or not, we have a report from Moscow. W7VQC held down the fort in that city (in Idaho, that is) and centralized activity in several other Northern Idaho points. Public service and utility agencies were superlative in their support of the alert and cooperation with the amateurs. W7QEL was an energetic worker in Northern Idaho, without whom little could have been done.

W7DPD in Arco was active three days in a row, in contact with Boise and handling much traffic for his c.d. people.

W7EYR held down the job of maintaining communication with Boise from Canyon County C.D. in Caldwell, assisted by W7OL and a relay by W7PCP in Nampa. He says that 2 meters is the most dependable band locally and that 75 and 40 meters did not stand up well.

Illinois

Chicago Area RACES had 2 mobile control centers and 3 communications control centers in operation on nine frequencies under the direction of RO W9SPB. Eight different control centers were used, and during the alert one of them was visited by the mayor, the Illinois c.d. chief and the Chicago c.d. director. It was a good turnout. — W9STR

W9IFA reports activity from Greene, Jersey and Calhoun Counties where amateurs worked with c.d. police and fire personnel, using two meters.

Evanston RO W9BUK reported by radio that Evanston held their OPAL 60 on May 8, using twenty operators in three nets.

Nine amateurs manned the gear at K9KHN, the St. Clair County c.d. station, throughout the alert. Frequencies on 75, ten and two meters were used. Everything went smoothly. — W9JMY, EC.

Indiana

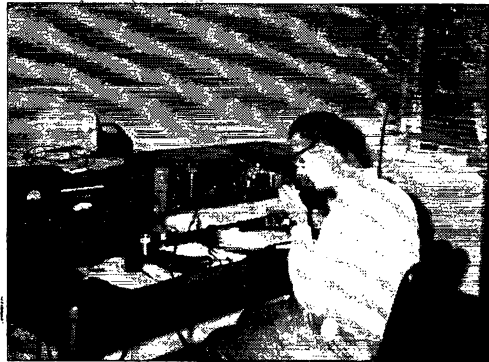
OPAL in Jay and Delaware Counties was held on May 1 by the AREC of those counties in order to take advantage of the week end. The activity simulated a tornado and was supervised by W9SNQ, EC for Jay County.

The Vanderburgh County RACES group monitored for the CONELRAD alert during OPAL.

A book message from four stations in Seymour indicates activity at that point, but no other information.

Iowa

Our sole source of information on Iowa activities is a club bulletin of the Sioux City Amateur Radio Assn. Therein, it is stated that RO W9FZO called the area RACES net at 1230 on May 3 to collect fallout information for Northern Iowa. Much difficulty with band conditions on 75 meters was experienced, but after collecting all information avail-



W7EYR, at the controls of the RACES station at Caldwell Idaho, for Canyon County OPAL.

able, W9FZO finally succeeded in passing it along to K5KDA/β on 3990 kc.

Kentucky

The AREC of Owensboro, Ky. (Davies County) took part in OPAL on May 5. Five mobile stations and seven home stations were active, with a traffic count of 32. C.D. officials were impressed with the drill, which lasted one hour. Nets were set up on 75 and ten meters, passing simulated messages dealing with refugees from Louisville, Henderson and Evansville. Twenty AREC members took part. — W4VJV, EC Davies Co., Ky.

Massachusetts

Winthrop RO W1BB came through with his usual fine report. Operation was 100%. Sixteen stations and 28 people did the job locally, with all battery-powered equipment functioning perfectly. Net control was at the town hall. Two and six meters were used for inter-area and sector drills, with all traffic being handled promptly and accurately. The Alert warning was received and sirens sounded through the RACES net.

Michigan

Washtenaw County EC and RO W8JYJ submits a good report on their activity. The county c.d. bus was used as net control in a May 3 drill lasting from 1300 to 1430, with sixty messages handled by twelve participating amateurs. On May 4 the net was reactivated at 0830 and over 100 messages were handled on that date, with 14 amateurs taking part. A great improvement was noted over last year's drill.

Muskegon County RACES and Red Cross combined for the operation in that area with six networks on 80 c.w. 75 phone, 10, 6 and 2 meters. The six meter group provided a tie-in with western Michigan areas and also with state in Lansing. All traffic was efficiently handled. All communications were under the direction of W8UCG, who is director of communications, RO and EC.

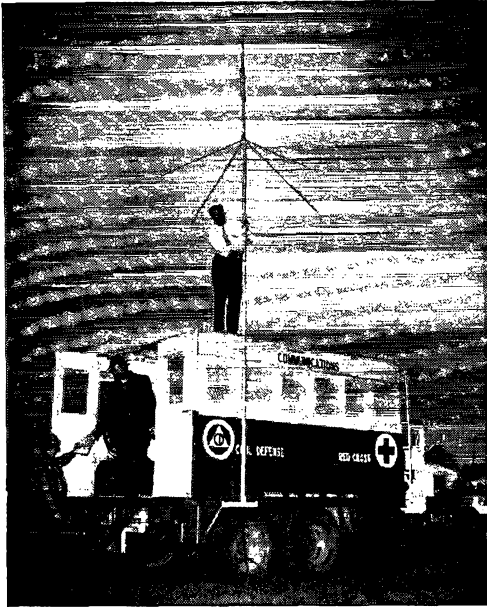
Minnesota

At 1200 on May 3 the RACES network of Minn. Area III began to handle c.d. simulated emergency traffic. Fifteen amateurs in eleven counties of the area took part, with W7TWG in the NCS seat. In the two-day exercise 151 messages were handled by the net, an average of 10.7 messages per hour. This was over half of all the traffic passed during the entire c.d. operation. Only two counties in the area were not represented in the drill — a most creditable performance.

Only one other report from Minnesota — a message from K8MAH indicating that the Brainard group was "in full swing."

Nevada

The Boulder City AREC conducted a continuous watch on 7112 kc. on May 3, 4 and 5 at the request of state RO W7ZT and succeeded in copying thousands of words of traffic from Carson City, as well as some traffic from Boulder City to Carson City. Four AREC members, three of whom



Civil Defense, the Red Cross and the amateurs work closely together in Muskegon County and have joint responsibility for this nifty communications truck. That's W8KTJ on the ground, handing a message to K8KPS, while EC/RO/W8UCG manipulates the ground plane atop the truck roof.

are also RACES members, did the job. — W7HJ, EC Boulder City, Nev.

New Mexico

Our info comes from *LAB News*, a paper put out for employees of Sandia Base in Albuquerque. You don't think of New Mexico as being cold, but four amateur operators nearly froze on top of Pajarito Peak in the Jemez Mountains. With an inch of ice on the 144-Mc. antenna, they nevertheless succeeded in setting up communication with Grants and Moriarity. Actually, this was on the third day of the test. On the first and second days, 28 members of the Caravan Club of New Mexico and other c.d. personnel maintained communication between the Weather Bureau, state police and c.d. headquarters at Rio Grande Park in Albuquerque.

The Totah Amateur Radio Club put on a c.d. program over a local radio station during the conelrad test.

New York

Monroe County was tied into state nets on 75 phone and 80 c.w., while area and county communications were handled by eleven mobiles on ten meters, four on six meters, the Rochester Warden's Net on 2 meters, Command Net A with four towns and Command Net B with three towns on

six and two meters, all funneling into the Monroe County Control Center. A total of ten nets were in operation with 52 operators. An average of one message per minute was maintained the first night of operation. The exercise was conducted on a 24-hour basis for three days.

Operation Alert in Erie County lasted fifty hours and encompassed 258 operators, some in operation for the full time. Erie County RO (also W. N. Y. SEC) W2LXE says it was a good test and provided many ideas for smoothing out operations.

North Carolina

SCM W4RRH states that on a statewide basis OPAL 60 was successful. C.D. areas used v.h.f. on six or two meters for intra-area communications, while 75 phone or 80 c.w. was used to communicate with state c.d. headquarters from the areas. Crowding of the phone frequency made delays in getting traffic through quite commonplace. However, the state c.d. director was pleased with the result.

Oklahoma

SCM W5DRZ is high in praise of the work done by Oklahoma AREC-RACES groups during OPAL. Despite the fact that tornadoes were leap-frogging all over the state and that real emergencies existed in many places, the amateurs were able to pile up an impressive traffic total for the c.d. test in addition to taking care of needed communications for the tornado emergencies. Over a hundred operators from all parts of the state piled more than 600 messages into state headquarters through the RACES networks, far surpassing the performance that had been expected by the state c.d. director. No area of the state was left without communication on May 4 and 5.

Oregon

In the Portland area, thirteen RACES members were active for the full alert, handling traffic at c.d. headquarters. All are AREC members. The alert was directed by W7GWB, radio officer, and on the roster are two ECs and the Oregon SCMI, who sent us this info. Eighty-eight messages were handled.

RACES operators were also active in Marion, Washington and Clackamas County, and in all cases nearly all were also AREC members.

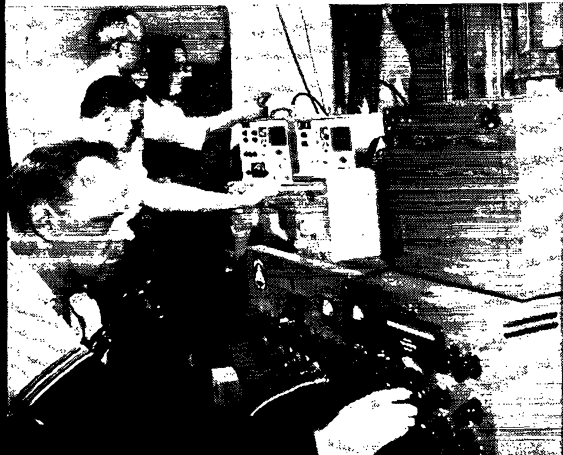
Pennsylvania

AREC-RACES operators in the Blair County area took part in OPAL with four mobile units on ten and two meters on high points surrounding Altoona and a fifth unit at Roaring Spring. Contact was maintained with two-meter portables in the downtown area. Reports on traffic conditions were funnelled from the portables to the mobiles, thence to W3LIV who relayed them to the main control center. Base stations in Tyrone, Hollidaysburg and Roaring Spring also reported to W3LIV. The plan worked out perfectly and the amateurs received high praise. — W3LIV.

EC W3WRE advises that Cambria County has only its regular weekly drill to report, with 25 operators, twenty of whom are AREC members. This is the seventh year without a break in weekly drills, the chain not interrupted for OPAL because there was no statewide activity.

Rhode Island

Amateurs in Newport County turned out in force in an OPAL exercise built around a simulated enemy submarine sending saboteurs ashore. RACES operation was on ten



Serious business at the Erie County, N. Y., control center during OPAL. From front to back are K2HUK (SCM, W.N.Y.), W2CUU, K2VAW (EC Erie County) and W2LXE (SEC, W.N.Y.). The latter is also county RO and the other three are alternate ROs.

QST for

This is the gang that put on such a fine OPAL show in the Altoona (Pa.) area. Top row, l. to r., K3GRU, W3ZVA, K3GIH, W3KQD, K3IML, W3ISZ, W3MRI. Bottom, W3MBS (RO), W3LIV (EC), K3ELL, W3JHG, W3ROA, W3CHN, KN3JPN.



and two meters, including stations in Newport, Portsmouth and Middletown, all operating under W1JFF, RO and EC for Newport. W1LUO and W1BBN, RO-EC for Middletown and Portsmouth respectively, were also active with their groups. The Newport c.d. director was high in his praise of the amateur efforts.

Tennessee

Oak Ridge was active in OPAL, according to info gleaned from the bulletin of the Oak Ridge Radio Operators Club. Contact with state was maintained on low frequencies when the planned six-meter link was unable to do the job. The operation was under the direction of EC K4OUK.

Texas

Harris County EC W5AIR says that our bulletin to ECs on OPAL contained a great deal more information than they got from their c.d. office. The latter said they would not know the assumed situation until the sirens sounded, but even then nothing happened and the amateurs were not called upon. A pity not to make use of an active AREC group such as exists in the Houston area.

Vermont

We have a complete and detailed report from W1VSA, RO for C.D. District #1. Wish we could reproduce it in full, but because it's six pages long this is obviously not possible. Local operation was on two meters, covering two of the three sectors in the district. Contact with state was on 3993 and 3518 kc. Twenty operators took part. Towns represented were Enosburg Falls, Shelburne, Winooski, Essex Jct., Middlebury, E. Middlebury and Vergennes. Liaison with northern New York State was effected via Air Force MARS.

Washington

The State of Washington got off to a good start on May 2 by a c.d. alert of doctors throughout the state. Doctors alerted went to the homes of amateurs and a simulated emergency test was carried out with excellent results. Six amateur stations were known to have been active in this alert. The AREC of Clark County participated by helping to supply extra operators. — W7ZDQ, EC Clark Co.

West Virginia

Our very competent SEC, W8HZA, supplies us with a complete summary of amateur participation through both RACES and AREC. The state net operated a total of 18½ hours, mostly during the first two days. State net control handled 27 messages and alternate control handled 37, using nineteen operators. Contact was made with thirteen strategic locations. Operation was on 80 and 40 c.w., 75 phone and six meters. Contact was maintained with OCDM Region 2 headquarters without difficulty on 7103.5 kc. Special mention is made of the support of the Kanawha County AREC group for their organized manning of the two state control centers.

A separate report from W8FUM says 15 amateurs were participating in the OPAL exercise in Cabell County.

Wisconsin

Brown County had an extensive turnout for OPAL. EC W9HDV directed the amateur activities from a new control center on 2, 10 and 75 meters.

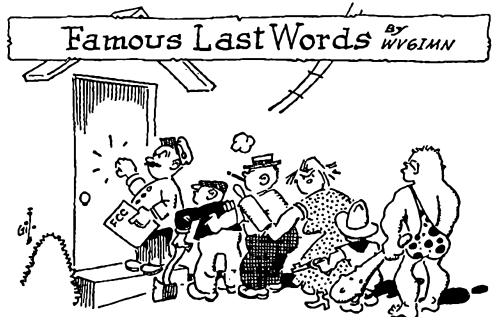
Twenty-one amateurs participated in OPAL in Eau

Claire County, many of them mobiles. Officials were greatly pleased with the result.

The Milwaukee unit of the AREC took part in OPAL under EC W9RUF, who is also RO for the Metropolitan Target Area C.D., covering seven counties. Control center was located at Indian Mound Boy Scout Camp. Other units were installed at Lapham Peak State Park, Milwaukee County/City Control Center and five zone controls in Milwaukee County. Operation was on 2, 6, 75 and 80 meters. The traffic total mounted to 376 sent and 589 received. — K9KJT, Asst. EC, Milwaukee.

Comments

"A continuing growth of RACES in Florida is very evident." — W4UHY. "Some areas need improvement, but the test was a success from a communications standpoint." — W4RKH. "Last year I complained about wasting a day with nothing to do. Can't say that this year." — W7DPD. "We were pleased with the good turnout of operators and many things were learned." — W9STR. "We take our civil defense activities seriously. These alerts are for a definite purpose and the same situation could exist if the alert was issued during an enemy attack." — W9UMS. "Our successful net is due to the large numbers of willing and cooperative amateurs taking part." — W1BB. "A great improvement over OPAL 59 and we're proud of all who participated." — W8JYJ. "If it could be arranged to have a get-together of AREC-RACES and c.d. communications chiefs, a lot of problems could be worked out. Let's not let it slide!" — W0TWG. "Oklahoma amateurs sure came through and there was no mistake about that." — W6DRZ. "K4IUY's XYL decided to present him with a YL harmonic right in the middle of the Alert. We thought she should be named 'Opal,' but no soap." — K4OUK. "Hate to think what would happen if missiles started coming down in Texas; not one person in ten thousand would know what to do." — W5AIR. "Without communications, we have no command." — W1VSA. "Any government employee signed up in c.d. is allowed up to 40 hours per year leave, with pay, to participate in c.d. drills." — W7UVY, per W7ZDQ. "Scheduling of the alert for a three-day mid-week period made it difficult to obtain operators for the daytime shifts." — W8HZA. QST



"WHO NEEDS FILTERS OR EXPENSIVE SHIELDING? THIS IS ONE HOME-BREW RIG THAT IS ABSOLUTELY GUARANTEED TO BE TVI-FREE"



Correspondence From Members-

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

SLOW-SCAN TV ACTION

☐ Mr. Stephen Smith's letter in August, *QST*, nicely outlined the case for slow-scan TV in the phone bands. An important point to keep in mind is that the slow-scan equipped amateur is a phone man, and in most cases has been one for years. He is a phone man who likes interesting QSOs. At intervals, audio from his slow-scan gear replaces the audio from his voice and at the receiving location, pictures illustrate his comments. His transmitting and receiving equipment is regular phone gear, and the output of his slow-scan equipment is audio — audio requiring less band width than his voice for proper transmission.

With slow-scan permitted on a regular basis in the low-frequency phone bands, most things would remain the same; the same phone men with the same rigs would be spending about the same amount of time in QSO with other phone men. One thing would be different, however; we would be seeing the other fellow's rig, family, and community rather than just hearing about them, and perhaps would do a better job of understanding the other fellow's way of life as well as showing our own.

Some hams do not realize that the first positive step toward getting ARRL action on this or any other matter is a letter to one's ARRL division director asking for action. His address is listed on page 8 of most *QST* issues, and the little time required to write is an investment in the future of our hobby. — *Cophorne Macdonald, W4ZBCW, Elmira, New York.*

AMATEURS IN INDUSTRY

☐ From time to time the value of the radio amateur to the armed forces has been mentioned and is cited as one of the justifications for amateur radio. I do not dispute this claim but I do feel that we have not given proper credit for what amateur radio is doing for industry. An article in the June 1960 issue of *Iron & Steel Engineer* illustrates how the training of the radio amateur is being used in modern steel mills.

In this article "Electronic Maintenance Training at Allegheny Ludlum Steel Corp.", the author, Mr. J. C. Haube, states "It is interesting to note the qualifications of the six men chosen (for the position of electronic repairman) . . . four of the six were amateur radio operators."

In the discussion of this article, Mr. R. T. Winterringer of Republic Steel Corp. states, in commenting on selecting men to maintain equipment of an experimental nature, "We were fortunate in our selection of three amateur radio operators. . . . Two of these men, approximately one year ago, completed the FCC examination for the maintenance and adjustment of a high-frequency voice communication system recently installed on our transportation equipment such as locomotives, diesel cranes, overhead cranes and straddle trucks. The recent installation of electronic regulators on our high-speed shear rectifiers and the programming of screwdown control have added to their burdens."

Also of interest in the discussion of this article is the statement of Mr. J. D. O'Roark of Weirton Steel Co. "The number of electronic maintenance personnel (at Weirton Steel Co.) has grown from five in 1943 to 51 in 1959."

I feel sure that I am safe in adding that the radio amateur who is employed in electronic maintenance in industry usually finds his job interesting, challenging and one with a reasonably certain future. — *Walter H. Bolinger, W3UGV, Pittsburgh, Pennsylvania.*

HI-FI TVI

☐ I have just cleared up a bad case of TVI which had kept me off the air for over a month. What happened might be of interest to the gang.

One night the XYL called into the shack saying I was

knocking the picture off Channel 2. My daughter also commented I was getting into her new portable stereo record player and the little b.c. radio in the bathroom.

The rig was given a routine check and everything seemed to be okay. The only way the TVI could be eliminated was to lower the grid drive to the final until the output was almost nil. The s.w.r. meter was removed from the coax line to the antenna with no improvement. There was no noticeable difference with the low-pass filter in or out of the line. The intensity was about the same with either the beam or the long wire.

The TV receiver checked out okay. I borrowed a portable TV from W2DRV and set it up in the shack using only its built-in antenna. No adjustment to the rig helped any except to reduce the output to almost zero. The water pipes in the basement were rapped with a hammer and all the exposed BX cable I could reach was bonded together with copper wire. No good. I was getting desperate.

The decision was made. The only thing left to do was to pull out all the light bulbs and line cord plugs in the house and clean the contacts with steel wool or sand paper. The shack was first. Nothing overlooked. The rig was keyed occasionally to check the results. Next was the daughter's bedroom. The metal bases on the light bulbs were all cleaned up and I was sanding the prongs on the line cord plug to the stereo when the "light" dawned: this thing has a crystal in the pickup arm! Without returning the plug to its socket I went back to the shack and closed the key. With power in the antenna the TV picture was clean.

That was it. Plugging in the stereo again brought back the TVI. Reversing the plug altered the intensity somewhat but it was bad either way. A small 45-r.p.m. record player with no amplifier has no TVI effect at all.

It's nice to be back again. I went on a QSO binge to get it partly out of my system — Hi! — *James E. Higgins, W2CWFK, Highland Park, New Jersey.*

BURNT FINGERS

☐ Reference your printing of my "protest" (July *QST* Correspondence) on Larson E. Rapp — well, as PT once said, "there's one born every minute."

Sure is rough to attend meetings of the Okinawa Amateur Radio Club these days — *QST* and I have provided them a source of much merriment for months to come!

I'll read the mag more carefully next April! — *Norman W. Pinney, Jr., W4EMP/KR6PN, APO 239, San Francisco, Calif.*

WIAW CODE PRACTICE

☐ In the Navy, I have been stationed aboard the *U.S.S. Elokomin* (AO-55) and have tuned in on WIAW nightly (well, almost) for the past year, during which time we have been in the Mediterranean, the Caribbean, the North Atlantic and other coastal operations. Almost always WIAW could be heard with good strength, even in those remote places. I think I owe a lot of my success as an amateur and as a Naval operator to your nightly code practice sessions. I take my hat off to the League for the work it's doing for ham radio. Keep it up. — *Arthur J. Williams, K9DHX, FPO, New York, N. Y.*

OO CARDS

☐ The other day I received an A.R.R.L. Official Observer's card. It reported me RST 457. All other log entries on this date gave T9 reports.

I then remembered an article in July *QST* by W7ETK. I found the same thing in my log as Mr. King did in his — the constant use of just T9. This signal condition may have

(Continued on page 152)



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
GEORGE HART, WINJM, Natl. Emerg. Coordinator
JOHN F. LINDHOLM, WIDGL, Ass't. Comm. Mgr., C.W.

ROBERT L. WHITE, WIWPO, DXCC Awards
LILLIAN M. SALTER, WIZJE, Administrative Aide
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr., Phone

<i>ARRL Activities Calendar</i>	86	<i>DXCC Notes</i>	92
<i>Brass Pounders League</i>	87	<i>RACES News</i>	90
<i>CD Parties Results</i>	87	<i>Section Emergency Coordinators</i>	91
<i>Code Proficiency Program</i>	93	<i>Traffic Topix</i>	88
<i>DX Century Club Awards</i>	93	<i>With the AREC</i>	89

October. The new radio season as always holds inviting prospects of exciting DX, worthwhile traffic and fraternal contacts, and full opportunity for you to hold station appointment. May we extend to all amateurs an enthusiastic invitation to *take part* in the new season's operating activities. Output is in proportion to input, so it follows that more taking part will up your results. ARRL organization is designed to make work *with others* possible and practical. Operating individually gives much less return than by working with others. Speaking of activities, *QST's* monthly advance-listings in the Activities Calendar should be followed to plan for activities ahead of time. Detailed rules and announcement of major contests are usually printed the same month a given activity takes place. But these are merely the cream in the coffee. Making our *daily* operating richly rewarding should be our aim. Go after awards as you will, but beyond the casual collection of pasteboards for WAS or DXCC, take some time to belong and participate in your section net, club, and AREC/RACES emergency group. Just a *few minutes* of the day puts you in touch with ten or twenty amateur stations when you're a member of a net. The latchstring is always out to anyone who calls in with traffic.

Simulated Emergency Test, October 8-9.

In this test each Emergency Coordinator is asked to sponsor a *local* test based on simulated emergency. This is a chance to check out or develop stand-by amateur radio emergency plans and capability. It is also an opportunity to re-register individual amateur willingness to assist in emergencies, to join the AREC and, as part of the

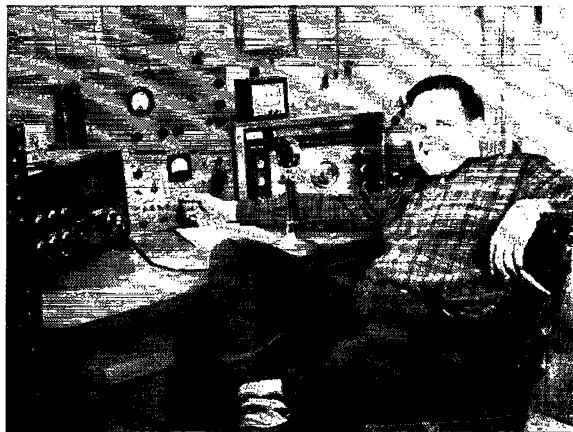
SET, to summarize in a radio message the action that was taken. The SET is not a substitute for additional AREC group get-togethers, such as community projects W8AEU recommended in his article last month. However, as the SET wheels are put into motion at about the same time throughout the country, it therefore becomes a nationally summarized exercise for which all Amateur Radio can take credit.

The Emergency Challenge and You.

Whether your main interest is v.h.f., traffic, DX, experimenting or just plain rag chewing, *you and all other amateurs* are needed in the AREC and in such tests as the Simulated Emergency Test. Regardless of whether you are a Novice, a real old timer, new General or Conditional, or a Technician, and regardless of what band you specialize on, there's room for you in the emergency program to make our communications potential for community and nation a lot greater than it is. If you have a mobile or emergency-power on your own (not required), so much the better. But all, if well organized, can count. What amateur operators demonstrate they *can* do in communications determines, to a considerable degree, the standing of our whole hobby and institution of amateur radio. Don't be left out.

Those AREC members that do have mobiles or portable emergency-powered units are eligible for the Official Mobile Unit identification cards, and the EMERGENCY RADIO UNIT placard, available commonly through ECs. See the full SET announcement on page 49 in this issue; get

A familiar call on 75 meters is W1EOR, SEC and state radio officer (RACES) for Connecticut. From the master control box (center), John can make his equipment do everything but sweep the floor.



data on local plans from your local ARRL officials, EC, SEC, or SCM. The first step is to get signed up in the Amateur Radio Emergency Corps, if not already registered with your EC or the Section Emergency Coordinator. Help demonstrate Amateur Radio's ability to function as an organized group in every communication need.

Traffic. For the last couple of years, traffic has been on an up-trend. The number of K and WA calls in the reports show the popularity of traffic nets with the more recently licensed amateurs. Our BPL listings last year showed a substantial increase over the previous year. Only 39 BPL medallions were issued back in 1956 but the number was 74 and 69 for 1958 and 1959. You will note that 516 net names are shown in the present Net Directory listings. If we consider nets that report separate sessions on different bands for a different listing, we come out with 560 separate nets. Only nets dedicated to a public service purpose are now listed in the ARRL Net Directory; registrations are currently being made for the new directory to be available around the end of the year. The progress made by NTS, the National Traffic System, should be mentioned. In simple terms this is the ARRL-organized means interconnecting the 73 ARRL sections year-round. There are still vacancies for some Transcontinental Corps positions. If you have the interest and skill, get information from your TCC director. We hope to fill some vacancies before the holiday season traffic peak.

FCC Suspends Technician for 14 Mc. Work; Suspension for Unlicensed and Obscene Operation. Current FCC monitoring actions support the basic requirements for compliance with the Communications Act, and likewise, by penalties, require all licensees to observe carefully the assigned band segments for operations strictly in compliance with the terms of one's class of license.

FCC took under consideration the suspension of the Technician Class Amateur Radio Operator License of Walter J. Burt (WA2CRE/KL7) Seattle, Wash., *it appearing* that on various occasions, Nov. 1959 to Jan. 31, 1960 and particularly on Jan. 16, 20, 23 and 24, 1960, licensee operated WA2CRE/KL7 in the 14 Mc. amateur band, A1 emission, contrary to the terms of his license and in violation of Sec. 12.23 (d) and 12.28 of FCC rules; and *it further appearing* that said licensee at various times and on the dates set forth transmitted call letters not assigned by proper authority to his said radio station, a violation of Sec. 12.158 of FCC rules. FCC ORDERED (Mar. 17, 1960) that the Technician Class Operator License of Walter J. Burt BE SUSPENDED for three months. This action became effective May 5, 1960.

FCC took under consideration the suspension of the General Class Amateur Radio Operator License of Dean Ross Hovey (K6KUT) Sun Valley, Calif., *it appearing* that on or about Jan. 9, 1960, licensee used and operated a radio transmitter without a license, a violation of Sec. 301 of the Communications Act; *it also appearing* further that said licensee transmitted communications containing obscene, indecent or profane words, language or meaning, a violation of Sec. 12.157 and transmitted unidentified radio communications or signals, a violation of Sec. 12.159 of FCC rules. The Federal Communications Commission ORDERED (April 1, 1960) that the General Class Operator License of Dean Hovey, Sun Valley, Calif., BE SUSPENDED for the remainder of the license term. This action was effective from Apr. 30, 1960.

Give Full Identification to Avoid FCC Citation. Sec. 12.82 of FCC's regulations states the requirements for identification. Transmit the call sign of the station you are working (or net identification), "DE" or "this is" or "from," followed by the authorized call sign of the station transmitting. The placement and time of such full identification is carefully spelled out in the regulations. More FCC citations appear to be being issued because of (1) dropping out parts of the call, (2) leaving out prefix letters and numerals, and (3) not fully identifying at prescribed times. ARRL Official Observer, W9GFF, suggests that we mention this to encourage more careful reading and observance of Sec. 12.82. During recent months he has noticed an increased tendency of many W/K stations to drop out the prescribed intermediate, or the call of the station being called or other parts.

Increase in the Use of Sideband. For amateurs interested in voice work, let us include another annual report item covering the use of s.s.b. Returns from 100 affiliated clubs chosen at random and representing 3196 amateur licensees indicated 342 amateurs active on s.s.b., and 131 additional club members planning s.s.b. operation. This represents 10.7 s.s.b. users per 100 amateurs surveyed through clubs. The figure is comparable to the 6.36 per 100 worked out just 12 months ago. In 1957, we found that 73% of the clubs surveyed had some members with s.s.b. stations. The current survey indicated 81% of these clubs with such members. Of the 3196 amateurs covered by the report, 67.57 operated phone (a.m., s.s.b., n.b.f.m., etc.). — F. E. H.

ARRL ACTIVITIES CALENDAR

- Oct. 5: CP Qualifying Run — W6OWP
- Oct. 8-9: Simulated Emergency Test
- Oct. 15-16: CD Party (c.w.)
- Oct. 20: CP Qualifying Run — W1AW
- Oct. 22-23: CD Party (phone)
- Nov. 3: CP Qualifying Run — W6OWP
- Nov. 12-13, 19-20: Sweepstakes Contest
- Nov. 18: CP Qualifying Run — W1AW
- Dec. 7: CP Qualifying Run — W6OWP
- Dec. 19: CP Qualifying Run — W1AW

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of QST issue in which more details appear.

- Oct. 1-2: Utah QSO Party, Utah Amateur Radio Club (p. 138, this issue).
- Oct. 1-2: VK/ZL DX Contest (phone), NZART (p. 75, last month).
- Oct. 8-9: VK/ZL DX Contest (c.w.).
- Nov. 5-6: RTTY Sweepstakes, RTTY Society of Southern California (p. 66, this issue).
- Dec. 3-4: 21/28 Mc. Telephony Contest, RSGB.

BRIEF

Correct KN8PFY's Novice Roundup score as reported in August QST to 7920, thereby placing him third in Michigan.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for July traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	369	2352	1844	361	4926
W6YDK	1732	41	29	12	1814
W0BDR	90	868	742	1	1701
W0LGG	683	410	387	24	1504
W0LXC	28	728	616	112	1484
W4PL	11	656	582	43	1292
K00NK	110	520	498	24	1152
W9IDA	31	563	548	2	1144
K1CIF	406	387	296	22	1111
K2THC	0	542	541	1	1084
K6BPT	47	515	403	92	1057
K4AKP	22	505	491	14	1032
W0TUS	40	408	469	87	1004
W0SCA	38	445	443	0	926
K6MCA	76	415	391	10	892
WA2COO	32	410	360	39	841
W6RSY	19	440	259	97	815
W7BA	4	400	374	26	804
WA6CDD	107	326	294	32	759
W2EZB	12	359	316	39	726
W1SMU	10	366	342	6	724
W6WPF	15	349	338	11	713
W6GYH	173	269	252	9	703
W9WAL	41	325	286	39	691
K4SJK	274	187	163	33	657
W9TT	26	305	134	152	617
W9DYG	16	318	260	16	610
W3VR	74	262	247	11	594
K2UCY	12	270	272	10	564
W7DZK	4	279	265	14	562
W1NJL	51	235	183	34	503
Late Report:					
W0OEJ (June)	2	262	251	11	526

More-Than-One-Operator Stations

W6ZJB	320	398	367	35	1120
K6WAH	37	364	246	118	765

BPL for 100 or more originations-plus-deliveries

WA2CCF	269	KP4API/1	119	K5TAJ	103
K0UKN/0	173	W1TXL	117	WV2KWZ	102
K7BKH	170	WA6EEO	113	K4FNR	102
W6ZCR	153	W4ZMH	109	K5CAT	102
W9DGA	153	K2DEI	108	K0VBU	101
W2EW	152	K0UTX	106	Late Reports:	
W3JWN/4	126	K1M1N	108	K8BQD (June)	263
W9GJS	126	W2RED	105	WA6EEO (June)	111
K4CNY	125	K0ORK	105	K4DWU (June)	108
W3TN	122	W8DAE	104		

More-Than-One-Operator Stations

W9LJT/9 118

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: W2EZB, K2THC, K4HJK, W0TUS.

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 or receipt, in standard ARRL form.



In the July CD Party, W2REH listened to 19½ hours of static interspersed with 166 contacts in 37 sections to grab the top of the phone totem pole. Operating 160 through 10 meters netted 31,080 points for Joe, a 16-year-old high school senior.

RESULTS, JULY CD PARTIES

Conditions for both the c.w. and phone Parties bordered on horrid. High noise levels, lightning storms, complete blackouts, ineffectiveness of the high bands, etc., proved a great challenge for the CD gang to surmount. W3GYP summed it up cutely with this comment: "The weather was quite hot; the bands, alas, were not." But K.O. the Party, conditions did not do.

W4DQS seems to be making a monopoly of the c.w. Party, again posting the top score with 199,950, just a hair under the 200K mark. Three in a row would be quite a feat — eh, gang. . . . Well, we got the October Party ahead to unset East Florida's grand scorer. K5ZBS (ex-W6WNI) continues to register top scores from Oklahoma, Earl fitting into the second national slot with 172,500. And W2OIB moved way up to third with 157,470.

The W2s and W3s definitely have taken the lead away from W1-land on phone. The top five scorers were W2s and W3s, with only four W1s making it into the high claimed scores; whereas, one-land used to dominate the high scores list. W2REH came through this time with 31,080 points, beating our fellow NNJer W2OIB with 22,225 and W3NF with 22,110. It is interesting to note that the top three phone scorers also placed on the c.w. list.

The following are the high claimed scores. Figures show score claimed, number of QSOs, and number of different sections worked. Final and complete standing will appear in the October CD Bulletin.

— W1DGJ

C.W.

W4DQS	199,950-638-62
K5ZBS	172,500-568-60
W2OIB	157,470-543-58
K2IMK/2	155,150-530-58
K4PUZ	153,400-516-59
K4BAI	152,320-537-56
W2REH	149,869-506-59
K00BF	147,200-457-64
W8IBX	143,925-500-57
K5QNF	141,305-472-59
K0QCQ	140,125-470-59
K0PIE	136,500-455-60
K4UBR	129,505-432-59
K8MTI	127,965-444-57
K6DDO	127,440-429-59
W3EIS	125,720-443-56
K8HGT	125,080-420-59
W9LNQ	118,530-434-54
K8KCO	117,425-420-55
K4SSB	114,550-390-58
W1MTX/3	114,215-426-54
W8TZO	113,430-391-57
K5ABV	111,805-379-59
W3NF	109,395-422-51

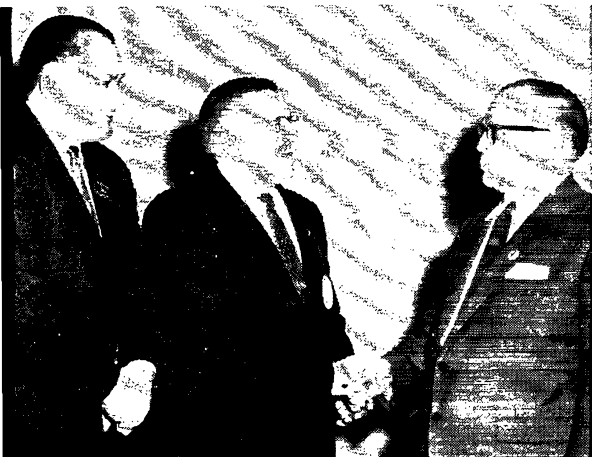
K5BSZ	108,300-375-57
K1JDN	107,590-406-53
WA2BEX	105,300-400-52
K4RAD	104,780-398-52
K4RIN	104,775-378-55
W4MLE	103,125-371-55
W3GYP	102,025-366-55
K4EJL	101,925-379-53
W8AEB	100,595-336-59

PHONE

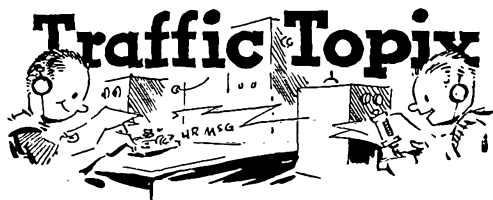
W2REH	31,080-166-37
W2OIB	22,225-127-35
W3NF	22,110-127-33
W3MFW	20,790-120-30
K2THC	16,120-119-26
K2VTX/VE2	10,665-75-27
W1NJL	10,450-89-22
KP4API/1	9,045-67-27
K2JTV	8,140-71-22
W1GKJ	7,480-63-22
K4PUZ	5,980-48-23
K9RFW	5,700-52-20
K1BBK	5,670-49-21
W9PNE	5,400-47-20



Illinois' W9PNE has been making noise in both the phone and c.w. CD Parties, posting 163-K last January, and again placing on the phone high claimed list for the July Phone Party. Versatility is a valuable asset in the hip pocket of ham radio enjoyment.



At a recent meeting in Michigan, these three important officials got together for a rare photo, for which we thank WBELR. Left to right are: W8YAN, SEC Michigan; MBUPB, ARRL Great Lakes Division Director and formerly SEC Ohio; and old-timer W8FX, SCM Michigan.



Well, how's everybody in the traffic game these days? Seems like October has rolled around again, and here we are on the threshold of another busy traffic season. The younger fellows who have kept things going during the summer while many of the old timers were on vacation will be going back to school. The veterans of many traffic seasons will be getting back into the swing of things.

Time was, doesn't seem so long ago, that all traffic handling came to a halt for the summer, from May through September. Only a few hardy souls tried to keep going. Not any more. Most traffic nets are year-around propositions. Oh, we still take vacations; more than ever, in all probability, although we have no statistics. The difference is that since those days we have approached traffic handling from a different angle. Then it was schedules, usually one a night with at least four or five different amateurs, but the same ones each night. Or it was Trunk Lines, in which one had to be an ORS and on deck every night — or else! Now it is nets, most of which require your attendance only one or two nights a week, and even then you may have an alternate. It is easier to be an active traffic man than it was 25 years ago, because today "active" means on the air regularly, while 25 years ago it meant on the air every night, except Saturday and Sunday and during the summer.

But leave us not reminisce. It dates us, and there is no particular merit to growing old. Traffic handling among amateurs is bigger and better today than it ever was, and we think that the coming season is going to be the best yet. We criticize and complain about bad procedure and undue delays and following organizational patterns, but the purpose of this is to make the good better rather than to make the bad good. When we get to thinking we are perfect we become complacent, and this is a bar to further progress — in fact, it's an invitation to decadence. We'll continue to lay it on as long as you'll continue your endeavors to make amateur traffic handling a public service to be proud of.

July net reports.

Net	Sessions	Check-ins	Traffic
Eastern Area Slow	28	123	65
20 Meter SSB	19	545	1986
Hudson Traffic	31	367	277
Trancontinental Phone	31	...	1940

National Traffic System. Ever since NTS was organized we have had difficulty reconciling our policy of using "the best mode to suit the need" with some of the NTS participants or would-be participants who use only one mode of emission for their traffic work. As a matter of fact, NTS development and organization has been difficult from the

start, mostly because it contemplated the ideal and strove to achieve it instead of the easier way of contemplating the existing situation and trying to make an organization out of it. We know as well as you that practicalities have to be considered, and if you will look back a little you will also see that NTS has had to make a number of concessions to circumstances in order to attract enough traffic men to make it succeed. But making temporary concessions doesn't mean abandonment of ideals. We still dream of a thoroughly integrated nationwide traffic system using all modes of emission suitable to the purpose with everybody working together to a twofold purpose: (1) Handle traffic systematically and with greatest efficiency from its point of origin to its point of destination, and (2) provide the maximum in traffic training for the maximum number of operators.

Now we want to make a couple of things crystal clear in regard to NTS: First, that we are definitely not prejudiced against any single mode of operation, as has been alleged by many of those who operate only one mode. Neither are we prejudiced in favor of any, as they are. Second, that there is at present no intention (and never has been) of establishing separate national traffic systems for the various different modes of operation. There are ways of working together if we really want to. If we look facts squarely in the face and without prejudice, it stands to reason that the best traffic man is the one who has the most operating efficiency and the greatest versatility, and we want the best traffic men for our liaison work in NTS. If we are to have proper liaison between NTS nets working by various different modes, we must have versatility as well as efficiency on the part of our traffic men. And insofar as practicable, we will select the mode to suit the need — or to put it differently, use the mode best suited to the purpose involved. Can't we stop the phone-c.w. squabbling and get down to business?

Net	Sessions	Traffic	Rate	Representation	
				Average	(%)
EAN.....	31	1189	.744	38.3	94.1
CAN.....	31	912	.513	29.4	98.9
PAN.....	30	1048	.593	31.9	100.0
1RN.....	31	467	.435	15.0	84.3 ¹
3RN.....	61	592	.341	9.7	94.0
4RN.....	62	593	.243	9.5	88.5
RN5.....	52	808	.457	15.5	92.5
RN6.....	62	1004	.312	16.2	87.4
RN7.....	60	415	.228	6.9	30.8
8RN.....	60	228	.153	3.8	73.9
9RN.....	47	626	.417	13.3	78.7
TEN.....	75	822	.412	10.9	55.2
ECN.....	18	112	.293	3.4	68.5 ¹
TWN.....	30	267	.333	8.9	60.7 ¹
Sections ²	822	4873		5.9	
TCC Eastern.....	99 ³	581			
TCC Central.....	93 ³	952			
TCC Pacific.....	124 ³	876			

Summary.....	1472	16365	EAN	9.4	PAN
Record.....	1710	20350	.795	15.2	100.0

Late Report:

8RN (June).....	51	234	.156	4.6	79.1
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¹ Region net representation based on one session per night. Others are based on two or more sessions per night.

² Section nets reporting: AENB, AENP Morn, AENP Eve, AENT (Ala.); QFN, FPTN, Gator, TPTN (Fla.); MSN, MJN, MSPN, MSPN Noon (Minn.); Iowa 75; Tenn. CW; CPN & CN (Conn.); VFN (Va.); S. Dak 40, S. Dak 75, SDN (S. Dak.); WVN (W. Va.); TLCN (Iowa); ILN (Ill.); NHN (N. H.); NEB (Nebr.); SCN (Calif.); CCW (Colo.); WIN, WSSN (Wis.); SCN (S. C.); MDDS (Md.-Del.-D. C.); BUN (Utah).

³ TCC functions reported, not counted as net sessions.

At first glance, it would seem that we finally failed to beat previous session and traffic records; but this column was prepared slightly earlier than usual, and the records shown were those adjusted for late reports last July. So although *maybe* we fell short of last July's records, this won't be sure until after all July reports have been received — and we think there are still quite a few to come.

Around the Regions. W9DYG now puts out an occasional CAN Bulletin called "CAN KAN"; CAN certificates have been issued to W0KBD and K4AKP. The 3RN reporting looks good mainly because of the efforts of two or three stalwarts in each section, but E. Pa., formerly a weaker link, is growing in stature through the efforts of RM W3AXA. W5TFB/5 took over RN5 during August and September while Doc's (W5GY) rig was temporarily *kaput*. RN6 certi-

cate has been awarded to WA6NCE (formerly K7CWW); summer conditions continue to make things rough on RN6. W8DAE, a really old time traffic man, has taken the reins of 8RN from W8DSX, who went to California; he hopes to get things really rolling this fall, but he needs a lot of help from you Eighth District traffickers. W9ZYK says that the figures in the 9RN report represent hard work under most difficult conditions. The early session (1700) of TEN is still being tested. VE3BZB replaces VE3AUA as manager of ECN. K0EDH says that TWN representation is just about as lousy as might be expected for this time of year, but is encouraged by increasing activity in Arizona.

Transcontinental Corps. Everything going along about as usual, with the boys successfully battling the unfavorable conditions most of the time. We still note a few vacancies in the TCC-Eastern chart, which may be gone by the time you get this. Better hurry if you want to get in on one of them (see W1SMU).

July Reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern.....	99	87.9	1103	581
Central.....	93	87.1	2036	952
Pacific.....	124	96.0	1732	876
Summary....	316	90.8	4871	2409

The TCC roster: Eastern Area (W1SMU, Dir.) — W1s WEF AW NJM OBR SMU, W2s OPB ZVW FEB, K2s THC SIL SSX, W4As APY COO, W3WG, VE2AZI/W1, K9GDF. Central Area (W0BDR, Dir.) — W4ZDB, W9s DYG CXY DO ZYK, W0s LCX SCA BDR. Pacific Area (W6EOT, Dir.) — W4DNU/6, W5ZHN, K6s TPL GID LVR, W6s EOT ELQ HC YHM WPF QMO, W4As ATB NCE, W7s ZB DZX GMC, K0s EDH EDK DTK CLS/6, W0s ANA WME KQD.

NATIONAL CALLING AND EMERGENCY FREQUENCIES (Kc.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

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.v.* — 3535, 7050, 14,060; *phone* — 3765, 14,160, 28,250 kc.



The announcement of the annual Simulated Emergency Test appears elsewhere in this issue, but for the benefit of the regular readers of this column (both of 'em), we want to point out something different about it this year that traffic from individual AREC participants will go to their SECs, rather than to ARRL headquarters. ECs will dispatch messages (brief radio reports) to headquarters, as usual, and in addition they will send a radio report to their SECs — or, if no SEC, to their SCMs.

The reason for this change is that in recent years some of the traffic nets have been complaining about overload as a result of the SET. Not that they wouldn't be overloaded in a real emergency, but this kind of an overload is unjustified and unrealistic. So we'll try a little different approach this year. Participating AREC members will originate messages, as usual, but this time addressed to the SEC instead of the NEC, to reduce overload on national nets. The SET dates: October 8 and 9. See your EC, get in the swim.

A genuine emergency interrupted the Kanawha County (W. Va.) AREC transmitter hunt on June 18. K8NYE/mobile broke into the net to report a severe auto accident near Institute, W. Va., in which a car loaded with passengers had rolled down a steep embankment with several people injured. Net Control K8CSG directed W8HYX to summon state police and medical assistance, and this was quickly and efficiently accomplished. More lives saved by amateur radio. — K8CSG.

On July 23 the sheriff's office of Cascade County, Mont., requested the assistance of the Great Falls AREC in establishing communications in connection with a forest and range fire ten miles south of Cascade. The AREC was activated, but withdrawn as fire-fighting was held up until daybreak. However, at 0400 the following day K7CYT

came on the air to check in mobiles starting for the fire location. At 0630 W7DSS took over as control station. At the scene of the fire, mobiles were placed at strategic locations on the fire's perimeter, with one at fire headquarters to act as control. These units relayed messages and information for the fire fighters and for the county sheriff's office, as well as maintaining contact with Great Falls. The frequency used was 3910 kc. Communication held up well until evening, when QSB and QRM became difficult. Cooperation from interfering stations contacted was excellent, but some could not be reached and undoubtedly did not realize they were interfering. W7DSS was relieved as NCS at 1725 by W7KUH (SEC), who closed his station at 2345; although the emergency was considered secured at 2245, a control station was kept on the air until all mobiles had returned. Everybody was well pleased with the work of the AREC in this emergency, reported by K7CYT, EC for the Great Falls area. Other participating amateurs: K7s DES JXL/mobile IOA/mobile, W7s AU/mobile BOV/mobile FGZ/mobile CRD/mobile TLA/mobile BOZ JZW HFZ, K0JTY, W0MNMK.

On July 25 the Mobile Amateur Communications System of Seattle was alerted at 2230 for a search and rescue mission near Bumping Lake in Yakima County, Wash. Three two-meter mobiles, a portable station and a hand-carried unit were dispatched. W7TWU packed twenty pounds of hand-carried unit into the search area for communication with W7GZS/mobile and K7GUH at the temporary center in the ghost town of Copper City. K7CXZ and K7CYB operated W7GZS/mobile and K7HNU set up a 40-meter station at Copper City. Through their combined efforts, the Yakima County sheriff could keep in touch with his office and with the searchers. The object of the search, a 13-year-old boy, was found early on July 27 in good condition after four nights in the brush. W7s KBH BJR and PHG assisted by handling traffic to and from Yakima and Seattle. — K7GUH.

On April 16 a tornado warning was issued for the Cleveland (Ohio) area at 1730 and remained in effect until 2230. The first storms began to appear within an hour of the first alert, so there was very little time for the weather net to organize, but they were in the job when the first storms hit. Although thunder storm activity was terrific, fortunately

no real communications emergency developed. However, several times the Weather Bureau requested information on particular storm cells over definite areas that appeared on radar, and the information was forthcoming from the AREC Weather Net within minutes. A total of 93 stations reported into the net. — *W8AEU*.

On April 30 a sudden cold front and squall line crossing Southern Michigan precipitated tornado rumors throughout the area. At the first warning, Calhoun County EC K8CIS at Battle Creek activated the Southern Michigan Net on 50.7 Mc. and put it at the disposal of the local weather bureau. Stations located in alleged strike areas were used to check out the many rumors being broadcast by radio and TV stations, all of which were discounted. Kalamazoo EC W8PDP activated the net in his area in running down the rumors. Four mobiles were used and ten other stations took part in this activity. After the storm, the weather bureau announced that their only reliable source of information was the AREC nets. No communications emergency developed. — *W8YAN, SEC Michigan*.

In early April, need for a rare instrument to save a dying child in Havana, Cuba, brought amateurs into action to locate the instrument and have it airlifted. In addition to Cuban and South American amateurs, many amateurs in this country assisted in locating the instrument and seeing that it was in the hands of the proper people in Havana. Thanks to KAICA for reporting this incident.

On June 26, W0TUS, Minnesota SEC, received a call from a woman in Bemidji asking for assistance in locating their daughter and son-in-law en route from Miami. It seems that there was a death in the family. W0TUS immediately went to work on the problem, and by 1230 the next day had amateurs in seven states on the alert to contact state police in an attempt to find the couple. — *W0TUS*.

Because we have to get our copy in early this month (so we can take a vacation), this cleans up all reports of emergencies, alerts and semi-emergencies in our files. We still have dozens of reports of other AREC activities that have never been reported. Although it just isn't possible to give a complete rundown on each (they date all the way back to around the first of the year), suppose we at least list them chronologically, so they will have been mentioned. Those which have to be hacked off the end of this list will be run later, in as much detail as space permits.

January 17: The Broome County, N. Y., AREC net sponsored a 6-meter transmitter hunt with excellent participation and some unique twists. — *K2RFC*.

January 19: Members of the Broome County (N. Y.) AREC took part in a TV discussion program on amateur radio, with WA2BTD and W2EDL the principal victims. — *K2RFC*.

February 7: Turlock (Calif.) Amateur Radio Club members provided progress reports on Olympic torch bearers for the 1960 Olympic Games at Squaw Valley, Calif. — *K1LVW*.

February 14: Portland (Me.) amateurs put on a local TV program designed to acquaint viewers with a cross-section of amateur radio. — *K1LSJ*.

February 21: Chenango County (N. Y.) mobile enthusiasts provided communications for a sports car rally in the snow. — *K2RFC*.

February 24: The Red Cross of St. Clair County, Mich., conducted a simulated emergency test in which the county AREC played an important part. — *W8QFQ*.

February 28: "Operation Sesame," a large-scale operation spark-plugged by WA2CGD of the Schenectady (N. Y.) AREC, was sponsored partially by the Schenectady County Chapter of the American Red Cross. This was all written up for *QST*, but unfortunately never hit print. — *K2HNW*.

March 26: A practice exercise of the Red Cross of Portland, Ore., with the AREC net on 3875 kc., included the section PAM, the SEC and six ECs. — *W7JDX*.

March 27: Three Washington ECs pooled their organizational resources to furnish communications for the Washington Mountain Rescue group in an exercise participated in by the governor and other state dignitaries — plus 29 amateurs. — *W7HMQ*.

April 17: K5DPH reports a "dandy" SET in southern Louisiana — a tidal wave problem. It was pulled completely by surprise on the net members.

April 29: A simulated disaster drill of the Red Cross of Jefferson County, Ala., in which eight county AREC amateurs took part. — *K4AOZ*.

May 8: Members of the Great Falls Radio Club, Electric City Radio Club, and Great Falls AREC took part in the annual Jaycee Trout Derby, 40 miles south of Great Falls, Mont. — *W7KUH*.

May 13, 14, 15: Lane County (Ore.) AREC members provided communications for the Boy Scout Camporee near Eugene. About 600 boys and 75 adults were served in this operation. — *K7CJB*.

May 16: The Cuyahoga County (Ohio) AREC sponsored a talk and demonstration to the East Cleveland Kiwanis Club. W8AEU did the talking, K8DBF assisted in the demonstration. — *W8AEC*.

May 20: Amateurs of Grants Pass, Ore., assisted local newspapers and radio stations in obtaining election returns. The local club was assisted by RACES members using c.d. equipment. — *W7JDX*.

May 22: Members of the Kalamazoo County (Mich.) AREC participated in a mock disaster exercise. About 45 amateurs provided communications on 75, 6 and 2 meters. — *W8ELV*.

May 25: Both the Queens County (N. Y.) Net and the Milwaukee (Wis.) Emergency Net found themselves on the same frequency (29.5 Mc.) starting net roll call with skip just right between them. Confusion for a while, then they got together and had a ball. — *W4ZIZ*.

May 30: The Southern Oregon Radio Club of Grants Pass furnished communications for the second Memorial Day "Boatnik" on the Rogue River, near Galice. — *W7JDX*.

June 5: Amateurs provided communications for the Third Annual Canoe Race on the Raisin River from Deerfield through Petersburg and on to Dundee, Mich. Six mobiles took part. — *K8ENY*.

June 14: AREC mobiles took part as usual in the Cleveland (Ohio) Flag Day parade, and did the usual fine job. KBMBW was in charge and thirteen amateurs were in on the act. — *W8AEU*.

July 2: K9DFK, EC for Clinton County, Ind., reports that his AREC group provided communications for the centennial of Sheridan, Ind., on this date. Some nine amateurs were involved. — *W9SNQ*.

July 4: The Tampa AREC had a drill in conjunction with the U. S. Coast Guard to determine the amateurs' value in Coast Guard rescue operations. — *K4EBT*.

July 17: A simulated hurricane alert was conducted in the Norfolk area by Acting EC W4QDY (also SCM) and his AREC crew. It lasted for two hours and was very successful.

Thirty-two SEC reports were received for June activities, on behalf of 11,819 AREC members. This makes our June 1959 records look pretty sick (23 and 9602). Louisiana's SEC reported to make one additional to our list for 1960, now totalling 39. Other sections whose SECs reported: Mont., Ill., E. Fla., Okla., S.C.V., Ore., E. Pa., E. Mass., NYC-LI, Minn., Mich., Colo., Ohio, S. Texas, S.J.V., Wis., Nevada, Utah, Wyo., Vt., S. Dak., Ala., N. Mex., Ga., Ont., Me., E. Bay, N. Texas, Wash., Ind., Kans.

We are considerably ahead of our half-way point of last year in the matter of SEC reporting. Let's keep going, and you ECs: *give your SECs something to report!* The following sections have 100% reporting records for the first six months of 1960: S.C.V., NYC-LI, Ore., Ga., Ala., N. Texas, S.J.V., E. Fla., S. Texas, E. Mass., E. Bay, S. Dak., E. Pa., Wyo., Nev., Me., Wash., Ind., N. Mex., Okla., Utah, Minn. That's a mighty long list of 100%ers!

RACES News

On June 11 at 2000 the members of the Wood County (Ohio) Amateur Radio Club set their RACES program in action when a tornado alert was posted for Northwestern Ohio. Radio Officer W8PSK and EC W8VTL had all members notified within 15 minutes and activated the base station, K8TIH. Two mobiles were dispatched and two fixed stations were alerted on 50.37 Mc. As no tornadoes were sighted, the net was secured at 2200, four additional amateurs having participated in what turned out, fortunately, to be just another RACES drill.



Section Emergency Coordinators of the Amateur Radio Emergency Corps

The Section Emergency Coordinator is appointed by the SCM to take charge of the promotion of the Amateur Radio Emergency Corps organization throughout the Section. He acts as the SCM's executive in the furthering of provisions for emergency amateur radio communications in every community likely to suffer in case of a communications emergency. One of the duties of the SEC is to recommend the appointment of Emergency Coordinators for the various communities in his Section. Does your town have an EC? If not, recommend the name of a likely prospect to the SEC. The SEC invites your questions concerning the status of the AREC in your Section.

ATLANTIC DIVISION

Eastern Pennsylvania	W3DCI	Emmett W. Kuehner	242 E. Broad St.	Hazleton
Maryland-Delaware-D. C.	W3PKC	John J. Campodonico	629 McCabe Ave.	Baltimore 12, Md.
Southern New Jersey	W2YRW	John Wesley Sammls	300 S. Woodstock Dr.	Haddonfield
Western New York	W2LXE	John S. Tylee	193 Avon Rd.	Tonawanda
Western Pennsylvania	W3OMA	Walter P. Remele	20 N. Howard Ave.	Bellevue 2

CENTRAL DIVISION

Illinois	W9PSP	Jack Stanton	2623 E. 74th St.	Chicago 49
Indiana	W9SNQ	Leonard M. Chalk	815 West Arch St.	Portland
Wisconsin	W9YQH	Chet T. Horton	930 Oregon St., Box 179	Oshkosh

DAKOTA DIVISION

North Dakota	K0KBV	Robert H. Dexter	514 First Ave., E.	Dickinson
South Dakota	W9SCT	Lester R. Lauritzen	Rt. 3, Box 32	Centerville
Minnesota	W9TUS	Robert R. Power	Bob's Radio TV, Box 2	Backus

DELTA DIVISION

Arkansas	K5CIR	Odla L. Musgrove	1321 W. Baraque Ave.	Pine Bluff
Louisiana	W5KXQ	A. T. Powell	224 Hollywood Drive	Metairie
Mississippi	K5QNF	Ed Russell	1322 Chambers St.	Vicksburg
Tennessee	K4EJN	Judson H. Scott	201 Logan St.	Jellico

GREAT LAKES DIVISION

Kentuck:	W4BAZ	J. B. Wathen, III	391 Mockingbird Valley Rd.	Louisville 7
Michigan	W8YAN	Donald E. Blashfield	RFD 3, Box 704	Battle Creek
Ohio	W8HNP	Arlington A. Garn	2979 Pemberton Dr., Apt. 2	Toledo

HUDSON DIVISION

Eastern New York	W2KGC	William L. Stahl	Shirley Ave.	Fishkill
N. Y. C. & Long Island	W2ADO	Maurice Mulligan	Box 134	Westbury
Northern New Jersey	WA2APY	Daniel Earley	216 Grove Ave.	Metuchen

MIDWEST DIVISION

Iowa	K0EXN	Ronald M. Schweppe	1412 Kellogg Ave.	Ames
Kansas	W0VZM	Patty L. Goyette	Box 83	Maize
Missouri	K0LTP	Henry Millig	2033 Eureka	Springfield
Nebraska	W0JDJ	Francis B. Johnson	820 S. 44th St.	Lincoln 10

NEW ENGLAND DIVISION

Connecticut	W1EOR	John L. Henley	RFD 1	Andover
Maine	W1JMN	Jeffrey I. Weinstein	79 Caleb St.	Portland 4
Eastern Massachusetts	W1AOG	Donald F. Gupitill	17 Park St. Court	Medford 55
Western Massachusetts	W1BYH	Norman Rivers	18 Saari Pkwy.	Fitchburg
New Hampshire	K1GQK	Howard Hook	RFD 1	Contoocook
Rhode Island	W1PAZ	Thomas C. McCormick	1934 Smith St.	Centerville 11
Vermont	W1EIB	Harriet Proctor		East Middlebury

NORTHWESTERN DIVISION

Alaska	KL7BES	Herbert R. Tresidder	1710 Snowcap Drive	Anchorage
Idaho	W7IWU	Alan K. Ross	2105 Irene St.	Boise
Montana				
Oregon	W7UQI	Emmett F. Roberts	Box 771	Canby
Washington	W7HMQ	Everett E. Young	2217-5th St., S.E.	Puyallup

PACIFIC DIVISION

Hawaii				
Nevada	W7JU	Ray T. Warner	539 Birch St.	Boulder City
Santa Clara Valley	W6ZRJ	Jean A. Gmelin	1089 Huntington Drive	San Jose
East Bay	K6DQM	Alex Eastman	210 Castle Hill Ranch Road	Walnut Creek
San Francisco				
Sacramento Valley	K6IKV	Antone F. Buzdas	4308 — 38th Ave.	Sacramento
San Joaquin Valley	W6EBL	F. E. Robinson	Sonora Motor Hotel	Sonora

ROANOKE DIVISION

North Carolina	W4RRH	B. Riley Fowler	Box 143	Morganton
South Carolina	K4PJE	Woody Brooks	Box 455	Andrews
Virginia	K4MJZ	William B. Zammit	1323 Kaiser Place	Falls Church
West Virginia	W8HZA	John A. Davies	659 Forest Circle	So. Charleston 3

ROCKY MOUNTAIN DIVISION

Colorado	W0NIT	Donald Middleton	920 West Adams	Pueblo
Utah				
New Mexico	W5CIN	Leonard M. Norman	903 North Butler Ave.	Farmington
Wyoming	W7CQL	Wayne M. Moore	2000 E. 1st	Casper

SOUTHEASTERN DIVISION

Alabama	K4JDA	Leighton W. Steele, III	212 Murphy Drive	Birmingham 6
Eastern Florida	W4IYT	Andrew C. Clark	41 Lenape Drive	Miami Springs
Western Florida	W4HKK	Clark A. Simms, jr.	3365 Newton Drive	Pensacola
Georgia	W4PMJ	Harold M. Rosser	P.O. Box 146	Harlem
West Indies (Cuba-P.R.-V.I.)	KP4AAA	Ernesto Viera	170 Arizmendi St.	Rio Piedras, P. R.
Canal Zone	KZ5RM	Roger M. Howe	Box 462	Balboa Heights

SOUTHWESTERN DIVISION

Los Angeles	W6LIP	Bruce T. Huntley	4570 San Blas	Woodland Hills
Arizona	W7CAF	Gary M. Hamman	1420 E. Missouri	Phoenix
San Diego	W6LYF	Harold Lindsay	4126 Falcon St.	San Diego 3
Santa Barbara	K6EAQ	Edward J. Shedd	3018 Lomita Rd.	Santa Barbara

WEST GULF DIVISION

Northern Texas	K5AEX	Robert G. Bender	c/o OCDM Civil Defense	Denton
Oklahoma	W5UYQ	Roy K. Bryan	2117 S.W. 61st Terrace	Oklahoma City 19
Southern Texas	W5QKF	Dr. R. O. Best	P.O. Box 1656	Corpus Christi

CANADIAN DIVISION

Maritime	VE1BL	C. A. Smith	Transmitter Bldg., R.R. 1	Lakeburn, N. B.
Ontario	VE3KM	T. W. Clemence	2278 King St., East	Hamilton
Quebec	VE2QN	Felix Edge	2604 de la Falaise Ave.	Ste. Foy
Alberta	VE6MJ	Sydney T. Jones	10706-57th Ave.	Edmonton
British Columbia	VE7KX	J. T. Hepburn	864 General Currie Rd.	Vancouver 14
Yukon				
Manitoba				
Saskatchewan	VE5IG	Harold Gronsdahl		Congress



Simplicity is the keynote of success in the Winthrop, Mass., RACES operations. This compact portable unit, operated by W1JL, was sufficient to effect communications between the Racing Committee boat and the Yacht Club in the July Interclub Sailing Boat Races—"RACES at the races."

The 160-meter band may be considered practically useless in some sections of the country, but out in the midwest it is widely used. In Pembina County, N. Dak., the RACES organization had itself an emergency drill on June 28, using 1990 kc. It was started at 1030 and conducted in accordance with the state RACES plan. KØHOZ, alternate RO and county EC, was in charge. The problem was to pick up election returns. RACES operators were used in addition to the some half dozen amateurs.

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

ELECTION NOTICE

(To all ARRL members residing in the Sections listed below.)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Section. The notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested. (Signers will please add city and street addresses to facilitate checking membership.)

Communications Manager, ARRL. [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the.....
.....ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this
Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Term Ends
Yukon *	Oct. 10, 1960	W. R. Williamson	Mar. 17, 1949
West Indies	Oct. 10, 1960	William Werner	Aug. 10, 1958
Kentucky	Oct. 10, 1960	Robert A. Thomason	Aug. 16, 1960
Arkansas	Oct. 10, 1960	Ulmon M. Goings	Oct. 15, 1960
Idaho	Dec. 9, 1960	Mrs. Helen M. Maillet	Feb. 10, 1961
Colorado	Dec. 9, 1960	Carl L. Smith	Feb. 11, 1961
Minnesota	Dec. 9, 1960	Mrs. Lydia S. Johnson	Feb. 17, 1961
Sacramento Valley	Dec. 9, 1960	Jon J. O'Brien	Feb. 25, 1961
Eastern Florida	Dec. 9, 1960	John F. Porter	Feb. 27, 1961
Missouri	Dec. 9, 1960	C. O. Gosch	Mar. 1, 1961

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian Director Noel B. Eaton, VE3CJ, R.R. 3, Burlington, Ontario. To be valid, petitions must be filed with him on or before closing dates named.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Quebec Western	C. W. Skarstedt, VE2DR	June 10, 1960
Pennsylvania	Anthony J. Mroczka, W3UHN	Aug. 7, 1960
Vermont	Mrs. Harriet Proctor, W1EIB	Aug. 10, 1960
Northern Texas	L. L. Harbin, W5BNG	Aug. 10, 1960
Wyoming	Lial D. Branson, W7AMU	Aug. 22, 1960
Montana	Ray Woods, W7SPK	Sept. 1, 1960
Canal Zone	Thomas B. DeMeis, KZ5TD	Oct. 1, 1960
Northern New Jersey	J. Sparks Remeczsky, K2MFF	Oct. 10, 1960

In the North Dakota Section of the Dakota Division, Mr. Harold A. Wengel, WØHVA, and Mr. E. J. Litton, KØKJR, were nominated. Mr. Wengel received 66 votes and Mr. Litton received 41 votes. Mr. Wengel's term of office began Aug. 19, 1960.

DXCC NOTES

Announcement is hereby made of eight new and separate additions to the ARRL's Countries List. DXCC credit claims may be made for these eight starting December 1, 1960. Claims for any of these eight received before December 1, 1960 will be returned without credit.

Four of these additions concern Republics formerly contained in the French West Africa listing. Contacts made on or after the date of independence for each of the following will be considered as separate from the French West Africa listing:

Dahomey Republic	August 1, 1960
Niger Republic	August 3, 1960
Voltaic Republic	August 5, 1960
Ivory Coast	August 7, 1960

The other four concern Republics formerly contained in the French Equatorial Africa listing. Contacts made on or after the date of independence for each of the following will be considered as separate from the French Equatorial Africa listing:

Chad Republic	August 11, 1960
Central African Republic	August 13, 1960
Congo Republic	August 15, 1960
Gabon Republic	August 17, 1960

Announcement is also made of the deletion of the French West Africa listing and the French Equatorial Africa listing. DXCC credit can be claimed toward the French West Africa listing for contacts made with the Dahomey, Niger, Voltaic, and Ivory Coast Republics prior to their independence dates listed above. DXCC credit can be claimed toward the French Equatorial Africa listing for contacts made with Chad, Central African, Congo, and Gabon Republics prior to their independence dates listed above.

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 October 20 at 2130 Eastern Daylight Time (0130 GMT, October 21). Identical texts will be sent simultaneously by automatic transmitters on 3555, 7080, 14,100, 21,075, 28,080, 50,900 and 145,800 kc. The next qualifying run from W6OWP only will be transmitted October 5 at 2100 PDST (0400 GMT, October 6) on 3590 and 7129 kc.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening at 2130 EDST (0130 GMT). Approximately 10 minutes' practice is given at each speed. Reference to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the

order of words in each line of QST text sometimes is reversed. To improve your fist, hook up your own key and audio oscillator and attempt to send in step with W1AW.

Date Subject of Practice Text from August QST

- Oct. 3: *Experimental Transceivers* . . . , p. 11
- Oct. 6: *The Inverted V-Shaped Dipole*, p. 18
- Oct. 11: *813s in Grounded-Grid*, p. 40
- Oct. 17: *A Featherweight Array for 50-Mc* . . . , p. 38
- Oct. 25: *How to Win the . . . Sweepstakes*, p. 52
- Oct. 27: *On Working Ws*, p. 54

BRIEF

The deluge of Field Day logs hitting the ARRL Communications Department was simply astounding. Initial indications are that all previous scoring records are to be seriously challenged if not surpassed, as well as the over-all number of those participating. As the log checking continues, it remains to be seen exactly what records were broken. In the meantime, stand by for the Field Day results soon to appear in QST. An Official Bulletin soon will be sent by W1AW and all Official Bulletin Stations giving those highest claimed scores.

DX CENTURY CLUB AWARDS

HONOR ROLL

ZL2GX 300	W3JNN 296	W1GKK 293
W1FH 300	W1ME 296	ZL1HY 293
W9NDA 299	W9YFV 295	W2BXA 292
W3GHD 299	W6EBG 295	W4DQH 292
W8GW 299	W7GUG 294	W7AKX 292
W6AM 298	W6WV 294	W6WDF 292
PY2CK 297	W5ASG 294	CE3AG 292
W4BPD 297	W8DM 294	W8UAS 292
W8JIN 297	W8BKP 294	W5ADZ 292
W2AGW 297	W9RBI 294	W6DZZ 292
W2EUQ 297	W7GCBW 294	ZS6BZ 291
W8BRA 297	W3JMN 294	W7NNV 291
KV4AA 296	G3AAM 293	W3BES 291
W6SYG 296	G2PL 293	W6TT 291
W6CUQ 296		G4CP 291

Radiotelephone

PY2CK 297	W3RIS 289	W8KML 286
W6ERR 292	W1FH 289	W8PQQ 285
ZS6BW 292	W8GW 288	4X4DK 285
W6GZ 291	W3JMN 288	ZL1HY 285
W8BF 290	W9RBI 288	W6AM 284
	W6YY 287	

From July 1, to August 1, 1960 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

W2PEV 128	W7PCZ 104	K6ZIF 101
SM3AZV 122	W9YAE 104	W6ZMW 101
W9WNV 120	DL0BH 104	W6ZSS 101
T2COMF 117	K3CBU 103	K7LAW 101
DL1CF 115	K7GCM 103	ZL1HY 101
UB5CK 115	W7MWF 103	K2YMO 101
W7DWM 114	W8NPF 103	K4ZYU 100
JA3EK 114	SM3AD 103	W6ADTA 100
K1APQ 113	K2TDI 102	W6EOT 100
W2VUF 113	W7GPI 102	KH6DLF 100
K8DTZ 110	W0YNL 102	KL7TI 100
E45BA 110	CT1IG 102	W8NAN 100
W1VKZ 109	W3CBP 101	K9LSN 100
O44HK 109	W3GYF 101	FF8BF 100
ZL2PM 109	W3INH 101	G3AEZ 100
W1KVG 106	K4HR 101	JA2AB 100
W9JO 106	W4LAV 101	ON4KF 100
VK9NT 106	W6LRD 101	ON4FK 100
K4QBP 105	K6QKH 101	VP8MC 100

Radiotelephone

EA7GF 163	YV5AIP 110	K1APQ 101
G3KHE 163	K4OGT 108	WITBG 100
CE4BP 130	K9EMG 107	W2PTM 100
G3HJ 128	O44HK 106	K6YDY 100
ZL1AX 128	YV5E 106	W7DVT 100
W2PEV 122	JA3EK 105	W8TTN 100
VE3BMB 116	K1DPI 103	W9PAO 100
W91VU 110	W1KVG 102	DL4GX 100
	VE1WL 102	

ENDORSEMENTS

W8TMA 281	K4RID 256	W5VU 232
W6CYV 280	W2FXN 250	W3AYD 231
W4LYV 276	W2HSZ 250	W1EQ 230
W8WZ 270	KP4CC 250	K5BGB 230
G3AAE 262	W2EQS 240	VE2NV 230
W2BRV 261	K2LWR 240	WITS 227
W3NKM 260	W7AUS 240	W2KJZ 223
W4AZK 260	K9BVR 240	K4HRG 222
G3HLS 260	W4PLL 232	W1HGT 220

W2BUI 220	W9PVA 175	ZLING 142
DJ2AE 214	W6FLT 173	K2TQC 140
I1UA 214	W6VVR 173	W6VVR 140
ZL4BO 213	W6PDV 173	W82AO 140
W1LQ 211	IIRC 173	W4RWV 139
W1RAN 210	W3HDZ 172	K9GTK 139
W2QKJ 204	SM6VY 171	DL1FZ 139
W9EHW 204	W4CKB 170	ZE7JY 139
W6LTR 202	W4JL 170	W7LIO 137
W9UZS 202	W6PHF 170	K84AO 137
W8VNU 202	E47CP 170	K4BLK 135
F8EJ 201	SM5BPJ 161	ZS5LV 134
W2FZY 200	W2ZKQ 160	DJ4TZ 132
W2TP 200	K8LSG 160	U05AA 132
W2YX 200	K8DDI 160	W5QK 131
W7ZAS 200	VE1WL 160	K8ANP 130
W0HX 200	VE2BK 160	W0RZU 130
K4EJO 195	VE3CIO 160	VE1ADE 130
K4LTA 194	G5VU 160	W9PWM 129
W3DPS 193	W8KBT 157	W5OJL 128
W4NT 193	SM3AZI 156	K1JJC 124
ST2AR 192	W6JH 156	W2REH 123
G2BVN 191	F8BG 154	K4BUJ 122
W1OHA 190	W8JRG 153	I1ZCN 122
W5PSB 190	W1IKB 152	VE6TP 121
W8DEL 189	Z6GJY 151	K3JFB 121
W4CWC 187	K4YCP 150	E14A 120
W9ZTD 183	W5CPW 150	W4GAMZ 120
W3KHU 182	K9BGL 150	K0RAL 120
W1IUU 181	K9PPX 150	DJ4OP 120
W1ZDZ 181	K0PIE 150	W6LJK 112
W6MVL 181	P40FL 150	W7KOF 112
XE2FL 148	W6OUH 148	E14A 112
W8TTN 180	K9GVE 145	K4ZKZ 111
W0OAO 180	G2KI 145	W4ORT 110
W4WSJ 176	K1BEB 143	JZ0HA 110

Radiotelephone

W9WHM 270	W4WSJ 176	W4QT 142
W9YSQ 260	ON4BX 174	SM3AZI 142
W3DHM 251	W8WZ 172	W3VSU 141
W4ANE 250	CT1MB 171	L1LDJU 132
W5VU 221	PA0ZD 171	F9MD 131
W3NKM 213	W2QKJ 170	K4EJO 129
W1LLF 210	VE2JZ 170	K6EHP 121
W4NYN 210	G4JW 165	VE3BTI 121
I1UA 210	W1B1H 162	K8RTW 120
F8HBO 207	W2SN 162	K5BJU 119
H8VNU 201	W3AYD 161	K9ECE 119
G3AAE 196	W4RVL 161	W9ZTD 117
W1BAN 193	W2WCV 160	W9PVA 112
W1HJB 191	W2YYL 160	KL7BHE 112
W6OQG 191	W2EQI 157	W91O 112
W4SKO 181	K0RFL 153	K2TAP 111
W5AFX 181	I1CKV 145	K1BEB 110
XE2FL 178	W7ZAS 144	W9LXW 110
	K4HRG 142	

U.S.-Canada Area and Continental Leaders

KH6CD 261	VO1DX 230	VE6NX 256
KL7PI 231	VE2WW 276	VE7ZW 285
WBELA 288	VE3DF 260	VE8AW 195
VE1PQ 260	VE4KO 180	4X4DK 288
	VE5JV 200	

Radiotelephone

W2BXA 274	W0AIW 270	VE3QA 224
W4DQH 273	VE1DR 147	VE4RP 102
W5BGP 260	VO1DX 110	VE5RU 178
KH6OR 254	VE2WW 220	VE6TF 160
W7PHO 283	VE3KF 224	VE7ZM 267
KL7AFR 190		G2FL 266

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: DUL PAM: IVS. RM: AXA. The Pennsylvania Phone Net meets nightly Mon. through Fri. at 1800 EST on 3850 kc. The EPA C.W. Net meets every evening at 1830 EST on 3610 kc. All traffic nets have returned to Eastern Standard Time. AMC and TCC set up a station at the Lehigh Council Boy Scout Jamboree. WHK was ham radio counsellor at Camp Akiba and K3DEM was counsellor at Camp Minsi. K3JSX will replace K3ANS as OBS on the PFN Net. HNK is NCS on the PFN each Mon. evening. Awards: DXCC to GYP, W-21 to AXT, RCC and CP-20 to KN3LTZ. K3IPK is now using a DX-20 for his traffic load. K3BHU and DGX spent a week vacationing at the shore with WA2BUI. The EPA C.W. Net is on the lookout for a Scranton Area outlet. EML is QRL getting the Philadelphia Electric Club station in working order; the call is K3LDD. NNL reports the UTL Net now meets on 7075 kc. at 2100 EST daily instead of on 3565 kc. NF is sending high-speed code transmissions on 3520 kc. at 8:30 p.m. BUR is ice-conditioning his antenna farm and beams for the coming cold season. BFF spent a few weeks at the VA hospital and was visited by KMD, ZIV and ZLP. OY and KMH swapped stories when they met in a New Jersey parking lot. YLL was a western states visitor and stopped in to assist KVX print his *DX Magazine*. EU had too many visitors at his shack and it cut into his traffic skeds. K3CVF has joined the "Pack Rats." K3JHE is on 50-Mc. c.w. ZRR is invading 220 Mc. New officers of the Hellertown ARC are K3ALV, pres.; K3EXV, vice-pres.; K3BLN, treas.; K3HFX, secy. K3KNN is now General Class. K3CNCN put up a 20-meter folded dipole. BNR/6 is on 80 through 10 meters and sends his regards to the PFN gang. K3ACD is an Official Observer. NNC, an Observer, has made an average discrepancy report of 75 stations over the past 4 months; 95 per cent were for harmonics. K3KUD is a new OES. SAO spent two weeks vacationing in the hill country with the Mahanoy Valley Brass Pounders. Traffic: W3CUL 4926, VR 594, IVS 452, HNK 305, WHK/3 185, K3ALD 171, DCB 106, W3AXA 100, EML 81, K3IPA 79, HXC 65, W3KMD 64, K3HEX 60, W3NNL 57, K3DEM/3 54, W3NF 41, FAF 37, ZRQ 33, K3BHU 28, IPK 23, W3ZLP 27, UIU 22, AMC 20, K3ANS 19, AOX 14, W3BUR 14, K3GAY 13, JSX 12, W3BFF 11, PKE 9, K3AHT 8, CAH 8, GSU 8, W3ITI 8, NQB 8, OY 4, DUI 3, GYP 2, K3ACD 1, W3JNQ 1.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Thomas B. Hedges, W3BKE—SEC: PKC. MDD Traffic Net meets on 3650 kc. Mon. through Sat. at 1915 EST; MEPN (phone) on 3520 kc. Mon., Wed. and Fri. at 1800 and Sat. and Sun. at 1300 EST; MDSD and MSN (slow speed) Nets on 3650 kc. at 1845 and 2030 EST. New appointments: STG and YTW as ORS; K3CRF and K3JQI as OBS; K3HDW as OES. There are openings for ECs in Caroline, Charles, Dorchester, Frederick, Harford, Howard, Montgomery, Somerset and Worcester Counties in Maryland. Let's hear from some prospective appointees. AHQ maintains his record OO activity in spite of hot weather. K3ANA is building a new final. BU reports that the St. Marys ARA is active and enjoyed meeting a delegation from Calvert County at a recent meeting. CPM says he will be back on the air soon. Old-timer CQS has a new 10-meter beam. CVE is busy with OB and EC activity. K3CXX reports in from Baltimore. The PVRC entertained KH6IJ at a recent dinner meeting. K3CYA made a good start with his OO activity. EFZ slowed down during the summer doldrums. EOY is now on RTTY

and wants to contact others in this section interested in teletype. 4EXM/3 will continue to use his portable call and reports his S/Line equipment is working fine. The Anne Arundel RC gave valuable communications assistance at a forest fire! Good work. K3GBV reports plenty of 2-meter work is keeping him busy. K3GKF is pleased with reports on his OBS transmissions. K3GZK reports in from Bel Aire. HCE is busy with OO work. K3HDW reports several good 144-Mc. openings. ENU reports the Free State ARC is keeping up its activity during the summer. New OES K3HJD has a 2-meter mobile rig. HKS keeps Delaware on the traffic nets. K3HPG graduated from high school and will have more time for OBS work. K3HTE has a new 20A and 2 4X250Bs with a kw. on s.s.b. New OBS K3JQI sends in a good traffic report. JMIE is active in the Baltimore County Emergency Net. JWN/4 reports in by radiogram from North Carolina. JZY operated mobile on a trip to the West Coast. KA built a new electronic keyer and will burn up the SS this year. KHA reports in from Baltimore. KLA keeps his OO activity up. K3KPF has a new Apache and reports the Chesapeake ARC is planning a heavy fall schedule. KN3LLR has a new antenna. KN3MDL is a new reporter. OSF is active as an OO. TN made BPL again. TSG has a new jr. operator. Congratulations! UE keeps after the 3RN boys and keeps the net at the top in activity. K3VBJ reports in again from Walter Reed Hospital. New ORS YTW reports in from U. of Md. ZAQ is moving to a new QTH. ZGN reports from College Park. ZNW is busy with plans for a station at the Calvert County Fair. Remember the Foundation Hamfest at Gaithersburg, Md., Oct. 2. Traffic: W3TN 208, UE 167, K3WBJ 61, W3AHQ 37, BKE 33, K3KPF 32, JIQ 31, W3ZNV 29, YTW 26, CVE 23, TSG 22, EOY 21, BUD 14, K3GZK 13, ANA 9, W3CQS 9, KA 5, KN3MDL 2.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: W2YRW. RMs: W2BZK, W2HDW and W2ZI. Two new appointees are K2JJC, Pitman, as OBS, and K2RXB, Margate, as OPS. K2SNK, Trenton, has received a net certificate for activity in the N. J. Phone and Traffic Net. K2DEI, Maple Shade, continues in the BPL class. Much of his traffic is handled through Cape Christian. N. J. Phone and Traffic Net totals for July are 31 sessions, stations 710 and traffic 120. W2ZI, Trenton, has issued a fine roster of this net's personnel. W2BZJ, Pennington, is back on NJN after a fling at DXing. K2CPR, Pennsauken, DXCC totals are now 255/250. Jack has received 56 certificates and CHC No. 40. W2RXL, NJN manager, has issued a revised roster. NJN's July traffic total was 348. A report was received from the Bridgeton Area Radio Klub through its secretary, H. J. Sternem. WA2ANH has returned from a trip to England and Scotland. WA2ECR has been elected a director of the Gloucester Co. ARC. W2AFZ is the club secretary. K2UDA and K2MKD are vacationing in N. Y. State; both are on 2 meters all the way. W2EXB hopes to sign VE1 during his Nova Scotia vacation. W2BV, Minnetola, has a new antenna. K2YIB, SJRA v.h.f. chairman, presented the ARRL gavel to the club president, W2REB, at SJRA's July meeting. The following contacted all SJRA's Field Day stations and were presented with achievement certificates: W2BLV, K2BZK, W2FXN, K2GSJ, W2HBE, W2LBX and W2PAU. W2BLV has now worked 30 states on 2 meters. W2BBD has been appointed civil defense director of Haddon Heights. Southern Counties ARA issues a certificate for working five of its members. The club meets the 2nd Fri. in Pleasantville, the Burlington Co. Club the 1st Fri. and the Levittown (N. J.) Club the 1st Tue. Traffic: K2DEI 164, W2RG 116, W2TLO 68, W2BZJ 58, W2ZI 44, K2RXB 33, K2JGU 32, K2JJC 21, K2SOX 17, K2SNK 9, W2BEI 4, W2IU 4, K2CPR 2.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2LXE. RMs: W2RUF and W2ZRC. PAM: W2PVI. NYS C.W. meets on 3615 kc. at 1900; ESS on 3590 kc. at 1800; NYSPTN on 3925 kc. at 1800; NYS C.D. on 3510.5 and 3993 kc. at 0900 Sun.; TCPN 2nd call area on 3970 kc. at 1900; IPN on 3990 kc. at 1600. W2EZB takes BPL honors this time. K2-IMK has been endorsed as ORS. W2RUF has a Ranger and a Courier linear. K2ZVD reports that the WNYVHFS Hamfest at Great Valley was FB. The Sid-

(Continued on page 108)

FASTEN YOUR SEAT BELT AND CHECK YOUR AIR SPEED

(Part I of II)

IN the last decade all manner of long-standing records have been broken . . . the 4-minute mile, now less than 4 minutes; high jump 7 feet, $3\frac{3}{4}$ inches; the shot-put 65 feet, plus; and golf scores below par. Only Babe Ruth's record of 60 home runs in 1927 remains intact. The "Fastest Gun" falls by the wayside on TV each week.

WHICH is by way of saying, "What has this to do with amateur radio?" An urgent word of careful caution must be injected here to say this in no way intends to suggest or encourage speed before or without accuracy.

MANY of our present day c.w. amateur operators have approached operating "air speeds" heretofore attained only by mechanically actuated commercial gear such as the Wheatstone, Boehme and Creed "transmitting heads". Of course, these instruments are fed with perforated tape from the Kleinschmidt or similar perforator. Tape is "cut" by skilled typists, 90 or more w.p.m. At the receiving end, an ink recorder forms the dots and dashes into letters on a paper ribbon, usually called "slip". Top flight operators copy 90 w.p.m. using the audio and visual signals on high speed circuits.

ALL of this specialized mechanical gear is beyond the thin wallet of the radio amateur, so he has had to find some other way to do it. True, he cannot compete with very expensive gear, but neither can a gazelle compete with the modern racing automobile. But, Mr. Radio Amateur "Ain't just a-sittin' either".

LET'S turn time and pages of *QST* back to February, 1934, "How's Your Fist?" by W9UZ (now W4CF). The opening paragraph, page 18: *"The goodness or badness of somebody's fist is a matter which must be handled rather gently. It is a delicate subject. The human ear reproduces faithfully everything it hears and passes it along to the brain. But brains seldom agree. By using something entirely mechanical, therefore, we remove the greatest error-making device involved. The mechanical visual recorder provides a record that can be seen, measured and inspected."*

Now to *QST*, April, 1936, page 62: *"Assume that a 'Highspeed bug merchant' promises to deliver signals at 45 w.p.m. That is one big promise which will be filled by very, very few amateurs. Of hundreds which have been recorded at W9UZ, no one has approached that speed."* That was in 1936.

LOOKING at that whole page of "Fists I Have Seen" in *QST*, March, 1936, page 23, and listening to these "wizards of this 1961 space age" in that 7.0-mc slip stream (7,006 to 7,018 kc), those 1936 records truly are but dim images of the past.

WHAT has happened (TO BE CONTINUED NEXT MONTH)

— FRED SCHNELL, W4CF

Buell Gallagher Jr.

W. J. Halligan W9AC

hallicrafters

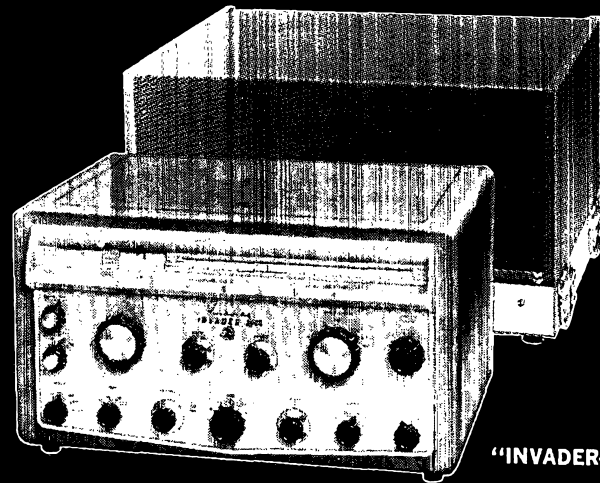
A totally new concept in transmitter design—**FILTER-TYPE**

SSB

TRANSMITTER / EXCITER / AMPLIFIER



"INVADER"



"HI-POWER CONVERSION"

"INVADER-2000"

*A superbly engineered SSB Transmitter/Exciter
... add hi-power conversion for 2000 watts P.E.P.
(twice average DC) input SSB!*

Here is the most versatile . . . most advanced SSB Transmitter/Exciter/Amplifier package ever designed for the amateur service! Excitingly different—from exclusive filter-type circuitry to distinctive front panel and cabinet design—the Viking "Invader" and the "Invader-2000" offer flexibility and performance for a lifetime of operating pleasure.

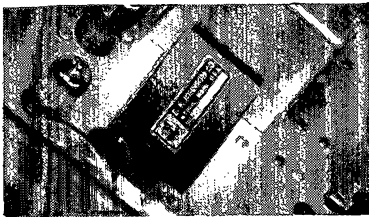


Viking

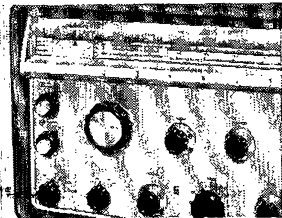
INVADER



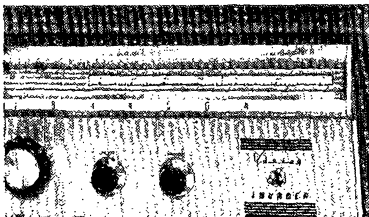
INVADER-2000



CRYSTAL FILTER-TYPE SIDEBAND
—Exclusive high frequency bandpass crystal filter gives you more than 60 db of unwanted sideband and carrier suppression! Select upper or lower sideband instantly with front panel "mode" switch.



SIMPLIFIED OPERATION — Unique design and circuitry make the "Invader" and the "Invader-2000" extremely easy to tune and operate! Tune for maximum on the meter and you're ready to go—just a few front panel controls give complete flexibility!



FREQUENCY CONTROL — Instant bandswitching coverage of the full 80, 40, 20, 15 and 10 meter bands . . . no extra crystals or retuning required. Highly stable, built-in VFO is differentially compensated and factory adjusted for maximum stability—exclusive "keep warm" heater element keeps VFO at operating temperature even with equipment turned off . . . NO WARM-UP DRIPT!



Write today for your free 8-page "Invader" brochure—complete with detailed specifications and photographs!

Here's the transmitter with the sharp, penetrating signal you've been waiting for—plus more exclusive operating and convenience features than any other Transmitter/Exciter on the market today! The "Invader" offers instant bandswitching, full bandspread coverage 80 through 10 meters—no extra crystals to buy—no retuning necessary! Rated a solid 200 watts CW and SSB input; 90 watts input on AM! Final amplifier utilizes a pair of 6146's in parallel, bridge neutralized. Unwanted sideband and carrier suppression is 60 db or better! Exclusive RF controlled audio AGC and ALC (limiter type) provide greater average speech power—high gain push-to-talk audio system has plenty of reserve gain for either crystal or dynamic microphones. VOX and anti-trip circuits are extremely smooth in operation—built-in anti-trip matching transformer—adjustable VOX time delay circuit. Mixer-type shaped keying is crisp, sharp—click and chirp free. Single knob wide range pin-network output circuit. Fully TVI suppressed. Blocking and operating bias provide noise-free T-R switch operation. Heavy duty power supply is completely self-contained. The "Invader" may also be used as an exciter for the Viking "Courier", "Thunderbolt", or the Viking "Kilowatt". Dimensions: 11 5/8" high x 21" wide x 17 1/2" deep. Compact, heavy duty power supply with swinging choke circuitry gives excellent voltage regulation—supplies all necessary high and low voltages. Power Requirements: 325 watts, 105-125 V AC 2-wire, 50-60 cycle.

Cat. No. 240-302-2 . . . Viking "Invader" wired and tested with tubes, crystals, less key and microphone.

Amateur Net \$619.50

VIKING "INVADER" HI-POWER CONVERSION—Take the features and performance of your Viking "Invader" . . . add the power and flexibility of the unique Viking "Hi-Power Conversion" system . . . and you're "on the air" with the "Invader-2000"—a solid 2000 watts P.E.P. (twice average DC) input SSB, 1000 watts CW and 800 watts input on AM! Completely wired and tested—includes power supply, new front overlay panel, extra knobs, additional meter, necessary tubes—everything you need to convert your "Invader" into the power-packed "Invader-2000". All you need is a small wrench and a screwdriver—no soldering necessary—complete the entire conversion in just one evening!

Cat. No. 240-303-2 . . . Hi-Power Conversion, complete

Amateur Net \$619.50

ANTICIPATED DELIVERY—LATE FALL

FIRST CHOICE AMONG
THE NATION'S
AMATEURS



Viking

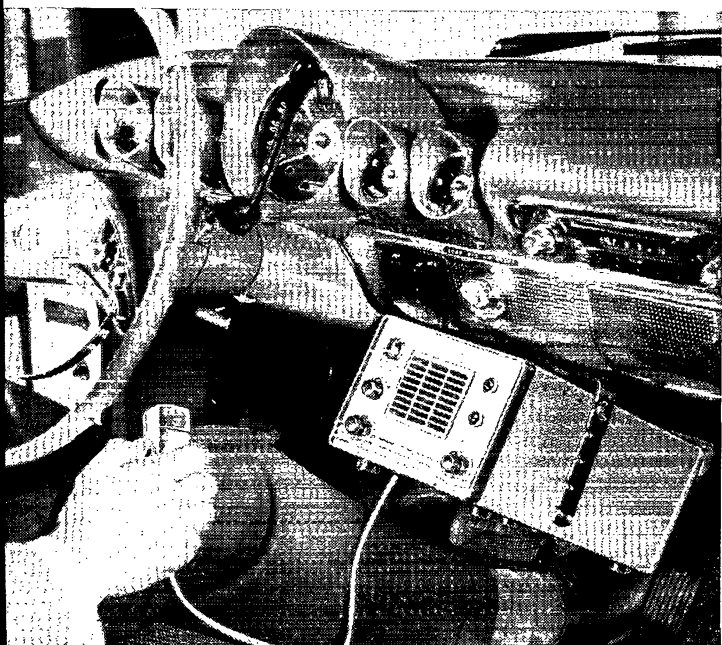
E. F. JOHNSON COMPANY • WASECA, MINNESOTA

Available completely factory wired and assembled, the "Invader-2000" offers all of the fine features of the "Invader" plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Here's desk-top operating convenience unsurpassed by any other high power transmitter . . . 2000 watts P.E.P. (twice average DC) input on SSB, 1000 watts CW, and 800 watts AM input! Final amplifier employs two rugged, high efficiency, low replacement cost Type PL-175A pentode tubes in parallel, . . . features a ganged tank assembly that provides exceptionally uniform "Q". RF stages are cut off automatically on stand-by and key-up—wide range output circuit (40 to 600 ohms adjustable) will match virtually any antenna system. Push-pull fan assembly draws air through the chassis, effectively cooling components as well as filament and plate seals for extended tube life. Heavy duty, multi-section power supply uses 866A High Voltage Rectifiers. Screen supply employs a 5U4GA rectifier and uses heavy bleeder and high filter capacity for excellent dynamic screen voltage regulation in Class AB2 operation. An OC2 bias regulator provides regulated bias for the two PL-175A final amplifier tubes. Dimensions: 11 5/8" high x 21" wide x 17 1/2" deep. Power Supply: 11 1/4" high x 19 3/4" wide x 14 1/2" deep. Power Requirements: 1600 watts, 105-125 V AC 2-wire; or 210-250 V AC 3-wire, 50-60 cycle.

Cat. No. 240-304-2 . . . Viking "Invader-2000" wired and tested with remote power supply, tubes, crystals, less key and microphone.

Amateur Net \$1229.00*

Viking transmitters and accessories... 1st choice of amateurs the world over!

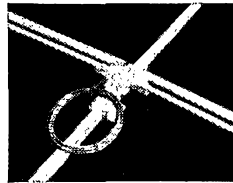
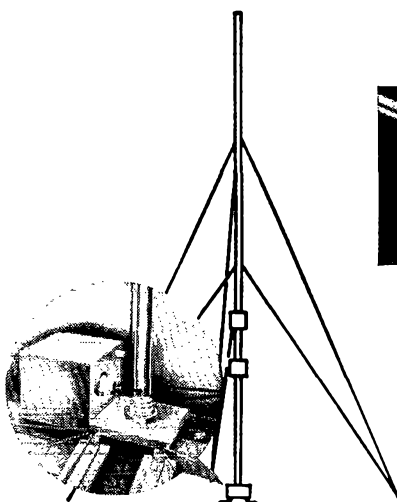


NEW... FOR 10 METERS!

10-Meter Messenger

Ideal for fixed or mobile operation, the new 10-meter "Messenger" is a complete 10-tube (including rectifier) crystal-controlled transceiver! Superhet receiver offers excellent sensitivity and selectivity—with effective ANL, AVC, and Squelch circuits. 10 watts input delivers a solid signal. Wide range pi-L network output circuit—self-contained power supply. Pre-tuned for 29.4 to 29.7 mcs—covers any 5 frequencies within a 300 kc segment of the 10-meter band. Compact... lightweight... easy to install. 5 7/8" high, 7" wide, and 1 13/8" deep. For 6V D.C. and 115 volts A.C., 12V D.C. and 115 volts A.C., or 115 volts A.C. only. Complete with tubes, microphone, power cords, and crystals for one frequency covering 29,640 kc, national calling and emergency frequency. For complete details write for specification Sheet 737.

Cat. No.	Amateur Net
242-201...115 V only.....	\$129.75
242-202...115 V & 6 V.....	\$139.75
242-203...115 V & 12 V.....	\$139.75



PRE-TUNE BEAMS—Rugged semi-wide spaced beams—pre-tuned for 20, 15, and 10 meters. Low SWR. With 3 element beams, boom and balun. For 52 ohm coaxial transmission line.

Cat. No.	Amateur Net
138-420-3...20 meter beam.....	\$139.50
138-415-3...15 meter beam.....	\$110.00
138-410-3...10 meter beam.....	\$ 79.50

"MATCHSTICK"—A fully automatic bandswitching vertical antenna system—may be mounted on roof top, ground, or in any limited space location. Completely pre-tuned—low SWR on all bands 80 through 10 meters. Low vertical radiation angle for DX. Impedance: 52 ohms. Complete with 35' mast, base tuning network, relays, control box and 9 Dacron guy ropes.

Cat. No. 137-102... "Matchstick".....	Amateur Net \$129.50
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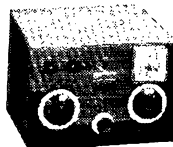
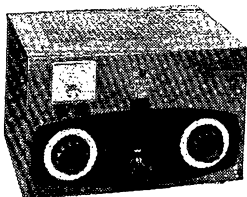
"MATCHBOXES"—Provide completely integrated antenna matching and switching systems for kilowatt or 275-watt transmitters. Bandswitching 80, 40, 20, 15, and 10 meters. No "plug-in" coils or "load-tapping" necessary.

275 Watt "Matchbox"—Designed to match a 52 ohm coaxial link line to reactive and nonreactive loads ranging from 25 to 1500 ohms for balanced lines; and 25 to 3000 ohms for unbalanced lines. For transmitters with a maximum power input of 275 watts.

Cat. No.	Amateur Net
250-23-3... With directional coupler and indicator.....	\$86.50
250-23..... Less directional coupler and indicator.....	\$54.95

Kilowatt "Matchbox"—Handles unbalanced line impedances from 50 to 2000 ohms, and balanced line impedances from 50 to 1500 ohms. For transmitters with a maximum power input of 1000 watts.

Cat. No.	Amateur Net
250-30-3... With directional coupler and indicator.....	\$149.50
250-30..... Less directional coupler and indicator.....	\$124.50

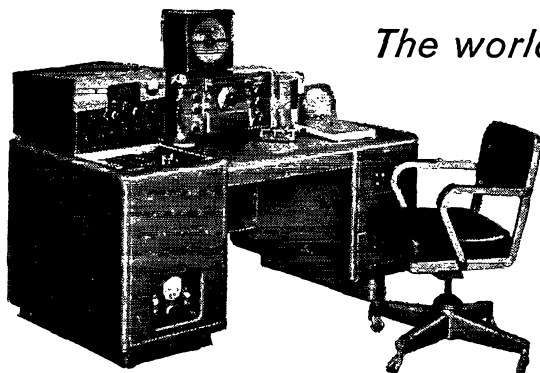


250-30-3

250-23-3

COMING SOON... the all new Viking filter-type sideband transmitter with 60 db sideband suppression!

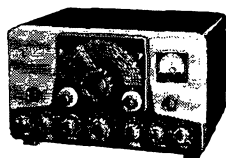
The world at your finger tips!



VIKING "KILOWATT" AMPLIFIER—The only power amplifier available which will deliver full 2000 watts SSB* input, and 1000 watts CW and plate modulated AM. Continuous coverage 3.5 to 30 mcs. Excitation requirements: 30 watts RF and 10 watts audio for AM; 10 watts peak for SSB.

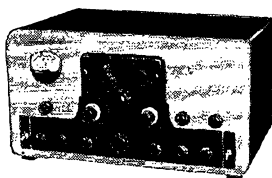
Cat. No. Amateur Net
240-1000 ..Wired and Tested.....\$1595.00
251-101-1..Matching desk top, back and 3 drawer pedestal, FOB Corry, Pa.\$132.00

*The FCC permits a maximum of one kilowatt average power input for the amateur service. In SSB operation under normal conditions, this results in peak envelope power inputs of 2000 watts or more, depending upon individual voice characteristics.



"RANGER" — 75 watts CW and 65 watts phone input. Bandswitching 160 through 10 meters. Built-in VFO or crystal control. With tubes.

Cat. No. Amateur Net
240-161-1..Kit\$229.50
240-161-2..Wired\$329.50



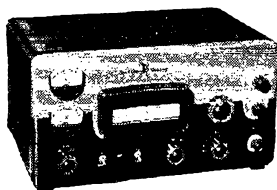
"VALIANT"—Instant bandswitching 160 through 10. 275 watts input CW and SSB (P.E.P. with aux. exciter) 200 watts phone. With tubes.

Cat. No. Amateur Net
240-104-1..Kit\$349.50
240-104-2..Wired\$439.50



"FIVE HUNDRED" — 600 watts CW input; 500 watts phone and SSB (P.E.P. with aux. SSB exciter). Bandswitching 80 through 10. With tubes.

Cat. No. Amateur Net
240-500-1..Kit\$749.50
240-500-2..Wired\$949.50



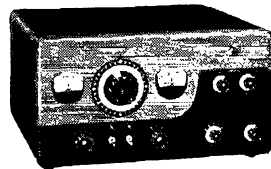
"THUNDERBOLT" AMPLIFIER—2000 watts P.E.P.* input SSB; 1000 watts CW; 800 watts AM linear. Continuous coverage 3.5 to 30 mcs. With tubes.

Cat. No. Amateur Net
240-353-1..Kit\$524.50
240-353-2..Wired\$589.50



"6N2"—Instant bandswitching coverage of both 6 and 2 meters. Power input rated at 150 watts CW, and 100 watts AM phone. With tubes.

Cat. No. Amateur Net
240-201-1..Kit\$129.50
240-201-2..Wired\$169.50

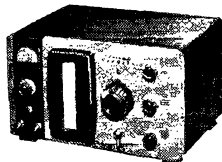


"6N2" THUNDERBOLT AMPLIFIER—Input rated 1200 watts P.E.P.* SSB and DSB, Class AB₁; 1000 watts CW, Class C; 700 watts AM linear, Class AB₁. Continuous coverage 6 and 2. With tubes.

Cat. No. Amateur Net
240-362-1..Kit\$524.50
240-362-2..Wired\$589.50

"COURIER" AMPLIFIER — Class B linear rated 500 watts P.E.P. input with auxiliary SSB exciter; 500 watts CW; 200 watts AM. Continuous coverage 3.5 to 30 mcs. With tubes.

Cat. No. Amateur Net
240-352-2..Wired\$289.50



New Catalog

Your complete guide to amateur radio's most exciting equipment. Write today for your free copy.




FIRST CHOICE AMONG
 THE NATION'S
 AMATEURS



Viking

E. F. JOHNSON COMPANY • WASECA, MINNESOTA



1959 AWARD RECIPIENT Walter Ermer, Sr., W8AEU, points out to Cleveland Police Lieut. Michael J. Roth, K8KNJ, a critical area that is served by the 300-member Amateur Radio Emergency Corps Ermer organized. The Corps' equipment rivals its manpower—197 radio-equipped cars, 77 walkie-talkies, and 26 emergency power generators.

Nominations Open for 1960 Edison Award

Eight previous annual Edison Radio Amateur Awards have honored hams who rendered important public service. The ninth Edison Award, for 1960, will follow the same distinguished pattern as its predecessors.

A panel of impartial judges—all men of national standing—will select the Award recipient, from a group of candidates made up entirely of

names which you and others submit by letter.

You will help raise the stature of *all* radio amateurs by naming a suitable candidate for the acclaim, trophy, and gift that go with the Edison Award. See rules below for help with your nominating letter! Mail it to *Edison Award Council, General Electric Company, Electronic Components Division, Owensboro, Kentucky.*

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 1960 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 limits of the United States.

RECIPIENT OF THE AWARD will receive the Edison trophy in a public ceremony in Washington, D.C. Expenses of his trip to that city will be paid.

\$500 GIFT. Recipient will be presented with a check for this amount in recognition of the public service which he has rendered as a radio amateur.

WHO CAN NOMINATE. Any individual, club, or association familiar with the public service performed.

HOW TO NOMINATE. Include in a letter a full description of the service performed, as well as the candidate's name, address, and call letters. Your letter of nomination must be postmarked not later than January 2, 1961.

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. Edison Award judges will be:

E. ROLAND HARRIMAN, Chairman, The American National Red Cross.

ROSEL H. HYDE, Commissioner, Federal Communications Commission.

GOODWIN L. DOSLAND, President, American Radio Relay League.

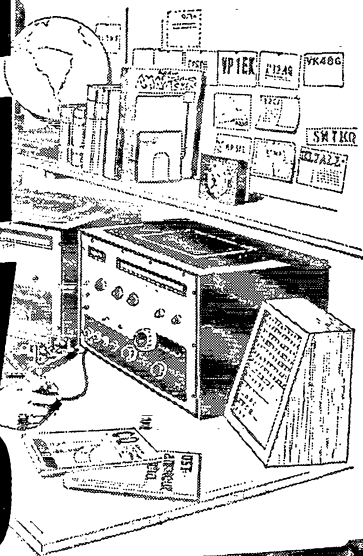
Recipient of the Award will be announced on or before Thomas A. Edison's birthday, February 11, 1961.

Employees of the General Electric Company may nominate candidates for the Edison Radio Amateur Award, but are not permitted to receive the Award.

GENERAL  ELECTRIC

624-401

FROM HEATH ... 9 NEW RADIO AMATEUR KITS



GC-1
\$10995
\$11.00 dn.,
\$10.00 mo.



**TEN-TRANSISTOR
"MOHICAN" GENERAL COVERAGE
RECEIVER KIT (GC-1)**

An excellent portable or fixed station receiver! Many firsts in receiver design for outstanding performance . . . ten transistor circuit . . . flashlight battery power supply . . . ceramic IF filter. The amazing, miniature transistors used in the GC-1 replace transformer, inductive and capacitive elements used in conventional circuits; offer superior time and temperature stability, never need alignment and provide excellent selectivity. Other features include telescoping 54" whip antenna, flywheel tuning, tuning meter, large slide-rule dial and attractive, rugged steel case in gray and gray-green. Covers 550 kc to 30 mc in five bands. Electrical bandspread on five additional bands cover amateur frequencies from 80 through 10 meters. Operates up to 400 hours on 8 standard size "C" batteries. Sensitivity: is 10 uv, broadcast band; 2 uv, amateur bands for 10 db signal to noise ratio. Selectivity: 3 kc wide at 6 db down. Measures only 6½" x 12" x 10". 20 lbs.

Heathkit XP-2: plug-in power supply for 110 VAC operation of GC-1. (optional extra). 2 lbs. \$9.95



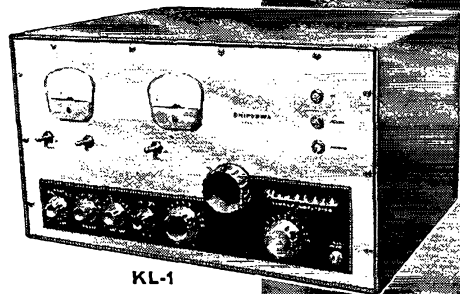
HD-20
\$1495

100 KC CRYSTAL CALIBRATOR KIT (HD-20)

Align or check calibration of your communications gear with this versatile ham aid. Provides marker frequencies every 100 kc between 100 kc and 54 mc. Transistor circuit is battery powered for complete portability. Accuracy is assured by .005% crystal furnished. Measures only 2½" x 4½" x 2⅝". 1 lb.

7 more kits on following pages

HEATHKIT® . . . WORLD'S FINEST HAM GEAR



KL-1
\$399⁹⁵

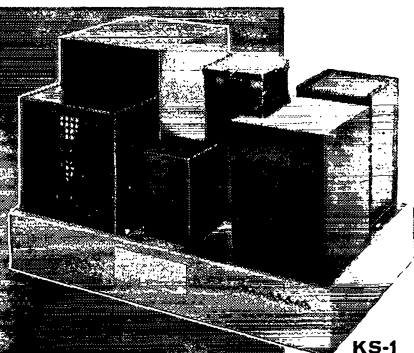
\$40.00 dn.
(Write for time
payment details)

"CHIPPEWA" KILOWATT LINEAR AMPLIFIER KIT (KL-1)

Here is a top-quality kilowatt rig with all the features you've been looking for. Operates at maximum legal power input on all bands between 80 and 10 meters, in SSB, CW or AM linear operation. Premium tubes (4-400A's), forced air cooled with centrifugal blower. Grid neutralized, continuous plate current monitoring, extensive TVI shielding. Features both tuned and swamped grid circuits to accommodate all popular exciters. Operates class AB1 for SSB and AM linear service and high efficiency class C for CW service. Convenient panel controls include power switch, tune-operate switch, HV on/off switch, final bandswitch, meter switch, grid bandswitch, grid tuning, mode switch, plate tuning, plate loading and bias adjust. Accessory connectors are provided on the rear apron of the chassis for complete compatibility with all control circuitry in the Heathkit "Apache" Transmitter. Two meters provided; one monitors final plate current; the other indicates switch selected readings of final grid current, screen current, and plate voltages. Send for complete specifications now. 70 lbs.

A PERFECT COMPANION FOR THE "CHIPPEWA" KILOWATT POWER SUPPLY KIT (KS-1)

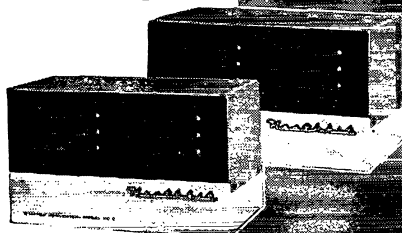
Ruggedly constructed for heavy-duty use in medium to high power installations, the KS-1 fills the requirements of a top-notch power supply with economy and safety. Features an oil-filled hermetically sealed plate transformer, "potted" swinging choke input filter and 60-second time delay relay. Line filters minimize RF radiation. Maximum DC power output is 1500 watts. Nominal voltage output, 3000 or 1500 volts. DC current output, average 500 ma, maximum 1000 ma. Control circuitry is arranged to allow remote installation. The KS-1 employs two 866A half-wave mercury vapor rectifiers in a full-wave, single-phase configuration. Power requirements: 115 V, 50/60 cycles, 20 amperes; 230 V, 50/60 cycles, 10 amperes. 105 lbs.



KS-1
\$169⁹⁵

\$17.00 dn.,
\$15.00 mo.

XC-6
\$26⁹⁵



XC-2
\$36⁹⁵

6-METER CONVERTER KIT (XC-6)

Extends frequency coverage of the Heathkit "Mohawk" and most other general coverage receivers into the 6 meter band. Converts 50-54 mc signals to 22-26 mc. 3-tube circuit provides two RF stages and low-noise triode mixer. Calibration accuracy assured by .005% overtone crystal supplied. Provision for external RF gain control. 6 lbs.

2-METER CONVERTER KIT (XC-2)

This top-quality 2-meter converter may be used with receivers tuning any 4 mc segment between the frequencies of 22 and 35 mc when appropriate crystal is used. Converts 144-148 mc signals to 22-26 mc with .005% overtone crystal supplied. High quality parts used throughout. Silver plated chassis and shields. 7 lbs.

IN KIT FORM TOPS IN TRANSMITTING POWER

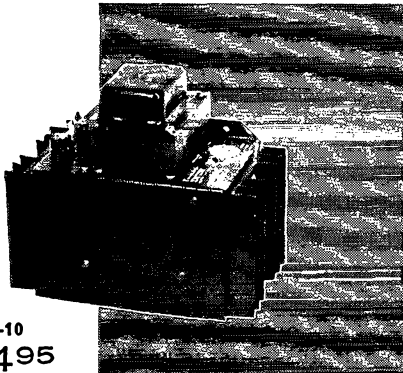
TWO BRAND NEW MODELS HEATHKIT 10 & 6 METER TRANSCEIVER KITS

Complete ham facilities at low cost! The new Heathkit transceivers are combination transmitters designed for crystal control and variable tuned receivers operating on the 6 and 10 meter amateur bands (50 to 54 mc HW-29 and 28 to 29.7 mc for HW-19) in either fixed or mobile installations. Highly sensitive superregenerative receivers pull in signals as low as 1 microvolt; low power output is more than adequate for "local" net operation. Other features include: built-in R.F. trap on 10 meter version to minimize TVI; adjustable link coupling on 6 meter version; built-in amplifier metering jack and "press-to-talk" switch with "transmit" and "hold" positions. Can be used in ham shack or as compact mobile rigs. Not for Citizen's Band use. Microphone and two power cables included. Handsomely styled in mocha and beige. Less crystal. 10 lbs.

VIBRATOR POWER SUPPLIES: VP-1-6 (6 volt), VP-1-12 (12 volt). 4 lbs. Kit; \$8.95 each, wired; \$12.95 each.



HW-19 (10 meter)
HW-29 (6 meter)
\$39.95 each



HP-10
\$44.95

NEW! IMPROVED DESIGN TRANSISTOR MOBILE POWER SUPPLY (HP-10)

Brand new power supply for mobile gear; features all-transistor circuit, instant starting, high efficiency, rugged construction. Operates from 11 to 15 VDC input; at 12 VDC, provides 600 VDC @ 200 ma, or 600 VDC @ 150 ma & 300 VDC @ 100 ma simultaneously, at 120 watts. Negative 150 volts @ 30 ma also provided. Max. ambient temp., 150 @ 120 watts ICAS. Input current requirements: 2 amps, idling; 13 amps, full output. Includes heavy filtering of input and output leads, remote relay control of primary power, silicon rectifiers, and extruded aluminum heat sinks for efficient cooling of power transistors. Measures 8" x 7 1/2" x 6 1/8". 10 lbs.

ORDER DIRECT BY MAIL OR SEE YOUR HEATHKIT DEALER*

*The convenience of Local Heathkit Sales and Service costs but a few dollars more.

HEATH COMPANY

a subsidiary of
DAYSTROM, INCORPORATED

Benton Harbor 3, Michigan

All prices and specifications subject to change without notice. Please include postage on orders to be shipped parcel post. 20% deposit is required on all C.O.D. orders. All prices are NET F.O.B. Benton Harbor, Mich., and apply to Continental U.S. and Possessions only. Dealer and export prices slightly higher.



FREE CATALOG!

Describes over 150 easy-to-build electronic kits in HI-FI, Test, Marine, and Ham radio fields. To get yours, fill in this coupon and mail today!

ITEM	MODEL	PRICE

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ADDRESS _____

CITY _____ ZONE _____ STATE _____

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A product that is consistently advertised in *QST* month after month, year after year, has to be good. Over 10,000 GOTHAM antennas have been purchased by *QST* readers. Even the "price-is-no-object" customers choose GOTHAM antennas on the basis of performance and value. Select your needs from this list of 50 antennas:

Airmail Order Today—We Ship Tomorrow

GOTHAM Dept. QST
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

TWO BANDER BEAMS

A full half-wave element is used on each band. No coils, traps, baluns, or stubs are used. No calculations or machining required. Everything comes ready for easy assembly and use. *Proven Gotham Value!*

- | | | |
|-----------------------|--------------------------|---------|
| 6-10 TWO BANDER..... | <input type="checkbox"/> | \$29.95 |
| 10-15 TWO BANDER..... | <input type="checkbox"/> | 34.95 |
| 10-20 TWO BANDER..... | <input type="checkbox"/> | 36.95 |
| 15-20 TWO BANDER..... | <input type="checkbox"/> | 38.95 |

TRIBANDER

Do not confuse these full-size Tribander beams with so-called midgets. The Tribander has individually fed (52 or 72 ohm coax) elements and is broad banded. It does not have baluns, coils, traps, or other devices intended to take the place of aluminum tubing. The way to work multiband and get gain is to use a Gotham Tribander Beam.

- | | | | |
|----------------------------------|---------|-----------------------------------|---------|
| <input type="checkbox"/> 6-10-15 | \$39.95 | <input type="checkbox"/> 10-15-20 | \$49.95 |
|----------------------------------|---------|-----------------------------------|---------|

2 METER BEAMS

Gotham makes only two different two meter beams, a six-element job and a twelve-element job. They are both Yagi beams, with all the elements in line on a twelve foot boom.

- | | | | |
|-------------------------------------------|------|--------------------------------|-------|
| <input type="checkbox"/> Deluxe 6-Element | 9.95 | <input type="checkbox"/> 12-El | 16.95 |
|-------------------------------------------|------|--------------------------------|-------|

6 METER BEAMS

New records are being made every day with Gotham six-meter beams. Give your rig a chance to show what it can do, with a Gotham six-meter beam.

- | | | | |
|--------------------------------------------------|-------|----------------------------------|-------|
| <input type="checkbox"/> Std. 3-El Gamma match | 12.95 | <input type="checkbox"/> T match | 14.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 21.95 | <input type="checkbox"/> T match | 24.95 |
| <input type="checkbox"/> Std. 4-El Gamma match | 16.95 | <input type="checkbox"/> T match | 19.95 |
| <input type="checkbox"/> Deluxe 4-El Gamma match | 25.95 | <input type="checkbox"/> T match | 28.95 |

10 METER BEAMS

Ten meter addicts claim that ten meters can't be beaten for all-around performance. Plenty of DX and skip contacts when the band is open, and 30-50 miles consistent ground wave when the band is shut down. Thousands of Gotham ten meter beams have been perking for years, working wonders for their owners, and attesting to the superior design and value of a Gotham beam.

- | | | | |
|--------------------------------------------------|-------|----------------------------------|-------|
| <input type="checkbox"/> Std. 2-El Gamma match | 11.95 | <input type="checkbox"/> T match | 14.95 |
| <input type="checkbox"/> Deluxe 2-El Gamma match | 18.95 | <input type="checkbox"/> T match | 21.95 |
| <input type="checkbox"/> Std. 3-El Gamma match | 16.95 | <input type="checkbox"/> T match | 18.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 22.95 | <input type="checkbox"/> T match | 25.95 |
| <input type="checkbox"/> Std. 4-El Gamma match | 21.95 | <input type="checkbox"/> T match | 24.95 |
| <input type="checkbox"/> Deluxe 4-El Gamma match | 27.95 | <input type="checkbox"/> T match | 30.95 |

CITIZENS BAND ANTENNAS—Any of our ten meter beams or the V40 vertical is perfect for the CB operator.

FREE GIANT 1960 CATALOG

Name.....
Address.....
City.....Zone.....State.....

New! Ruggedized 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

- | | |
|---------------------------------------------------------|---------|
| <input type="checkbox"/> Beam #R6 (6 Meters, 4-El)... | \$38.95 |
| <input type="checkbox"/> Beam #R10 (10 Meters, 4-El)... | 40.95 |
| <input type="checkbox"/> Beam #R15 (15 Meters, 3-El)... | 49.95 |



15 METER BEAMS

Fifteen meters is the "sleeper" band. Don't be surprised if you put out a quick, quiet CQ and get a contact half-way around the world. Working the world with low power is a common occurrence on fifteen meters when you have a Gotham beam.

- | | | | |
|--------------------------------------------------|-------|----------------------------------|-------|
| <input type="checkbox"/> Std. 2-El Gamma match | 19.95 | <input type="checkbox"/> T match | 22.95 |
| <input type="checkbox"/> Deluxe 2-El Gamma match | 29.95 | <input type="checkbox"/> T match | 32.95 |
| <input type="checkbox"/> Std. 3-El Gamma match | 26.95 | <input type="checkbox"/> T match | 29.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 36.95 | <input type="checkbox"/> T match | 39.95 |

20 METER BEAMS

A beam is a necessity on twenty meters, to battle the QRM and to give your signal the added punch it needs to over-ride the high power boys. Hundreds and hundreds of twenty meter beams, working year after year, prove that there is no better value than a Gotham twenty meter beam.

- | | | | |
|--------------------------------------------------|-------|----------------------------------|-------|
| <input type="checkbox"/> Std. 2-El Gamma match | 21.95 | <input type="checkbox"/> T match | 24.95 |
| <input type="checkbox"/> Deluxe 2-El Gamma match | 31.95 | <input type="checkbox"/> T match | 34.95 |
| <input type="checkbox"/> Std. 3-El Gamma match | 34.95 | <input type="checkbox"/> T match | 37.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 46.95 | <input type="checkbox"/> T match | 49.95 |

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a \$16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida

Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gabbert, K6INI (Ex-T12TG)

FACTS

ON THE GOTHAM

V-80 VERTICAL ANTENNA

- If K6INI can do it, so can you.
- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- Withstands 75 mph wind-storms.
- Non-corrosive aluminum used exclusively.
- Omnidirectional radiation.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price. **ONLY \$16.95.**

73,
GOTHAM



YOU COULD
WORK
WONDERS WITH
A
GOTHAM
VERTICAL
ANTENNA!

FILL IN AND SEND TODAY!

Airmail Order Today — We Ship Tomorrow

GOTHAM Dept. QST

1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS. ESPECIALLY SUITED FOR THE NOVICE WHO OPERATES 40 AND 15.....\$14.95

V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS... \$16.95

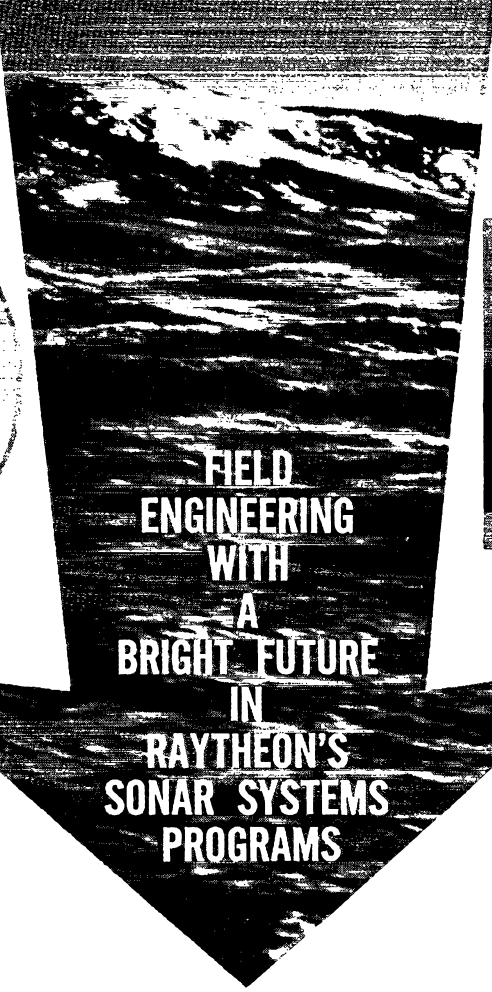
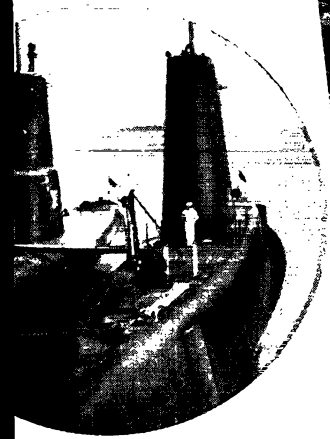
V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO..... \$18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

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City.....Zone.....State.....



**FIELD
ENGINEERING
WITH
A
BRIGHT FUTURE
IN
RAYTHEON'S
SONAR SYSTEMS
PROGRAMS**

■ Some of the newest and most challenging field engineering programs are under way at Raytheon in the sonar field. ■ Just completed was a seven week technical evaluation trip in Bermuda waters where the newest underwater communications system developed by Raytheon was tested. These tests proved very successful. ■ Among the Raytheon field engineering group assisting on this trip aboard the submarines were three "Radio Hams". They were A. C. 'Doc' Aulwurm, K1LXZ; Claude Stogsdill, K1NXS; and Milton Levy, K1KIT, shown in photo above in conference with Ed Dodge, W1CMU. ■ Ham radio electronic experience has helped many engineers advance within the Company. ■ You may qualify as a Raytheon field engineer if you have previous experience plus an E.E. degree or the equivalent in practical experience with guided missiles, fire control, ground and bombing radar or sonar. ■ Benefits include attractive salary, assistance in relocating, insurance, and the opportunity of participating in educational programs. For details, please contact Ronald Guittarr.

Electronic Services Division
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Burlington, Massachusetts



COMMUNICATOR IV...

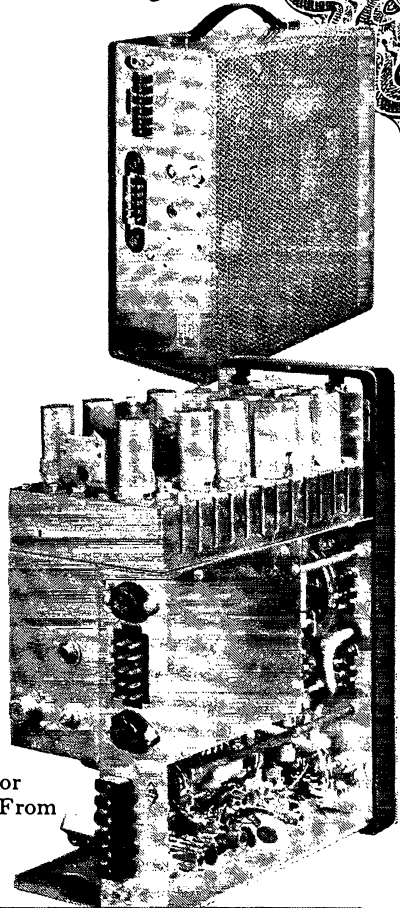
Blue-chip Investment.

Many of the thousands of Communicators on the air today were purchased a number of years ago. A substantial number of these units have changed hands several times over the years. Basically well designed and constructed, they continue to perform . . . retain their resale value. Any Communicator owner can find a good market for his old gear whenever he decides to step-up to a newer, more advanced model. And COMMUNICATOR IV gives any VHF man the best of reasons for taking this step . . . *today*.

Now . . . higher input power . . . greater "Talk" power. A fine modern-design receiver using the latest VHF frame-grid, front-end tubes for a noise figure of 4-5! Triple conversion with *first conversion* quartz crystal controlled . . . your assurance of high stability of the frequency range where stabilization is most important—and usually most difficult to obtain. Receiver is continuously tunable, 143.7-148.3 mcs.

Add other "dividend" features: adjustable "squelch", noise limiter, "S" meter, earphone jack, 6-switchable crystal positions plus provisions for external VFO . . . transistorized universal power supply built-in, no strapping—merely use proper plug/cable supplied to change from AC to DC.

All-in-all, features for greater range and flexibility . . . for a new high order of operating pleasure and convenience. From any viewpoint . . . a *blue-chip investment*. **369.50**



OTHER MODELS:

COMMUNICATOR IV IS CERTIFIED FOR OCDM SPECS WHEN SUPPLIED WITH #3361 C-D KIT.

COMMUNICATOR IV MODELS FOR CAP



SOON . . . COMMUNICATOR IV MODELS FOR 50 MCS AND FOR 220 MCS.

GONSET

GONSET

Division of Young Spring & Wire Corporation
801 SOUTH MAIN ST., BURBANK, CALIFORNIA

EXPORT SALES: WESTREX CORP., 540 WEST 58TH STREET, NEW YORK 19, N.Y.

DESIGN

STRENGTH

DEPENDABILITY

THREE REASONS WHY
YOUR BEST BUY IS...

E-Z WAY Satellite "60"

E-Z WAY AERO-DYNAMIC design decreases wind load and provides telescoping action that permits raising and lowering of tower sections. CRANK UP TO 60 FEET, DOWN TO 25 FEET and TILTS OVER FOR ACCESS TO ROTOR OR BEAM.

STRENGTH is built-in to every E-Z Way Tower...Heavy wall steel tubing legs, continuous diagonal bracing of solid steel rod and electrically welded throughout...no loose bolts or nuts here. E-Z Way design and strength are your assurance of DEPENDABILITY that you can count on year after year. See your nearest distributor today or write for free literature.

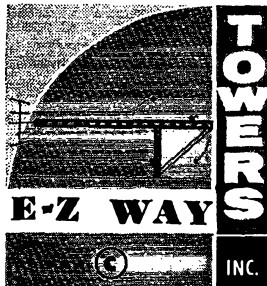
The SATELLITE

Model RBX-60-3P (Painted) \$335.00
Model RBX-60-3G (Galvanized) \$410.00

MOUNTING KITS:

GPK X60-3 (Ground Post) \$125.00
BAK X (Wall Bracket) \$17.00

Freight Prepaid anywhere in (48) U.S.A.



P.O. BOX 5767 TAMPA 5, FLORIDA

108

Station Activities

(Continued from page 94)

ney ARC held its Annual Picnic at the QTH of K2MQA with an attendance of 55. The Auburn ARA elected W2TCU, pres.; W2YAD, vice-pres.; W2QHQ secy.; and K2JVL treas. W2PVT compliments K2VOX for NCS duties on ECEN. W2QCI reports that 29.2 Ms. is monitored evenings in the Lockport-Albion-Rochester Area. The Buffalo Area Telephone Co. employees (TE.A.R.) contact K2CD or K2PVN for the fall schedule. K2CWD got a degree in elec. tech. from Broome Tech. College. Broome County amateurs are using the AREC organization to supply communications for sports car rallies and soaring meets. A group headed by K2QKX gave valuable assistance to the police in Johnson City. WA2GCH reports there was a large turnout to hear W3YA, Atlantic Division Director, speak on the ARRL North Country amateurs are really becoming active, largely through the organizational efforts of WA2GCH with the *North Country Call Book* and *CV-ARC Ham Bulletin*. There has been discussion concerning the suitability of our section name. "Western New York" doesn't seem too descriptive when you consider that it encompasses the Adirondack Region, St. Lawrence, Champlain Valley and the Southern Tier. I would be interested in hearing ideas on the subject. How about "New York State Section"? There are over 4000 hams in our section, more than 100 organizations that I know of and many nets. We have 41 Emergency Coordinators and in most cases they also are Radio Officers in their respective counties, resulting in the RACES and AREC organizations working together for maximum efficiency. If you have a RACES or AREC problem, W2LXE or I will be glad to help. Traffic: W2EZB 726, K2SSX 405, K2RFV 150, K2QDT 141, W2OE 119, K2IPI 113, WA2ALO 80, K2OFU 78, W2-FEB 74, WA2CRH 62, K2RTQ 61, K2DXV 55, K2QQK 33, K2RWV 33, K2TDG 33, W2RYH 23, WA2DSC 22, WA2IZK 15, K2BBJ 12, K2EE 13, K2GKK 11, WA2HEC 11, W2TPV 7, W2PGA 4, W2PVI 2, K2RTE 2.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC, OMA. RMs: KUN, NUG and GEG. The WPA Traffic Net meets Mon. through Fri. at 1900 EST on 3585 kc. The PFN meets Mon. through Fri. at 1800 EST on 3850 kc. Newly elected officers of the ATA of WPA are UGV, pres.; NUG, vice-pres.; ZJZ, secy.; UL, treas.; KQP, LTH and EOU, directors. LXQ is fishing in Canada. GEG is installing radio gear in the Belgian Congo. WRC is teaching classes on using a resuscitator. The following members of the Nittany ARC passed the General Class exam: K3AKR, HCN, K3LUT, K3LUX, K3LVB and SYV. The Greater Pittsburgh V.H.F. Society reports that JEO has a new HQ-180; GCT has his General Class license; winners of the local ground-wave contest were BWU, GQA and ERK in that order; UAK is Greenland bound. The Horseshoe RC reports via *Hamateur News*. K3IGA attended the Scout Jamboree in Colorado; K3GRU has a Johnson Valiant; TXQ has 186 countries worked with 179 confirmed; AUD mobilized on 6 meters to Utah and back. The Steel City ARC reports via *Kilowatt Harmonics* that OKU has been appointed asst. chief eng. of KQV; MJC is constructing a 2-meter rig; SVJ was elected club trustee; KWH now is on 220 Mc. The Etna RC reports via *Oscillator* that the club was host to the RACES of Sector 1, with OMA giving a progress report; OVM, TAS and TWV have gone mobile; new officers of the Breezeshooters are PSF, pres.; OFF, secy.-treas.; TVW, checker; SHT, YPH and K3COT, wind gaugers. The Cumberland Valley ARC reports via *Valley QRM* that Field Day in Franklin County was a success; K3JKK is moving to W2-Land. The Washington County ARC reports the following new officers: YDG, pres.; UEN, vice-pres.; WJF, secy.; K3DXV, treas.; IDO, act. mgr. The Coke Center RC voice code and theory classes are showing good progress at the c.d. center. Traffic: W3WRE 226, K3GHH 108, W3KUN 52, LSS 51, MFB 19, K3HWL 15, W3UGV 10, K3COT 3.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, 9GME. SEC: PSP. RM: USR. PAM: RYU. EC of Cook County: HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CST. By now most of the annual hamfests are over and it was a pleasure getting out into the field and meeting the gang again. EU was honored by the Governor and appointed to the Development Council of the State of Illinois. MCE is DXing with a new HT-37 and in the off hours his XYL, KMD, is ragchewing on the local nets. HB finally is on s.s.b. Traffic for nets follows: ILN 141, North Central Phone Net 217. GDI is using a new quad made of fiber glass. QPJ is now on 120 meters. SXL, EC

(Continued on page 110)

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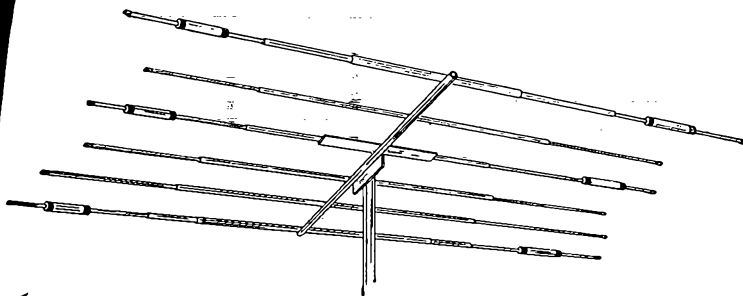
of McLean County, reports that the CIRC (Bloomington) c.d. has its portable equipment ready to roll. LU6-MR visited ERU on his visit to Rockford. The Sangamon County and Springfield C.D. Weather Net is progressing satisfactorily, according to SVO, net control officer. New Novices heard in Hoopston are a father and son, KN9ZKA and KN9ZJY. The Chicago RACES is operated with the Classic Car Club and provided communications on a field trip to Mendota with FBP, INF, QKE, STQ and STR providing the handie-talkies. We extend our sympathy to the family of KX, who recently passed away. LGH is now working for the FCC in Chicago and one of his duties is giving amateur radio license examinations. K9ITM is back on the air after completing his 4-year stint at the University of Illinois with a new QTH. QQN has been appointed Radio Officer for Olympia Fields C.D. A new Novice heard was KN9YOI, in Decatur. Our congratulations to Asst. SCM GME and her OM on their 20th wedding anniversary. She will edit future publications of the *Queens Key*, official bulletin of the Chicago YLRL. K9YHU is Radio Officer and K9VJP is c.d. captain of the newly-organized Woodrider RACES. Members of the Madison and Tri-County Storm Warning Net visited the Lambert Field weather station to survey weather radar equipment with which the local net is linked on 2, 6 and 10 meters. K9BHD is rebuilding his RTTY shack with a new complete diversity installation. K9MHF, UYP, K9-KKL and LOK are new 4-1000 HB linear amplifier owners. KN9ZAF, KN9ZAD, KN9ZBV, KN9WQE and KN9ZCI are new Chicago Area licensees. MEZ is recovering from a serious illness. KMN has a new Apache and an SB-10 adapter. New appointees are K9QVA as OBS, K9JTD and K9IVG as OOs. IDA is the only BPL winner. Traffic: (July) W9IDA 1144, DO 364, USR 358, JXV 240, K9UGY 128, QYW 103, RHU 74, W9MAK 72, FAW 63, K9MHW 63, RAS 58, IVG/9 46, W9SXL 38, K9KGO 37, LKG 21, W9GFF 12, K9BIV 10, IUM 10, W9PRN 10, K9JMA 6, OCU 6, QFO 6, W9SKR 6, K9MLI 4, UCR 3, QMJ 2, VQA 2. (June) K9QDA 1.

INDIANA—SCM, Clifford M. Singer, W9SWD—Asst. SCM: Arthur G. Evans, 9TQC. SEC: SNQ. PAMs: K9-AOM, BKJ, RVM and UKX. RMs: DGA, JOZ, TT and VAY. Net skeds: IFN, 0800 daily and 1800 M-F on 3910 kc.; ISN (s.s.b.), 1900 daily on 3920 kc.; QIN, 1900 daily and RFN, 0700 Sun. on 3656 kc.; QIN (training), 1800 M-W-F on 3745 kc.; CAEN (160 meters), M-F at 1900 on 1805 kc. New appointments: K9HEL as EC for Floyd County, K9TJJ as EC for Decatur County, MIO/EDO as OBS and K9MAN as OPS. JOZ resigned July 29 as RM for QIN (training) after doing an FB job since its founding in Sept. '59. The new RM replacing him is FJR. Novices who would like to join the net may obtain a crystal from FJR for 3745 kc. for 25¢ deposit. Stations assisting with communications for the Sheridan Centennial Parade, all operating 6-meter mobile, were K0BBZ, K9IXD, K9LAQ, K9LBN, K9SER, K9SQD and HMK. A class of nine students at the Indiana Blind School studied code and theory under the direction of DNQ, assisted by JJC, PSE, APJ, K9EUC and JZV. Four obtained Novice Class licenses. Classes will resume in the fall. K9GEL has a new HQ-170, K9UQC is a new call in Winslow. TWU has worked 4 states on 2-meter RTTY. K9IXD worked K0GYE in Kansas City, Mo., on 6-meter RTTY. The Wabash Valley ARA held another successful V.H.F. Hamfest at Turkey Run State Park. KN9ZQZ is a new call in Indianapolis. K9KFK, K9KFL, K9GCU and K9PPP, an all-ham family, received a royal welcome and enjoyed an FB visit at ARRL Headquarters. K9VCH is on 6 meters with an HB-6146 with a good signal. *Amateur radio exists as a hobby because of the service it renders.* July Net reports: VAY reports QIN traffic at 386. IFN totaled 361, as reported by RVM. K9AOM reports 199 for ISN. RFN netted 107, reports TT. QIN (training) and CAEN were not reported. Those making BPL: DGA, GJS, LIT/9 and TT. Traffic: (July) W9TT 617, ZYK 374, GJS 324, DGA 217, BDG 208, MM 160, K9GBB 158, W9LIT/9 153, NZZ 126, K9UBK 92, HMC 89, W9RVM 47, SWD 41, FJR 40, SNQ 39, K9AOM 38, BSU 35, W9RTH 28, QYQ 20, CC 18, K9MAN 18, RMI 15, TCG 15, W9IMU 13, BDP 12, BUQ 11, K9GSV 7, W9YXX 7, EJVV 6, TQC 5, FWH 4, K9IXD 4, ELE 3, W9AB 2. (June) W9MAM 158, K9MAN 54.

WISCONSIN—SCM, George Woita, W9KQB—SEC: YQH. PAMS: NRP and NGT. RMs: VHP and VIK. New appointees: K9MWQ as OES, NRP as OPS, ZB as ORS. The Waupaca Club elected K9MAS, pres.; CIZ, vice-pres.; ZDJ, secy.-treas.; K9LWV, act. mgr. With K9PDJ moving to Ohio, our section has lost one of its better traffic operators. A kw. is in the making at YT as per SZR, who is trafficking mobile. The first issue of DYG's *CAN Bulletin* was well received by members of that net. K9GDF has an 80-meter DX record of 12 miles with his self-contained, 1½-pound 35-mw. 3Q5 rig. The 2-meter portable stations project of the Osh-

(Continued on page 112)

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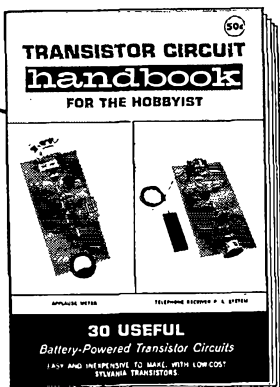
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kosh Club is progressing successfully. Formerly of Oconomowoc, ZB is back in Milwaukee after 4 years as K4BI in Florida and has taken to active traffic-handling. NRP has turned over the management of the BEN to NGT. A job well done, Sid, and to Sherm, much success. From Green Bay, K9PTL is taking traffic for home from out-of-staters applying for fishing licenses. GFL is busy installing citizen band and two-way radio systems. K9ALP is with the USNR on the West Coast. K9GOZ now is attending classes at Milw. School of Eng., and K9ELT enrolled in a commerce course at U. of Wis. The Milwaukee Club's mobile wing held its meeting in IZO's rathskeller to coordinate its emergency activities. K9PZJ completed his 100th consecutive check-in to the Breakfast Club Net. At 9 states worked on 432 Mc., GAB is looking for schedules. The LaCrosse Club received its new call, PJ. The Wisconsin Slow-Speed Net (WSSN) on 3535 kc. at 1930 CDST is in need of more outlets. This is a good way to keep up your c.w. Traffic: (July) W9DYG 610, CXY 282, K9GDF 210, W9KQB 104, W2MTA/9 76, K9PDJ 68, DTK 67, W9SAA 55, VHP 50, NRP 46, K9JQA 26, W9SZR 22, LFK 19, CBE 18, VIK 18, ZB 18, APB 10, K9DOL 9, ELT 8, W9CCO 7, FZC 7, K9GSC 7, LWV 6, W9MIWQ 5, K9ESN 4, CJL 2, LCA 1. (June) K9GYQ 141, W9CBE 31, K9DAF 21, GSC 15, W9LFLK 14, ONI 6.

DAKOTA DIVISION

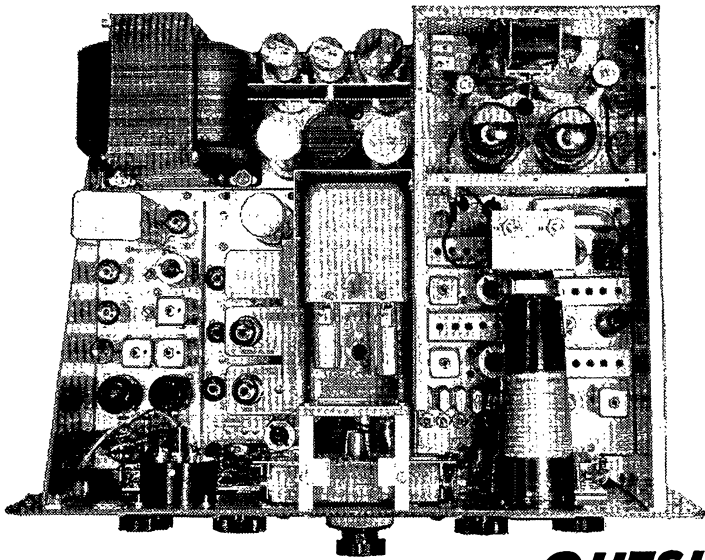
NORTH DAKOTA—SCM, Harold Wengel, W0HVA—SEC: K0KBV. PAM: K0KJR. RM: KTZ. The Minot Hamfest was well attended with 186 licensed hams present. Speakers included ARRL president TSN; Dakota Division Director, BUO; Perry Williams, W1UED, who gave a report on the Geneva Conference; Major Rexford and 30II, who spoke on MARS; and a captain from the Minot Air Base, K0ZPA, who spoke on Air Base Communications. The North Dakota Amateur Radio Assn. was organized with GNS, pres.; K0GRM, vice-pres.; QNW, secy.-treas.; RGT, KTZ, DNJ and NAD, directors. Late net report for June: GRM reports 4 sessions, total check-ins 77, formal traffic 10. CAQ spent a month at Lake Lizzie in Minnesota. Traffic: K0TTP 92, MPH 19, ADI 12, RLF 10, KJR 9, W0P8C 8, K0GGI 7, AZX 2, W0BHT 2, CAQ 2, K0GRM 2, PVH 2.

SOUTH DAKOTA—SCM, J. W. Sikorski, W0RRN. SEC: SCT. Ex-9MMY, of Menomonie, Wis., is president of the Farmers and Merchants Bank, Watertown, and is newly licensed as AFF. YQR, Black Hawk, is home after hospitalization for a heart attack. ADJ has moved from Rapid City to Meade County. New members of the Mitchell ARC are KN0ALR and KN0BMD. The Mitchell Club has moved its quarters to the new City Hall. GCP has a new HT-32. He received his 2nd-class commercial phone license while on vacation. KN0YNS has moved to Huron. EGL, formerly of Lemars, Iowa, is working for KIJV in Huron. K0WXD, Huron, who recently dropped the "N", is putting together a Valiant kit. The Huron ARC has postponed its picnic and auction until next spring. K0VEM and KN0WEN visited their son, WA2GWT, in New Jersey and brought back an HT-32, a Courier and a t.r. switch. New Technicians are K0YNR and K0YWP, Sioux Falls. The South Dakota Noon Net has moved to 3870 kc. at 1215 CST. K0ZMA has WAS. HON moved to Denver to accept a position with Martin. A new licensee in Sioux Falls is KN0CLT. Traffic: W0SCT 325, K0BMBQ 174, W0DVB 75, ZWL 28, K0DUR 8, ACJ 4, PDW 4, ROY 4, W0YVF 4, K0AIE 3, W00FP 3, K0VIZ 3, VYV 3, DHA 2, W0RSP 1. (June) K0ACJ 13.

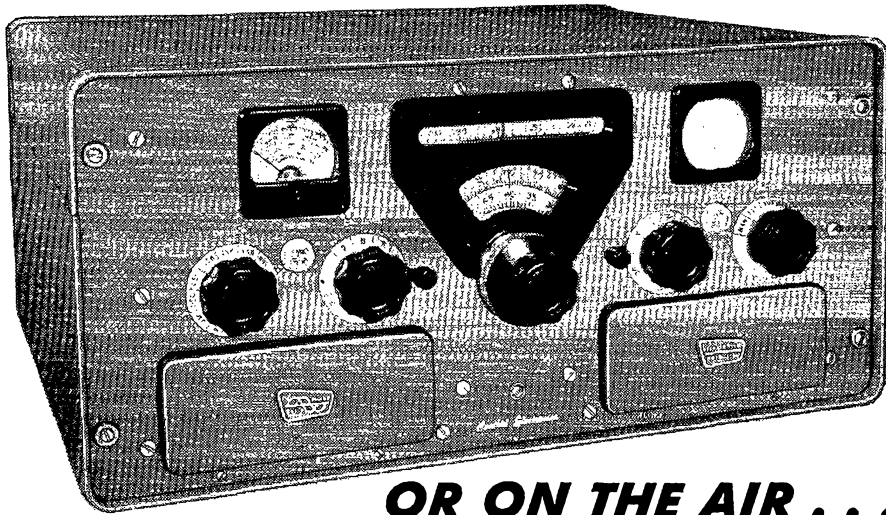
MINNESOTA—SCM, Mrs. Lydia S. Johnson, W0KJZ—Asst. SCM: Rollie O. Hall, 0LST. SEC: TUS. Asst. SEC: K0EWC. PAMs: OPX and K0EPT. RMs: RIQ and K0IZD. MARC members BUO, dir.; K0EPT, PAM; and your SCM had the pleasure of meeting and hearing ARRL Assistant Secretary Perry Williams, W1UED, speak in Mankato. Two hundred attended the MARC Picnic, and eighty the SPRC's. K0JYC and EWC passed the 1st-class commercial exams. EC MNC, chairman of the TVI committee, stated that the Minneapolis Club received a letter of commendation from the FCC Field Engineer for outstanding work in handling TVI complaints. AGL and his XYL are back from a two-month European tour. OES K0DUO spent three weeks in Alaska. KN0BIJ is a newly-licensed YL in Minneapolis. The *Ground Wave* editor received the call KN0CWZ. K7GPW, of Montana, is a Minneapolis resident now. BBY can be heard on RTTY. K0QBB, QBE and QBJ are active on 6 meters. NVA Pilot RAZ is planning a DX-pedition to the British Virgin Islands in February. EC K0MEQ's home was damaged during the Jordan flood. K0OQT handles overseas phone traffic. EC K0QLM joined AF MARS. OO WMA runs a kw. and a pair of 813s on s.s.b. KN0AKM wired a Vik-

(Continued on page 114)

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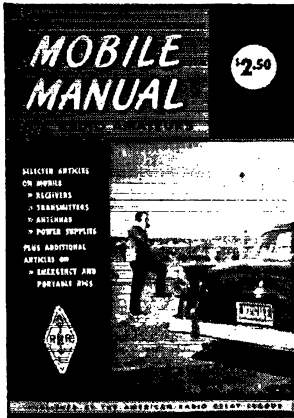
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ing Adventurer and uses an NC-46 receiver. K8WYV received his General Class license and is a new MJN member. CO and his XYL are touring in Europe. Congrats to TUS and K8ORK on making the BPL. A total of fifteen violations were listed by OOs WMA, KLG, WAS and K8JCF. Thirteen-year-old KN8CIB uses a Globe Chief transmitter. K8GJZ was transferred to New York. EC FGP had more eye surgery. EC K8KKQ renewed his appointment. Our AREC membership stands at 581 now, and our section ranks fifth among the 72 active ARRL sections. Congrats to K8UOV on receiving her General Class ticket. K8IKU operated portable in Hubbard County for WAM. K8SNC was top scorer in the last CD Party. Last of the W and K zero calls, KN8ZZZ, was issued recently to Charles Ginn, Minneapolis. Traffic: (July) W8TUS 1004, K8ORK 432, QBI 107, SNC 102, W8HEN 100, LST 95, PET 93, OPX 83, K8PML 83, W8KYG 73, K8UKU 73, W8KLG 69, K8LWK 59, W8RIQ 56, WMA 53, BUO 47, K8EPT 40, JYJ 40, JCF 38, MGT 34, W8ISJ 32, KJZ 32, DQL 30, VVW 26, K8QYY 23, IZD 21, SBB 21, OQT 17, SNG 17, W8THY 17, UMX 17, K8HIW 15, IKU 15, RHN 12, W8FGP 8, K8MAH 6, W8VPO 6, K8VPP 5, W8OET 4, SZJ 4, KN8ZMH 3, W8UCV 2, WVT 2, K8WYV 2. (June) K8EPT 47, IZD 35, W8ISJ 29, K8QLM 11, W8WAS 10, MXC 8, K8OQT 2. (Apr.) W8WMA 57.

DELTA DIVISION

ARKANSAS—SCM, Ulmon M. Goings, W5ZZY—SEC: K5CIR. PAM: DYI. RM: K5TYW. HFQ has been operating at reduced power for the past few months because of illness. We hope Harry soon will be up and back in his shack with his rig. (He has had a rig in his sick room.) We notice that DZK has a new tri-band beam erected atop the shack. SZJ has a new v.f.o. The hams in the Arkansas section were very sorry to have K5HOL leave us for Ocala, Fla., where he now lives and soon will be using a 4 call. ZZY has just returned from a vacation in W6-Land. GWB has been visiting hams in Alabama. With the fall season now before us, let us encourage you all to renew your efforts in the AREC and the various traffic nets in the section. Our congratulations to John Merideth on receiving his Extra Class ticket. Traffic: K5GXR 104, IPS 48, W5SZJ 44, K5TYW 12.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—MXQ found the shorted condenser that was plaguing him and keeping him off the air so he is going strong again. There will be a new AREC Net in operation each evening at 9:30 P.M. CST in the New Orleans Area soon. K5AGJ is home from the hospital after a pretty bad heart attack, but judging from his traffic report I would say that he is fully recovered. LAN activity is continuing through the summer. Most of the regulars are the new hams. Among those reporting were MXQ, CEZ, PXY, WMU, K5OKR, K5UYL, K5IGW, K5LZA, K5TTA and K5MNP. The Dixie Early Bird Net had a reunion and barbeque with 33 attending at Gulfport. The Lake Charles Club has its station, QEG, at the Boy Scout Camp in Edgewood handling traffic from the scouts to their families. K5LZA, who recently moved from Texas to Louisiana, is now active in the Crowley Area. However, will go back to Texas A&M when school reconvenes. The Westside ARC held its annual banquet and election of officers and awarded certificates and otherwise honored its members who have worked hard for the club. The new officers are K5KEF, pres.; K5UNP, vice-pres.; ERR, secy.; INL, treas.; BUK, act. mgr. The most valuable member award, a bronze plaque, was awarded to BUK. The Novice of the Year Award went to KN5BME. Your SCM was glad to be invited to this fine annual affair. Incidentally, BUK just made WAZ. The teachers were K5USU, K5VAV and W5KSI. The results were KN5s CRW, CRT, DQC, DJZ, DPM, DKF and DGQ. Classes are held each Fri. 7-9 P.M. The newest old-timer to come back on the air is NZ. Traffic: W5CEZ 277, K5LZA 196, AGJ 183, W5MXQ 36, K5CZV 18, ARH 17, W4DLM/5 12, W5EA 9, NUH 8.

MISSISSIPPI—SCM, Floyd C. Teetson, W5MUG—K5WOW and K5WOX have moved to Yazoo City from Ozona, Tex. Welcome to Mississippi, fellows. KN5EYS is on the air from Decatur. The JARC held its annual hamfest at Legion Lake. There was a fine gathering with good prizes. The s.s.b. supper was well attended, also. Congratulations on a fine program, fellows. K5-QNF has been appointed SEC for Mississippi. Anyone desiring to take part in emergency activity, contact either Ed or myself. New appointees for Mississippi are ACS and K5IUE as ECs and K5QNF as OO. Now that fall is here I'll be looking forward to meetings with the many clubs throughout the section. Please contact me for meeting dates.

TENNESSEE—SCM, R. W. Ingraham, W4UIO—
(Continued on page 116)

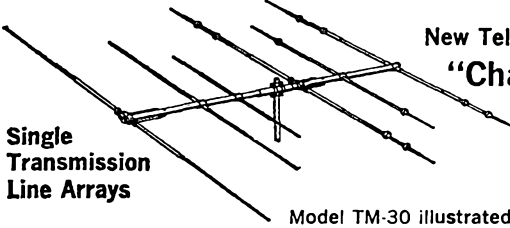
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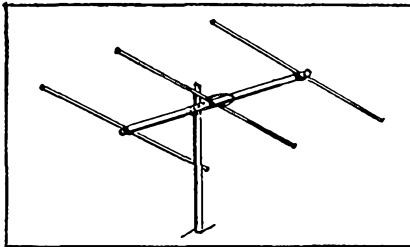
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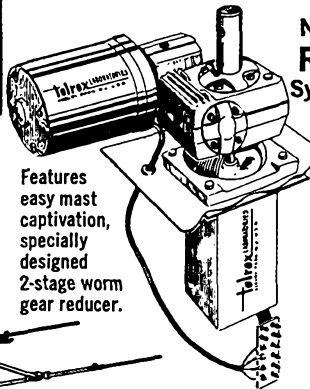
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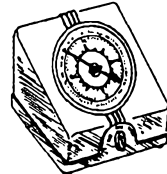
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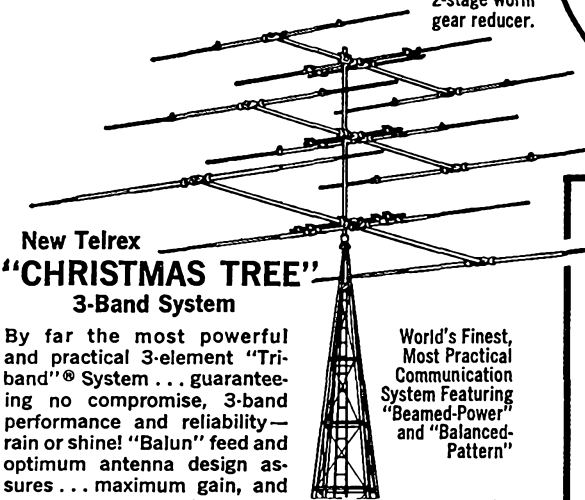


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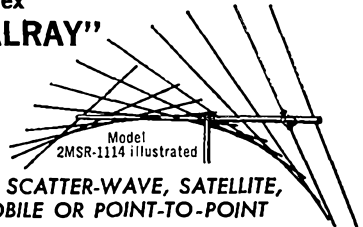
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SEC: K4EJN. PAMs: PAH and UOT. RM: FX. BPL awards for July traffic went to PL and K4s AKP and FNR. WBK reports that the MARA amateur radio school had an average attendance of 90 and that most met requirements for an amateur license. K4AMC says he is looking forward to a full season of traffic. TDZ says that he, LNB and K4KTC have 432-Mc. antennas. New appointees are K4AKP and K4BWS as ORSs. Renewals are FX as RM and JYM as EC and OPS. Reports received: Net, FX and PAH; OES, K4KYL; OO, TDZ and K4RIN. Traffic: W4PL 1292, K4AKP 1032, BWS 219, W4EIN 125, K4FNR 121, W4VJ 87, K4OUK 60, W4FX 54, PQP 43, UIO 13, K4AMC 8, W4UUV 8, TYV 6, K4KYL 4, W4PAH 4.

GREAT LAKES DIVISION

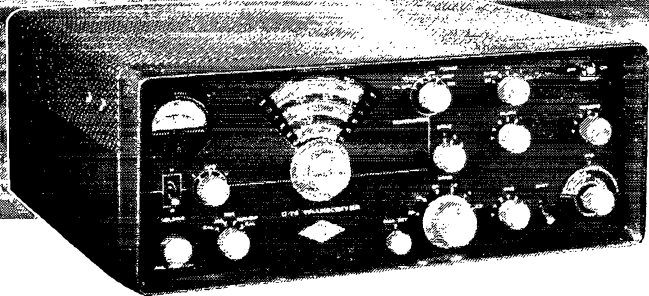
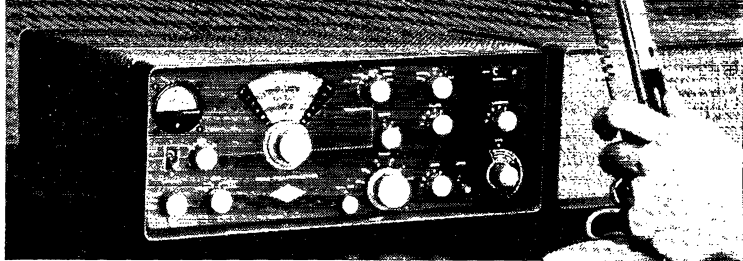
KENTUCKY—SCM, Robert A. Thomason, W4SUD—Asst. SCM: W. C. Alcock, 4CDA, V.H.F. PAM: K4-LOA. PAMs: K4HCK and SZB. RM: K4CSH, KN4QDF has the Tri-State Novice Net in operation and is looking for more active stations. Cumberland County purchased a 3-kw. power plant and issued it to the c.d. communications officer and PAM SZB. YVI is out of the hospital and doing fine. K4LRX reports that a storm wrecked all his antennas. He will be back on soon with a 60-ft. tower and beam. KN4WJ received his ticket at Maysville. HTD is glad to be back on KYN after a rough school term. K4HTO is building an s.s.b. rig to take back to M.I.T. this fall. K4VDN is keeping KYN-9RN liaison. K4ZRA worked 44 countries in 1 1/2 months of operation. K4MSV and K4MPV plan to operate portable VE3 on a fishing trip. OO K4ZQR has a new LM frequency meter. Everyone reporting on the Louisville Hamfest says it was a big success. K4KWE has a new Ranger. ADH reports excellent 50-Mc. openings July 12 and 13. K2LWQ/4 is new on KYN. OO reports were received from K4BUB, K4ZRA, K4IFB and K4ZQR. Traffic: K4VDN 102, W4BAZ 91, K4CSH 71, PGH 71, KWE 60, KWQ 59, W4HTD 49, CDA 31, K4JMU 30, VDO 27, W4SZB 23, K4SFD 21, DFO 18, FUM 16, W4SUD 15, K4ZRA 12, SBZ 10, W4ADH 8, K4ZBA 8, ZQR 7, W4JVJ 4, WVU 4, K4YCB 3, W4KJP 2, K4SPJ 2.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: YAN. RMs: SCW, OCC, QOQ, FWQ. PAMs: AQA, K8CKD, K8JUG, ATB, V.H.F. PAMs: NOH and PT. EC appointments were issued to EMD and FZL. ORS to DSE, OPS to QBA, OBS to QBA. OO to K8CWI. PLP was killed in an auto accident while driving up to the QCWA Picnic on Tahquamenon. His wife was badly injured when the car turned over near Higgins Lake. K8DJE, in the Navy, wants mail from BR netters. His address is Nathaniel Jones, SN, 5th Division, USS Saratoga, CVA 60, FPO, New York City. PHM, mate 25-w.p.m. CP, K8KIR is now in MARS. Since Sept. 1, '59, EMD (OO) has turned in 2036 "citations"! Ninety per cent ham operation in S.W. Michigan is now v.h.f. and we need OOs on 50 Mc. there. The Straits Area RC again helped the Top O'Mich. Marathon Race, with assistance from W8s CRB, FFD, PIC, RPH, RHD, K8s EWL, HHM, NOO, RDF, K8RQT, in Port Huron, has formed a new school radio club called the Chippewa Smoke Signals! Excellent v.h.f. reports were received from NOH, PT and PYQ. EMD says 90 per cent of the ham activity in the Kazoo Area is on v.h.f. K8RDE is now 12 years old and has a General Class license. K8-LZF is now on phone traffic. K8EWI has started his OO activities. ZHB is rebuilding the auto generator for 110-volt a.c. output. K8KCO has to drop OO and OBS activity because of moving. Cw. activity on 50 Mc. is increasing. Good OES reports were received from K8BGZ and K8HNQ. Traffic: (July) W8OCC 178, FWQ 120, FX 75, K8GJD 70, LZF 68, OTJ 59, W8NOH 54, JTQ 52, NUL 41, ELV 39, K8JUG 38, KMQ 38, NAW 37, W8RTN 23, SWF 21, COU 19, K8DJQ 17, W8TBP 17, K8EWI 15, W8YAN 14, ZHB 14, AUD 10, ALG 9, K8GWZ 3, W8EU 7, HKT 5, DSE 4, EGI 2, K8KCO 1, LPV 1. (June) K8BOD 353, JUG 53, AEM 27, DJQ 25, EWI 19, KVV 16, W8QFO 3.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, 8DAE. SEC: HNP. RMs: DAE and VTP. PAMs: HZJ and WYS. K8VHG, the XYL of K8TOX, received her Tech. Class license, as did K8VKT, the XYL of K8OBW. GFE, one of Ohio's leading OOs for many years, joined Silent Keys. Toledo's Ham Shack Gossip tells us that K8CKS was named as its "Ham of the Month." Oregon City RC's officers are K8JQG, pres.; K8CCP, treas.; and K8HIG, secy; IZF has a new Seneca; The Bluffton ARC toured the RCA transistor plant in Findlay with 40 amateurs in the tour; HWX is now on 6 meters; the stork brought a baby girl to TXV. Springfield ARC's Q-5 states that K8HUY won the Bausch & Lomb Honorary Science Award and the stork brought KJP a baby boy. The

(Continued on page 118)

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GONSET G-76

6-band
100 watt AM
transceiver

Sparkling new... smooth-working combo... a powerful 100 watt AM transmitter, sensitive dual-conversion receiver... two-way operation on 80-40-20-15-10 and 6 meters. This handsome, designer-styled package is just slightly over one foot long, less than six inches high, mounts handily under the dash of your car—blends in too, belongs. Transistorized DC supply is separate, mounts in any small convenient space.

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While G-76 is properly called a **transceiver** because of some common audio circuitry, transmitter and receiver are separately tunable. Receiver can be set to out-of-band DX, transmitter VFO anywhere within the band. Transmitter VFO is intended to be spotted on receiver dial. Frequency control may be either by VFO or quartz crystal. (Except on 6 meters which is crystal controlled only.) Transmitter and receiver oscillators are both compensated so that drift with temperature is negligible. Oscillator circuit has very low drift even with exceptionally wide excursions in both plate and filament supply voltages.

HIGHLIGHTS: Transmitter power input 100 watts AM, 120 watts CW • pi network output for 52 ohms • Dual conversion receiver • BFO for CW/SSB reception • Automatic noise limiter • Sensitivity: approx. 1 microvolt at 50 ohms for 6 db S+N/N ratio • Selectivity: 3 to 3.5 kc bandwidth at 6 db down, 14 kcs or less at 60 db down.

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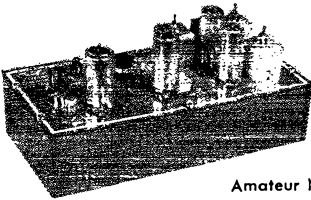
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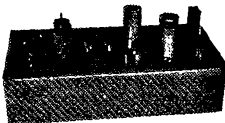
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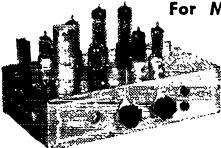
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Cuyahoga County AREC aided the Cleveland Police in locating and tracking down three juveniles on bicycles who were breaking all the glass they could find in the streets. After they were picked up the boys were busy with broom and dust pan cleaning up the damage. Mobiles who participated were AEU, MAE, QXC and K8AAG. The Geauga County ARC meets the first Tue. of the month in the American Society for Metals Building in Newbury. Columbus ARA's *Carascope* informs us the club held a picnic sponsored by the v.h.f. section. K8MYG has a new baby girl, NWR vacationed for two weeks in Florida. FSM, NOY and K8LBZ are mobile. The OHKYIN V.H.F. Radio Society did its bit to handle Boy Scout traffic, with DQK, OUL, UAR, VBG, K8s IOI, GYK, HAL, MLQ, NHE, PUT and SGK participating. K8s CMI and LYR have their General Class licenses. K9PDJ moved to Wapakoneta from Wisconsin. Your SCM attended two hamfest picnics. The first was the Hocking Valley RC's Hamfest in Glouster, where it rained until mid-afternoon, with ten amateurs and their families braving the WX. The second was the Buckeye Net Picnic held at Mt. Vernon with 24 members and their families. The handling of traffic was discussed pro and con and plans were made for the coming heavy traffic periods. Lancaster & Fairfield County ARC elected K8JPL, pres.; APT, vice-pres.; KN8TWE, secy.; KN8TTU, treas.; and K8UCY, act. mgr. K8QK has a new Drake 2A receiver. The stork brought a baby boy to RLR, who has moved to Wooster. DAE made BPL in July. K8EKG has been appointed as OO. The Great Lakes Division Convention will be held in Cleveland Oct. 7 and 8, so make plans to be there. Announcement will be made later as to where it will be held. Another large Ohio city may carry a series of articles on amateur radio like those BAH has edited in the *Cleveland Plain Dealer* for the past year. Many of you boys who over the years have been having fun getting into the CD Parties have had your wings clipped and there will be many more, for we want working appointees not just those who hold appointments and do not even send their certificates for yearly endorsement. Traffic: (July) W8UPH 465, DAE 398, BZX 199, CFM 81, K8ONQ 73, W8OOU 40, K8MTI 36, GWW 33, MFY 33, W8AL 30, PMJ 30, K8DHJ 29, W8YGR 27, K8QHH 19, W8GQD 16, IBX 14, K8HKU 10, MYG 9, W8LT 7, WYS 5, CL 4, K8EKG 4, W8CQP 2, KN8RNZ 2, EIL 1, LTA 1. (June) W8DQG 46, K8MMO 6, MFY 4, HVT 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU.—SEC: W2KGC. RM: W2PHX. PAMs: W2IJG and W2NOC. Section nets: NYS on 3615 kc. at 1900; NYSPTEN on 3925 kc. at 1800; ESS on 3590 kc. at 1800; ENY (emerg.) on 29,490 (Thurs.) and 145.35 Mc. (Fri.) at 2100; MHT (Novice) on 3716 kc. Sat. at 1300. Endorsements: W2PHX and WA2ALO as ORS. We miss those large traffic totals from K2UTV, who is attending college. With club picnics, net outings, vacations and mobile, your SCM received little or no news for July. This is a good time to think about AREC activities. We need several good Emergency Coordinators in the southern counties in the section. Why don't you pass the word at club meetings or hamfests that your county or city should have an EC with an organization ready to move in immediately if disaster strikes? It's an important appointment easily overlooked until fire, flood, tornado, sleet storms or major accidents happen to hit your community. At present we have ECs for the following counties: Albany, Columbia, Greene, Dutchess, Putnam and Schenectady. Those in the larger cities and villages include Altamont, Spring Valley, Grassy Point, Westmore, Poughkeepsie, Elmsire, Scarsdale, Monroe, Brewster, Kingston, Copake Falls. We certainly would welcome nominees from Rensselaer, Ulster, Orange and Rockland Counties. In Westchester County, how about Yonkers, New Rochelle, Peekskill, Pelham, White Plains and the other large communities? Think it over and send your candidate's name to W2KCG, our SEC, or to your SCM. Traffic: (July) K2YZI 351, K2MBU/2 115, K2OZT 79, WA2ALO 73, K2RKY 56, W2PHX 39, W2EFU 27, W2HLH 24, W2PKY 15, K2HNW 6. (June) W2PHX 110, W2HLH 7.

NEW YORK CITY AND LONG ISLAND—SCM, Harry J. Dannels, W2TUK.—SEC: W2ADO. RM: W2VDT. PAM: W2UGF. V.H.F. PAM: W2EW. Section Nets: NLI 3680 kc. nightly at 1930 EST and Sat. and Sun. at 1915 EST; NYC-LIPN, 3908 kc. Mon. through Sat. from 1730 to 1830 EST; NYC-LI AREC, 3908 kc. Sun. at 1730 EST; the V.H.F. Traffic Net, 145.8 Mc. Tue., Wed. and Thurs at 2000 EST. The fall operating season is rapidly approaching and our section nets are looking forward to the increased traffic load. In order to cover this increased activity our nets require additional outlets. If your desires cover phone, c.w. or strict-

(Continued on page 120)

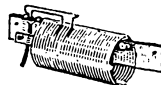
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You'll enjoy this fun-filled band even more with efficient, maintenance free
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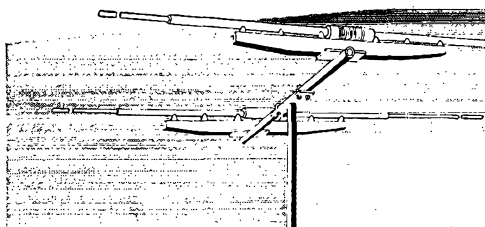
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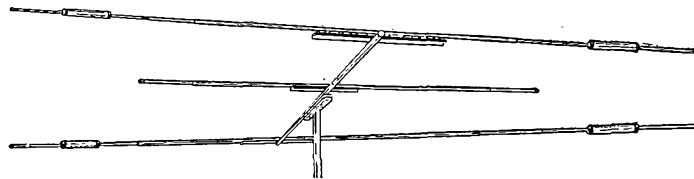
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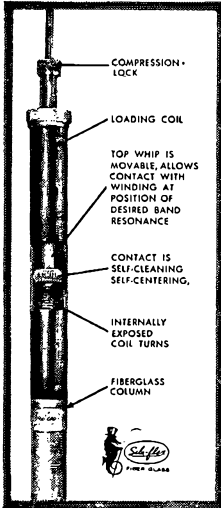
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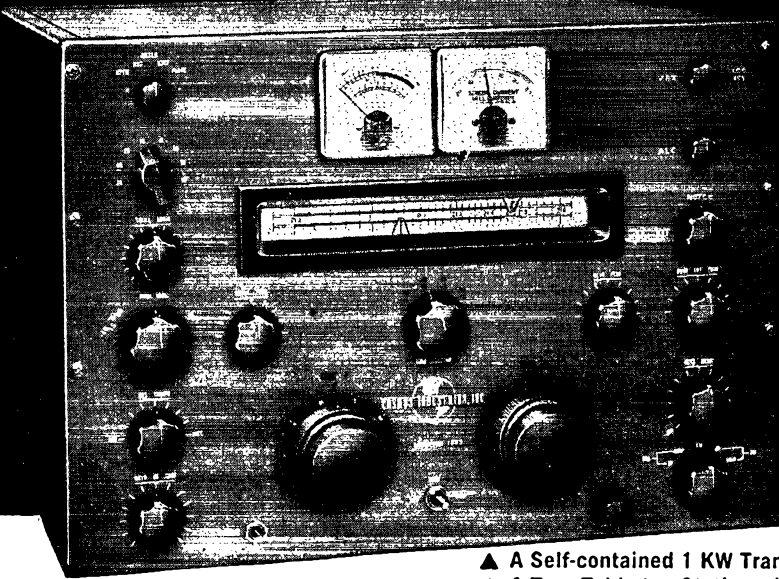
ly v.h.f., this section offers a traffic-handling group to fulfill your need. All nets welcome newcomers. Outlet needs at this moment are in the New York City Metropolitan Area on the 80- and 75-meter nets. Our V.H.F. Net requires liaison stations capable of operation on h.f. and v.h.f. bands. Congrats to W2EW, who has earned his fourth BPL card on the V.H.F. Net. Many have noted the absence of W2KEB from our BPL ranks. It is with regret that I report the departure from our section of Georgia and her well-known OM, W2KFV. They are now located in Sun City, Ariz., where they will hold forth on all bands, concentrating on 20-meter s.s.b. with their S/Line and tri-band beam. The BPL records tell only part of the story of this team. Their devoted service to amateur radio in the NYC-LI section will long be remembered. K2UFT filled in as Acting RM for W2VDT during the summer months. In his first month's return to the traffic ranks W2GKZ sent in an impressive traffic total. K2CMJ received his WAC award. WA2CSE is now active on 6 meters. WA2GPT was impressed by the Vermont v.h.f. gang and the power-plus stacked beams. Bea said her six watts seemed lost but she made several contacts. WA2GIVW is running 100 watts to a homebrew rig on 144 Mc. K2AZT completed his Heath GC1-A in time for a New Hampshire camping trip. WA2JTC passed the Tech. Class exam. K2RHN moved to New Jersey. W2TNI/3 reports from the District of Columbia where he will be operating on 2 meters during a year's work assignment there. K2DDK moved to Manhasset. Al needs only seven elusive cards for DXCC. K2OFD is now using a 75A-4. K2TAQ worked his brother, K3IUZ, for the first time on 50 Mc. using a Communicator III and an eleven-element Yagi. K2TPU and his sister, WA2-BEA, are enjoying 144-Mc. work. K2VDR is working on transistorized crystal-controlled converters for 6 meters. WA2LZF is on 6 meters with a Viking Challenger and a Heath XC-6 converter. W2VNYR is a new station m Dix Hills using a Globe Chief and a multi-band vertical. Your SCM added a five-element 6-meter beam to the station, with the transmitter soon to follow. K2DEM1, a BPL Medallion winner and one of our section's active stations, moved to New Rochelle with his mother. K2-UTP, and dad, W2ASL. It is with deep regret that I report the entry of W2YKM to Silent Keys. WA2NWG passed the General Class exam on the first try without the Novice-Tech. route. WA2HGI passed the Tech. Class exam and enjoyed his first operation on 2 meters with a Communicator II. WA2GAB passed the General Class exam with help from the OM, K2SLD. K2OEI is running 100 watts on 2 meters with a 417-A converter and four-element quad. Bill reports a great increase in 144-Mc. activity on Staten Island. Your attention is invited to the Hudson Amateur Radio Council Convention to be held Oct. 15 at the Statler-Hilton in N.Y.C. An excellent program has been planned. Of particular note to appointees and others is the ARRL forum at which time we will meet neighboring SCMs, SECs and our Hudson Division Director and discuss section and division activities. Hope to see you there. Traffic: (July) K2UFT 338, W2EW 246, W2GKZ 173, WA2CZG 143, K2CMJ 138, W2RED 105, W2KZW 102, W2OKU 98, WA2CSE 76, WA2GPT 76, K2RBW 70, K2DNY 54, K2RHG 34, WA2GWW 21, K2THY 19, W2PF 18, K2YQK 12, W2EC 8, W2LKG 8, K2OEI 8, K2ADL 7, K2QBW 6, K2AZT 5, K2SJP 5, K2DEM 4, WA2HGI 2, K2RHN 2, K2MEM 1, (June) W2VDT 128, K2SJP 10.

NORTHERN NEW JERSEY—SCM. Edward Hart, jr., W2ZVW—SEC: WA2APY, RM: W2RXL, PAMs: K2-SLG and K2KVR. W2CVW is NCS for NJN Sat. nights and is doing a fine job. WA2EBR had receiver trouble, but now is manager of EASN. WA2GQI and WA2GQZ added an electronic keyer and a 40-ft. tower. K2KVR worked some fine short-skip stations on 6 meters. W2-TLV was high New Jersey scorer in the Maine QSO Party. WA2CCF visited the Connecticut Wireless Assn. on Field Day but did not meet your SCM. K2UKQ still is chasing DX on 20 meters. WA2COO has a new Viking and puts out a much stronger signal. WA2GZR was in Pennsylvania portable, but is back at the old stand. K2THC was on vacation for two weeks so his traffic total is only 1084. W2RXL has a Heath 6-meter mobile job. The NJN held 31 sessions, 571 stations checked in and 348 messages were handled. WA2EDG joined AREC and RACES, two groups that all hams should join. Apply to WA2APY or your EC. K2UCY has an electronic keyer and a DX-100 and made BPL. W2CFB is getting back to business after a vacation in New York and Vermont. W2ZI reports the NJPN had 31 sessions, 710 stations checked in and 120 messages were handled. K2RHN is working all kinds of DX on 15- and 20-meter phone. K2PVH is NCS for NJPN on Sat. W2EWZ met W2BSK, W2IAZ and W8IMB while on duty with the U. S. Army Reserve at Ft. Rodman, Mass. K2AGJ has ordered and is waiting for a 60-ft. tower. K2UWN is working on a receiver design for 6 meters. K2PTI reports

(Continued on page 122)

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COSMOPHONE "1000"



- ▲ A Self-contained 1 KW Transmitter-Receiver
- ▲ A True Table-top Station with NO Sacrifice of Performance

SPECIFICATIONS

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INPUT: Full 1 kw on Voice Peaks (Meters Read 2500 V at 400 ma) into a pair of 4 x 300 A's
UNWANTED SIDEBAND: 42 db down
DISTORTION (SSB): Third order products approx. 32 db down
FREQUENCY STABILITY: Drift less than 100 cycles.

CALIBRATION: Built-in 100 kc marker
AUDIO CHARACTERISTICS: 200-3100 cps

MIKE INPUT: High impedance
VOX: Built-in
LEVEL: Automatic level control
METERING: Screen, plate, and grid current, plus RF output
RF OUTPUT: 52 ohms
VFO's: Dual VFO's permit transmitting on the receive or any other frequency
CONTROLS: Vox, Qt, ALC, Grid Tuning, Plate Tuning, Antenna Loading, Audio Gain, Band Switch, Meter Switch

RECEIVER

SENSITIVITY: 1 microvolt for 6 db S/N
SELECTIVITY: 3.1 kc mechanical filter plus a T-notch filter
STABILITY: Drift less than 100 cycles from a cold start at room ambient
TUNING KNOBS: Coarse gear ratio of 20:1, fine gear ratio of 100:1 gives a 1 kc dial reading per division
CALIBRATION: Built-in 100 kc marker
IMAGE AND IF REJECTION: Better than 50 db
AUDIO DETECTOR: Balanced detector for SSB and CW, diode detector for AM
MODE SWITCH: Selects up or low SSB, or up low AM, or CW
DUAL RECEPTION: Two VFO's permit reception of any two frequencies on one band with the flick of a switch
BFO: Crystal controlled
METERING: S-meter
CONTROLS: T-notch filter, audio gain, RF gain, antenna trimming, tune selector, phone jack, tune A and B

"The COSMOPHONE 1000"—a complete Station, Receiver, and Transmitter. Dimensions: 17 inches wide, 12 inches high, and 15 inches deep. Power Supplies packaged separately, can be placed under operating desk. Price: "The COSMOPHONE 1000" with Power Supplies...\$1,550.00.

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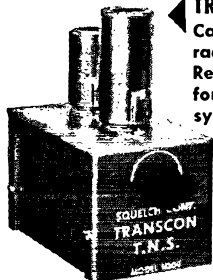
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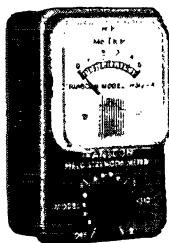
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Can be easily installed in any car radio. Tubes: 6AL5 and 12AX7. Requires 150-225 VDC designed for 6 or 12 volt auto or marine systems. Amateur Net **\$17.90**



FIELD STRENGTH METER

For mobile, marine or fixed station use. May be installed in series with broadcast receiver antenna and switched in or out of circuit as desired. Lets you know you are Amateur Net "getting out." **\$18.80**



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that officers of the Irvington RAC are W2YGM, pres.; W2IMM, vice-pres.; K2RKL, treas. K2GEC, secy.; and W2TRA, chief operator. W2CJX has been laid up but is OK and will be back soon. K2CBG is vacationing in California. K2VNL is a very active NJN member. The NJ6 reports 9 sessions, 85 stations checking in and 6 messages handled. W2RON blew the 6146s in the Viking. Traffic: (July) K2THC 1084, WA2COO 841, K2UCY 564, WA2CCF 320, WA2APY 184, WA2FGP 119, WA2EDG 118, W2RXL 107, K2VNL 106, WA2EBR 79, W2EBG 62, K2EQF 52, WA2GQI 45, WA2IAT 43, WA2GZR 36, K2MFF 34, WA2GQZ 32, K2CBG 25, K2PVH 25, W5-FKL-2 25, K2AGJ 24, W2CVV 21, K2MFX 20, W2ZVV 17, K2JTU 16, W2RON 15, WA2AKM 13, W2DRV 12, W2CFB 11, K2SLG 10, K2UKQ 4, W2MZR 2, W2NIY 2, K2RHN 2, (June) K2CBG 21, W2CFB 6, WA2EJZ 4, (May) K2CBG 16.

MIDWEST DIVISION

IOWA—SCM, Russell B. Marquis, W0BDR.—W1UED, ARRL Assistant Secretary, visited the Sioux City Club. K0BSG, PAM, reports 1018 QNS, 169 messages handled for 26 sessions of the 75-Meter Phone Net. W0PZO, RM, reports 224 QNS, 431 messages for 26 sessions of the TLCN. GQ, Midwest Division Vice-Director, is vacationing in Hawaii. K0UKN, operating portable at the Boy Scout camp near Woodward, made BPL by originating messages. The Burlington Club assisted the Police Department by providing communications for an Air Show, using mobiles, fixed stations and its communications truck. K0EXN has been appointed SEC for Iowa. Other new appointees are K0DQC, QDC, TBL, W0DUA and VAU as ECs and K0HBD as ORS. SCA renewed his EC, RM and ORS appointments. K0OTV has been appointed RACES Radio Officer for Grundy County. DU received a net certificate for TLCN. LCX has a new SX-101. The Sioux City Clubs have combined and formed the Sioux City Amateur Radio Association with K0MMX secy. and PZO, FBY and MHC board of directors. Ex-K0MMX is now W3NCT. Traffic: (July) W0BDR 1701, LGG 1504, LCX 1484, SCA 926, NTB 327, DUA 306, PZO 254, K0UKN/0 192, W0QVA 64, WVF 58, K0HBD 54, BSZ 37, KAQ 34, W0BLH 30, K0CNC 25, W0PPL 25, K0AAU 18, EXN 17, BXP 14, SEV 14, GOT 11, IHC 10, JPI 9, TGT 9, W0UHO 8, SLC 7, K0MFX 5, KZC 4, POI 4, DBW 2, OTV 2, W0QVZ 2, (June) W0LJW 18, K0AAU 10.

KANSAS—SCM, Raymond E. Baker, W0FNS—SEC: VZM, Asst. SEC: LOW, RM: QGG, PAM: UTO, V.H.F. PAM: HAJ. The Kansas Federation of Amateur Radio Clubs has appointed IUB as publicity director to handle Kansas Centennial certificates; K0RNZ, Awards; Dorothy Hall, certificates; K0LZM advertising. Basic rules are: (1) A Centennial certificate for working 25 stations (Kansas) 1961. Dx stations need only 10. (2) Two QSO Kansas Parties, Jan. 28, 29 and another in December. (3) Three trophies given: (1) Kansas ham who works the most Kansas stations, (2) U.S.A. station that works the most Kansas stations, (3) DX station that works the most Kansas stations. Success of this venture depends on the Kansas amateurs, so let's give IUB, RNZ, GIA and IZM all the help possible. K0REG/0 handled traffic at the Wellington Scout Camporee. K0TNW, EC Zone 10, reports on two trips. BBO reports obtaining 5 walkie-talkies on 3885 kc. for emergency work at McPherson. K0SWR reports that the Flint Hills Club has secured its Official Shirts. K0RNZ led Kansas in the Sweepstakes Contest and also has a new 6/2-meter converter and is going to 500 watts on 2 meters. K0GHI has a Class I frequency measurement MARS rating. K0QWN operated portable at Harper High School demonstrating amateur radio to the students. Traffic: (July) K0HGI 216, W0FNS 159, IOL 157, ABJ 97, ORB 91, SYZ 65, K0UAX 62, W0UTO 54, K0HVG 45, IZM 30, W0FPR 24, WYK 22, K0VBD 21, REG 20, W0AMJ 17, K0QKS 14, GIG 12, EFL 8, PIE 7, SMQ 6, TNW 4, JID 3, W0WFD 3, K0ZSG 2, (June) W0OHJ 526, K0BCH 302, HGI 228, QWN 13, W0IFR 9, VZM 9, BBO 4.

MISSOURI—SCM, C. O. Gosch, W0BUL—SEC: K0LTP, RMs: OUD, QXO and K0ONK. PAMs: BVL and OMM. Net reports: MON (3580 kc. 1900 CST M-S) sessions 21, QNI 135 QTC 148; NCSs OUD 14, K0QCQ 5, RTW, TPK, K0ONK 1. (June) SMN (3580 kc. 1600 CST S) QNI 9, QTC 1; NCS OUD. (July) MON (3580 kc. 1900 CST M-S) sessions 26, QNI 135, QTC 140; MCSs OUD 19, K0ONK 5, K0QCQ 2. SMN (3580 kc. 1600 CST S) sessions 5, QNI 13, QTC 2; NCS OUD. HBN (7280 kc. 1205 CST M-F) sessions 14, QNI 254, QTC 179; NCSs K0HGI 4, WAL 3, K5JXD 2, K0LTI, K0ONK, K0BFH, K0HVG and K0UAX 1. K0VIQ/K-VPH report the acquisition of a new 350-watt rig with accompanying stronger signal and more contacts. K0VAY has graduated from the Novice ranks. OHC is building a c.d. shelter complete with ham communications (Continued on page 124)

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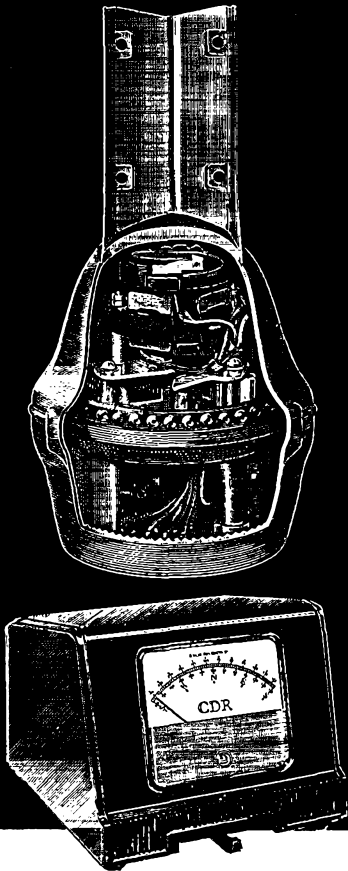
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equipment, for demonstration purposes at the Missouri State Fair. KØVXU reports cleaning up his signal on the higher frequencies and has embarked on a DX spree. KØJPL also reports working some rare ones. YKC will operate a portable station at the Peach Festival at Campbell. He has just received a new 100V transmitter. MKJ has a new antenna and reports improved operation. KØPFF reports a traffic relay from the local Scout camp to Kirkwood with accompanying publicity in the St. Louis press. (This type of publicity is an excellent boost for ham radio, fellows.) LFE reports a registration of 300 with 150 licensees at the V.H.F. Picnic at Bowling Green. V.h.f. devotees from Michigan, Wisconsin, Illinois, Iowa, and Missouri were in attendance. New officers of the Jefferson Barracks ARC are ODI, pres.: KØSZX, vice-pres.: WØKWJ, secy.: KØDCQ, treas. Traffic: (July) KØONK 1152, KØVAL 691, KØVBU 182, UTX 172, VXU 107, WØKIK 76, RTW 49, OVV 28, BUL 27, KØLGZ 27, WØMKJ 21, BVL 17, PNE 15, VPQ 10, KØPCK 8, PEF 8, VPH 6, VYQ 5, VYQ 2. (June) KØKBD 183, WØKIK 118, QZP 27, TPK 12, KØPFF 4, WØGBJ 1. (May) KØVBU 1.

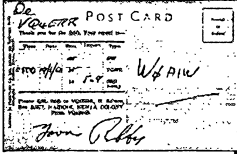
NEBRASKA—SCM, Charles E. McNeel, WØEXP—The extremely hot and dry weather in the Nebraska section seems to have had a slowing-down effect on ham radio activity so it is hoped that next month things will be back to normal. The Western Nebraska Net, reported by NIK, had QNI 630, QTC 101. The Nebraska Section C.W. Net, reported by NYU, had 23 sessions, QNI 104, QTC 38. The Nebraska 74-Meter Phone Net has elected KØDGW as net manager for the coming year and reports QNI 783, QTC 174. KØDFO has a new jr. operator. The Annual North Platte Hamfest was held Aug. 7 at Cody Park with over 100 in attendance. New appointments in July: GGP and OXN as ECs, DDT as ORS and KØVAZ as OBS. Traffic: (July) WØZJF 111, KØMISS 78, DGW 70, IJW 66, WØNYU 66, VZJ 55, KØRRL 52, QFK 40, KJP 36, WØDDT 35, KØROP 22, RTZ 18, UWK 17, WØBOQ 14, KØDFO 12, WØHTA 12, NIK 12, OCU 12, FTQ 11, GGP 11, KØVIA 9, WØVEA 7, KDW 6, KØUQN 6, DVW 5, WØEGQ 5, KØMZV 5, SCM 5, ROA 4, WØWKP 3, KØSLB 2, TCH 2, WØRJA 1, KØVID 1. (June) KØMZV 21.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Victor L. Crawford, WITYQ —SEC: EOR, RM: KYQ, H.F. PAM: YBH, V.H.F. PAM: FHP. Traffic nets: CPN, Mon.-Sat. 1800, Sun 1000 on 3880 kc.; CN, daily at 1845 and 2030 on 3640 kc.; CVN, Mon., Wed. and Fri. at 2030 on 145.98 Mc.; CTN, Sun. at 0900 on 3640 kc. KP4API made BPL at Camp Ken-Mont in Kent using an HT-32A and an NC-300. MDB is active on CPN again. FNE, RAN and WJF helped OBR tune his new 20-meter beam. The Tri-City Amateur Radio Council participated in the Connecticut State Firemen's Parade Aug. 21. BDI added two new countries. KIMBA is looking forward to fall and a change from the night shift so he can check into CPN. FVV added Michigan on 50 Mc. to make his state total 26. KRRLJ and 9K2AD give KIIVT a 176/155 country total. GJV vacationed in Colorado. NWE is getting out with 6 watts and a three-element beam on 50 Mc. Let's all support the First Regional Phone Net, which was activated Sept. 7. KICCB enjoyed the CD Party. KICEC is back on the air after a year's absence. KIMNX passed the Conditional Class exam. KILFS enrolled in the AREC. KYQ reports CN met 31 times, handled 275 messages and had an average attendance of 7.4 stations. The second session handled 18 messages. High QNI goes to KIJAD, AW and REFJ. New Novices in New Haven are KN10TN, KN10MR and KN10VH. KINQM, K1MEG and K1NFD passed the General Class license examination. K1HTV works at WELI. K1KSH worked 35 states and 7 countries on 160 meters using a 2200-ft. antenna. ERB is planning a "V" beam for 160 meters. K1LXP is now in West Haven. KQY is moving to Madison, Conn. K1MBH likes his new DB-23. JVV is building an Apache. DIJ is on 6 meters with 75 watts and an eight-element beam. KN10JM is a new Novice in Stamford. New appointments: KICEC and QV as OPS. KICEC as OO, QV as OBS, ZAD as EC. Appointments renewed: K1AQB as OPS, K1CBB as OO. Reports received: OES from FVV; OO from K1GUD, K1IYT, K1LFS, K1MBA, MBX and NWE. Traffic: (July) WIAW 277, KYQ 213, K1JAD 196, W1OBR 169, KP4API/1 125, W1YBH 121, EFW 80, MDB 70, RFJ 28, K1GGG 24, DGK 23, CBV 13, WITYQ 10, BDI 9, CUH 8, K1MBA 5, W1EBW 4. (June) W1EFW 149, K1DGG 22, BSB 15, W1EBW 11.

MAINE—SCM, Jeffrey I. Weinstein, W1JMN—The State of Maine Official Bulletin System is now in full operation. Bulletins and information of state-wide interest from my office is well as those pertaining to national matters are being transmitted regularly. JMN

(Continued on page 136)



E. Robson, VQ4ERR, of Nairobi, Kenya Colony, Africa

"...performance matches the thoroughbred appearance..."

...writes Robbie, VQ4ERR, of his Electro-Voice Model 664 Cardioid Microphone

Doubtful that a fine cardioid microphone — such as the Electro-Voice Model 664 — could improve your signal? Then read these excerpts from a letter written to us by VQ4ERR, long recognized as one of the world's top DXer's. He writes: "I thought you might like to know the results and comparisons since I added my Model 664 . . . I talk to a DX friend daily (MP4BBW) . . . he at once noticed the difference and said 'So your new mike arrived at last . . . knowing you, I can tell you that the mike IS YOU . . . it is exactly as you talk . . . don't go back to your old one.' His comments made a great impression as I had not told him I was using my new mike. . . ."

VQ4ERR adds: "... all reports say, incidentally, that it (the Model 664) has additional bass and quality lacking in my other mikes and cuts through QRM just as well . . . it is a pleasure to own such a mike . . . the performance matches the thoroughbred appearance in every way . . . I find myself using less slang and taking more trouble with my speech . . . out of sheer respect!"

What the Model 664 accomplished for VQ4ERR — it can also do for you. Investigate the performance of this fine microphone at your Electro-Voice distributor — today. Connect it to your rig and try it on the air. The Model 664 Cardioid is guaranteed to meet our claims — or your money will be refunded.

TECHNICALLY SPEAKING: Variable-D Dynamic design of the Model 664 incorporates multiple sound openings to the back of the diaphragm — one each for high, low and mid-frequencies. Response is free of dips and peaks. Uniform cancellation of sounds, echoes, or reverberations from rear of microphone.

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Check the values: NEIL transmitters tune easier (all controls on front panel, no screwdriver tuning), and sound better (because they are fully modulated using the best type of modulating system with the finest audio circuitry).

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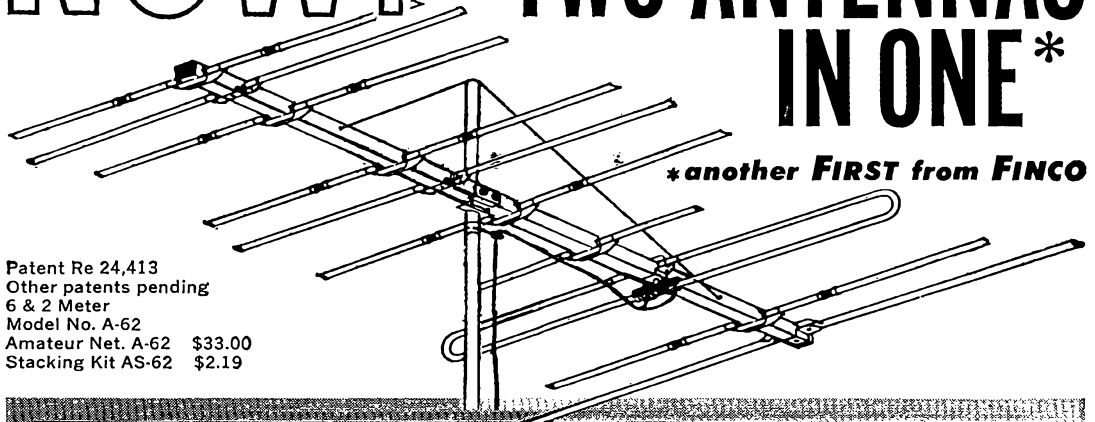
can be heard on 3600 kc. at 1800 week ends, while BXI and JDA serve the State nets daily. Although the Sea Gull Net (GRG and BXI, co-PAMS, 3940 kc. at 1700 daily) and the Maine Slo-Speed Net (GVQ, RM, 3728 kc. at 1730 Sun., Tue., Thurs. and Sat.) are conducting excellent sessions, the Pine Tree Net (EFR, RM, 3596 kc. at 1900 daily) could employ more support from State of Maine amateurs. The Pine Tree should be given a try by everyone. I think you'll find it a pleasant and rewarding experience. Individuals who are interested in receiving an ARRL appointment are requested to submit their preliminary application to your SCM (Jeffrey I. Weinstein, JMN, 79 Caleb Street, Portland 4, Maine) at the earliest opportunity. Appointments are currently available to all classes of licensees who are ARRL members. Do your part in PICON by rendering your support to the AREC organization in your area! Justify your existence as a radio amateur! Northern Maine (KFY-EC), Central Maine (GRG-EC) and Southern Maine (AHM-EC) are looking forward to 100 per cent quotas of AREC members in their respective areas. Join now! Traffic: K1MJN 196, DUG 47, WIUDD 42, GRG 39, K1KSG 19, DYG 8, W1JMN 5, K1MPM 5, W1AHH 4, K1GVQ 4, BDQ 2, W1OTQ 2, K1FAA 1.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP—SEC: AOG. New appointments: K1JUR as OBS, YHY and K1JIU as OOs. FZU is a Silent Key. K1KXQ has a DX-35, a BC-348 and a 500-watt rig on the way. NJL made the BPL. K1JML worked on 6 meters and heard VOIDW. New on 6 meters: PJD, K1s, KZV, IKX, NDS and HGF. K1KZU has a new shack. LMZ worked VE2II on 2 meters. K1MHC worked some DX on 2 meters during the Aurora. LMZ is attending Wentworth Inst. and is president of the Bedford Radio Club. AUQ worked K2KOE, ex-1AN. K1KYN came out first in New England in the Boys' Life Radio Contest and 14th in the nation. K1JUR has a Valiant on 10 and 40 meters. DFS was principal speaker at the Augusta Hamfest. KIAQI says if any ECs want 6-meter mobile rigs for drills or emergency work to call AOG. The Mass. Phone Net had 532 stations on and handled 151 pieces of traffic. The Eastern Mass. 2 Net had 407 stations on and handled 213 pieces of traffic. VP3AD visited BB. BB sent out a nice 160-meter DX bulletin. K1KZP, IWB and KN1-PKX are on 2 meters. FEC says the Nemasket Net still is active Sun. on 28,780 kc. and the gang was out on Field Day. K1JAW says traffic is moving smoothly on the 40-meter nets. The following are on: K1s, BYL, BYV, IXT, JIU, MHM, WINJL and UE. PEX, K1GNR, AFF and W1ZSS are on 40-meter phone. SU is active on the air. NF worked VU2ZJ, a new one. MEG is State MARS Director. Ten Burlington hams were out on Field Day using the call CB/1. K1LJK has a 40-ft. tower with a Hornet Tribander beam also an inverted "V" dipole 55 feet up similar to K7GCO's. HIL has a Conset Tribander, a six-element for 6 meters and an eleven-element beam for 2 meters. K1JUR joined MARS. NOS has a Globe Scout 680. PEX has a Seneca on the air and is a member of AF-MARS. FJJ has a new tower Tribander. KBN has a new HT-37. K1NCS is in the 2-meter net. K1JCC is back on the air. K1MEM has a new DX-100B. K1ODL is rebuilding. K1LQC is back to normal; indians are all gone. DBO has an HT-32 and an HT-33A on all bands. The 2200 Club Net meets each night at 2200 on 50.25 Mc. K1JIU has another commercial ticket and is putting up a beam for 20 meters. K1NHB has a Globe Scout Deluxe, an SX-128 and is on 6 meters. K1OIKT has a Knight T-50 transmitter, an NC-183 receiver and is on 80, 40 and 15 meters. Appointments endorsed: MKW Dennis, VYH Topsfield, VYI Radio Office for Area 1 WNP, Concord and DPO Chatham as ECs; BGW, AYG and UBC as OOs; LMZ as OES; DFS as PAM for the 75-meter phone band. NJL as ORS and OPS. KIAII has a Navigator, is on 80 meters and is converting the 11-meter position to a stable v.f.o. for 6 and 2 meters. Many of the newer hams wonder why news sent in doesn't appear immediately, but it takes longer than that. This report, for example, was mailed in on Aug. 7 for the October issue. Traffic: (July) WINJL 503, PEX 386, K1GNR 265, W1-ZSS 130, K1BYL 129, JIU 93, JAW 83, W1EAE 65, K1LLX 61, W1OYK 58, SIV 42, GEK 31, K1BYV 29, W1AUQ 27, K1BGK 26, GYM 25, W1AOG 21, FJJ 20, K1KZP 20, W1ZOP 18, KBN 16, K1LQC 6, W1TWG 8, K1JCC 7, MHC 7, W1VYS 7, K1CMS 6, W1IHL 6, K1MEM 6, W1BB 3, KIAII 2, ODL 2. (June) W1AUQ 71, NJL 42, K1LQC 8, KYN 4.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: BYH. RM: DWV. PAM: DXS. Assistant to the RM for the Novice Net: K1JIU. The WMN meets on 3560 kc. at 7 P.M. Mon. through Sat. The MPN meets on 3870 kc. at 6 P.M. daily. The WMN meets on or near 3744 kc. at 8:30 P.M. Mon., Wed. and Fri. The First Region Net has added a phone session

(Continued on page 128)

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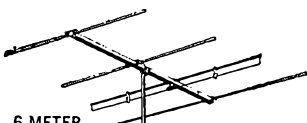
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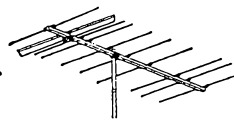
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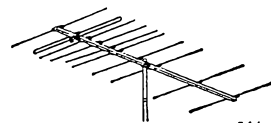
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with DXS in charge. This is the first region net to try it, and we wish it the best of success. DVW took a well-earned vacation on the Cape. The WMN managed to keep its six-day-a-week sked but attendance was not too high during the summer months. The MPN reports 151 messages were handled during July with an average attendance of 16.84 stations. AGM reports that his new 100V is working very well on s.s.b. Westfield has two new Novices: KN1PES and KN1PKZ (the latter a sightless lad since birth). Western Massachusetts is allotted about twice this amount of space each month and I shall be glad to use that much provided you fellows supply some material! Traffic: W1BVR 105, K1IJV 81, LBB 70, WIWFE 63, DVW 52, KN1MGK 16, K1GCV 12.

NEW HAMPSHIRE—SCM, Robert H. Wright, W1RMH—SEC: K1GQK: RM: K11IK. PAM: 1IQ. The GSPN meets at 1900 Mon. through Fri. and at 0930 Sun. on 3842 kc. The NHN (c.w.) meets Mon. through Sat. on 3685 kc. K1GQK is the new SEC for the State. He intends to promote interest in AREC activities in all corners of the State. Anyone interested in the EC posts in the counties now lacking, please contact either GQK or myself. N. H. ranked last in all the states in AREC participation in the past few years and we hope to improve the situation. Please give GQK your maximum support. YVX is now located at Westville. ZUS announces formation of the Central New England Net. Meeting time is 0645 Mon. through Sat. on 3842 kc. The Laconia High School Amateur Radio Society, K1OOP, has a Viking 1 and an NC-240D. Newly licensed K1PGA is the XYL of K1GQK. The Concord Area 6-meter stations have a new emergency and traffic net on 50.826 Mc. New officers of the Turkey River Amateur Radio Club are RMH, pres.; K1OKX, vice-pres.; YXA, secy.-treas.; and K1GQK, trustee. Endorsements: K1CIF as ORS, YHI as OPS and OBS. Appointments: GAH as EC for Sullivan County, KHITS as ORS. Traffic: (July) K1CIF 1111, I1K 162, ITS 161, W1GQU 97, TA 86, CUE 38, ZUS 16, PFU 9, YHI 5, AIJ 4, K1CFX 4, IEH 3, MID 3, W1BYS 2, K1CIG 1. (June) W1AIJ 13.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: PAZ. RM: SMU. PAM: TXL. K1GRN is a new OES. The RISPN now meets at 1830 daily on 50.6 Mc. with net controls K1DZX, K1GRC, TXL and K1LGX. The net traffic was 163 with 150 QNI. The RIN held 11 sessions; 28 traffic, 38 QNI, with CMH, HLY, QR, SMU, TGD, JXD, K1BBK and K1MJJ reporting in. K1CZH, secy. of the WISKT RC, invites all members to meet on 29.080 Mc. at 1830 for a club net. The NCRRC election results are ETM, pres.; JFF, vice-pres. DEI and JFF are now on 6 meters. ETM has a new mobile rig. During the recent Boy Scout Jubilee Celebration, the CRA of Cranston set its equipment up at Scout Camp Yawgoog in hopes of contacting the National Jamboree at Denver, Colo. Although contact was not made, a demonstration was given the Scouts. CRA members taking part were ZGH, KN1MOE, K1ADK, K1ABR and ZFG. K1ZHN reports working SM7BAU/MM, who was in the Pacific 500 miles from L. A. on 40 meters. He also reports lots of DX on 40 meters in the early hours of the morning. K1JNJ, OES, and K1HVN have left to join the Armed Forces for training in radio. Traffic: (July) W1SMU 724, TXL 215, CMH 162, K1BBK 45. (June) K1GRC 82.

NORTHWESTERN DIVISION

IDAHO—SCM, Mrs. Helen M. Maillet, W7GGV—Boise 2-Meter Net members assisted the sheriffs with communications during the Idaho City forest fire. Nampa hams assisted police with powerful lights and portable generators while searching for a drowning victim's body. K7KBU set up a "fire watch station" on 3945 kc. during the extremely dry summer, for vacationing mobiles to report forest fires. The Boise and Nampa 2-Meter groups meet Sun. for transmitter hunts. Sponsoring events at the W1MU Hamfest are the Shelley Tubers, Valley, Teton Valley, Magic Valley and Pocatello Amateur Radio Clubs, and Idaho radio amateurs. The St. Anthony c.d. group provided a monitor station. Officers of the 1960 W1MU are DWE, prey; JFA, veep and Helen, GGV, secy. K7LGQ has a new baby girl. Lois, K7JIK, got a complete ham rig as a wedding gift. New hams in Pocatello are brothers John KN7MLJ and Steve KN7MLK. FARM net traffic: 18. Traffic: K7KBX/7 25, W7VQC 17, JFA 10, ZRQ 5, DHL 4, GGV 4, LIQ 4.

MONTANA—SCM, Vernon L. Phillips, W7NPV/WXI—SEC: KUH. PAM: YHS. RM: K7AEZ. The MPN meets on Mon.-Wed.-Fri. at 1800 on 3910 kc. TSN meets Mon. through Fri. at 1200 on 7225 kc. MSN meets Tue.-Thurs.-Sat. on 3530 kc. W7SFK, of Brady, is your new SCM. Registered attendance at the Glacier Hamfest was 456. Ham picnics were held at Lewistown and Fishtail. Amateurs throughout the State supplied communications during one of the worst sieges of forest and range fires

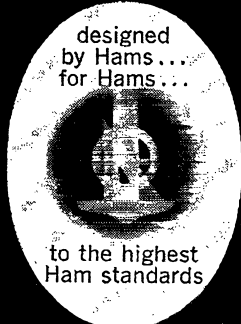
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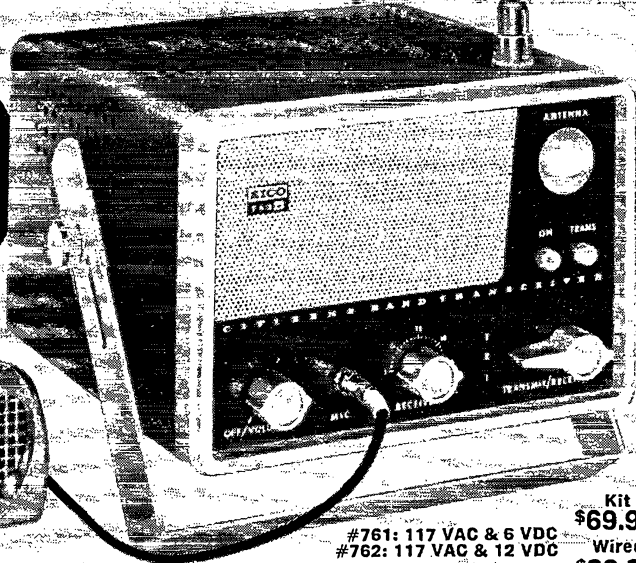
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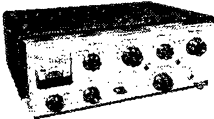
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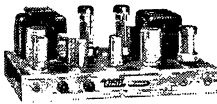
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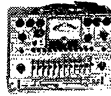
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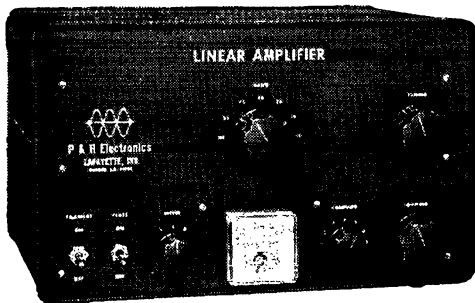


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in the State's history. YRC amateurs furnished communications during the annual Sports Car Races. CQC was seriously injured in a motorcycle-truck accident. VLY had a series of heart attacks. PYZ is critically ill. PRH is in the hospital. DWR and NOZ have a new jr. operator. OGT has a new baby girl. COH moved from Missoula to Stevensville. INM moved from Harlowton to Enterprise, Ore. K7BKH made BFL for the 13th consecutive month. New calls: K7LEL at Glasgow AFB, K7MRZ at Butte, K7GHK at Billings, KN7MOW at Laurel and KN7MOY at Great Falls. Thanks for all the cooperation during the past four years. 73, gang. Traffic: K7DCI 287, BKH 219, DCH 14, W7IDK 6, K7DNU 4, W7YQZ 3, NPV 2.

OREGON—SCM, Hubert R. McNally, W7JDX—The Oregon gang rendered swell service during the recent forest fires in the northeastern part of the State. A special report will be made giving details and listing those participating. Thanks, gang, for the swell job. GUH really is working at his OO job. LT traded an NC-173 for a 183D. K7JBQ handled traffic for the Boy Scout Jamboree in Colorado. No fishing in the Rogue River? K7EPO is back after a long period of rebuilding. ZB has a new mobile but his traffic totals are down. Could be too much driving, Don? There is a new AREC Net on 50.55 Mc. in Washington County. K7JSJ is working with JIP on 10,000 Mc. and perhaps there will be some new records soon. K7DVK is busy on 6 meters. A nice report was received from the OSN mgr. which shows the summer slump has finally hit but all old-timers seem to be holding things up. The SCM seems to be licking the bursitis and should be getting around the country a little more. The PARC is lining up swell programs for members. The OEN Picnic at Medford was a big success, as were the ones held by the Portland Club Council and the OHMS. Hope more of you will send in cards and dope on your activity. Let's make this column larger. Traffic: (July) W7BDU 356, ZB 300, MW 66, ZFH 45, K7EPO 24, W7DEM 17, K7JBQ 15, W7LT 14, MTW 14, DIC 13, GUH 13, K7JWY 12. (June) W7ZB 246.

WASHINGTON—SCM, Robert B. Thurston, W7PGY —Over one hundred fifty attended the Washington Amateur Radio Traffic System (WARTS) Picnic at Lake Wentachee. LFA was M.C. and in charge of the registrations. K7AJT was elected manager for the coming year, with K7CHP as asst. mgr. and GSP as net secy. A new Novice in Burlington is KN7MQF. K7IEY has a new SX-101 and a DX-100. The Totem Net (Seattle) on 29 Mc., has a new SX-101 and an DX-100. The Totem Net (Seattle) on 29 Mc., has 43 AREC members with 18 mobiles. BSW is looking for a Viking KW. APS is taking a vacation. AMC complains of the long hot summer days and is looking for rain. K7MFF, ex-K8MTK, is working portable out of Forks. AHQ, from Anacortes, joined the ranks of Silent Keys on July 13. LFA is using a new home-brew transistor power supply on his mobile. YFO is QRL pouring cement for the new ham shack. TH, from Walla Walla, says that ham radio played a big part during the forest fire in the Blue Mountains. MCU and K7DYL both have new towers and beams in operation. K7BXG remodeled his shack and has a nice set-up now. OMO, in Warden, says conditions are very bad at his location. K7EVI works for the NP Railroad. K6NFR/7 has a new Valiant. K7CWO has a new 20-A. VPW received the RBE Award at the WARTS Picnic. K7BBW is very active on 40 meters. K7ELH is mobilizing with a new Elmac receiver and transmitter. AIB converted his Hy-Gain Tribander to the new Thunderbird model. K7MAX is a new General Class licensee in the Poulsbo Area. FBI is planning on a new QTH in the Bremerton Area. DDL and DJV are going mobile. CW is QRL outboard boat race official. EVU, RGL, RZO, NCC, HXE, IKM and HNV provided communications for the boat races at Poulsbo on July 4. ZCE renewed his EC certificate. K7CHH has three to go for DXCC. K7HZN still is chasing bugs in the DX-100. K7HSX has a new NC-109. The Franklin County AREC did the communications for the parade and boat races in the Pasco Area. The Spokane AREC holds regular hidden transmitter hunts the 2nd Tue. of each month. The Pierce County AREC forces were called out for a surprise test run. UMJ is going to 2 meters. VLC was home from Annapolis on a 40-day leave. The AREC Forum is scheduled to start on Sept. 25 at 1800 PST on 3970 kc. and will meet thereafter on the last Sun. of each month. The SCM and SEC attended the WARTS gathering at Lake Wenatchee. The SEC, along with WHV, then covered the entire southern end of the State on recruiting duty for AREC members. IYU now has an XYL. QLH is back home from college at Michigan State. Traffic: W7BA 804, DZX 562, K7IEY 373, W7IST 341, APS 87, AMC 53, QLH 53, K7AJT 33, CWO 20, W7GYF 14, K7MFF/7 13, W7VPW 9, BTB 8, LFA 8, YFO 8, AIB 7, EBU 5, K7ASY 3, W7IEU 3, K7DDQ 2, CHH 1.

(Continued on page 132)

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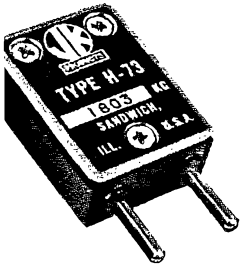
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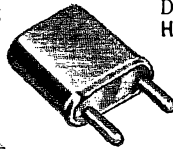
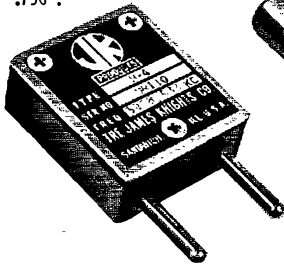
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Pin Dia. .093" Pin Spacing
.500"

H-43 or H-4 (HC-1/U).
Pin Dia. .125". Pin Spacing
.750".



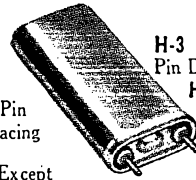
H-173 or H-17 (HC-6/U). Pin
Dia. .050". Pin Spacing .486".
H-17L (HC-6/U Except .093" Pin Dia.)
H-17W (HC-6/U With Wire Leads)



H-3 (HC-18/U Except .039".
Pin Dia.) Pin Spacing .192".
H-3W (HC-18/U) With
Wire Leads

H-17T (HC-13/U). Pin
Dia. .050". Pin Spacing
.486".

H-17TL (HC-13/U Except
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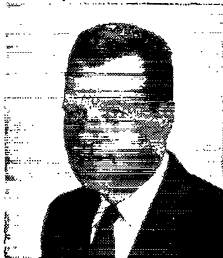
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I have the following used gear to trade: (Please use this code to describe it.) 3. Like new, little use; 4. Minor signs of use, no major blemishes; 5. Good condition, with minor modifications; 6. Has major modifications, or requires major repairs

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PACIFIC DIVISION

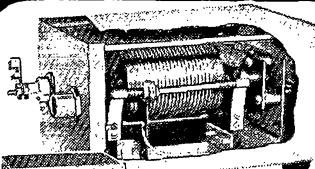
NEVADA—SCM, Charles A. Rhines, W7VIU—JU has his Mohican as a constant companion on all trips. YCT has a new mobile set-up. PWE is taking a tour of Europe. HOP has moved back to W6-Land, leaving us without an EC for Humboldt County. QHH is active with an ART-13 and is building 2-meter gear. JKV and KN7MNL, age 14, are new ARCC members. YRY is recovering from surgery. SNP, the daughter of HJ and K7IWI were married July 16. Congratulations. YNO, the son of VIU, is now at the Naval Communications Center at Cheltenham, Md. K7AGZ has returned from a vacation trip. BJR has moved to Las Vegas. John Kreiger has dropped the "N" and is now K7JUW. KN7LFB had a fire in his shack. CWV is moving to W6-Land.

SANTA CLARA VALLEY—SCM, W. Conley Smith, K6DYX—VE2AGF spoke on Modern Miracles of Electronics at the August meeting of the NPEEC. Each Tue. and Thurs. night at 1930 the club sponsors a code school at 222 Alta Vista Dr., South San Francisco, the QTH of W6QIE. Here's a chance to learn or brush up on copy by stick or mill under ideal conditions. New officers of the Poothills ARS are: W6JKJ, pres.; K6TCH, vice-pres.; K6JKG, secy.; K6JTC, treas.; W6ZWE, RO; K6MOB, dir. at large. Looks like a real livewire group for the new term. K6JJU and W6AFC, of the SCARS, worked on a special 6-meter rig for a contest held in September. Frank Quement's High Sierra group operated W6NX/mule-mobile while on its annual trek into the back country. Ma Bell is transferring several OTs, including W6WGO, former SCM, Sacramento. Our section's loss is SV's gain. W6MXO recently moved to San Bruno and is back on the air with a vertical. K6VQK is installing a Valiant. W6HRS is converting his final to three parallel 811-As and is studying for the Extra Class exam. K6ZCR is collecting parts for higher power. K6MZN, OO-I, is planning to use a crystal mixer and low-frequency oscillator method in the next FMT. W4OXO/6 had lots of help from Monterey hams in erecting a 75-ft. tower which wouldn't stay up. After the disaster enough parts were left to put her up 60 feet. A new appointee is W6RPL as OBS. Traffic: (July) W6RSY 815, K6ZCR 352, W6JCG 114, K6GZ 103, W6FON 68, K6DYX 64, W6DEF 49, W6YHM 47, W3MVK/6 27, W6ZLO 26, W6YBV 24, W6OII 21, W6AIT 13, W6PLG 10, K6YKG 5, W6HRS 2. (June) W6YHM 54, K6YKG 48, W6WX 8, K6TEH 5, W6AJY 2.

EAST BAY—SCM, B. W. Southwell, W6OJW—K6GK is helping Boy Scouts to build a crystal receiver. W6WLI is leaving the section to return to Sacramento. W6CFA visited W6NBX and will move to the section while attending U. C. W6CBBF was in the Phone CD Party. W6IFZ, with K6OSO at the key, made 10,000 points in the CD Party. The MDARC held a picnic July 24. K6UFK won the RARC construction contest. W6MHJ is a new General in Berkeley. RARC made 2094 points in the Field Day activity. K6ZBG is working on super-duper d.f. receivers. K6MVS and his XYL have a new YL harmonic. K6ZBW has a new 1-kw. linear with a pair of 813s and built a 600-watt mobile rig. W6URH has a new 4-1000A linear. K6UIV built a Heath Mohican transistor receiver. W6EJA is in the hospital. Get well soon, OM. A new Novice is W6VMAQ, the XYL of W6HGGO. W3WAU/6 and his XYL have a new harmonic. W6BRD built a transistorized grid-dipper. K6TWB has a new Chevy for his mobile rig. W6GUM has a new HRO in-haler. K6LGE was bitten by the 2-meter bug. K6AHV has left the section. The MDARC had a good turnout for Field Day. W6JYZ is moving to the Sacramento Valley section. W6MGE is a new Technician at the Dixon V.O.A. station. W6MAO is the new call of the BAY-LARC. W6AFKN still is trying to get his ART-13 going, and has been working 6-meter mobile with a Heath receiver. W6FLC is working 6 meters with a beam. W6OJW is knocking off a few new ones on 14-Mc. s.s.b. Now is the time to check over your antennas for that winter DX. Let's have those reports by the first of each month. Traffic: (July) W6NBX 362, K6GK 150, K6OSO 105, W6OT 38, W6CBF 1. (June) W6IFZ 19, K6OSO 12, K6ESZ 7.

SACRAMENTO VALLEY—SCM, Jon J. O'Brien, W6GDO—Asst. SCM: William van de Kamp, W6CKV. Many RAMS participated in the Pony Express Centennial Celebration, with stations located all along the route between Sacramento and State Line. W6GTG and W6ADGH are spending two months in Baltimore. All club reports indicate Field Day was the best ever. The boys from Willows, W6KUI, K6KGH and K6BIQ, walked away with 2nd, 3rd and 4th prizes, in that order, at the GEARS Field Day event. W6JEQ is off to Korea for 45 days. W6ADQI is having fun on 6 meters and has worked

(Continued on page 134)

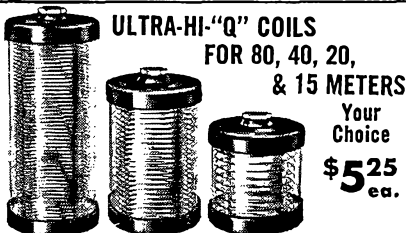


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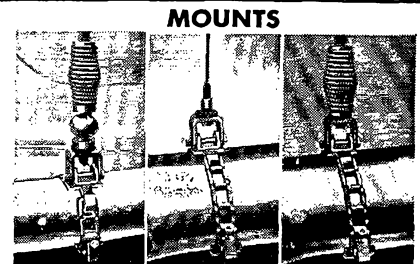
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8 western states. W6AF is taking an auto trip through the Northwest and east to Illinois. Summer vacations are being enjoyed by many local hams with camping heading up the list of ways to spend those vacations. That is all this time; no traffic reports were received.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—A High Noon Net has been started in Stockton to promote 6-meter activities. It is held each Mon.-Fri. on 50.25 Mc. from 1200-1400 local time. K6R1IX is working 6-meter mobile. New Novices in Stockton are W6CKEJ, W6KIJ and W6VLUX. W6BXXD got his Technician Class license. K6AVA got his General Class license. K6ROU and K6OZL gave each other competition in the CD Party. W6RRN has a 30-watt rig on 6 meters. K6EUY has a new HQ-110. W6BTK has a new v.f.o. for his Challenger. W6BXXH is building a 6-meter receiver for mobile. K6OEY is on the mend, no longer on the crutch. W6FUF, after reading page 62 of Feb. QST, joined the Naval Reserve! W6IHE is heard on 75-meter s.s.b. K6IXA is heard on 75-meter s.s.b. W6ADEA is operating 75-meter phone. W6UBK has trouble with DX stations calling him when he calls CQ using his rhombic on 20 meters. He says there are too many of 'em. W6FXV is thinking of a high-power final amplifier for his 100V. W6OVR is looking for more activity on the c.d. net on Tue. nights, 146.8 Mc. at 8 P.M. W6OVR has a new Gonset. W6BST is on RTTY. W6PJF is on s.s.b. every morning. KL7CAK has a 2-meter Gonset and is located in Stockton. W6IAI is operating 20-meter s.s.b. from KL7FAR. An old friend of mine, and I'm sure a good friend of your, W6QK, has joined the list of Silent Keys. Now that the vacations are over, let's have some activity and some news from you guys. Traffic: K6ROU 117.

ROANOKE DIVISION

NORTH CAROLINA—SCM, B. Riley Fowler, W4RRH—PAM: DRC. V.H.F. PAM: ACY. RM: PNM. The Winston-Salem amateurs took part in a Highway Safety Program that proved very successful. They cooperated with the local Civic Clubs and the law enforcement officials. Communication was maintained via a 2-meter RACES set-up. Congratulations. PNM is getting out an excellent NCN Bulletin each month and is doing an excellent job with the c.w. portion of our section net. 3JWN/4 made BPL and K4DWU made it in June. Ronnie originated 103 messages; Pete originated 37 plus 89 deliveries. Congratulations, fellows. A nice report was received from BBZ, who has his rig all packed to move to Florida. He is being transferred to Jacksonville. We are sorry to see Ellis in the future but we wish him the best of everything in the future. A short training program is being carried out each Mon. evening on the Tar Heel Emergency Net, 3885 kc. at 1930. Changes in District One of the Army MARS program is noted. RVH is now the new District Director. RRH has been promoted to assistant to the Third Army MARS Director in charge of Education and Training. To the many fellows applying for ORS, be patient. I will send certificates along just as soon as I receive a supply. BPL cards are being sent. Many of you are eligible but fail to make a report. You must have a total of 500 messages, or 100 originations, or a total of 100 originations plus deliveries, either c.w. or phone. Traffic: (July) W3JWN/4 238. (June) K4DWU 153.

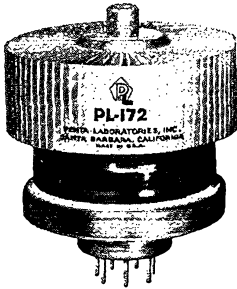
SOUTH CAROLINA—SCM, Dr. J. O. Dunlap, W4GQV—SEC: K4PJE. RM: K4AVU. PAM: K4IIE. The Mike and Key Club of Greenville now has 23 active members; the latest addition is KN4TPJ. The club hopes for WAS on Field Day contacts. Other clubs reporting on Field Day activities are the Spartanburg ARC, the Palmetto RC of Columbia, the Cheraw ARC, the Rock Hill RC and the Barnwell Mike and Key Club. New club officers in Barnwell, with Barney at the helm, are GOJ, vice-pres.; K4VVE, secy.; and OFP, act. mgr. K4PIA was married to JIR on Aug. 28. K4HDX, VVE and ZHV, of SCN, are new ORS. The DX RC of Camden held a picnic at Kershaw State Park Aug. 28. K4JPT was very busy publicizing the affair on the phone net. The Rock Hill ARC has made elaborate plans and preparations for the annual hamfest to be held at Joslin Park Oct. 9. On Oct. 8, prior to this hamfest, a supper meeting will be held of League Officials, net managers, NCSs and net members to coordinate and discuss net activities in the State; also to have reports on c.d. and RACES, which are under the direction of K4AI. UMW, business manager of Scarab has a new rig on the air. Traffic: K4ZHV 262, HDX 110, AVU 76, W4VIW 18.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—SEC: K4MJZ. PAM: BGP. RMs: K4JKK, K4KNP, SHJ, K4QER, K4EZZ and QDY. Your SCM attended the Graveyard Net Picnic on July 10 and the Fifth Annual Roanoke Hamfest on July 23 and 24 but missed the VFN Picnic at Bonney Lake on July 31. The VFN elected K4DCN as manager and K4LTO as asst. for the next

(Continued on page 138)

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PL-4E27A



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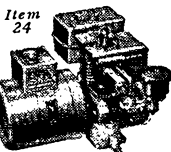
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season. BGP, the former manager, is doing two weeks of active duty at Ft. Belvoir. The brand-new Norfolk AREC had an outstanding drill on July 17; one dozen stations took part. The Tidewater Mobile Radio Club's Sunday transmitter hunts on 3835 kc. are open to every mobile in the area, according to K4LPR, our OPS and OO. EEU now is modifying his G4ZU beam. CXQ says "Traffic 147 this month and all I did was check in one night to ask K4JJK for a date with his sister." OOL reports that KN4WHJ dropped the "N" from his call. Pete also says the CD Party was FB and he worked both A1 and A3. K4QIX and PNK both have new QTHs. Larry says, "Mobilizing and hamfests are taking their toll of traffic time." Rog is not satisfied with his "low-flying antenna system" after a CD workout. K4DOR reports much MARS activity and keeps up a busy gas station, also. K4IIP is slowed down by a transfer to Richmond—he is home only once a week. K4ELG, a former top-scoring traficker, complains about his low score but work comes first. PVA, from Manassas, is in the same boat. Hi. July usually is the low month of activity but the section as a whole has a healthy look. OO reports were received from BGP and K4LPR; OES from K4EUS. Traffic: (July) W4QDY 219, SEJX 208, ZMH 205, CXQ 147, OOL 142, K4MXF 91, SHX 61, SGQ 57, FSS 38, W4DVT 28, BGP 26, K4SNS 21, W4AAD 19, K4IIP 14, W4OWV 12, ATQ 11, PRO 9, PNK/4 8, K4LPR 5, ELG 2, FMS 2. (June) K4SNS 16. (May) K4IIP 6.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—GIU has been appointed EC for Randolph County. K8GAP increased power to 800 watts on 3890 kc. and reports a new club is being organized in his area. KN8VIP received his license as a result of the East River ARC code and theory classes. MLX is now mobile with Gonset Twins. K4CQA/8 worked VR2DK on 7 Mc. with 75 watts to an indoor antenna. K8CSG has 60 watts on 8 meters and is very active in Kanawha County emergency work. K8JLF has finished the 150-watt rig and reports that KN8MBH, now K4THQ/5, is in the Air Force in Mississippi. The Huntington Weather Net meets at 1900 each Mon. on 50.55 Mc. K8HID, c.w. net manager, reports stations up 60 per cent and a 4 per cent increase in traffic. K8BIT now is operating RTTY. K8AEN worked EL4A on 7 Mc. K8JSX reports K8SQH, K8EYS and K8QMU are on 50 Mc. in the Kanawha Valley with activity high. K8PJC wonders if he is the youngest General in W. Va. NYH is active in phone net traffic work. The Blennerhasset ARC held a very successful picnic at Parkersburg July 31. K8PCF is active on 6 meters from Parkersburg. K8BLR is back on v.h.f. from a new QTH in St. Mary's. DPT and GAD are on 144 Mc. trying to work Kanawha Valley from Fairmont. Traffic: K8HID 33, W8NYH 28, K8JLF 18, CSG 7, W8ELX 6, K8JSX 4, PJC 2.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Carl L. Smith, W0BWJ—Asst. SCM: Howard S. Eldridge, K6DCW. SEC: NIT. RMs: WME and MYB. PAMs: CXW and IJR. OBS: DCC. A new RM was appointed July 17 at the DRC Hamfest Traffic Meeting. He is MYB, replacing K8EDK, whose resignation was accepted under protest. The DRC Hamfest was a huge success, with W8ESP winning the Collins 75S-1 and AJH the Hallcrafters TO keyer. A tip of the hat to IA, who has been the NCS for the Colorado WX Net each day, Mon. through Sat. for so many consecutive years. It was rather discouraging for Colorado traffic-handlers to be so ignored by the group at K8BSA during the Scout Jamboree. Seems that the use of the NTS was unheard of, at least on a section level. AREC membership in Colorado has been growing lately because of the able work of NIT, our SEC, and the following ECs: W8s DQN, DWE, GDC, QKD, NUU, NVU, NVX, OMN, PGX, PXZ, SFS, SIN, YPS, VSM, YMP, K8s BOH, CEN, CEZ, COI, DXF, EGJ and PVN. A wonderful time was had by all participating hams at the International Pack Burro Race on July 31. Ham radio got a lot of fine publicity, both locally and nationally, from its coverage of this event. Congrats to WME on his new 100V. K8DNP has gone into the Navy, but his mother is soon to take over the r. f. output from Palmer Lake. Traffic: (July) K8EDH 371, W8KQD 265, K8EDK 259, W8WME 186, K6DCW 60, W8MYB 58, K8TMM 46, QGO 24, EVG 13, W8CBI 3. (June) W8KQD 108.

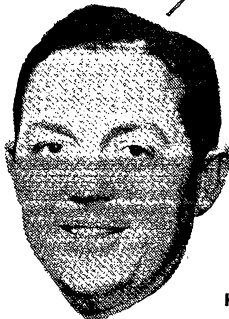
UTAH—SCM, Thomas H. Miller, W7QWH—Asst. SCM: John H. Sampson, OCX. SEC (acting): QWH. RM: OCX. V.H.F. PAM: SP. There are quite a few appointments to be filled. If you are interested in one, please contact the SCM. The UARC (Salt Lake) had its annual hamfest in Parley's Canyon. K7DVT won a v.h.f. receiver. K7CUB won a 75-watt transmitter kit. K7BDX has asked to be relieved of her duties as NCS on BUN. Arline has done a real fine job. Thanks for a job well
(Continued on page 138)

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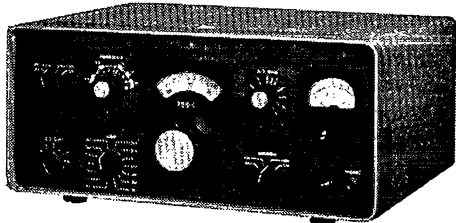
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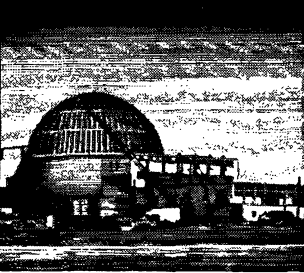
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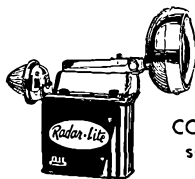
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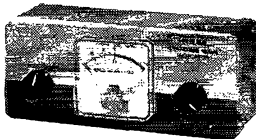
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done. The time has come to nominate for division director and vice-director. See QST for information. Please send any news you may have to the SCM. BUN is doing pretty well despite the bad summer conditions. Traffic: W7OCX 223, QVH 2.

FIRST UTAH QSO PARTY

October 1 and 2

The Utah Amateur Radio Club is sponsoring the first Utah QSO Party so that amateurs the world over may have a chance to work a "rare" Utah station.

This is not a contest but an attempt to have as many amateurs from Utah on the air as possible so that many stations may complete their WAS. Starting time is 1800 MST October 1 to 2359 MST Oct. 2 (0100 GMT Oct. 2 to 0659 Oct. 3). All QSL cards must be sent to station contacted.

NEW MEXICO—SCM, Newell F. Greene, K5IQL—Asst. SCM: Carl W. Franz, 5ZHN. SEC: CIN. PAM: ZU. 10-meter PAM: LQM. V.H.F. PAM: FPB. RM: ZHN. Until Oct. 1, the Breakfast Club will meet Mon. through Sat. at 0630 MST on 3838 kc. The NMEPN meets Sun. at 0700, Tue. and Thur. at 1800. The NMBP meets Mon., Wed. and Fri. at 1900 MST on 7060 kc. The TWN meets daily at 2000 on 7060 kc. ZUV/M, with members of the Grotto Club, were exploring caves when they spotted a forest fire in the hills. NMEPN was convening at the time, so the information was quickly relayed to authorities. The Sun. session of the NMEPN has an average QNI of 25 per session covering a vast area. Mobiles in any part of the section can be heard and boosted in, if necessary. K5TQP, working hard to get established on 144 Mc. in New Mexico, now has a 100-ft. tower at home and a 70-ft. tower at his mountain location. Traffic: W5ZHN 464, K5GOJ 63, IPK 41, W5UBW 11, K5DAB 8, RHR 8, LWN 7, DAA 5, W5VC 3. CIN 1.

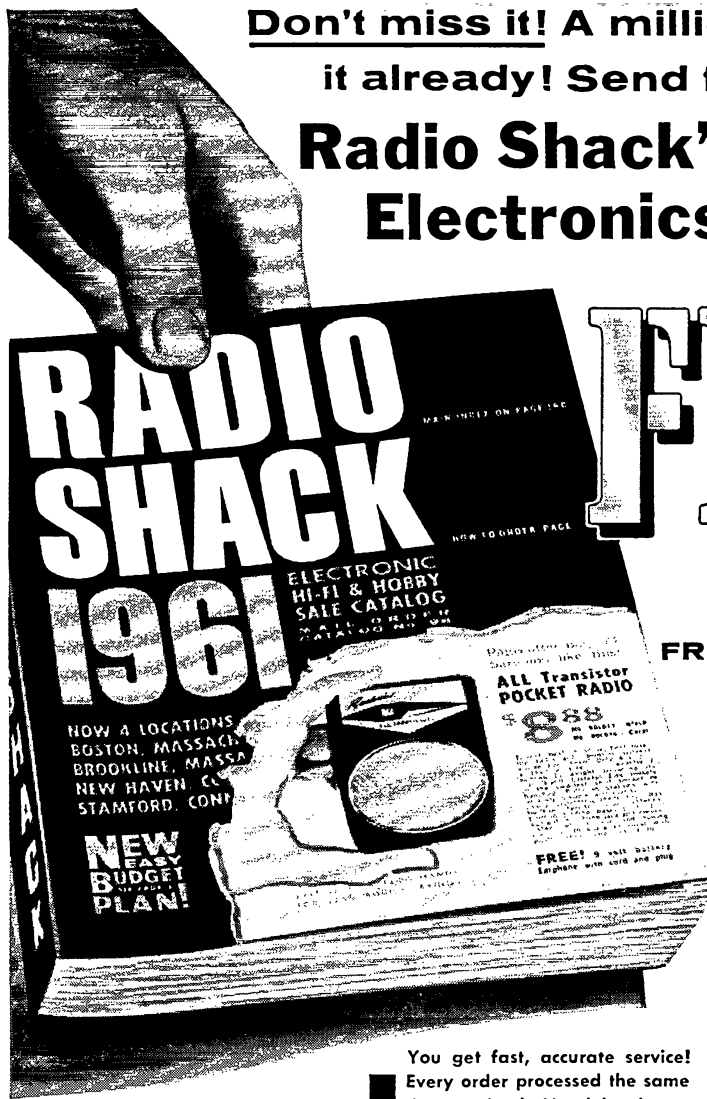
WYOMING—SCM, Lial D. Branson, W7AMU—SEC: CQL. The Pony Express Net meets Sun. at 0800 MST on 3920 kc.; the Wyoming Jackalope Net meets Mon. through Fri. at 1200 MST on 7255 kc. for traffic. The YO Net is a c.w. net on Mon., Wed. and Fri. at 1830 MST on 3610 kc. There was a large turnout at the Wyoming Hamfest July 16 and 17 at the Pines Lodge, west of Buffalo. Several out-of-State hams attended, including 9FM, of Illinois, and his XYL. ARRL Rocky Mountain Division Director IC was present and gave a very nice talk during the banquet. He also demonstrated how to send c.w. on the hot seat key. The Casper Radio Club held a very nice Field Day on top of Casper Mountain using the club call VNJ and made a large score, using the club's stand-by light plant. Traffic: W7BHH 12, ABO 6, AMU 5, HH 4, K7GMD 3, LIL 3, W7LQK 3, CQX 2, K7IAY 2, JLO 2, W7HHW 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William D. Dotherow, K4AOZ—SEC: JDA. RMs: RLG and OCV. PAMs: PHH, BTO and JJK. AUP would like to hear from anyone interested in reactivating the Alabama QSO Parties. GYW has a new Gonset KW linear amplifier. Congrats to DFE on appointment as RACES Officer for Jefferson County. K4PHH would like all CD appointees to join in on the CD Parties. K4GOW reports that much traffic is being passed without a check. If it's worth sending, it's worth a "check"! K4IWI is back from two weeks at Fort Bragg on Army Reserve duty. BTO changed the mobile from 6 to 12 volts. AYU has moved to Virginia. K4HJM reports two more AREC mobiles in Anniston. Welcome to AENB K4AOZ, K4JSO Decatur, K4UFL Piedmont, K4SAV and RLG were highest QNI on AENB in July. MLU is in Oklahoma for the summer. K4CZK and K4SAV invite all stations with traffic to check in to AENT on 3905 kc. at 1630 CST daily. PTR scored 82,700 points in the recent C.W. CD Party and reports moving to Boston. K4KJD reports that KN4WO and KN4ZGB are new hams in Athens. K4AUP reports that VYI and his family moved to California. RQS now is sporting a Collins KWM-2, a 30S-1, a 312B-5 and a CE MM-2 scope. PKA, EC, reports new officers of the Decatur ARC are K4JSL, pres.; KN4VHW, vice-pres.; K4SMF, secy.; BFM, treas.; K4UEC and BFM, asst. ECs. K4UEE has moved to KR-Land and says, "Thanks, everyone, for a wonderful stay in K4-Land." K4RJM now is at Georgia Tech. *Six Meter News*: JJK reports a new v.h.f. emergency net, AENY, with members in Mont-

(Continued on page 140)

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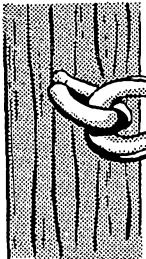
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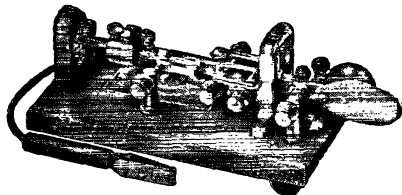
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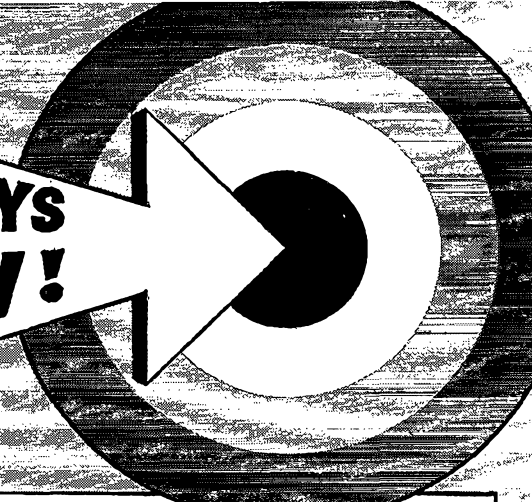
gomery, Clanton, Selma, Talladega, Troy, Childersburg and Prattville. The manager is IRT and the net meets Tue. and Fri. at 8 p.m. on 50.250 Mc. NCSs will be K4ZXA and IRT. A commendable fact noted at the organizational meeting was that 7 of the 11 present had General Class licenses. K4EPM and CIN hold daily skeds with Marietta, Ga., and Atlanta stations for propagation checks. MWF, K4KAM, ZUP, K4CNA and VYI now are on 6 meters. K4UMD has a new Elmac AF-68 and is NCS on AENO Mon. nights. K4MEQ has 30 states confirmed on 6 meters. CIN is building an s.s.b. rig for 6 meters. K4YGS is building a 6- and 2-meter rig. K4JSP installed a 30-watt home-brew mobile rig in the car. Traffic: (July) W4RLG 157, K4PFM 115. SAV 109, W4PTR 81, KIX 30, PVG 30, CIU 27, K4AOZ 26, PHH 26, CZK 22, W4MI 21, ZRQ 18, K4JDA 17, UEE 16, AAU 15, BTO 14, BFT 12, HVN 11, GOW 10, HJM 9, W4DGH 7, K4AAQ 6, W4VHW 6, K4HFH 5, UMD 5, TDJ 4, ZBX 4, ZNI 4, RIL 2, YGS 2, YTR 2, RIX 1. (June) K4UEE 51, W4PVG 30, K4RJM 27, HVN 9, RSB 7, YGS 7, W4JJX 2, K4MEQ 2, UMD 2. (May) K4UEE 19, RSB 12.

EASTERN FLORIDA—SCM, John F. Porter, W4KJGJ—SEC: IYI. RM: K4SJH. PAM: SDR, V.H.F. PAM: RMU. New officers of the Tampa ARC are K4LML, pres.; GMJ, vice-pres.; K4EQH, secy.; CI, treas.; DDM, GLZ, KRC, Turrentine and Wilkerson, directors. The Hillsborough County AREC/RACES group was on the job during the floods in and around the Tampa Bay Area. This organization has come a long way under the able leadership of K4YOQ, EC and Radio Officer. K4SJH, our RM, is responsible for quite a bit of traffic on our nets during July. He ham operated from the Boy Scout Camp at Sebring from the 24th to the 30th, handling over 187 pieces. Some of the many that helped to get the traffic on its way were LDF, ZPO, AKB, CNZ, NDJ, AHZ and K4s BLM, TDT, EHV, JZJ and LQS. Thanks also to the net control stations for their fine cooperation. The Broward ARC participated in Gold Coast Marathon again this year. K4RNS received the second Certificate Hunters Club certificate given to a YL. This makes 31 for Marge. Net manager of the Florida Sidebenders is CNZ. With all the new mobiles on the road these days we should have one of the best set-ups for emergency communications in the South. How about some of you new amateurs with gear signing up with your local AREC organization and giving them a helping hand? After all, fellows, amateur radio exists as a hobby because of its service rendered in times of disaster when all other means of communications fail. Ragchewing is fine but a percentage of your time should be devoted to some sort of public service. There is no better place than in the AREC and RACES. We had one BPLR this month and a total traffic of 2535. Traffic: (July) K4SDR 657, LCF 239, KDN 230, LCD 185, BV 180, W4SDRH 164, AKB 163, K4EHY 125, TDT 85, W4GJI 58, TRS 57, K4DBT 46, MTP 45, W4CNZ 42, K4DAX 39, BOO 37, YOQ 35, W4EHW 33, K4AKQ 32, RNS 32, ODS 23, W4EAT 14, SGY 14. (June) W4JRJ 28.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: HKK, PAM: K4RZF, RM: UBR, Field Day in N. W. Florida found clubs from Tallahassee (YUU), Panama City (K4FDS), Pensacola (K4ALI), Eglin AFB (SRX) and Thomasville, Ga. (UCJ) operating. The PCARC had the most contacts, but the TARC had the high score. Steinhatchee: UZB is the new EC for Dixie County. Perry: KQP and K4FTG arranged for your SCM to visit a number of hams while in town, including ZWY and K4NJH. Tallahassee: TDT is in school at F.S.U. K4PVU, CHZ and YUU have left for college. MXE is finishing a new transmitter. K9EDJ is the A.P. teletype maintenance man for the North Florida Area. CMG has moved here from Georgia and lives next door to K4VLE. MLE made WAS 50 between Apr. 1 and May 17. Quincy: 5YMO has moved here to work for a gas pipeline outfit. Marianna: K4TTY, AIA, K4CDU, PHV, RIH, RZE, SZH and K4ZTQ are active on 10-meter phone. Madison: PBO will be on 6 meters soon. KN4VOK has received his ticket but is moving to Kansas. Defuniak: HQN's XYL received the call OSD. Eglin AFB: Local hams are taking part in several drills conducted by Air Force and county c.d. officials. Gulf Breeze: K4ZMV is now ORS and OBS. Pensacola: *Parasitics* has gone high class, with photos and a new format. K4SWQ and editor K4SMB hope to expand the mailing list to all of Western Florida. Traffic: (July) K4CNY 358, UBR 149, W4MLE 71. (June) K4BSS/4 160.

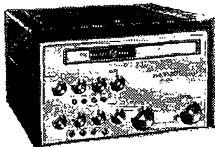
WEST INDIES—SCM, William Werner, KP4DJ—SEC: AAA, ATK, Ramey AFB, joined the AREC. KL7CQL/KP4 is on s.s.b. from Urb. Universidad with a 10A plus linear. Drake 2A and a Tribander beam. AAA, in the same neighborhood, has a new HQ-170. AAN's 50-Mc. antenna has 20 elements on a 36-ft. (Continued on page 142)

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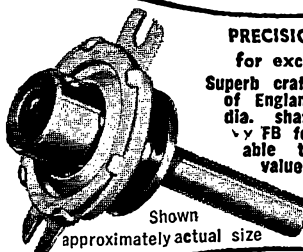
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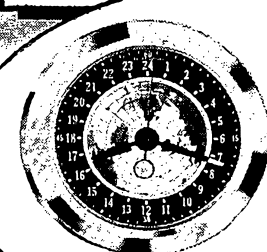
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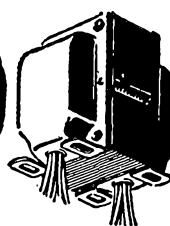
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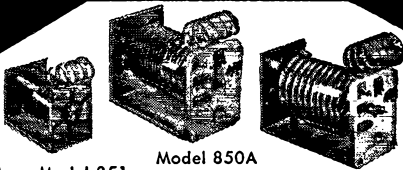
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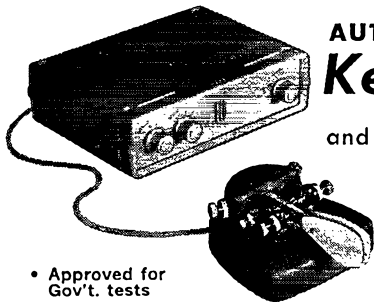
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boom 60 feet high. AAN has a G50, a G66 and a 51J-RME converter combination. AVB has a Heath Sixer in the Volkswagon using a Saturn Halo antenna. DJ worked 25 KP4 stations and two K4s in Miami in two weeks on 6 meters with a Heath Sixer. CA, CK, AAB, ACH and AOD have ordered Heath Sixers. AAB will use a Heath Sixer in the car and plans a Saturn Halo atop a tall building for 6 and 2 meters. AVB, AAB and DJ have Sixers crystal-controlled on 50.125, 50.150 and 50.130 Mc., respectively. The PRARC is purchasing two Heath Sixers with vibrator power supplies and Saturn Halo antennas to be loaned to club members to stimulate 6-meter interest and to provide two mobile units for emergency operation. These will be raffled off at the Annual Hamfest/Election. W2DVT/KP4 operated on 6 meters while on vacation here. DJ is building a 50-Mc. six-element beam on a 24-ft. boom. ALX, ALL and ART are on 50 Mc. from Arcibo, AMJ from Vega Baja and AHF from Manati. CK rearranged the equipment in the shack and wound up with only the 6-meter gear working. ALY has 50 confirmed on 50 Mc. for the WPR-50 Award. AIS is building an 813 linear for h.f. and uses a Seneca on v.h.f. AEA uses a Challenger and an HQ-170 with an eight-element beam on 50 Mc. ASN is on 6 meters with a TBS-50 and a five-element beam. Old-timer AY is back on 20, 40 and 6 meters with a Globe Scout Deluxe, an HQ-170 and a Telrex six-element beam for 50 Mc. Old-timer CU built a 6-meter rig for his daughter which he now uses. JM ordered a CE 100V. AMU, our very efficient OO, has transferred to the States. AWT, a new ham in Bayamon, is planning 6-meter operation. CO2XZ, Havana, is testing with CK, AAN and ALD crossband 144 to 50 Mc. AVO is going mobile on 6 meters. SV swapped the Heath Sixer for a Conset G50. AVB ordered a PolyComm 6-2 v.h.f. transceiver. AMG is off to Bolivia to make a microwave survey for IT&T. AMG installed a mechanical filter in the 75A-2 and has assembled a kw. linear using 4-250A5. HZ is in a new QTH at Las Americas. K1ALR, ex-KP4FF, vacationed here before a 13-month tour of duty in Korea. ALR is a major in the Signal Corp. AAN, ALY and AOD, in Rio Piedras, each have emergency power plants and are close to State Civil Defense Hq. Civil Defense Director Mercado Reveron has been appointed to a new post by the Governor. DV accepted the job of editor of PRARC *Ground Wave*. DJ and HZ are planning a committee for the island-wide "Worked KP4 Contest" to be sponsored by the PRARC. Stations holding official appointments who do not return the questionnaire mailed to them will be cancelled. Active stations who are ARRL members are urged to apply for appointment as OO, ORS, OPS, OES or OBS. QSL Manager KD reminds KP4s expecting QSL cards via the bureau to file a self-addressed stamped envelope with him. Please report your activity to the SCM the first of each month. Traffic: KP4WT 63.

CANAL ZONE—SCM, Ralph E. Harvey, KZ5RV—After Field Day the amateur bands seemed to drop away to nothing in the tropics and from the few contacts with various amateurs the doldrums seem to be universal. Past observations show that the sun-spot cycle is on the wane and we can expect conditions to be very poor for the next several years. There have been several new additions to the ranks of the Canal Zone amateurs, among them Major General O'Connor, chief of staff, who has been active for over thirty years and now has a Canal Zone license. Also during the month of July a number of amateurs left the Canal Zone for new assignments. Among these were BS. US. AH, EM, KC, MN and TT. We hear by the grapevine that Bill Cobb, ex-KC, had a heart attack the day that he arrived at his new station. We hope that he is well on the road to recovery by the time this appears in print. At the July meeting of the CZARA KQ showed a movie of life in Newfoundland. All present enjoyed the show. Traffic: KZ5JW 101, UR 30, VR 21, CC 11, RM 6.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, jr., W6JQB—SEC: W6LIP. RMs: W6BHG and K6HLR. PAMs: W6BUK and W6ORS. The following stations earned BPL in July. W6ZJB, K6MCA, K6WAH, W6WPF, W6GYH and WA6EEO. Congrats, fellows! New officers of the San Gabriel Valley Radio Club are W6ZPM, pres.; W6ORS, 1st vice-pres.; K6VJT, 2nd vice-pres.; K6PFY, secy.; W6KXU, treas. Just heard that WA6AKS had another jr. operator! WA6DFT, operator at K6WAH, has a new Mohawk and an HT-32A. WA6EEO is recovering from eye surgery. Glad to have you back, Larry! The SoCal 6 Net did a bang-up job serving the Salvation Army Disaster Communications during the San Gabriel fire. New officers of the Downey Amateur Radio Club are K6MSL, pres.; K6CHQ, vice-pres.; K6ICQ, secy.; W6UPJ, treas. WA6DCF passed the radio-telephone 1st-class exam! W6EBK got the mobile rig installed in the new family chariot! W6NAA, WA6BFC,

(Continued on page 144)

NO TRAPS in the New Doublet Antennas

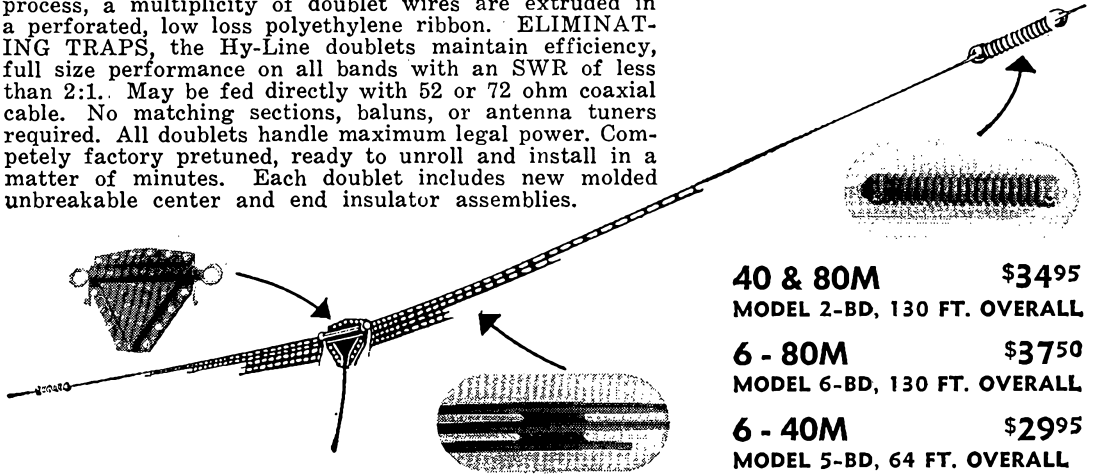


Says Leo I. Meyerson,
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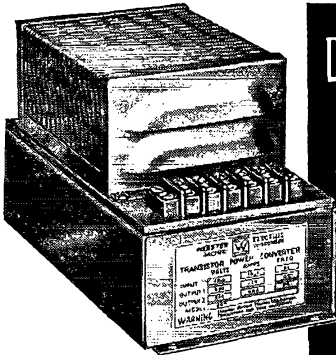
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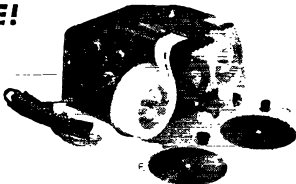
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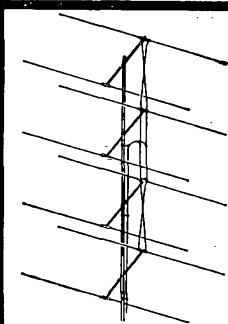
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K6SIX and many others did a wonderful job on the fire emergencies and the missing boy search. W6LRD has the new S-Line gear and received the DXCC Award. Congrats, Don! W6FB is moving to Palm Springs. K6LJY came out with "A" in summer school! K6GTG has a new twenty-element Spiralray beam on 2 meters! W6AM has returned from a nice trip through Russia. W6DWP hit 100 per cent attendance on SCN for the second month. Congrats, John! W6JOC has a new 40-ft. tower and a tri-band beam up. W6CIS is getting to stick around home for a few days! It is good to see W6CMN back among the reporters! Support your section nets: On phone: the SoCal 6 Net meeting at 1900 PDT on 50.4 Mc.; on c.w. the Southern California Net meeting at 1900 PDT on 3600 kc. Both nets are on daily. Traffic: (July) W6ZJB 1120, K6MCA 892, K6WAH 765, W6WPF 713, W6GYH 703, K6CLS/6 496, K6OZJ 274, W6EEO 225, W6BHG 159, W6BFC 65, K6JSD 62, K6TPL 58, W6DWP 26, W6JOC 24, K6SIX 21, W6BUK 16, K6PZM 14, W6CMN 13, W6CK 12, K6COP 8, W6ORS 7, W6CIS 6, W6HUC 5, W6NAA 5, W6AM 3, K6LJY 3, K6CDW 2, K6GTG 1. (June) W6EEO 212, K6ZJS 86, W6MLZ 40, K6JSD 29, K6TPL 23.

ARIZONA—SCM, Kenneth P. Cole, W7QZH—SEC: CAF. The Copper State Net meets at 1930 MST Mon. through Fri.; the Grand Canyon Net Sun. at 0800 on 7210 kc.; the Catalina Emergency Net Wed. at 2000 on 29.627 and 145.8 Mc.; the Tucson AREC Net Wed. at 1900 on 3880 kc. Three alerts kept Tucson fixed stations and mobile units busy in July. Working under the direction of Capt. Kenneth Sturgeon, and as an integral part of the Pima County Search and Rescue Unit, the Tucson group was called out on the 16th and again on the 22nd to search for children lost in the mountainous areas. Both children were found unharmed. On the 20th, in an all night effort, communications were furnished by these amateurs for fire-fighters battling a blaze in the Kitt Peak Area. LAD, Civil Defense Radio Officer for Pima County, has announced that a RACES plan for Pima County has been approved. LVR is net control for the northern half of the county; UVR is net control for the southern half of the county. The Copper State Net extends best wishes to AMN, who recently transferred to Saudi Arabia. Ray Meyers, Southwestern Division Director, visited amateurs in Phoenix, Tucson and Ft. Huachuca in July. New calls: K7MFD, Phoenix; K7JTS and K7JTT, Flagstaff. New equipment; K7AEW, a homebrew cubical quad. Traffic: W7AMM 40.

SAN DIEGO—SCM, Don Stansifer, W6LRU—WA6-KGK, in Fullerton, operated during a Scout-O-Rama in Orange County. The Orange County, RACES group is forming a club to be known as the Amateur Communications Club, so K6RCK reports. K6BTO has been able to get an APX-6 to operate on higher frequencies. W6HU, OO in Santa Ana, has been busy preparing for his daughter's marriage. W6CDD vacationed in W-land and Milwaukee and visited ex-K6EUE, of El Cajon, who is now K9DQW. The Fourth Annual South Bay Amateur Radio Society potluck was held in August. Those visiting from the Tijuana Radio Club were XE2S, AJ, KE, OO and OP. Ex-member K3JYZ (ex-K6BCG also was present. W6AIVB is building a new 813 amplifier. W6CAE vacationed in Northern California during August. W6AFJD has moved to the top of Pt. Loma, a choice DX spot. W6BUX spent August in the High Sierra fishing and hiking. W6FAY was at the July meeting of the San Diego DX Club, held at the home of W6RCD. W6JH and his wife left in mid-August by jet for an extended vacation in Europe. W6NXP vacationed in Oregon. W6BKZ vacationed in New York City. Traffic: W6YDK 1814, K6BPI 1057, W6CDD 759, K6LKD 296, WA6ATB 151.

SANTA BARBARA—SCM, Robert A. Hemke, K6-CVR—There are more openings for League appointments. Let your SCM know and the appointment will be considered. Two-meter activity is picking up. W9KLR/0 is operating from Orcutt. K4RFP/6 and W8PMO/6 are operating out of Santa Maria. K6VDW is on daily at 2030 on 145.8 Mc. He has gear stations from Long Beach, which is all right from Grove City. New calls in the Santa Barbara Area are W66MBQ, W66MCW, W66JGM, W66MCT, W66JAR, W66IUI, W66HGV and W66FGV. K6VWJ traded in his Conditional for a General Class ticket. W6HUT and K6ODE have some 420-Mc. equipment to experiment with. Anyone else interested, let W6HUT know. K6AQB/6 changed his QTH to Santa Barbara and is on 15 and 40 meters with a Globe Scout transmitter. W6IHD has a new twin 8 antenna on 2 meters, plus a BC-6400 transmitter with 100 watts input. The Arroyo Grande Area amateurs named their club "RADIO," which means Radio Amateur Designers, Inventors and Operators. Traffic: K6VDW 4.

(Continued on page 146)

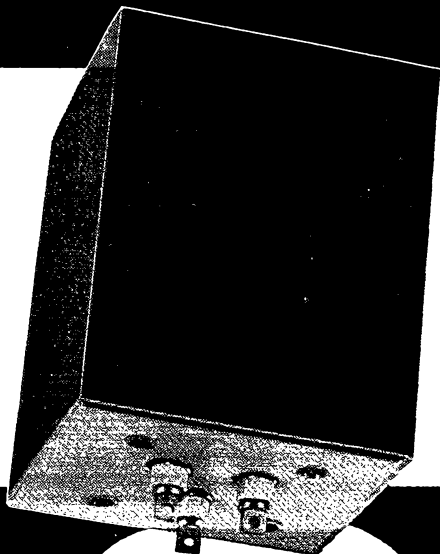
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WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, 5NFO, SEC: K5AEX, PAM: BOO. RM: LR. Brownfield seems determined to stay in the news headlines, even the hard way. This time it was an explosion in a large grain elevator. This was the second large explosion in less than two years and as usual Brownfield amateurs were prepared to render assistance. NFO and K5GEC furnished emergency power plants to light the disaster area until local power was restored. K5EDJ, of Farwell, Tex., moved 200 yards west and is now a 1/5 in New Mexico. Little League ball and vacations are taking a toll in club attendance and other activities all over the section. Because of an increase in membership the North Texas Emergency Net now meets at 0730 on 3930 kc. instead of 0800. LGI is the new net manager for NTN. KCQ was a visitor from Omaha and advised he expects to get his 8 call soon. K3GKV, ex-K5ASZ, brought his family back to Ft. Worth for a short visit and son Rickie was bitten by a rattlesnake. Thanks to quick action there were no ill effects. Ft. Worth mobiles have come up with a new pastime; all mobiles assemble at one place and get several fixed stations in various parts of town to give them signal strength readings as the mobile operators adjust rigs or antennas. It is very interesting and enlightening. Traffic: W5BKH 158, ACK 126, K5BKH 113, W5AYX 51, K5HTM 41, W5ASA 16. K5SXX 7. PVV 1.

OKLAHOMA—SCM, Adrian V. Rea, W5DRZ—K5IBZ is a new ORS and K5OOV is a new OPS. The Okmulgee Club has a good group, active in AREC and RACES. and with a good activity program. K5MDH is the capable president. An interesting account in the *Collector and Emitter*, club paper of the Aeronautical Club of Oklahoma City, tells of K5JEA's experience in getting into Alaska with an emergency message. This is just another example of what radio amateurs can and will do. Thanks to K5UND for a newsy letter concerning the activities of the Jackson County Amateur Radio Club. New officers of the Muskogee Club are K5BPY, pres.; WAX, vice-pres.; KN5ADX, secy.-treas.; K5PRW, act. mgr. The July windstorm that swept through the State destroyed quite a number of antennas. Among the biggest losses were the antennas of DNG and EHC, who lost three. Glad to hear K5IXS, K5HFW, K0OVD/5 and AHD checking into the traffic nets. Official Bulletin Stations in all parts of Oklahoma transmit ARRL Official Bulletins regularly using all bands and all modes of transmission. Listen to the Official Bulletin every week. Traffic: K5IBZ 231, JGZ 172, W5OOF 147, K5DUJ 118, CAT 104, TAJ 104, CAY 93, W5DRZ 86, K5QEF 69, DLP 55, W5WAX 43, K5AUX 41, OOV 37, RLG 36, CBA 29, W5WAF 27, K5LUR 21, JOA 20, W5KY 18, CCK 15, K5DJA 14, W5MFX 12, K5LZF 10, W5WDD 9, K5EZM 6, W5ADB 5, K5REH 3, W5VLW 3.

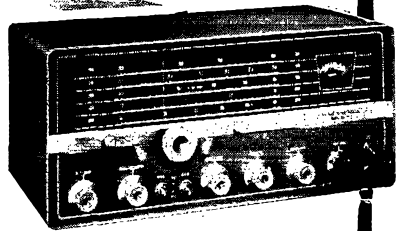
CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. D. Solomon, VE1OC, and H. C. Hillyard, VO1CZ. SEC: BL. The 3rd World Scouting-Jamboree-on-the-Air will be held the week end of Oct. 21-23. Here is an opportunity to assist the Boy Scout groups in your area by letting them participate from your station. Why not contact local Scout Leaders for more information? Don't forget the Worked All Nova Scotia Award. Many Nova Scotia amateurs have been making DXpeditions to counties with little or no amateur activities to assist those who are working on their WNAS certificate. DB has moved to a new QTH. W9QNI/VO2 has been transferred to South Carolina and will be looking for VEs and VOs on 75 meters. Apologies for the short column this month. The writer has moved to a new QTH with the address changed to Harvey Station, N. B. Traffic: VE1OM 85, ADH 49, W9QNI/VO2 29.

ONTARIO—SCM, Richard W. Roberts, VE3NG—We have noticed with great satisfaction the many additional mobiles that are appearing each week. May we congratulate BZB, of Peterboro, on his recent appointment as manager of the ECN. OE is doing FB as OBS on s.s.b. RW has become a Silent Key. The Algoma RC had an FB Field Day turnout. The London Club members were hot-shots at Field Day. The v.h.f. boys had a dandy do in June at Toronto. WIHQ was the guest. The Ontario Amateur Radio Assn. voted A. Page, pres.; T. Hunter, vice-pres.; A. Mean, secy.; W. Choat, asst. secy.; A. Benson, treas.; R. Parry, 2nd vice-pres. The Sarnia ARC had an FB article on safety in its bulletin. (Copies on request to its secretary.) The Hamilton ARC knocked them dead on Field Day. IB is recovering very rapidly and expects to be on the air soon. ADD, NG, DTO, LI, AQL, OE, ARF, ELC, DSM and CO are among the many on mobile these summer days. AEJ is

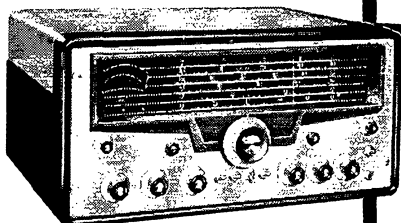
(Continued on page 148)

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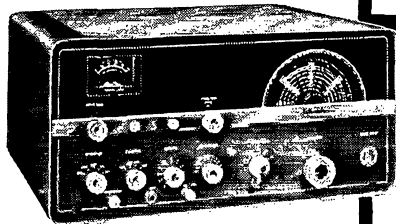
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vacationing in Eastern Ontario and W1-Land. DXZ is vacationing at Port Severn. CPR also is in the same area. DVG now is in the Rexdale Area near Toronto. DAR is going s.s.b. RG has an Apache. OE is RTTY, as is TL, BAD and TV. The Goderich gang held an FB picnic. Members of the Grey-Bruce Net were present. AUU and BZB were at Outlet Lake. Visitors were AIL and BAQ. AOE is a bee-keeper. CWA is a new net member on the ECN. IOM was a guest of BZB and AUU. He is a former SCM of the Maritime section. Boys to the east of Belleville are quiet this summer. Ottawa mobiles are busy at their cottages. *Correction:* In Aug. QST CMR was noted as rec. secy. of the Nortown ARC. This should have read CRM. Our apologies to both gentlemen. Traffic: VE3CWA 266, NG 91, BZB 85, AIL 78, DPO 73, AUU 65, BUR 51, BAQ 49, NO 27, CFR 25, EAM 25, DZA 20, OE 20, DWN 19, DTO 18, DXZ 16, KM 13, DH 5, ELC 3.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—BK, while holidaying in U. K., held the call G3OGA and contacted AEL on s.s.b. This year the Boy Scouts again are holding a Jamboree with Hq. station VE3JAM at Ottawa. Join them by calling "CQ Jamboree." Dates: Oct. 22 and 23. Frequencies 3750, 7100, 14,175, 21,250 and 28,450. BK is the Quebec Coordinator and will be glad to supply further information. QC, back from Europe, reports he is World Representative for the International Ham Hop Club with headquarters in U. K. This organization promotes international friendship and arranges cost-free holiday lodgings for hams travelling in Europe. Following are the graduates from the 2nd C.J.O. code classes: BFR, BFP, BEZ, ASC, BER, BDZ, BDU and BDF. A new class started Sept. 24 and will comprise a 6-month course in code, theory and law. EA is "Centre des Experimentateurs Amateurs de V.H.F.," active on 144 Mc. during contests. Had the pleasure of meeting G500 (YU's father) at the Lakeshore Club meeting. Other DX visitors to VE2 were DL6QH and SM5CZF. TA is back on the air after a long absence and uses an HT-4 and an AR-88. BCR, at Landrienne, enjoys his DX-40 and Knight R-100 receiver. BCE had a pleasant trip to VE5-Land, where she met 5QM, another lady operator. The first report was received from W7QMU/VE8, who will stay at Cape Christian, Baffin Isl. for the next 11 months. AFU and AMA have joined the enthusiastic Three Rivers 2-meter gang. WA's three-element beam is being manufactured at the rate of one element per year. Traffic: W7QMU/VE8 92, VE2DR 47, EC 10.

MANITOBA—SCM, M. S. Watson, VE4JY—The Flin Flon RC reported a successful Field Day was held north of the 54th. Attendance was 20. The following Manitoba amateurs attended the Regina Hamfest; MN, KP and KN. Preparations are being made to cooperate with the Boy Scouts in their On-the-Air Jamboree Oct. 21 to 23. Instructions are to call CQ Jamboree. The International Bureau of Boy Scouts will operate a station at Ottawa under the call VE3JAM. BG has the dope on the 20-meter cubicle quad. GV, IW, DQ, PX, JQ, HP, KN, SQ and MN made the headlines in the recent copy of RF. The Manitoba Hamfest was held at Brandon Sept. 3 and 4. Traffic: VE4CB 44, PE 32, QD 10, A1 7, AN 6, GB 2.

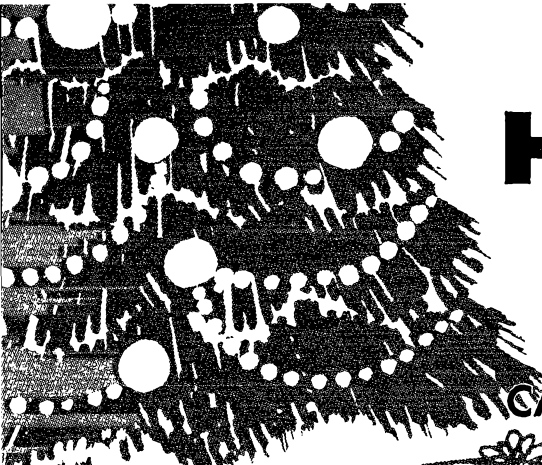
SASKATCHEWAN—SCM, H. R. Horn, VE5HR—Congratulations to the Regina Amateur Radio Association on a successful hamfest. MS won the Gus Cox Memorial C.W. Award again. RE took the CKBI Trophy event. EG and TI were the oldest and youngest hams, by license, attending. 7AZ came from the farthest point. LQ was first in the transmitter hunt. A new trophy, donated by CM, was won by LU for the best overall active amateur. This is a yearly award. YY, the XYL of XX, was the youngest licensed XYL attending. It was decided that Prince Albert would be the host club next year. QC was elected president of the Saskatchewan Amateur Radio League. OF was named vice-president. Let's all get behind Mel and Cliff and give the SARL our complete support when the election for directors is called. AG and DB are new mobiles heard on 75 meters. QC and HQ were the only VE8s attending the Appar, Mont., Hamfest. Saskatoon hams supplying communications for the Annual Travellers Day Parade during Exhibition Week were QC, XP, CU, HQ, CJ, MI, HR, MN and LM. Congratulations to QC and his XYL on the arrival of a YL jr. operator. TH and his family vacationed at Flathead Lake, Mont., but he found contacts poor on his mobile. Traffic: VE5HQ 140, LM 130. QST

Meter Reading by Sound

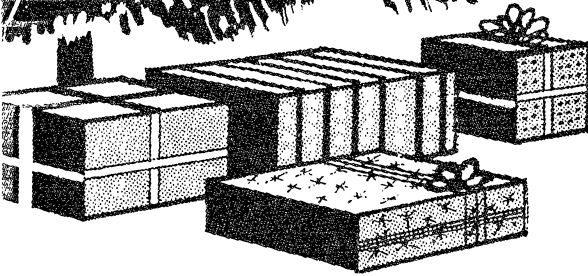
(Continued from page 15)

The unit may be used with high-current meters (ammeters) if they are of the type having basic

(Continued on page 150)

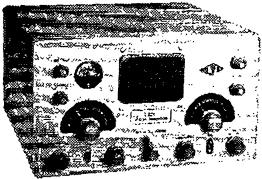


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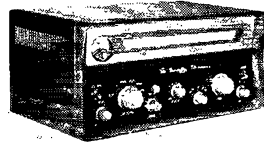
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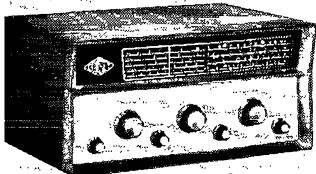
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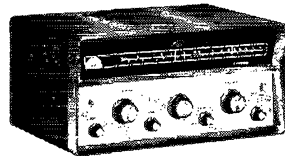
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See Page 173

movements of 50 ma. or so with internal or external shunts. However, many ammeters are of the unshunted type with relatively high internal resistances. The voltage drop across meters of this type may be great enough to temporarily paralyze the 2N229. The reader should not be used with meters of this type. **Q57-**

Coaxial Feedlines

(Continued from page 21)

feed through of this sort tends to degrade the front-to-side or front-to-back ratio of a beam antenna on reception. By using a somewhat more complicated switching circuit, we could short out or ground unused antennas, and this should help matters. The reader is invited to try this approach, and the author suggests the Centralab switch deck type FFD for the necessary contact arrangement.

Briefly, to make your own coaxial switches, you should first figure out the minimum circuit which will do the job, then build it in a small metal box with the proper coaxial jacks, other connectors and switch.

A word of caution — don't try to switch antennas with the power on. Even with low power, the switch contacts will probably burn right off. This does not apply to switching while receiving, and it is very interesting to note the signal variations that show up, particularly between vertically and horizontally polarized antennas. Try switching your antennas; it's a real help in operating. **Q57-**

Screen Protection and More

(Continued from page 22)

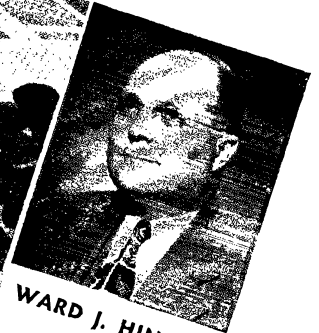
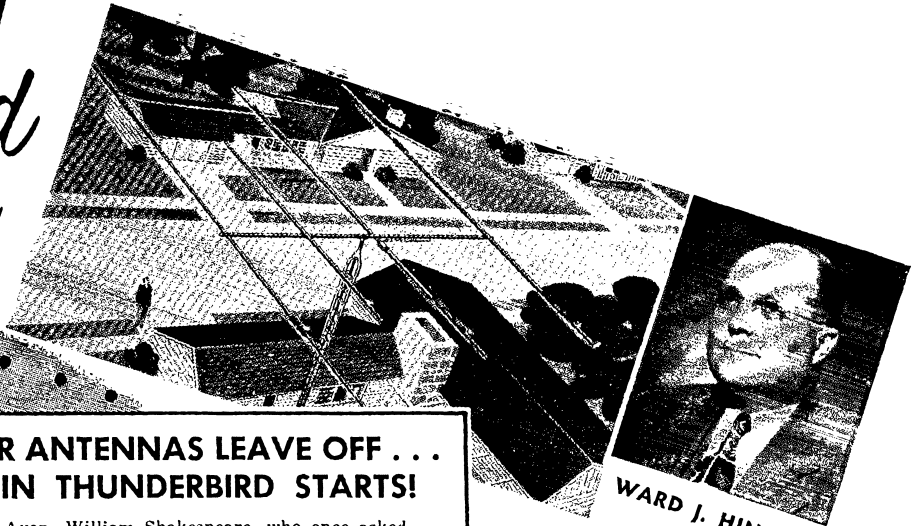
current which will actuate the relay somewhere south of the maximum screen dissipation rating of the tube. The meter shunt formula in the *Handbook* will help determine an approximate value for the setting of R_1 . Then an exact adjustment can be made with the rig fired up.

K_2 is a two-coil relay with a latching mechanism. A momentary pulse to one coil will transfer the contacts, and a pulse to the second coil will return them. The double-throw contacts on K_2 are each rated at 10 amp. with 115 volts and a resistive load. With the two sets of contacts of the reset section connected in parallel, the relay will handle low-power transmitters directly. In high-power applications, the contacts should control a power relay in the main supply line. The holding section contacts should not be paralleled with those of the reset section because of time lag, but they may be used to control auxiliary equipment, indicator lamps, etc. If arcing at the contacts is excessive, external arc suppression is recommended. See the *Handbook* under key clicks.

As with all your equipment, normal precautions should be exercised in installing the relays. Mounting should be such that the contacts are in a vertical plane so dust particles will pass through

(Continued on page 162)

A
Word
from
Ward



WARD J. HINKLE

**WHERE OTHER ANTENNAS LEAVE OFF . . .
THE HY-GAIN THUNDERBIRD STARTS!**

It was the Bard of Avon, William Shakespeare, who once asked the question: "What's in a name?"

And talking about names, I wish I knew why the Hy-Gain people decided to call their magnificent 4-element tribander antenna the "Thunderbird."

Actually, there never was such an animal as the thunderbird! It was a wholly imaginary bird, dreamed up by the people of ancient mythology—to personify and indicate thunder itself!

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The Hy-Gain company, you know, has the reputation of being "The World's Largest Manufacturer of Amateur Communication Antennas." Now, I admit I haven't compared their production to the output of every other antenna manufacturer from here to Timbuctoo. But I've done business with those Hy-Gain folks long enough to know that they wouldn't make a statement like that if they couldn't back it up.

And back it up they do. Let me give you one example of how that Hy-Gain company operates. You are probably aware that the Hy-Gain Slim-Trap, the only solid state trap system, is an integral part of every Thunderbird tribander and vertical antenna. Well, sir, even before Hy-Gain put that unit on the market, they wanted to be good and sure it would deliver the goods under all conditions. What did they do?

To check its resistance to shock, they conducted vibration tests according to Military standards, placing the trap in three different mountings, and making it undergo vibrations from 10 to 55 cps.!

Temperature cycling? That trap had a baptism of ice and fire that ranged from -60° all the way to 250° F.

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After all these tests were completed, here's the report as it came from the lab:

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As I said earlier, I don't know if Hy-Gain manufactures the most antennas—but sure as shootin', they manufacture the best!

I'll be proud to send you some special literature Hy-Gain made up for us on their antennas. Write for it today.

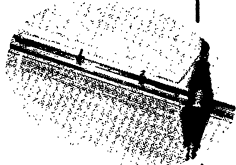
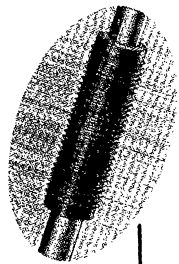
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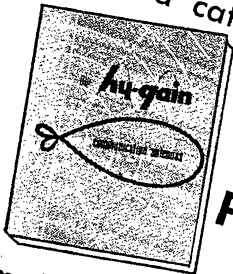
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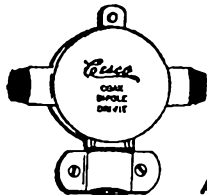
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rather than deposit on the contacts. If voltages in excess of 500 or so are involved, the relays should be mounted on stand-off insulators, or at least on an insulated panel.

Incidentally, the same arrangement could also be used in the plate circuit (with an appropriate value of R_1) to protect the plates against overload.

The author wishes to thank W9PNE and W6SAI for their very able advice and constructive criticism. QST

The "Ultimatic" — Transistorized

(Continued from page 34)

monitor off and should rise to about 27 ma. on mark. The drain from the 3-volt battery BT_2 is about 1.5 ma. and is about constant from space to mark. With the monitor on, the drain on both sources is increased by about 4 ma. With the monitor on, about 40 hours of life can be obtained from BT_1 if the specified cells, which are designed for transistor service, are used. BT_2 , using a pair of the same cells, should be good for 200 hours. Penlite cells of the same size will give only half the service of the transistor-type cells. These estimates are based on the circuit functioning until the cell voltage reaches 1 volt from the fresh 1.5 volts. As BT_1 nears the end of its life, readjustment of the spring tension on the relay for the higher speeds will probably be necessary. When the battery switch S_4 is in the "off" position, the circuit is connected to the external power plug to which may be connected a more permanent high-capacity battery pack or an a.c. supply for fixed-station use. The intent of the self-contained battery supply is to make the keyer usable on a moment's notice for portable operation or for lunch-hour practice sessions at work or school where the minimum of set-up effort is desirable. QST

FEEDBACK — Part I

On page 28 of the September issue, the arrow at the junction of R_{23} and R_{24} should be labeled +3 volts.

On page 29, in the caption, R_{69} should be log taper (IRC PQ-13-128, M13-128, or equiv.).

Correspondence

(Continued from page 84)

existed for quite a while, but how was I to know if I wasn't notified of it in the signal report? This lack of use of the "T" part of the RST signal report is characteristic of not only the Novice, but the General too.

The ARRL has helped a lot with the use of the OO appointments to safeguard the privileges of amateur radio. The Official Observer also helps the amateur to keep his signal "clean" and avoid citation from the FCC.

Today all the bands are crowded. One bad signal can make it bad for a lot more. — Norm Wilson, WY6JVD, Corcoran, Calif.

THIRD PARTY TRAFFIC

¶ Suggest a QST editorial on the third-party traffic rules, republishing the permitted countries, etc., for the benefit of a large group of amateurs who are, by their actions, not familiar with the rules. Recently I refused to take third

(Continued on page 154)

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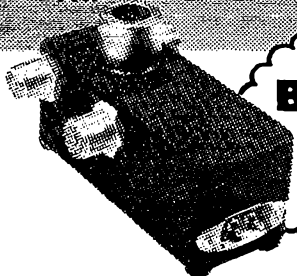
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party traffic for HZ1AB, who then tried to talk me into it (without success). I later heard the traffic being accepted for Oklahoma City by a W4. I also still hear numerous other third-party traffic being handled from nonagreement countries for armed forces people located there. Some of these foreign stations allege "emergencies." Such contentions are not valid as Red Cross facilities exist for this type of traffic and, in fact, must be used prior to the approval of an emergency leave back to the States. — Major Fred G. Alden, K1LDW, HQ 100th Bomb Wing, Pease AFB, New Hampshire.

[Editor's Note: Readers are again reminded that messages and other communications on behalf of third parties may be handled internationally by U. S. amateurs only with the following countries: Canada, Chile, Peru, Ecuador, Liberia, Cuba, Panama, Costa Rica, Nicaragua, Mexico, Venezuela, Haiti, and Honduras. Further, only relatively unimportant traffic may be handled with these countries.

Third-party traffic between points where amateurs are licensed by some branch of the U. S. Government (i.e., where calls begin with W or K) is of course permissible, and the only restriction is on messages in which the operator has a pecuniary interest. However, no third-party communications may be handled with KAs in Japan.]

PROBLEM SOLVED?

☞ Your front cover (August QST) must have "stopped" every ham who was ever mobile.

The solution? There is a classified ad on page 164 which says that WICUT has a Gonset II for sale. H11 — Bill McMahon, W1YCP, East Hartford, Conn.

THE FIRST CALL . . .

☞ I note in the article entitled "The Key to Communication" by Louise Ramsey Moreau in the August issue she mentions that the first call for help from a ship went out from the key of the late Jack Binns, operator on the *Republic*.

I wish to point out that the distinction of first using radio telegraphy to summon aid to a ship in distress went to my old friend, the late Ludwig Arnsen of the Radio Receptor Corporation, who was wireless operator aboard the old liner *Kroonland*. On December 7, 1903 while 190 miles off the coast of Ireland, the vessel lost one of her two propellers. In response to the message sent out by Mr. Arnsen, aid was forthcoming in the form of a British cruiser. — Richard S. Egolf, W2WFX, RCA Communications, New York, New York.

GMT USAGE

☞ I note with satisfaction that at long last you are starting to put emphasis on GMT in ham radio communications. Why this has taken so long to bring before the amateur radio fraternity is beyond the comprehension of my feeble mind. In all my log entries, on all my QSLs etc., I have used GMT since coming out of the Navy after WW1, which was in 1919, and if anyone can dig up one of my QSLs with any time but GMT so designated, I will buy him a new straw hat and eat his old one — with cream and sugar yet. It is so much easier to make use of GMT in setting schedules. I am sure that if these youngsters getting into our favorite hobby would just get accustomed to GMT, its use would soon be universal. I have a 24-hour clock with a fifteen inch dial in my shack; it is set to GMT and has never been set for any other time. It's the only clock in the shack. — J. W. Anderson, W6QV, Los Angeles, Calif.

DX Contest

(Continued from page 62)

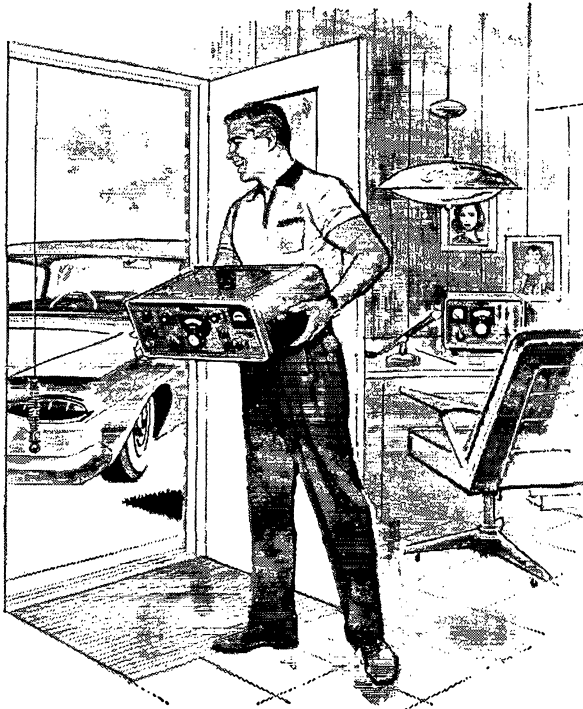
AFRICA

Angola		French Equatorial Africa
CR6CA.....5148- 12-143- A- -		FQ8AF.....21,750- 29-250- A- -
Liberia		Belgian Congo
EL8D.....49,620- 29-560- B- -		OQ5FV.....7656- 24-107- A-18
Eritrea		Nigeria
ET2US4.....252- 6- 14- C- 8		ZD2JKO.....44,064- 34-432- A-25
Algeria		Union of South Africa
FA3JY.....1485- 9- 55- A- -		ZS50A.....39,060- 35-372- A- -
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(Continued on page 156)

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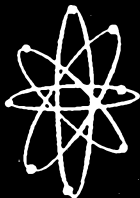
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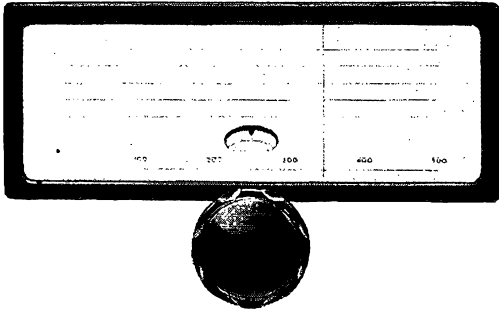
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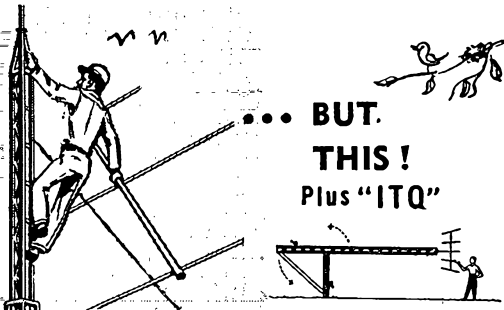
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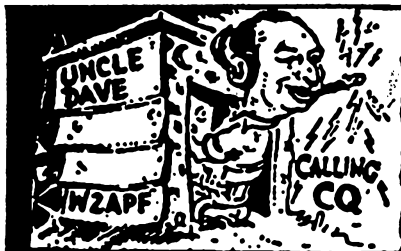
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<i>Japan</i>	
JA3IS... 46,788- 42-372- B-46	
KA2CB... 46,276- 46-338- C-33	
KA2GI... 32,705- 31-352- A-31	
JA3EK... 17,085- 17-335- A-20	
JA1GC... 15,120- 28-181- A-21	
JA9CQ... 10,116- 18-189- A -	
JA1YL... 7884- 27- 98- A -	
JA1AAT... 7182- 18-133- A -	
JA6GT... 6752- 16-142- A -	
JA1BUN... 5904- 18-110- A-16	
JA8BY... 5616- 16-118- A -	
JA1BDF... 5040- 15-113- A -	
JA2JW... 378- 7- 18- A - 5	
<i>India</i>	
VU2BK... 7200- 24-100- A -	
EUROPE	
<i>Germany</i>	
DJ1BZ... 114,534- 54-715- B-55	
DL7AD... 13,328- 34-131- A-21	
DL3DW... 1326- 17- 26- B -	
DL6DF... 581- 7- 30- A -	
<i>Spain</i>	
EA3JE... 193,068- 62-1038- A-70	
EA3IT... 36,720- 36-340- A -	
EA1FD... 18,900- 35-180- A -	
EA2DT... 3531- 11-107- A-36	
EA7JT... 1215- 15- 27- A-20	
<i>France</i>	
F3OX... 14,056- 28-168- A -	
F2NH... 2832- 12- 79- A - 9	
F2MO... 972- 9- 36- A -	
F3II... 693- 7- 33- A -	
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GM3BCL... 11,837- 19-209- A-18	
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<i>Italy</i>	
I1ZFT... 26,190- 30-291- A -	
I1DFB... 6578- 22-100- A-22	
I1TC... 5773- 23- 84- A - 4	
I1NE... 621- 9- 23- A - 2	
I1ZCN... 231- 7- 11- A - 3	
<i>Norway</i>	
LA1JG... 76,986- 47-546- A-30	
LA4TE... 60,114- 43-466- A-28	
LA6CF... 16,511- 19-290- A -	
LA2JE... 6432- 16- 34- A-39	
<i>Luxembourg</i>	
LX1HM... 14,075- 25-189- A-10	
<i>Finland</i>	
OH5SM... 106,050- 50-711- A-54	
OH5PN... 3822- 13- 99- A -	
OH2RL... 1500- 10- 50- A - 7	
<i>Czechoslovakia</i>	
OK3KGI... 945- 9- 35- A -	
OK1JX... 102- 6- 6- B -	
OK3KRN... 12- 2- 2- A - 1	
<i>Belgium</i>	
ON4OC... 244,288- 64-1275- A-61	
ON4GM... 77,428- 44-579- A -	
ON4LX... 52,250- 50-349- A-29	
<i>Faeroes</i>	
OY7ML... 12- 2- 2- A -	
<i>Denmark</i>	
OZ5JT... 64,872- 51-424- A-50	
OZ7G... 2010- 15- 45- A-16	
OZ5KP... 744- 8- 31- A -	
OZ5KQ... 504- 8- 21- B -	
<i>Netherlands</i>	
PA9HBO... 55,620- 45-412- A-26	
PA9DVM... 9724- 28-120- A-20	
PA9DJ... 4686- 22- 72- A-10	
PA9KSB... 2128- 16- 45- A - 6	
PA9ATY... 195- 5- 13- A -	
<i>Sweden</i>	
SM3EP... 20,604- 34-202- A -	
SM5BLA... 12,576- 24-175- B -	
SM5MC... 144- 6- 8- B - 5	
<i>Poland</i>	
SP5XM... 5300- 20- 89- A-16	
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RB5AJU... 835- 5- 56- A -	
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UC2AA... 22,072- 31-239- B-25	
<i>Latvia</i>	
UQ2AN... 8025- 25-107- B-10	
<i>Estonia</i>	
UR2KAE... 27,861- 37-253- B -	
NORTH AMERICA	
<i>Cuba</i>	
CO2DD... 85,260- 49-580- B-26	
<i>San Andres and Providencia</i>	
HK0AI... 169,050- 49-1150- A -	
<i>Panama</i>	
HP1AC... 79,991- 41-652- A-37	
<i>Guantanamo Bay</i>	
KG4AP... 33,924- 33-343- A-16	
<i>Puerto Rico</i>	
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KP4A00... 29,481- 31-317- A-14	
<i>Guatemala</i>	
TG5HC... 82,404- 63-436- A -	
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VP2AR... 109,620- 58-634- A-51	
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<i>Turks & Caicos</i>	
VP5AB... 8832- 23-128- A-14	
<i>Bahamas</i>	
VP7NT... 6996- 22-106- A -	
<i>Mexico</i>	
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FK8AU... 6768- 24- 94- A-19	

(Continued on page 158)



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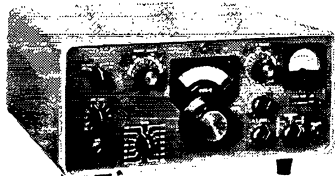
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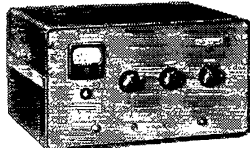


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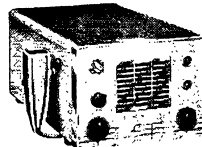
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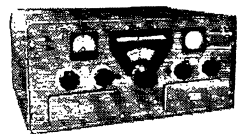
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K6QPG/KW6.972- 9- 36- A-3	LU2BN...16,632-28-198- B- -
Marshall	LU5DDF...15,039-27-187- A-22
KX6CS...16,191-21-257- A-23	LU4EJ...2211-11-67- A-3
	LU8CW...1440-15-32- A-4
Australia	Peru
VK3ATN...49,396-53-313- A-17	OA1W...27,684-36-258- A-22
VK2AKF...26,445-41-215- A-26	
VK3MK...3523-13-91- A- -	Brazil
	PY2ADT...4396-14-105- B-13
Fiji Islands	Netherlands Guiana
VR2BC...51,435-45-381- A-16	PZ1AX...38,650-50-258- A-18
	British Guiana
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ZL1MQ...90,540-60-503- A- -	VP3YG...30,788-43-240- A-11
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CE1AD...5280-16-111- B- -	YV5ED...9309-29-107- A- -
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HK3LX...86,240-55-524- B-23	

¹ W1WPR, opr. ² Hq. staff — not eligible for award. ³ W2LHL, opr. ⁴ W7GHX, opr. ⁵ K6QPG, opr.

Check logs: C.w. — W2s GES JGU W3s QQR VTH ZAO, W4LRN, W5MSG, W6HPB, K7ADD, W7BTH, W8s QQH SZW, W9LZ, K9MTY, W9NXU, W9EKS, EL4A, FO8AC, G2s MPH ZR, GD3FBS, LA1K, OH6PJ, OK3KMS, OZ4RT, OZ5SQ, PA0NV, SM7MS, SPKAS, UA4RHN, VE1AE, VE2AJD, V23s CYX DDU, VE5CX, VQ2RG, VQ3PBD, VU2MD, Y03FN, ZE3JJ, 9G1BQ; Phone — K1JKA, W1s MGP RFQ, W3MDJ, W4JII, W5MSG, K6CJF, K9MTY, DL9YC, EL4A, GI4RY, LA3K, OZ5SQ, PA0SNG, VK2JZ, VQ2PBD, ZS6ARX.

World Above

(Continued from page 79)

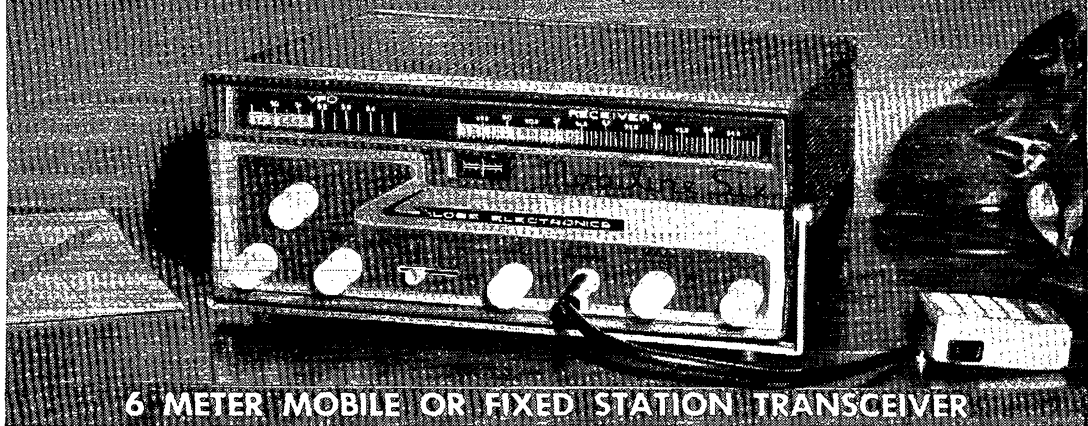
Toledo, at 2130 CDT on 432.078 Mc. Bob transmits on odd five minute periods. While we're on the subject of schedules, we might point out that Steve, W9OJJ, is transmitting on 432.020 Mc. from 0130 GMT to 0200 GMT with his antenna on New Jersey. Steve is using 64 elements with a 4X250R in the final amplifier.

O.E.S. Notes

- K1AII, Plymouth, Mass. — 50 Mc. W's 2, 3, 4, 8, 9, VE1 and VE3 during July. VO1DW worked again on July 30.
- K1CIG, Manchester, N. H. — Several good openings on 50 Mc.
- K1CXX, Auburn, Maine — Good 50 Mc. aurora into Maine on the 15th of July, heard K7 in Montana calling CQ Vermont, couldn't raise him.
- W1FVV, Hartford, Conn. — Seasonal openings on 50 Mc. during July to W4, W5, W9. One short opening to Michigan for a new state; no activity on 144 Mc.
- K1GQK, Contoocook, N. H. — Many openings on 50 Mc. during the middle of June, but not much else.
- K1JML, Malden, Mass. — 6 meter activity only, contacted VO1DW.
- K1KUY, Marblehead, Mass. — Seasonal openings on 50 Mc. No activity on 144 Mc.
- W1LMZ, Concord, Mass. — VO1DW heard and worked on July 30 on 50 Mc. Worked 2, 3, 4, 8, on aurora on 144 Mc. On the 29th W4's were worked, hear VE2TT nightly on 144.31.
- K1MHC, Winchester, Mass. — Working on a new single sideband high-level mixer for 2 meters, caught the July 15 aurora openings on 144 Mc., but could not raise anyone.
- W3RTV, Verona, Pennsylvania — 50 Mc. open July 3 to S. Dakota, Eastern Ohio stations S6-S9 on 144 Mc. nightly at this QTH.
- W4CIN, Birmingham, Alabama — Good copy of stations on 50 Mc. within 200 mile radius of Birmingham during July.
- K4EUS, Chester, Va. — Caught the July 15 opening on 144 Mc. Worked 3's, 1's, 8's and 2's; heard W9ZIH and VE3IK.
- K41QU, Huntsville, Alabama — Finished 75 w. mobile transmitter for K4OCV's mobile.

(Continued on page 180)

Introducing THE NEW GLOBE Mobiline Six...



6 METER MOBILE OR FIXED STATION TRANSCEIVER

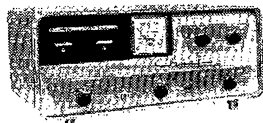
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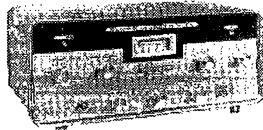


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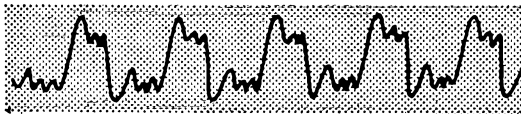
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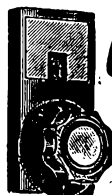
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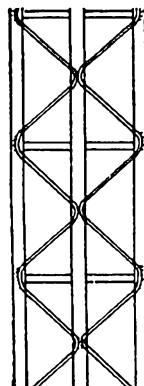
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K4KYL, Knoxville, Tenn. — Openings all over the place on 50 Mc. Called CQ nightly at 145.01 at 2100 and 2200 EST.

K5TQP, Albuquerque, New Mexico — Activity concentrated on preparing for Perseids shower.

WA6BFC, Arcadia, California. — 50 Mc. opened July 29 toward the midwest.

WA6EEO, Los Angeles, Calif. — 144 Mc. open to San Diego.

W6LEY, La Mesa, Calif. — Activity on 2 meters, 220 Mc., and 50 Mc.

W6ORS, Altadena, Calif. — Texas activity on both 50 Mc. and 144 Mc., Convair Pomona Radio Club and San Gabriel Valley Radio Club are working on 1296 Mc. contact via moonbounce with New Zealand.

K6SIX, Los Angeles, Calif. — 50 Mc. worked W5VVF in Texas, copied but did not work K4JGU in Florida, K7MIT in Arizona, K5IQL in New Mexico. K6TRU and K6VWM received a license for 50 Mc. repeater and are experimenting with it at present.

K6TVC, San Gabriel, Calif. — Constructing 2-meter transmitter.

K7BBO, Tacoma, Washington — 50 Mc. activity only.

W7EGN, Whitefish, Montana — Worked VE8BY at the Great Slave Lake NWT. VE8BY's signal when first heard showed no signs of aurora flutter but was T9.

K7GZB, Vancouver, Wash. — Would like some information on simple 2300 Mc. gear.

K8BGZ, Lansing, Mich. — Activity on 50 Mc. and 144 Mc. caught the August 1 opening, to W9's. Worked W8EMS, Omaha, Nebraska, for state number 14 and W8YMG Wichita, Kansas for number 15. Heard W5PZ, Omaha and several W2's and W3's.

W8HNQ, Gregory, Mich. — 50 Mc. activity only. Working on 420 Mc. transmitter and receiver.

W8NOH, Grand Rapids, Mich. — Caught the July 15 aurora on both 144 and 50 Mc.

W8PT, Benton Harbor, Mich. — Active on 144, 220 and 432 Mc.

W8PYQ, Battle Creek, Mich. — Completed 100-watt final for 220, caught the July 15, 2-meter aurora; two new states, W4RFR, Tennessee, and W4KDH, Virginia.

K8SUJ, Springfield, Ohio — Activity on 50 Mc. only.

W9GAB, Beloit, Wisconsin — Primary activity has been on 432 Mc. contact with Iowa on 432. Brings total states up to 11.

K9GSC, Portage, Wisconsin — Working on new two-meter converter.

K9LCK, Wausau, Wisconsin — Working on 420 Mc. gear.

K9MGV, Lebanon, Indiana — Number of openings on 50 Mc. during July to Texas, Nebraska, La., Tenn., Wyo., Minn., Fla., Mo., Mass., Ohio, Colorado and Kentucky.

K9MVQ, Wasau, Wisconsin — Caught the July 15 aurora for W8, 9's and 8's on 2 meters.

K9RRS, Racine, Wis. — 50 Mc. operation only.

K9TFJ, Greenwood, Indiana — 50 Mc. activity during July to Missouri, Nebraska, S. Dakota, Cuba, Florida, Texas, La. Many 4's coming in. Called "CQ Ohio" and landed K8MHJ at Cedarville. Also had QSO with W1FCH at Connecticut.

K9GIC, Wichita, Kansas — 6 Meter openings on July 6, 8, 12. Quite dead between the 13th and 27th.

K9RWK, Pittsburg, Kansas — 50 Mc. openings on July 7, 8, 9, 11.

K9WUD, Collyer, Kansas — Heard no signals on six meters during the month of June. (Better check your receiver. — Ed.)

QST

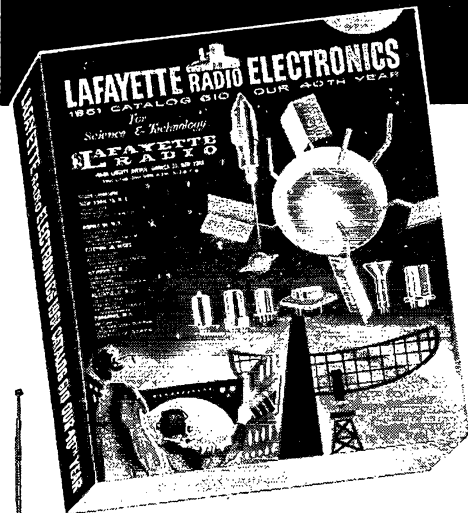
Stability with Simplicity

(Continued from page 13)

so that the v.f.o. may be spotted on frequency without turning on the transmitter. On 80 meters the signal from the v.f.o. without cathode follower is just enough to be used for spotting purposes; on the higher-frequency bands it is necessary to energize the cathode-follower section and the 6DT6-A amplifier.

(Continued on page 162)

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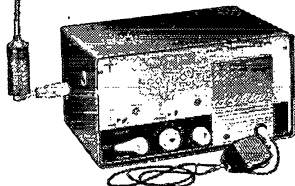
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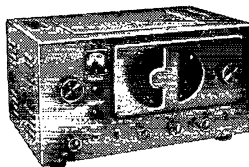
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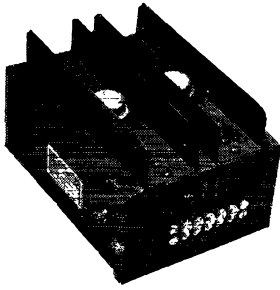


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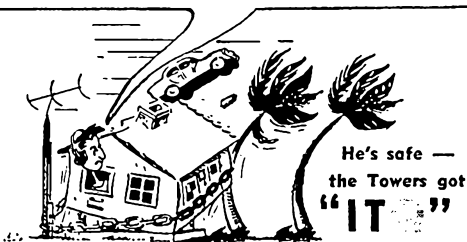
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Performance Considerations

Those interested in circuit details may wonder why a higher-transconductance tube was not used so that the oscillator grid might be tapped farther down on the tuned circuit. Such a tube was tried, but caused instability. Experiment indicated that the medium- μ , medium g_m tube worked best in all cases. Other tubes that can be used for the oscillator-cathode follower are 6SN7-GT, 6CG7, 5692, and 6189. The last two are, of course, premium tubes, and are intended primarily for critical industrial applications.

The performance of the v.f.o., as mentioned before, is exceedingly good. With the coil and capacitors used, the tuning range is nearly linear from 3495 to 4005 kilocycles. The frequency-set capacitor, C_3 , will shift the oscillator frequency about 35 kc. The measured frequency drift after about 3 minutes' warm up was less than 20 cycles in $2\frac{1}{2}$ hours. QST

Strays ^{MOB}

In the dead of night KN10BL can clearly pick out the call of KN1N9E (his next-door neighbor) in the motor hum of his own refrigerator.

I.A.R.U. News

(Continued from page 75)

medicine and money to the Radio Club de Chile to be distributed among those who needed it. We must mention among others our friend K6SED who made a call to American amateurs, many of them answering with donations. Also sent donations: HC1FG, W4FZC, K2UBG, W4SIB, OD5CL, K5IMF, Radio Association of Western New York, Radio Club Argentino, Association Radio Ecuatoriana, Chatham Kent Amateur Radio Club (Canada), Evans Amateur Radio Club (Angola, New York), and many others.

The Radio Club de Chile most deeply appreciates the help that foreign radio amateurs gave to Chile on those days of misfortune. — Luis M. Desmaras, CE3AG, Foreign Relations Secretary, Radio Club de Chile.

Though it is obvious that some of the work done by individual amateurs will never fully come to light, we have a story from the *Pittsburgh Catholic* of July 21, 1960, concerning the service performed by one Chilean amateur, Father Raphael de la Barra, CE7BN. The young priest had gone to a resort on Osorno Volcano to check out a rig. When he made contact with a ham in Valdivia 70 miles north to get a signal report, he was told that a severe earthquake had just struck that city. Quickly he checked with another ham in Puerto Varas, 70 miles south, and found that the southern town has also suffered an earthquake. CE7BN immediately warned the forty tourists at the resort, and most of them fled with the priest. Nine were skeptical and remained on the volcano. The refugees were not out of sight of the building when it was crushed by an

(Continued on page 164)

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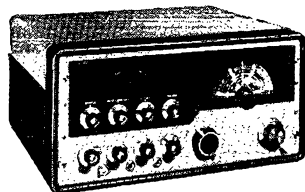
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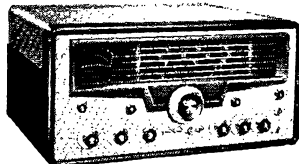
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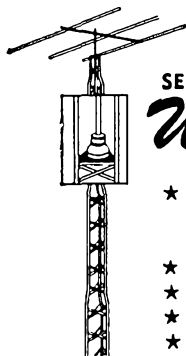
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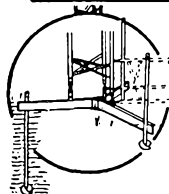


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Technical Correspondence

(Continued from page 44)

Two things are essential to good n.m.c.w. work. The modulating tone must be low in pitch, below 200 cycles for 20 w.p.m., and decreasing about 20 cycles for each 10 w.p.m. above that. Also, and this is the essence, please, fellows, if you hear an m.c.w. signal, particularly a low-pitched one, when your receiver is set up for a.m., turn up your selectivity to "sharp." This will transform a 3-db. advantage over a.m. to a 14-db. advantage.¹

N.m.c.w. has many advantages to offer as a mode of transmission. While it cannot take the place of c.w. for point-to-point skeds and it cannot beat phone for ragchews, remember, if the band is open, the proper use of n.m.c.w. should be a great aid in working DX. Let's give it a try!

— Raphael Soifer, K2QBW

FREQUENCY VS. AMPLITUDE MODULATION

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Malden, Mass.

Technical Editor, QST:

Frequency modulation has enjoyed only limited use by amateurs. Most feel that it is inferior to amplitude modulation for amateur communication purposes and its use has been mainly as a last resort to get out of TVI/BCI trouble, or to avoid the cost of the modulator that is needed to amplitude-modulate a high-powered final. I also suspect that there is a "line of least resistance" factor involved that is a natural human reaction, even with hams who are supposed to be eager and willing to try the unfamiliar and even the impossible. Amplitude modulation is the easy way for the average ham for two reasons: a.m. was the first method of modulation to be put into common use and therefore the most widely developed and understood, and manufactured receivers for many years have included a.m. as the only method of phone reception built directly into the receivers. True, n.f.m. adapters were available as accessories (National has always provided them for its receivers in the past) but they have not been purchased in quantity.

ARRL has published articles in QST on various phases of frequency modulation over the past twenty-five years but the response to these articles has not been gratifying. Unfortunately, the comparison between a.m. and n.f.m. in the chapter on frequency modulation in the Handbook gives some the impression that a.m. has a 6-db. advantage over n.f.m. Many hams will state that they have compared a.m. to n.f.m. on, say, ten meters and that they drew their own conclusions that the a.m. signal was better. These fellows did not use an n.f.m. adapter and made their comparisons with "slope-tuning."

Let us consult Crosby, one of our best authorities on frequency modulation. He states that when a modulation index somewhat greater than 2 is used, the f.m. signal becomes 6 db. superior to the equivalent a.m. signal, when proper f.m. detection is employed. This is the reverse of the commonly-held opinion of f.m., and gets close to the 9-db. figure tossed around by the s.s.b. boys.

Why this discrepancy? First, let's discuss the logic of the Handbook. We define an n.f.m. signal as one which occupies no more space than the equivalent a.m. signal. Assuming that 3000 cycles is the highest frequency to be transmitted, the maximum bandwidth to be occupied by either signal is 6 kc. Quoting from the 1960 Handbook, "If the modulation index (with single-tone modulation) does not exceed about .6, the most important extra sideband, the second will be at least 20 db. below the unmodulated carrier level and this should represent an effective channel width about equivalent."

(Continued on page 166)

¹ Only catch here is the deliberately poor low-frequency response of most communications receivers. — Ed

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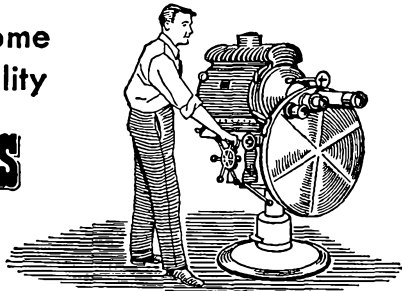
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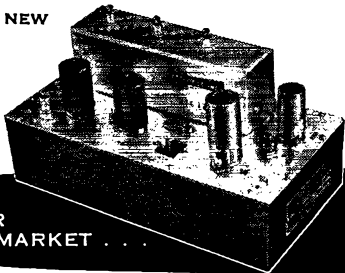


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lent to that of an a.m. signal." Further on, it says, "With an index of .6, the amplitude of the first sideband is about 25 per cent of the unmodulated carrier amplitude: this compares with a sideband amplitude of 50 per cent in the case of a 100 per cent modulated a.m. transmitter. So far as effectiveness is concerned, an n.f.m. or p.m. transmitter is about equivalent to a 100 per cent modulated a.m. transmitter at one-fourth the carrier power." ¹ This pegs n.f.m. at a 6-db. disadvantage. After reading this, the average ham is convinced that n.f.m. is for the birds. This would be true if hams modulated their transmitters with a 3000-cycle tone. Happily, this is not the case.

In the practical case, 3000-cycle tones are not transmitted by hams, but rather a conglomeration of tones constantly changing in both pitch and amplitude in such a manner as to preclude their insertion into simple formulae. A bass singer can use a greater modulation index than a lyric soprano! Perhaps a fair average tone of modulation would be 1000 cycles. Certainly, the amplitude of the 3000-cycle component of an average voice is much less than the 1000-cycle component, and the average voice will probably swing the 1000-cycle component to a modulation index greater than 2 without at the same time having the 3000-cycle component exceed a modulation index of .6, and the 6-kc. bandwidth limit will not be exceeded. Here we have both the advantage of Crosby and the disadvantage of the *Handbook* mixed together in the same transmission with the relative efficiency of the actual transmitted signal lying between the two extremes.

Being unable to substitute the ham's voice into a formula, the best method to obtain a reasonable answer is empirical. In other words, let's try it. The writer did exactly this about ten years ago both on 144 and 220 Mc. Before describing this, I would like to point out one thing that makes the difference between good and poor results when using n.f.m. It is imperative for good results that a clipper be used, followed by a 3-kc. low-pass filter, in the speech amplifier of an n.f.m. modulator. It is amazing what a difference the clipper can make. I would not believe it, at first, until I was shown.

Overmodulation from peaks with n.f.m. raise havoc to a much greater degree than is the case with a.m. Experience has shown that an n.f.m. signal which is unclipped must usually be tuned so far off resonance, on an a.m. receiver, that the signal-to-noise ratio is considerably degraded. With a properly-clipped signal, it is often possible to tune very close to the resonance peak with practically no loss in signal-to-noise ratio with only a very sharp null in the very center to tip off the operator that he is actually receiving an f.m. rather than an a.m. signal. The unclipped f.m. signals have undoubtedly done much to give f.m. a bad name. When the writer decided to try n.f.m. on 2 meters, the transmitter then in use on that band started out with a 5.3-Mc. crystal tripling three times (multiplication of 27) to get to 144 Mc., ending up with 85 watts input to an 829. Following a tip from W1OOP, a 6J5 tube (preceded by a clipper-filter) was resistance-coupled to the screens of the push-pull oscillator. With 12 to 15 volts of a.m. on the oscillator screens, a p.m. signal (rather than f.m., due to the extremely high *Q* of the crystal) of about 100 cycles was produced. As p.m. causes a rising audio characteristic, the highs had to be cut to produce a reasonably flat audio characteristic. This was done handily by adjusting the screen bypass capacitor to an optimum value. Now, multiplication of the 100 cycles of p.m. by 27 gave the desired -3-kc. deviation at 144 Mc. and the limiting action of three saturated grids wiped off all traces of a.m.

A very satisfactory n.f.m. signal resulted. For receiving, a converter feeding into an NC-173 receiver as an i.f. amplifier was used with an n.f.m. adapter which could be plugged in or out at will for f.m. or a.m. reception. The results with this transmitter were very satisfactory as long as the receiving station was using a conventional receiver for the i.f. (bandwidth of 4 to 6 kc.). Fellows using SCR-522 receivers or Communicators reported that I was only modulating about 10 per cent and on superregens, only a blank carrier was heard.

(Continued on page 168)

¹ The author quotes the *Handbook* in part, leaving out the all-important phrase "with reception methods used by most amateurs." The *Handbook* clearly points out that lack of success with f.m. in competition with a.m. in the ham bands is due largely to the lack of provision for proper f.m. reception in the vast majority of amateur receivers. — Ed.

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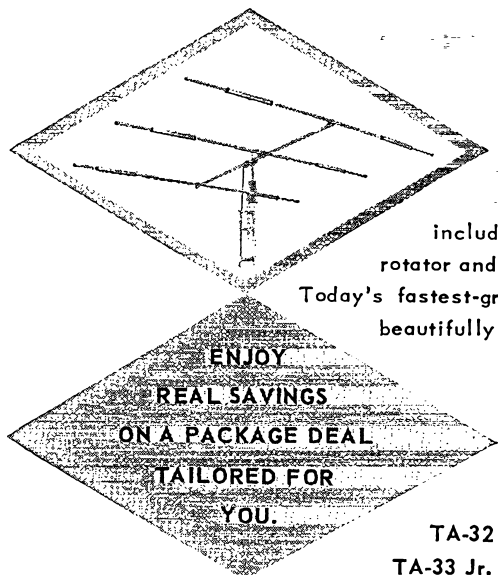
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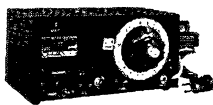
THE QSO THAT

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As the skip shortened up on 20 one morning and the VK5 I was QSO QSB'd out, a W8 called me. My contact with him was so long that it could have qualified me for the RCC! But it brought me something much more tangible: from this W8 I learned of the big money many hams are earning in commercial and public-safety 2-way radio maintenance. He told me how several years ago he had sent in a coupon from a Lampkin ad in QST—and received a free copy of "HOW TO MAKE MONEY IN MOBILE-RADIO MAINTENANCE". It started him on the road to a high extra income.

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The same method of modulation was applied to the 220-Mc. transmitter which was also crystal-controlled and tripled three times, with the same good quality n.f.m. signal. This band is worse than 144 Mc. or lower bands for BCI when using a.m. The signal does not need to pass through the i.f. but can get directly in the audio circuit. Note that in the BC or TV set, the leads from the first audio grid to the volume control and back to the audio cathode form a loop that is resonated by the grid-cathode capacity of the tube in the v.h.f./u.h.f. region. This tuned circuit can pick up the v.h.f. energy directly and the more you turn down the volume control the louder the voice becomes, as you are removing resistance in series with this loop and raising its Q. The first audio tube acts as a grid-leak detector. This occurs in TV and BC sets alike, although a.c./d.c. sets are the most vulnerable. Changing from a.m. to f.m. wipes out the effect as the circuit is not a good f.m. detector.

As discussed above, the conclusion was reached that on the v.h.f. bands the n.f.m. signal, properly received, is the equal of the equivalent a.m. signal. On the DX bands, 10 to 80 meters, there is one feature that handicaps f.m. signals. When selective fading occurs on ionospheric transmission paths, a.m. reception is not deteriorated as badly as f.m. reception. The discriminator just will not handle the signal effectively when selective fading is pronounced. Here is where s.s.b. really shines. Selective fading of an s.s.b. signal does not affect the quality nearly as much as for either conventional a.m. or f.m. signals, due to the greater simplicity of the transmitted signal. Further, the newest receivers are apt to have varying slope characteristics of their selectivity (extremely sharp in the case of mechanical filters) as compared to the comparatively standard i.f. selectivity of ten years ago. This means that slope tuning may be unsatisfactory in many instances and an n.f.m. adapter is essential.

The following summarizes the main advantages of f.m. over a.m., particularly as used on the v.h.f. bands:

- 1) Cures BCI and audio TVI.
- 2) Permits modulation of any power with a small receiving tube.
- 3) Permits c.w. ratings for full input. A pair of 4X250Bs will take 1-kw. input with f.m. instead of the 600 watts allowed for a.m. use.
- 4) Does not have to handle modulation voltage peaks of twice the normal carrier amplitude. This means that plate tuning capacitors can be only $\frac{1}{4}$ the size physically, or insulation in coaxial tanks can be $\frac{1}{2}$ as thick.
- 5) Above 52.5 Mc., you can swap signal-to-noise ratio for bandwidth and quieting action by using wideband f.m. This relaxes receiver and transmitter frequency stability tolerances.
- 6) There is no need to worry about linearity of the Class C amplifier. Insufficient grid drive does not cause modulation distortion.

It is hoped that the above discussion will start the reader thinking about the subject of frequency modulation so that he will be more tolerant of the method even though he may not actually use it. It is hoped that the stigma that has handicapped the use of f.m. by amateurs in the past will be removed so that it can enjoy wider use. In particular, the writer feels that v.h.f. men are missing a real good thing by not using f.m. more extensively.

— Cal Hadlock, W1CTW/W1IQD

"HOW TO SOLVE A QUIST QUIZ"

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Technical Editor, QST:

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$$IR_2 = \frac{120 - IR_1R_3}{R_2 + R_3}$$

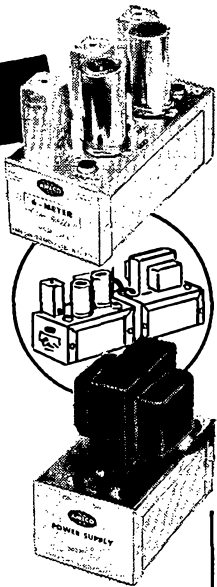
$$= \frac{120 + 2 \times 12}{32}$$

$$= 3 \text{ amp.}$$

$$ER_2 = 3 \times 20 = 60 \text{ volts.}$$

A voltage drop in R_3 due to current in R_1 equals their
(Continued on page 170)

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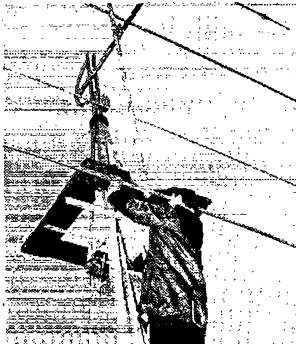
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product. This drop subtracts from the voltage available across R_3R_2 considered as a series combination, which is possible since the effect of the current through R_1 has been accounted for. — A. C. Hockett.

Silent Keys

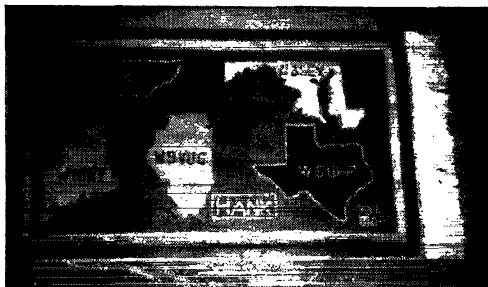
It is with deep regret that we record the passing of these amateurs:

- W1AIC, Wendell L. Smith, Meriden, Conn.
- W1FZU, Franklyn H. Standish, Middleboro, Mass.
- W1GR, Alfred W. Hyde, Cranston, R. I.
- W2CVU, Irwin Dreyer, Flushing, N. Y.
- W2GJE, Raymond L. Spicer, Wharton, N. J.
- W2LZ, Walter D. Wakeman, Walton, N. Y.
- W2TID, Leonard E. Young, Attica, N. Y.
- ex-W4HLC, Horace B. Greene, Anderson, S. C.
- W4IPS, Earl Waldo Strayer, Fairfax, Va.
- W4OWS, Lomax G. Sawyer, Coinjock, N. C.
- K4YGR, Patrick O. Parker, Griffin, Ga.
- W5AES, Isaac C. Bates, Sherman, Texas
- W5NUN, Fred A. Gerdes, Oklahoma City, Okla.
- W6ANQ, J. Bryson Walker, South Laguna, Calif.
- W6QCH, Dr. Claude E. Babcock, Keene, Calif.
- W6QK, Robert H. Bell, Fresno, Calif.
- W7CQC, Woodrow W. Dehl, Havre, Mont.
- ex-W8DLF, Dr. Paul A. Wilkinson, Norwalk, Ohio
- W8GFE, Donovan C. Smith, Mt. Healthy, Ohio
- W8PLP, Ralph W. L. Ziegenbein, Lansing, Mich.
- ex-W9BIA, Robert J. Broten, Buena Park, Calif.
- K9OWP, Everett D. Waites, Indianapolis, Ind.
- W9VEU, Raymond G. Warczynski, Chicago, Ill.
- K0AEC, Neal P. Campbell, Los Alamitos, N. Mex.
- KN0ZBL, William C. Libor, Minneapolis, Minn.
- KP4AVM, John K. Chatfield, Santurce, Puerto Rico
- VE2EU, Georges Forest, Montreal, Quebec
- VE3RW, T. William Thompson, Belleville, Ont.

In the August issue, we listed in error VK3ACE, Clyde Case of Birchip, Victoria, Australia. Mr. Case is *not* a Silent Key. We apologize for so listing him.

Strays

Long shots. W6ISL, being the youngest ham at the 3825 Picnic in San Diego, was selected to draw the winning ticket for the door prize. Well, for heaven's sake, if you can't guess whose ticket he drew. . . .



W0YUG's XYL felt sorry for her husband as they moved around the country, constantly getting a new call. So when they finally settled down in Chicago, she hooked the rug in the photograph to remind him of the five calls he had had in as many years. The calls, from 1948 to 1953, included: W4OLS in Memphis, Tenn.; W1SEY, Portland, Me.; W3SEY, Baltimore, Md.; W5UHP, Houston, Texas, and W9VUG in Chicago.

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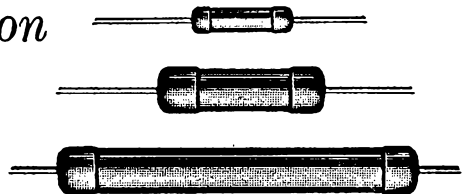
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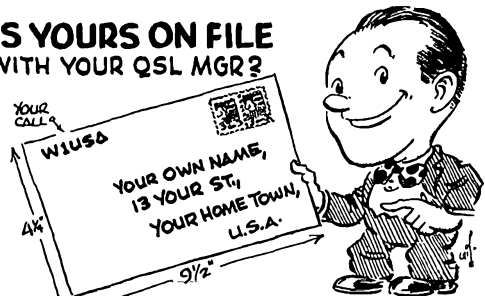


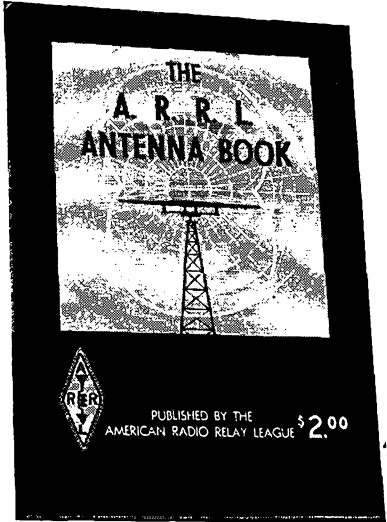
A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4 1/4 by 9 1/2 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

- W1, K1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass.
- W2, K2 — North Jersey DX Ass'n, P. O. Box 666 Hillside, N. J.
- W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Pa.
- W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
- W5, K5 — Brad A. Beard, W5ADZ, P.O. Box 25172, Houston 5, Texas.
- W6, K6 — San Diego DX Club, Box 16006, San Diego 16, Calif.
- W7, K7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon.
- W8, K8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland 10, Ohio.
- W9, K9 — J. F. Oberg, W9DSO, 2601 Gordon Drive, Flossmoor, Ill.
- W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
- VE1 — L. J. Fader, VE1FQ, P.O. Box 653, Halifax, N. S.
- VE2 — George C. Goode, VE2YA, 188 Lakeview Avenue, Pointe Claire, Quebec.
- VE3 — Leslie A. Whetham, VE3QE, 32 Sylvia Crescent, Hamilton, Ont.
- VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
- VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
- VE6 — W. R. Savage, VE6EO, 833 10th St., N., Lethbridge, Alta.
- VE7 — H. R. Hough, VE7HR, 1684 Freeman Rd., Victoria, B. C.
- VE8 — Earl W. Smith, VE8AT, P.O. Box 534, Whitehorse, Y. T.
- VO1 — Ernest Ash, VO1AA, P.O. Box 8, St. John's, Newf.
- VO2 — Douglas B. Ritecy, Dept. of Transport, Goose Bay, Labrador.
- KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
- KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii.
- KL7 — KL7CP, 310-10th Ave., Anchorage, Alaska.
- KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.

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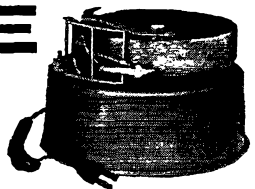


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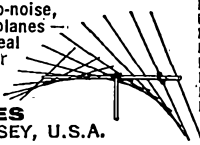
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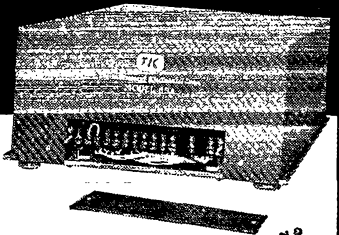
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RIPPLE: Nom. 1% at full load
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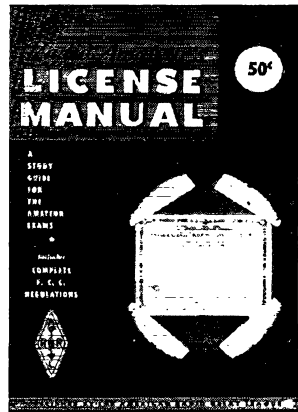


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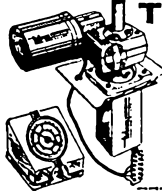
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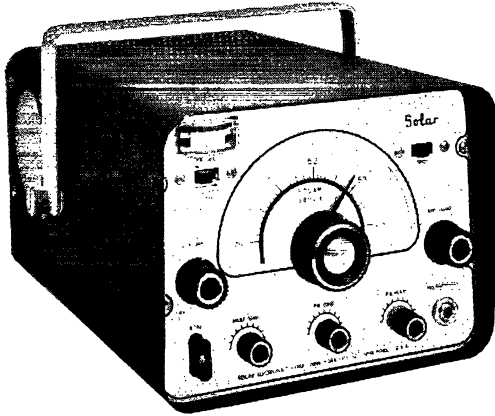
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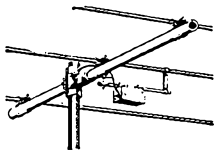
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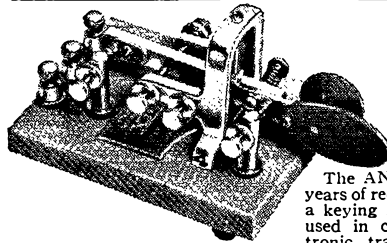
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(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

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MOTOROLA used FM communications equipment bought and sold W5BCO, Ralph Hicks, Box 6097, Tulsa, Okla.

WANTED: Military or Industrial laboratory test equipment. Electronicraft, Box 399, Mt. Kisco, N. Y.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 8 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmany 8-8262.

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CASH for used short-wave ham receivers, transmitters and accessories. Treger, W91VJ, 2023 N. Harlem Ave., Chicago 35, Ill. Tuxedo 9-6429.

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JOHNSON Courier in like-new condx. \$175. W7PSO, P.O. Box 455, Casper, Wyoming.

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QSL's: SWLS that are different, colored, embossed card stock and "Kromekote." Samples 10¢. K8AIA, Turner, Fox 953, Hamilton, Ohio.

QSL's: Quality and economy complete samples dime. QSL Printing, Box 12331, Houston 17, Texas.

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QSL's "Brownie." W3CJI, 3110 Lehigh, Allentown, Penna. Samples. 10¢ with catalogue, 25¢.

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QSL's-SWLS: Samples free. W4BKT Press, 123 Main, McKenzie, Tenn.

QSL Samples dime, Sims, 3227 Missouri Ave., St. Louis 18, Mo.

QSL's: Taprint, Union, Miss.

SUPERIOR QSL's: samples 10¢, Ham Specialties, Box 3023, Bellaire, Texas.

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QSL's-SWLS: reasonable prices. Samples 10¢. Robert Bull, W1BXT, Arlington, Va.

QSL's: \$1.00. Riesland, Del Mar, Calif.

QSL's: Lapel pins, samples dime. Kenhart W2SPV, 4309 Willis, Merchantville, N. J.

QSL's: SWLS, XYL-OMs (sample assortment approximately 934¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fantabulous, DX-attracting, protypal, snazzy, unparagoned cards (Wow!). Rogers, K0AAB, 737 Lincoln Ave., St. Paul 5, Minn.

PICTURE QSL Cards of your shack, home, etc., Made from your photograph, 1000, \$13.00. Raum's, 4154 Fifth St., Philadelphia 40, Penna.

GLOSSY QSL's: 100, 4 colors, \$3.50. Others less, Samples 10¢. Dick, W8VXX, 7373 No. M-18, Gladwin, Mich.

DELUXE QSL's: Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢.

QSL's: Samples free. Phillips, W7HRG, 1708 Bridge St., The Dalles, Ore.

QSL's: SWLS Nicholas & Son Printery, P.O. Box 11184, Phoenix, Arizona.

QSL's-SWLS: 100 2-color glossy, \$3.00; QSO file cards, \$1.00 per 100. Samples, 10¢. Rusprint, Box 7507, Kansas City 16, Mo.

QSL's-SWLS: Free Samples. Spicer, 4615 Rosedale, Austin 5, Texas.

QSL's: Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Sample 10¢. K2VOB Press, 162 Midland Blvd., Maplewood, N. J.

QSL's: 100 for \$3.00. Glossy. Distinctive design. Samples free. R. A. Larson Press, 32 Midland Ave., Stamford, Conn.

QSL's: Cartoons, colors, samples 25¢. Chis, W9PPA, 365 Terra Cotta Ave., Crystal Lake, Ill.

DON'T Buy QSL's until you see my free samples. Bolles, 7701 Tisdale, Austin 5, Texas.

ATTRACTIVE QSL's: Pearce, 192 Osborne, Danbury, Conn. QSL's Samples, dime. Printer, Corwith, Iowa.

QSL's-SWLS: distinctive, reasonable. Samples 10¢. Al-Mar Crafts, Box 6052, Riverton Heights, Wash.

QSL's: Stamp brings samples. Eddie Scott, W3CSX, Fairplay, Md.

QSL's: 100 3-color, \$3.00. Sample sheet, 10¢, RBL Print M.R. 12, Phillipsburg, N. J.

QUALITY QSL's: Samples and prices, 10¢. Savory Press, 172 Roosevelt Rd., Weymouth, Mass.

RUBBER Stamps for hams, sample impressions, W9UNY, 542 North 93, Milwaukee, Wisconsin.

FAST Service, send stamp for QSL samples. K2 Press, Box 372, Mineola, L. I., N. Y.

LATEST Designs, quality QSL's. Samples 10¢. Savory Press, 172 Roosevelt Rd., Weymouth, Mass.

QSL's: 300 for 3.95. Free samples. W9SKR, Vesely, RR #1, Box 208-A, Ingleisle, Ill.

QSL's: Attractive, colorful, Variety type styles, backgrounds. Samples 10¢. Jack Crandall, K6QAO Press, 5013 Enfield Ave., Encino, Calif.

OUTSTANDING QSL's: Dime, Filmcrafters, Box 304, Martins Ferry, Ohio.

QSL Cards printed in 2-colors on glossy Kromekote cards. Two designs especially for mobile, \$2.75 for each 100 cards. 5¢ for sample card and brochure. Williams Printing, P.O. Box 2597, Van Nuys, Calif.

EYECATCHING QSLs—quick! Dollar-saving sample. Dime. Rad'Oprint, Ojai, Calif.

QSLs Over a million delivered, 10¢, \$2.75 up. Samples, 10¢. WIGKH Press, Candleview Ridge, Danbury, Conn.

QUALITY QSLs. Large variety multi-color samples, 10¢. Don S. SOWT, Box 332, Ada, Okla.

QSLs, reasonable, nice designs, samples dime. W2DJH Press, Warrensburg, N. Y.

QSLs: Samples 25¢ (refundable), W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

RECEIVERS: Repaired and aligned by competent engineers using factory standard instruments. Authorized factory service station for Collins, Hallicrafters, Hammarlund, National, Harvey-Wellis. Our twenty-fourth year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

SSBERS! Keep up with SSB news and views! Join the Single Sideband Amateur Radio Association, dedicated to furthering good SSB operating; promoting advancement of SSB equipment; and disseminating SSB technical information. Read "The Sidebander", official publication of the SSBARA. Dues \$3.00 yearly. Write for membership application, sample "Sidebander", to SSBARA, 12 Elm St., Lynbrook, N. Y.

DON'T Fall FCC tests! Check yourself with a time-tested "Sure-check Test". Novice, \$1.50; General, \$1.75; Extra, \$2.00. We pay the postage. Amateur Radio Specialties, 1013 Seventh Ave., Worthington, Minn.

LOWEST Prices: Latest amateur equipment. Factory fresh sealed cartons. Self-addressed stamped envelope for lowest quotation on your needs. HDH Sales Co., 919 High Rise Rd., Stamford, Conn.

GREAT surplus values!! BC-603 Receiver New \$17.00—R-2 ARC5 Receiver \$6.95—New \$12.95—used \$7.95—R-27/ARC5 Rec 6-9 mc New \$12.95—used \$7.95—BC-659 Transceiver with PE-120 \$19.95—T-47/ART-13 Transmitters 34/AP \$49.00—Sound-Powered Dynamic Phones Pr. \$4.75—Rec. Microwave R-111/APR-5 \$39.00—Collins CFI 82-Q for Q-5'er compl. w/VHFs & instructions \$5.95—Collins Mod. Xformer 100 watt 811-PP to 813 final \$3.95—RA-62 C Power Supply A-C for SCR-522 VHF 110/60 cyc. New \$59.50—Kits only for above, \$17.00—Ground-plane VHF antennas 30-200 MC New \$9.95—Hi-Mu Electronics—131 Hamilton St., New Haven, Conn. Store hours 10-5. Sat. 9-12.

TOROIDs: Unused 88 mly like new. Dollar each. Five, \$4.00 pp. DaPaul, 101 Starview, San Francisco, Calif. After Sept. 1st our address will be at 309 So. Ashton, Millbrae, Calif.

S.S.B. Xfrms. exact type for W2EWL Special and other sideband units; hermetically sealed, brand new set of 3 for \$3.00. Brand new G-50 100 watt (audio) multi-impedance modulation xfrmr (10 lbs.) \$6.25. No. c.o.d. include postage. Send stamp for list of other gear. S. A. Tucker, W2HLT, 51-10 Little Neck Pkwy, Little Neck 62, N. Y.

FOR Sale: Tickets to the one and only—The Original Syracuse VHF Roundup, October 8, 1960. Write K2TXG, 317 Clover Ridge Drive, Syracuse 6, N. Y.

BEGINNERS. Code memorized in one hour. New method. Used in Armed Services, ham radio, scouting. "Ketchum's Hour Code Course" \$1.00 postpaid. Money back guaranteed. C. H. Ketchum, 0125 Flora Vista, Bellflower, Calif.

WANTED: 6 to 12 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

ATTENTION Mobilers! Leece-Neville 6 volt 100 amp. system, \$50; 12 volt system \$50; 12 volt 60 amp. system \$60; 12 volt 100 amp. syst. \$100. Guaranteed no ex-police car units. Herbert A. Zimmermann, Jr. K2PAT, 115 Willow St., Brooklyn 1, N. Y. Tel. Dickens 2-9121.

WANTED: Your buy or sell list. State price, condition. Small buyer fee. W2LMS Exchange, D'Amico, 319 Maryland St., Buffalo 1, N. Y.

SAN FRANCISCO and Vicinity: Communications receivers repaired and realigned. Guaranteed work. Factory methods. Special problems invited any equipment. Commercial two-way equipment. Factory service Leece-Neville and Delco alternators. Associated Electronics, 58 South P St., Livermore, Calif. W6KF, Skipper.

FOR Sale: SCR-522 rcvr E-xmtr w/pwr supp. for \$50. Never used. Lesher, 25 No. Market St., Elizabethville, Penna.

GONSET 2M Communicator: 110V AC, 6V DC, relay operated push-to-talk, separate S-meter, VFO and speech pre-amp. Halo antenna. Excellent condx. Mitchel Katz, W2KPE, N. Y. C. Phone BO 8-0672.

FOR Sale: Gonset III, 6 meters, with mounting rack and Halo, \$200. New York City area. Roy Dursio, W2KTG, Boices Lane, Kingston, N. Y.

FREE: Viking mobile VFO. Given to buyer of Viking xmtr and complete mobile pwr. supply. Price, \$95.00. Everything still in use and in excellent condx. Stanley Cokas, W1ULR, 36 Edgemoor Rd., Swampscott, Mass.

SELL QSTs complete, December 1929 to January 1960. Like-new condx. Best offer. W9EDH.

STOLEN from Don D. Cummins, K4HYV. 216 Shelbourne Towers, Knoxville, Tenn. Viking Ranger, xtal mike, Heath equipment as follows: 0-10 scope, TC-2 tube tester, GD-1 grid dipper, "Q" mult. Reward!

HRO 60T with complete set of coils, spkr, and xtal calibrator, \$400. Model B Central Electronics SSB slicer, \$50; Heath "Q" multiplier, \$5.00. All in perfect condx! First \$440 takes all. Jim Boardman, K9IUL, 710 Euclid Ave., Glen Ellyn, Ill.

HEATH Seneca, new, \$200; 2 new RCA 4CX250Bs with sockets, \$50; will deliver within 75 miles; many others, send stamped addressed envelope for list. K2VEY, 503 Bursess Dr., Saddlebrook, N. J.

HOME Brew half-gallon transmitter. Millen final and exciter, fully metered, regulated supplies, plate modulation, antenna coax relay, 4" x 6" metal office desk, all built into a beautiful 6-foot rack on casters. Forced sale, moving out of state: \$250.00. Worth three times as much. Will not ship, sry. W2VJO, Frank Miller, 70 Vanderbilt Ave., Island Park, L. I., N. Y. Tel GE 2-4414.

WANTED: Used standard broadcast station transmitter between 250 and 500 watts. Kenneth Slate, Rte. 2, Fond du Lac, Wis.

COMPLETE Station, 6 months old. F. W. Valiant, SX-101A, D-104, Vibroplex bug, TA331R, AR22 rtor, World clock coax relay, 4" x 6" metal office desk, First \$750 takes it, will not sell separately. Will ship and send photo W8WAL, Frank Tomanek, 31180 E. Rutland, Birmingham, Mich.

WANTED: Link Mod. 205 and 118X receivers. Motorola FM gear. Bird wattmeter. Sell-swap Lamkin 103. 575; field strength meter, \$25; modulation meter, \$25; McMurdo Silver receiver 2 and 1 1/4 meters, \$30. B. C. Higley, W20EA, 82 Lower Main, Matawan, N. J.

SACRIFICE Sale: Hallicrafters SX-101, Mark IIIA rcvr, Heath Apache xmtr with SB-10 SSB adaptor, Hallicrafters R-46B spkr, Mosley TA-33 Jr. beam, Mosley vertical antenna Mod. V-16, CDR rotor, Johnson low-pass filter, Dow coaxial relay, coax cable. All in little-used condx. SHIPPE COSTS included. Price \$675 cash. WA2JFL, 2 Union St., Batavia, N. Y.

FOR Sale: Hallicrafters SR-34 transceiver, \$375; Gonset G-43 receiver, \$125.00. K4REO, Rte. #2, Box 451, Salisbury, N. C.

BEST Offer by the 15th over \$60.00 for EE3A, \$20 for Vibroplex chrome DeLux. W1VOK.

HY-GAIN Antenna: 80-10M dipole with 1 Kw 72Ω twin lead-in. \$15.95; Webster wire recorder, \$25.00. W. R. Oringer, 109 S. Main, Elk City, Okla.

VIKING 500, factory-wired, 75A4, late model, Tri-Ex, 60 ft. telescoping tower; Ham-M rotor; Heathkit VTVM. Contact or write Lee Trop, W1ZSZ, Georgia Rd., Weymouth, Mass. Tel. ED 5-5052.

FOR Sale: Hallicrafters Model HT33A linear amplifier, like new condx. No time to use. \$500. Cash and carry. Leslie W. Phipps, W1VAP, Holliston, Mass.

SELL: Hammarlund HQ-110C with matching speaker. In exc. condx. \$180.00. K6SIP, 15530 Loukelton, La Puente, Calif. Tel. ED 3-5641.

SELL: DX-40, \$60; Viking 122 VFO, \$30; Mosley V-4-6 vertical, \$20. Wanted: Viking Ranger. Ken Koval, K9PGC, 4818 Van Buren St., Gary, Ind.

ANTIQUe Radios for sale. Dayton, 1923 Kennedy Magnavox amplifier, Horn spkr, Atwater-Kent, Western Electric. Send 25¢ for photographs. W8SZF, 1323 Plainfield Rd., Cleveland, Ohio.

SELL: Globe 680A Heath, VFO mint condx, slightly off calibration, \$93 K3EWO, 638 Michell St., Ridley Park, Penna. Tel. LE 4-1594.

FOR Sale: NC-125, in perf. condx. \$50. George Levy, Tel. ES 2-8990, 2816 W. 15th St., Brooklyn 24, N. Y.

POSITION: Electronics distributor has an opening for salesman with knowledge of components and ability to sell industrial buyers and engineers. Give complete details. Box 1189, Virginia Radio Supply Co., Inc., Charlottesville, Va.

HORNET Tri-Bander beam TB-500, 1 yr. old, \$25.00. Albert J. Bertolis, 382 Fulton St., Farmingdale, L. I., N. Y.

HAMMARLUND SP-600, \$375; Elmec AF67, PMR7, power supply operates on both 6, 12 or 115 volts; Webster Band-Spanner, complete mobile less than 6 months old, \$325. 1955 Handbook 813 transmitter, 500 watts, \$175. Paul Sligh, K4UYC, 1504 17th Ave., Columbus, Ga.

SPECIAL. Must sell my KWM-2, 516F2, 516E1, mobile rack, and Mosley MA-3 whip. Retail price \$1602; for only \$1200. Check or money-order. Purchased May 15, 1960. In perf. condx. R. Corbett, 46 Prospect St., Torrington, Conn.

WANTED: Johnson KW with pedestal. State price and condition. J. Power, 21 Holt Circle, Trenton, N. J.

FOR Sale: KWM-1 with noise blanker, AC and DC power supplies, speaker, mobile mount—wire, mike, Hy-Gain 3-band Micro-Dipole antenna with Universal Mount. \$650 plus shipping. Joe D. Olson, K6ECZ, 548 South Spring St., Los Angeles 13, Calif.

SELL: Heath DX-40 crystals, mike \$55; Heath VFO, \$15; Mon-Key Electronic Keyer \$15. All in exc. condx. Write for info. Robert Conant, K4YCY, 3901 Iris St. North, St. Petersburg, Fla.

FOR Sale: Excellent SX-100, \$190; DX-100, \$150. W90HO, 1107 Elm Street, Glenview, Ill.

COLLEGE! Must sell Viking Ranger, \$50.00; NC-300, \$225.00; HT-31 linear amp., 750 watts on c.w. and SSB, \$230.00. Complete station with other accessories, \$700. Will sell separately. Inquire! Lee Kulick, 570 W. 204th St. New York City 34.

MOBILEs: Used Motorola FMT-50D 60 watt units convertible to 6 meters, sud condx. For information write Mainbrace Co., P.O. Box 53, St. Louis 19, Mo.

FOR Sale: NC-183D with Johnson calibrator, just realigned, perfect in looks and operation, \$315. Mispriced as NC-173D in August ad. Sry. T. J. Sulas, WA2KZU, 5808-8 St., Elmhurst 73, L. I., N. Y.

SELL: 10A SSB exciter w/QTI and VFO, \$100; Gonset 500W linear, \$150; Heath GD18, \$15; all perfect. Also many parts. Send stamp for list. Lane, K2EGW, KI 3-0301, NYC.

COAXIAL Cable, new 58Ω—30 ft. length, \$1.00; 180 ft. six lengths, \$5.00. Send postage one pound per length. Radio magazines, buy, sell, trade. R. Farmer, Plainview, Texas.

FOR Sale: Collins 75A2 with speaker and Drake Q-multiplier, \$300. Roger Goodland, W9JHB, 5306 Sunnybrook, Ft. Wayne, Ind.

FOR Sale: Globe King 500B, \$475 and SX-71, \$125. W9QDI, Poplin, Box 434, RR #2, Belleville, Ill.

COLLINS 32S-1, 516F-2 with speaker, and 75S-1 with blower, \$995. Package deal only. B&W L-1001-A. HT-32 cabinet with remotely controlled, beautifully rebuilt BC-610 power supply, \$425. Buy all and also get handsome control console (SWR meter and bridge, 24 hour numeral clock, Lakeshore timer, AC line meter, Conelrad monitor), antennas, mike, coax relay, coax cable, for only \$50 more. Will not ship, but can deliver. Southern California. Will consider KWM-1 in trade. Heading for graduate school. Bob Moncrieff, W6ZRK, Box 243, Beaumont, California. Telephone Victor 5-3629 except Friday evening and Saturday.

RECONDITIONED! Terms! Guarantee! Collins 32V3 \$399.00; KWM-1 \$595.00; KWS-1 \$999.00; 75A4 \$499.00; Central Electronics 10B \$109.00; 600L \$299.00; B-W 5100 \$245.00; Gonset 500-V Linear \$149.00; Communicator III-6 \$199.00; Hallcrafters SX-71 \$135.00; SX-88 \$349.00; SX-100 \$235.00; HT-30 \$309.00; HT-32 \$435.00; HT-33 \$429.00; SX-34AC \$249.00; Hammarlund HQ-110 \$180.00; SP6001X \$499.00; HO140X \$165.00; Heath DX-100 \$189.00; SB-10 \$75.00; Apache \$265.00; Johnson Viking II \$169.00; Pacemaker \$295.00; KW final w/desk \$995.00; National HRO60T \$345.00; NC-98 \$95.00; NC-183D \$234.00; NC-300 \$209.00; Regency ATC-1 \$49.50; TMC \$299.00 \$355.00; Globe 65 \$65.00; 6 PM Converter \$17.00; DSB-100 \$74.50; 300A \$39.00; 500 \$375.00; 755 \$37.00; Leo, W8GFO, Box 919, Council Bluffs, Iowa. World Radio Laboratories.

1000 W Homebrew transmitter, pair 100TH finals. Complete with modulator, power supply and speech amplifier. VFO included. \$200. Selling because of death of husband. Mrs. M. S. Adams, 1400 Glenwood Terrace, Anniston, Alabama.

SELL: Complete station—744A with filters, speaker HT32, Johnson KW 4-400A final, Johnson A.M. amplifier, pad, Telrex Minibeam, Elmac AF67, \$75. K2AKK, 115 Walnut Lane, Manhasset, N. Y.

DX100B, grid block keying, PTT, 4 months old, perfect. Will deliver within 200 miles. \$175 including unopened MK-1 kit. Write Ayers, K3JZH, 325 Washington Ave., Jermyn, Penna.

SALE: Central Electronics 10A multiphase exciter with QT-1, \$100; DX-40 with VF-1 and 3 Novice xtals, \$70. All in yu gud condx. WAZFMK, 111 Garfield Ave., Merchantville, N. J.

COLLINS 12 volt DC pwr. supply 516E-1, \$195; Johnson TR switch, \$17. Sidney Ross, W9ISY, 1844 N. Rutherford, Chicago 35, Ill.

WANTED: For trade, registered Basset or toy Dachshund puppy. Have new 4-1000A, 4X150A, 4-250A, 813c, etc. Other dogs considered. Phil Lamarche, W9DVM, 6003 Danube Way, Orlando, Fla.

WANTED: Apache or similar transmitter. Also DX-40. Must be reasonable and in gud shape. Will pick up in a radius of 300 miles. Ken, VE3CCB, 1593 Dale St., London, Ont., Canada.

KWM-1, AC, DC supply, Collins speaker, Shure mike, mobile rack, Mosley 3-band mobile antenna, cables, 3-band Hy-Gain vert. antenna, \$950. firm, T. W. Samuels, Jr., M.D., 348 West Prairie, Decatur, Ill.

SPECIAL Sale: First come, first served, quantities limited. Give second choices, all new. B&W 5100 demo, \$450; 51SB \$195; 51SB-B, \$180; Globe DSB100(W), \$129.95; DSB100 (K), \$95.95; VOX 10 (W), \$26.35; VOX 10 (K), \$17.50; QT 10 (W), \$8.75; VHF 620 (K), \$10.00; L-1 (W), \$109.50; Sec. Dot. ure (W), \$129.95; SM90(K), \$10.95; 755A(W), \$51.95; VFO 62(K), \$43.95; FCL1 (W), \$21.95; FCL1(K), \$13.50; AT4(W), \$69.95; PB1 (W) wired, \$18.95; 90A (wired) \$69.95; 90A(K), \$51.95; 680A(K), \$84.95; 680A(W), \$124.95; PA1(W), \$79.95; two only G4ZU beams some small parts short, as is, \$25 ea.; Elmac AF67, \$150; Gonset GSB 101 demo, \$20. Tennalab 3-el. beam, \$159.95. Write for quotes if what you want isn't here. Uncle Dave, Ft. Orange Radio Distrib. Co. 904 Broadway, Albany, N. Y.

6 MTR Converter, \$10; 10 mtr. converter, \$8.50; 15 mtr. Pre-selector, \$4.50; W6RET, 8831 Sovereign Road, San Diego 11, Calif.

SELL: 100V. factory guarantee, \$700; KWS-1, modified, \$1,000; M-2 R.F. analyzer, \$45 Kc. \$100. All F.o.b. Lamb, 1219 Yardley Road, Morrisville, Penna.

FOR Sale: Collins 32V-3 in exc. condx. Check for highest amount received before Oct. 15th gets it. Minimum, \$375. You pay shipping. Richard Roos, W2PNT, 141-48 78th Rd., Flushing 67, L. I., N. Y.

FOR Sale: Used NC-300 with xtal calibrator, \$299.50 and factory-wired Viking Valiant, \$349.50. Both for \$600. William Stogdill, W9KWC, 520 N. Coquillard, South Bend, Ind.

SELL: Gotham Tribrander, \$32.50; Hickok 288X signal generator, \$215.50; RK4D32, \$20; OF1, \$5.50. In line condx. Albert Johnson, K11IK, Newport, N. H.

FOR Sale: SX-100 like new, in exc. condx, \$195. Two newly built Heathkit CB-1 VP-1.6, VP-1-12, \$100. Bill Flanan, 6036 N. Francisco, Chicago, Ill.

FOR Sale: Johnson Viking Kilowatt, converted with new 4-400As plus desk, \$1000; Viking Ranger with sequence keying, \$175. Also the following new items: PL-172, \$110; PL-184 socket, \$30; Chicago FMS-610 1/2 xfmtr (for PL-172), \$13; Johnson variable inductance 225-3, \$45; Chicago splatter choke SR-500, \$22. Used, but in excellent condx; Eimac VVC-2-60-20 variable vacuum condenser. Plate transformer, 110V pri. sec., 4000 volts at 500 Ma, no CT, \$35. National MB-40-SL, \$10. No trades as am moving to Arabia. WITYQ, RFD 5, Danbury, Conn.

SELL: HT-32A, exc. condx, \$225. Returning to school. K6PQC, Box 902, Ridgecrest, Calif.

COMPLETE station: need the money. All equipment is in perf. condx: Heath DX-40 and VFO, \$70; Hallcrafters SX-99 and R-47 spkr and Heath Q-mult., \$140; Vibrorplex Bug, \$15; St. key, \$2; tube cooling fan, \$3.00; home-brew TR switch/Amp-henol cones, \$4.00; earphones, \$2.00; 24 hr. clock, \$6.00 or entire station for \$230.00 or your best offer(s). Pls write for details and pix. Richard Henry, WAZFXF, 21 Oregon Dr., Huntington Sta., L. I., N. Y.

SINGLE Sideband generator as described page 26, August Co, \$75.00. Longhorn Electronics, Inc. Box 157, Wolfe City, Texas.

NEED 2nd RF section from BC-312 or BC-342 receiver, Andrew J. Dietz, WIRFJ, 134 E. Glenridge Rd., Stratford, Conn.

FOR Sale: Heath DX-20 transmitter, \$25.00; Hallcrafters S-85 rcvr, \$80. Like new. John Rybicki, 1228 Spruce Rd., Home-wood, Ill.

SELLING: GPR-90 with spkr, \$325; SX-25 with spkr and Q-Mult., \$60; Viking Ranger, timed sequence keying, \$165; RME DB25, \$32.50; Capacitor bridge, \$4.00; pair 110 VAC selsyns, \$7.50; Millen 90801 90 watt bandswitching rig, \$40. Wanted: crank-up tower and antenna rotator, Joseph Marshall, Jr., 22 Clare Dr., East Northport, L. I., N. Y.

TRADE: AF67, PE103, coax relay, Regency ATC-1 converter P52V power supply 10 meter whip and mount, all complete on KW transmitter commercial or home brew for use with Pacemaker or will sell for \$200. William Baxter, 3702 North First Ave., Tucson, Ariz.

FOR Sale: New, never used, WRL 755 VFO, \$40.00; HT-32, in gud condx, \$495; NC-300 in yu gud condx, \$295. W. B. Sewall, W5XYL, 10711 Stallcup, Dallas, Texas.

FOR Sale: Complete ham station, 75A4 rcvr, 32 and 33 Hallcrafters. Many extras including 20-meter beam. Price \$2000. Cannot ship, wry. W. A. Kuehl, 6647 Kenton, Lincolnwood, Ill.

MASTER Mount #444 and Webster Band spanner, whip, both \$15; Collins 32RA-8 modulator (100 watts) \$40. Master remote matcher #12; Bassett noise filters, regulator, generator, \$5.00 each. RCA "45" Changer, \$5.00. You pay postage. W5FJR, 515 West Main, Houma, La.

FOR Sale: Hammarlund HQ-150, \$220; Elmac equipment AF-67, \$130; PMR-7, \$115; PSR-6-12, \$25; M-1050 16-12V, \$30; Heath gear AT-1 xmttr with SM-90 screen modulator, \$25.00; TC-2 tube checker, \$22.00. All with instruction booklets and original cartons. TSGT Bill Whitten, K4KIV/6, 13 D Silver Drive, MCB, Twentynine Palms, Calif.

FOR Sale: Globe 500A, with speech compressor and external VFO; extra 4-250A, \$395; HRO50T1, six coils, calibrator, \$295. PE103, Old magazines, books. Kingman, 146 Arlington St., Brighton, Mass.

FOR Sale: Heath Mohawk rcvr, \$260; SB-10, \$80; Heath Apache xmttr, \$220 or \$525 takes the whole deal. Equipment is in mint condx and performs excellently. Carl Gallo, W2AW1, Director, Lincoln School of Radio & Television, 1851 Broadway, New York 23, N. Y. Tel. Circle 6-5300; home, New Rochelle 6-1488.

FOR Sale: Complete mobile, fixed station 10-80 M. Heath xmttr MT-1; receiver MR-1; power supplies MP-1, UT-1. Best offer takes it. Write to K20BM, 84-10 Main St., Flushing, L. I., N. Y.

HALLICRAFTERS SX-71 and matching speaker, clean, no alterations, and Q multiplier, new, \$130.00. W2BTE, 368 Durham Ct., Union, N. J.

SELL: HQ170, purchased March 1960, never used, \$250. Pick up only. Grossman, 3366 Decatur Ave., N. Y., 67, N. Y.

BRAND New Navy model RDR rcvr, 225 to 395 Mc., built-in 12 volt pwr supply, inc. cables, xtal oven and 150-p manual \$35.00; manual only, postpaid, \$2.50; Permeability tuned oscillator and multiplier sections from Collins ART-13 xmttr, both \$10; Bauer Industrial Supply Co., 17170 Redford, Detroit 19, Mich.

COMPLETE 1958-1959 run QSTs, \$5.00, plus postage; \$2.75 per year. Complete 1959 CQ for \$2.00. W2JBL.

HAM Magazine subscriptions: Write W6LJK (Tatum), 1451 Raymond Ave., Glendale, Calif.

ALUMINUM For every ham need. Write to Dick's, 62 Cherry Ave., Tiffin, Ohio, for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

TRADE: High standard Sport King for S-38C or D or SW-54. Richard Arensmeyer, Rte 2, Choteau, Mont.

SELL Globe-Chief Deluxe, factory-wired and tested, used less than a month: \$50.00. W9DDB, Box 73, Wenona, Ill.

SELLING Out: Collins 32V1, \$250; 32V2, \$300; National NC-173 with spkr, \$100; Gonset 66 and 77 mobile rig, complete with power supplies, \$350.00. A. S. Hatcher, Jr., W4ILG, P.O. Box 156, Macon, Ga.

FOR Sale: Johnson Adventurer, \$30; Johnson screen modulator, \$5.00; VF-1, \$15, all w/manuals, RAL-7 with p/s, \$20, all in excellent condx. Bob Ensminger, 712 Locust, Lodi, Calif.

SELL Or Trade: 900 40-40 ufd dual section electrolytics: 600 mica capacitors, five ratings, 500 paper capacitors: 2 810s, a UTC S-21 modulation xfmtr; Stancor xfmtrs and swinging chokes: tubes, etc. Send for list. Everything new. Need: SX-99 or equivalent; 250 watt modulation xfmtr; main tuning and bandspread dials for SX-28. Dick Fulton, K3KLG, 502 Ogden Ave., Clearfield, Penna.

FOR Sale: DX-40 transmitter, \$65.00. Philip Laspina, 137 Sunset Ave., Newark, N. J. Tel. E-4-7986.

MOBILE Rig for sale: Heath Cheyenne transmitter, Comanche receiver, MP-1 mobile power supply. Master Mobile antenna matcher, double bumper mount plus miscellaneous extras. Best offer takes. Don Borson, W5ACX.

VALIANT factory-wired, top condition, \$325, also HQ-100 receiver, \$125, both for \$425; transformer one amp at 2500 volts or 5000 volts 220 volt feed parts for KW final. Lyle Marble, Rte. #2, Box 91-A, Bay Minette, Ala.

COMPLETE Station for sale: Globe Scout 90A- \$55; Hallcrafters S-53A, \$65. Both for \$110. Exc. condx. WA2FFC, R.F.D. #3, Millville, N. J.

LEARN the Morse Code in minutes by a proven method, 1960 copyright. Send \$2.00 to: Easy Method Morse System, Box 86, Perrysburg, Ohio.

LEARN Morse Code in 30 minutes! Simple new system, tested and acclaimed by thousands of Radio Operators, Military Personnel and Boy Scouts. Complete code instruction kit only \$1.00. Moneyback guarantee. Send \$1.00 to Code, Box 666, Whittier 8, Calif.

SELL: Two converters NC300CGA and NC300C1, \$25.00 each. Three mechanical filters, F455E60, F455Z4, F455Z5, \$22.50 each. MultiMatch 600w (audio) modulation transformer (UTC) CVM-5, \$45.00. SR500 splatter choke, \$15.00. Prices F.o.b. my address, W8BR1/5, 202 Terrier Ave., White Sands Missile Range, New Mexico.

SELL: National NTE-B exciter (10, 20, 40, 80 meter push-button output) and speech amplifier, \$25.00; home brew VFO, \$7.00; K/W antenna tuner, \$20; Military VF554 Vibropack, \$7.00; Mallory 6A325 Vibropack, \$6.00; pair Selsyn motors, \$7.00. Shipping charges extra. QST run 1935 to 1955 and other miscellaneous gear, very reasonable. Want: 6N2 transmitter and gud mobile rcvr, W3BS, 1012 Wilde Ave., Drexel Hill, Penna.

KITS. Assembled, repaired. For information, write David Goodman, Rte #3, Box 193, Lakeland, Fla.

HAM Sale: 100 w. mod., 9.95; 6M. converter, \$14.95; Gonset carbon mike, \$8; Dumont oscilloscope cathode-ray tube, 3ACP, \$14; RCA 100 Kc. xtal, \$5.00 and \$50 worth of excit A-1 condx. tubes, \$15. Beat those prices; WA2DEA, 88 Cedar Ave., Newark, N. J.

FREE! Sample copy of Ham-Swap! Ham-Swap, Inc., 35-A East Wacker Drive, Chicago 1, Ill.

SELL: Stable SX-100, excellent, \$190. F.o.b. Westover AFB, Mass. W4PDB, Major L. E. Moses, 39C Davis.

COLLINS KWM-1 \$475; 516F-1, \$75; new condx. John S. Ward, Jeffrey Road, Greenwich, Conn.

SELL KWS-1, spotless condx. \$990. W2AEV, Ray Jones, 111 Hillside Road, Farmingdale, L. I., N. Y.

FOR Sale: HT-32, \$425; HT-33A, \$450; 75A-4, \$475; 2 & 6 Kc. \$25 each; KW Matchbox w/meter, \$90; C/E MM-2, \$cope, \$75; C/E GC-1, \$35. Mel Aichholz, 727 Floral Ave., Terrace Park, Ohio, TE 1-2252.

SELL Hy-Gain 3 element 10-meter beam, perfect condition, \$20. K3MYW, Dr. Mortimer D. Solomon, 41 Westbrook Lane, Rosevelt, N. Y.

KITS Wired: Experienced technicians, advanced facilities. Quality at reasonable rates. 15% plus postage. Precision Electronic Systems Co., Berson, 2800 University Ave., N. Y. C. 68.

GONSET G66B with 3-way power supply, \$150. W2JGV, 116-21 227 St. Cambria Heights 11, N. Y. C.

XTALS. 3rd overtone, \$1.25; 32.16 Mc., 32-36-32.4-32.7. K20SC, 310 Ann St., Harrison, N. J.

FOR Sale: Complete 6M. station: Heathkit Sixer, 6 and 12 volt power supply and halo antenna. Best offer takes all. KIJZC, Hancock, N. H.

SELL: 75S1, #2152 with CW filter, \$245; 32S1, \$1915 with AC supply, \$550; Eldico 1000F, \$500. W2KOY, 1740 Front St., East Meadow, L. I., N. Y.

SELLING Out: All equipment in excellent optg. condx: DX-100, filter, D-104 mike, \$200; NC-125, spkr and Q multiplier, \$150; Gonset #3220 Triband beam, \$85; Tri-Ex crank-up tower H-471, 71 ft. height, guy wires, thrust bearing, AR-22 rotor and 100 ft. RG8U, \$275. Will consider reasonable offers. Leo WINNU, 87 Dale Ave., Cranston 10, R. I. Tel. HO 1-4949.

SX-88, \$235.00; NC-98, \$80; Telrex 4-el. beam, \$50.00. A. Berger, 71 Bullard Loop, Ft. Leavenworth, Kans.

SELL: Hallcrafters SX-100, \$200; SX-25, \$45.00; Ultrasky- rider, \$30. Prefer local sale. W2KVL, 138 Cypress, Floral Park, L. I., N. Y. Tel. PR 5-9626.

SELL: Collins KWM-1 transceiver, a.c. power supply, 12 volt d.c. power supply, mobile mounting tray with wire and connectors and speaker, directional wattmeter. Will not sell items separately. Best offer. Write Box 1, West Hartford 7, Conn.

RANGER W/PTT connections, excellent condx, \$185; new Collins 23 MC. PTO unit factory carton, \$29.00. Will ship. W5GYB, 5900 Overlook Dr., Austin 3, Texas.

FOR Sale: Complete mobile station: 50W Gonset Commander, 160 thru 6 meters with coils, Gonset 6M conv., 1400 k.c., I.F. strip with built-in T.N.S., squelch and S meter, Cornell-Dubilier transistor power supply, 120 w. coax relay, control relays and Shure push-to-talk mike. All 12V. Exc. condx. \$185. Albert Pacifico, K2AW5, P.O. Box 245, Bloomingdale, N. J.

WANTED: Johnson Viking "500" in top condition or kit. State age, condition and best cash price. W1TF, Elmer Turner, 2 Virginia Circle, Reading, Mass.

GONSET GSB-100. Excellent SSB transmitter. Recent serial number. Ship in original container, \$350. Ed Doherr, W1EEE, 25 Rockridge Rd., Waltham, Mass.

CUSTOM Built chassis for your pet project. Free estimates. Mail sketch or print. Browne Elec-Tool Associates, 5501 SW 25th Court, Hollywood, Fla.

KWM-1 and A.C. supply. First certified check for \$525 gets this perfect unit. I'll ship! Sherm Hochman, K9PYY, 2712 N. 41st St., Milwaukee 10, Wis.

WANT: 51J4; keyboard Morse-tape perforator and sending head, preferably Creed; wire-mounted 100-kc GT-cut xtal. For sale: Wilcox CW-3, unopened crate, with coils, tubes, book, \$25.00; DB-23, \$25; three 4E27s, \$6.00 each; three 805s, \$3.00 ea.; unused 6280, \$20; unused 416B, \$12. W3AFM, 5800 Hillburne, Chevy Chase, Md.

COILS: R.F., I.F. chokes and toroids wound to your specifications. Any quantity. Barrett Coil Company, Inc. 1611 West Smith Ave., Orlando, Fla.

SELL: Viking II with VFO and Matchbox. Also HQ-140 receiver, all in mint condition, \$400.00. Will swap for SSB equipment. A. Ostrochovsky, W2UPY, 70 Rea Ave., Ext., Hawthorne, N. J.

ELMAC A54 all band transmitter with complete dynamotor supply, relays, etc. Vd gud condx. \$85.00. W8PLO, 9854 Zigzag Rd., Cincinnati, Ohio.

SALE: Hammarlund HQ-110 receiver with speaker, Handbook, orig. ctn., used month; SWR bridge AM-2, Handbook; LP filter; Dow Key relay, AMPHEN connectors on cables for hookup, \$200 package. F.o.b. Bridgeton, N. J. A. Diamant, 28 Devonshire Place.

HEATHKIT Mohawk rcvr, \$210; 6 Mtr. conv., \$20.00; DX-20, \$25. Bruce Charles, Ill. Tech. Men's Dorm, 71 E. 32nd St., Chicago, Ill.

COLLINS Station: 30S-1, \$1200; 75S-1 with noise blander, \$490; 3S-1, \$500; 516F-2, AC supply, \$90; 312B-4 console spkr, \$150; Central Electronics MM-2 \$cope, \$100; Telrex "Monarch" Tribander TBS-626, \$205; Ham-M rotor, \$85; Johnson TR switch, \$20; Johnson 52 ohm low-pass filter, \$10; Astatic 10D with G stand, \$27; all prices F.o.b. Phoenix, Ariz. K7EPD, 3850 E. Elm Tel. CR 9-2824. All above equipment in perfect condition. On the air less than 50 hours.

FOR Sale: Viking Ranger and DX-40. Both are extra gud. Want: 6M Communicator. C. Gerst, 2674 W. 25th St., Cleveland 13, Ohio.

SELL: Mobile station including Heath MT-1, transistor power supply, Gonset Super 12 converter, VSWR meter and interconnecting hardware. Complete, \$195. Desire KWM-1. Wagner, K2YOR, 4003 Hahn Ave., Bethpage, L.I., N. Y. Phone PErshing 5-8903.

KWS-1, #970, \$1195; 75A-4 w/spkr, \$545—both on air and available for pickup, \$1695; new 312B-4 station control in box, \$175; BC-312N AC powered \$45; RCA 155A oscilloscope, \$45; GOR AR-22 rotor, used only 2 mos., \$25.00; 300 ft. new RG11U cable, \$30; Underwood office mill, \$55; VOM meter, \$15. Tetract P1 converter, pwr supply, used 2 mos., \$15. Frank, WA2FMC, Rte. 111, Smithtown, N. Y. Tel. Andrew 5-2358.

HALLCRAFTERS SX-101A, \$295; HT-32, \$425; HT-33A, \$545; Central Electronics MM-2 \$85; Johnson Kilowatt Matchbox with coupler, \$95; Ham-M rotor, \$85; 2-element Tribander Hy-Gain beam with 100 ft. coax, \$35.00; Bud low-pass filter, \$10; All perfect. Very little usage. New in appearance and in operating performance. Ken Reiter, K9DBL, 240 Powell, Clarendon Hills, Ill.

SELL: Globe Scout 65B, \$60.00; Globe Antenna Matcher, \$10; bug, \$10 or best offer for any item listed. K4LXT, Williamson, Conetoe, N. C.

KWS-1 latest modifications, perfect, \$1025.00; 75A-4, \$475; new 100 v unopened carton, \$625; 32S-1 unopened carton \$575; HT-37, \$365. W8WGA, 3451 Ridge Ave., Dayton 14, Ohio.

VIKING II with matching VFO, used less than 150 hours since reconditioned. \$200 or best offer. Wanted: call letter or standard license plates. K9JOO.

KNIGHT R-100, less than 25 hours use, with xtal calibr., \$120 or your best offer. C. Hunsicker, 255 F. Pringle Circle, Green Cove Springs, Fla.

WANT to sell: 32V2, in exec. condx, with spare final tube, \$275. W8CQF, Russell Dye, 1011 Boland Dr., St. Louis 17, Mo.

KWS-1, D-104 and change-over relay, \$1050; 125 watt Kenyon mod. xfrmr, \$15; B&W KW buterfly, neut. plates and jack bar, \$15. Hank, W2OZD, 3 Elizabeth Lane, West Paterson, N. J. Tel. LAMBERT 3-0991.

QST. Complete run July 1923 to date. Cash and carry—\$100. George Kirchhoff, 169 Riverside Island, Fox Lake, Ill.

EX-W5HO. The famous S.S.B. talking dog and Geo. W. Fahrubel, now K4DP, 1004 Drake Ave., S.E., Huntsville, Ala.

SELL: Year old DX-20 with ext. pwr. supply, jack and BC-348-R rcvr, \$20 each or best offer. You pay shipping costs. W6VIZY, 902 San Benito, Berkeley, Calif.

CITIZENS Band Gonset G11, never used, 12v mobile, and one base station—\$89 each. K2BYB, 14 Cody St., Fords, N. J.

COLLINS 75S-1. In new condx. \$375. W7NOI, 1126 S.W. Curry St., Portland 1, Ore.

WILL Sacrifice Gonset GSB-100, like, new condx, for \$295. In orig. carton. Used very few hours. First check buys. Claude Goodman, Jr., W5KWC, 1803 South Marsalis, Dallas, Texas.

FOR Sale: Viking II xmr. Like-new appearance and condx. With instrux book, \$159. Fred Mehl, W9PYZ, 11460 West 73rd Pl., LaGrange, Ill.

NEED Money for college! Must sacrifice complete SSB station: TX-1 "Apache" and SB-10, in perf. condx, exc. SX-100 w/R46B spkr, brand new AR-22 rotator and 100 ft. cable, Dow-Key coax relay, Johnson filter and 100 ft. RG-8/U coax. Best offer \$550 plus shipping. Charles P. Brooks, K9KOC, 2268 Shannondale Dr., Libertyville, Ill.

NC240CS receiver w/spkr in top condx. Money back guarantee. W8ZHJ, 2444 D, Lincoln, Nebr.

FOR Sale: One AF68 Elmac xmt, including pwr supply; one Gonset G66B, one G 3ir, converter, all for \$375, full price. M. J. Smith, P.O. Box 3434 Term. Annex, Los Angeles 54, Calif.

SELL: BC-221 frequency meter, power supply and modulator, \$85. E. Rogalla, 730 11th St., Peru, Ill.

SELL: Eidico SSB 1000 kilowatt linear. Perfect condx. gray cabinet, half original price, \$385. K2CIV, Tom Patterson, 30 Crescent Lane, Roslyn Heights, L.I., N.Y.

SELL: Heathkit "Apache", exec. condx, SX-99 rcvr and accessories. Write K8GCK, 210 Summit St., Spring Lake, Mich.

SELL: HRO60T, standard coils plus BC band and Hy-Gain 10 M. and 15 M. coils. NBFM adaptor, xtal calibrator, 60S-C 2 comb. spkr and coil storage rack. Reg. amateur nct, \$860. Good as new, goes for \$475. W9ADN, Lockport, Illinois.

SELL: Ranger (new), \$225; Harvey-Wells TB550D with pwr. supp., \$60; Heath AC-1 antenna coupler (new), \$12; Want: gud Viking I, K2DZS, 58 Wayside Lane, Trenton 8, N. J.

FOR Sale: Johnson Kilowatt, speech amplifier, spare tubes and power divider, \$950; Collins 75A4 with new spkr, No. 2157, \$495; Hammarlund HQ-129X with matching spkr. \$139. All the above in v. gud condx. Charles S. Fleming, P.O. Box 88, Forrest City, Arkansas.

COLLINS 32S1 transmitter, \$480; 75S1, \$390; 75A4 with 800 and 15 filters, speaker, vernier knob, \$485. All equipment in "as new" condx. Reason: buying KWM-2. Chet Kucyn, W2BTP, 34 Dumbarton Drive, Huntington, N. Y.

FOR Sale: Eico 720, VF-1 with power supply, brand new, \$85. W. Reynolds, 351 N. Elm St., W. Bridgewater, Mass. W1AJG.

SELL mobile outfit. Stancor transmitter ST203A six volt, crystal controlled with manual; 50S-C Shure Mike; PE103A (six volt) power supply and complete AC power supply. Entire package \$37.50. W2FKF, Center 9-4278.

SELL: Big rig power supply components. Transformer 2500-0-2500 V., each side, 10 and 2.5V secondaries, 115V, primary. Gud for 300 to 400 Ma., \$32. Two big oil filled 2.5 mfd. condensers 3000 D.C. working volts each \$6.00; all three items, \$39. Crating for shipment, \$3.00. W5AMK, Box 31, Temple, Texas.

HIGHLY Effective home-study review for FCF Commercial Phone exams. Free literature. Wallace Cook (Q-10) Box 10634, Jackson 9, Miss.

"HORSE Trader" Ed Moory (W5BDR) will not be undersold: HT-37 used 4 hours, \$359; like new NC-300, \$189; HQ-170C, new, \$239; Johnson Thunderbolt, new in sealed carton, \$459; KWM-2, new demonstrator, \$895; Collins 32S-1, Ser. 2320, used 2 hours, \$499; matching supply 516-F-2, \$85; 30S-1 linear two weeks old, Ser. #425, \$1155; new Viking Ranger \$199; money back guarantee. We pay shipping charge. Terms. Cash, no trades. Ed Moory Wholesale Radio, Box 506, De Witt, Arkansas, Phone Whitney 6-2820.

KWS1, like new condx, high serial number, make fair offer; HT32A, \$525; Model B "slicer", \$50; RME152A tunable converter 2, 6 and 10 meters, \$40; Telrex 20 meter beam, 3' boom, like new, \$75; 30 watt SSB exciter with Collins filter, exc. condx., with VFO, \$75. Several 2-meter xmt's, 60, 80 or 100 watts; new Alliance antenna rotator, \$18; three linear amplifiers, one 400 watts using 4-6146 in parallel built-in nice cabinet with scope, linear amplifier 4-837 tubes in grounded grid, 811 grounded grid amplifier. Am open to offers. All prices F.o.b. W2JMH, 23 Locust Ave., Eatontown, N. J.

75A4 serial 2251, \$500; 75A2 serial 1642, \$325; IKW AM 813s, P.P. final 810s mod. with Viking Ranger exciter, \$450. Peter Chowka, 10 Mansfield Place, Darien, Conn. Tel. OL 5-4570.

FOR Sale: Northern Radio Mod. 115 variable master oscillator; 2-32 Mc. in four bands. Five unit vernier freq. adjustment, similar to BC-221. Oscillators in oven. Used commercially for stable receiver and transmitter control. Excellent for frequency meter or driving transmitter or heterodyne exciter. Orig. cost \$800. Mint condx. \$235 F.o.b. San Antonio. Manual airmailed upon receipt of \$50 deposit. Balance C.o.d. express. Inquire D. B. Olson, W9EAM, Box 65, Von Ormy, Texas.

BIG Sweep: Collins 310-C-2 VFO, orig. power supply buffer, \$100; Gonset Commander xmt 2 to 54 Mc., \$70; Mallory 6V Vibrapack, 300V 200 Ma., \$18; Gonset G66 rcvr, pack with spkr, 12 and 117V, \$140; Magnecondor, professional, 36" rack cabinet; PT6-J, PT6-AH, PT6-M separate take-up panel and motors for 10 1/2" reels, \$300; DuMont 241 oscilloscope 5, 10 cycles to 1 Mc., \$75. Precise 300 oscilloscope 7, DC to 5 Mc., \$80. Measurements by Signal Generator 300 to 100 Mc. AM and pulse modulation, \$135; cash or trade. Can use filter SSB exciter, foldover mast, 144, 220 hi-power finals. lab grade test equipment, R. C. Morris, W2ACH, 41 Peters Ave., Hempstead, L.I., N. Y.

HAM Licenses, resident courses. Novices and General classes, 3 evenings weekly. Delchanty Institute, 117 East 11th St., N. Y. 3. Tel. GR 3-6900.

SX-42, \$125 or offer. 10-15 meter mobile xmt, \$30. PB-1, \$10. W2RPN, 809 Peach, Vinland, N. J.

MOBILE Equipment: Palco Bantam 65-A xmt, PMR7 rcvr, and M-1070 AD-DC supply to power both, \$325. Dale Conrad, Apt. 5, 1525 Arapahoe, Boulder, Colo.

HQ-129X excl., \$135; Viking Adventurer, Knight VFO, plate modulator, excl., \$75; Vibroplex bug, \$15; Astatic mike, \$5, free ARC-5 wx mtr or rcvr. Write for bargain sheet. K2GBH.

FOR Sale: Viking Valiant, perfect mechanical and electrical condx. \$300. F.o.b. W8HWU, 4025 Tallman SE, Grand Rapids 8, Mich.

FOR Sale: All in excellent condx. National NC-183D receiver, \$240; Hallicrafters SP-44 Panoramic adapter, \$45; RME DB-22A Preselector, \$45; Silvertone 2-speed tape recorder, complete with mike and cables, \$50; Phonotrax battery operated tape recorder, new, cost \$70. Will take \$35 complete with speaker, mike and case. Dyer Matlock, 2702 Westwood Ave., Nashville 12, Tenn.

JOHNSON 10-meter Messenger, used three hours. \$135. W3HNE, Malvern, Penna.

COMPLETE File of QST for sale: 1915-1951. Landa, R2, Clayton, Ga.

FOR Sale: BC-221 w/A.C. pwr, \$60; NC-300, \$225; HQ-110, \$196.50; HQ-110C, \$203.50; P & H LA-400 linear, \$145; Heath VFO, \$15; RME \$350 w/matching spkr, \$35; Viking Valiant, \$35; DX-100, \$165; HC-160, \$279.50; HT-32, \$450; Johnson 6N2 converter (14-18 Mc. out), \$47.50; Eico 720, \$92.50; Heath SB-10, \$75; Knight VFO, \$26.50; SX-101, \$250; Viking Ranger, \$195; Johnson Matchstick (like new), \$65; 75A4, \$350; KWS-1, \$1395; 32V-2, \$300; 32V-3, \$350; Collins 310B-3, \$149.50; Viking II, \$169.50; 20A w/458 VFO, \$225; Alpha 6 (6 meter xmt, f.w.) \$64.50; Write Art Brown, W9IHZ, Brown Electronics, Inc. 1032 Broadway, Ft. Wayne, Ind.

KWS-1, \$1200. In top condx. W2ADD.

CRYSTALS Airmailed: SSB, MARS, Marine, Net, Novice, Commercial, etc. Custom finished FT-243, 01% any kilocycle 3500 to 8600, \$1.49 (10 or more 99¢); all Novice 99¢, 1700 to 30,000, \$1.95. All frequencies 60¢ addtl. for HC-6/u hermetic holders. Builders crystal packages; November QST, "Phasing Sideband", \$9.95; June 1958 QST "SSB Package", 3 mixer FT-243, \$9.95; hermetics \$13.95, matched filter, \$6.90 set. All types, if you don't see it be specific, write, Airmailing per crystal. Crystals since 1933, C-W Crystals, Box 2065Q, El Monte, Calif.

COMPLETE Stations for sale. Hammarlund Super Pro rcvr with rack panels, Globe Scout 680A, Globe 755A VFO, mike and accessories. First offer over \$200. Will sell separately if you quote your prices. Also, complete mobile station, also "Bantam" transmitter, 65 watts all-band operation; Gonset Super Six converter; Gonset noise-clipper; PE-101 dynamotor, all cables included. First offer over \$200. Will deliver both units within 100 miles. Tony Morris, 1629 Yale Station, New Haven, Conn.

SELL: Apache, \$225; Mohawk, \$250 or \$450 for both, Excellent condx. Must sacrifice for college funds. K3HMP, P.O. Box 38, Jersey Shore, Penna.

SELL: Gonset 6 mtr. Comm. III, \$190; DX-40, \$55; VF-1, \$10 or offer for \$65.00. A in excellent like-new condx. Earl J. Pysher, Box 144, Bangor, Penna.

DON'T Like one after all. Brand new perfect DX-40, \$65. Bill Kane, K2VPB, 85 South Main St., Pittsford, N. Y.

SELL: Heath Anach, \$200; SX-99 with spkr, \$100; Mosley 4-band grid plane vertical, \$15; Heath Commanche with spkr, \$100; Slim-Jim mobile whip and loading coil, \$15. Gene Rupp, K8MZ2, 68 Mitchell Ave., East Meadow, L. I., N. Y. Phone IVanhoe 9-1575.

SELL Complete station; DX-40, \$55.00; WRL-755 (VFO), \$24; NC-193-D, \$147.00. All like new. Will ship prepaid. KN3MKF, 615 Maryland Ave., Aldan, Penna.

DX-40, AR-3, dipole; excellent, \$95. F.o.b. Piedmont, Ala. King Butler, 506 3rd Ave.

JOHNSON Valiant, like new condx. \$300. John Mansheim, 1311 Ave., B, Ft. Madison, Iowa.

SALE: Globe King 500C, new, \$590; new Birdcage G4ZU beam, \$55; 8' el. 2 mtr. beam and rotator, \$22; W2LFB, 13 Shepard Pl., Nutley, N. J. Phone NOrth 7-7552.

NC-193-D with built-in 2 meter converter and spkr, \$235; Vikings I factory TVI kit, push-to-talk with mike and spare 4D32, \$135; VF-1 10. W3COX, T. J. McCormick, 109 S. Potomac St., Hagerstown, Md.

Will Trade, Century Graphic 2 1/4 x 3 1/4 with Ektar lens. Also Delux enlarger 2 1/4 x 3 1/4. For DX-40 with VFO or AM xmt or ?? WAZGXL, Box 85, Montville, N. J.

RADAR Type SU1, new tested, and working. Will trade or sell. W2QWV, 138 Hillcrest Ave., Summit, N. J.

CANADIANS: HT32A, \$575; SX101M3, \$375. Both as new, in original cartons. For \$900. P. Huber, VE7APN, Vancouver, B. C., Canada.

DEFECTIVE Commercial SSB exciter or transceiver wanted. K2OYN, 449 Hill Street, Boonton, N. J.

COLLINS Receivers reconditioned: 51J5, \$675; 51J2, \$495; 75A-4, \$545; R-725 similar to R-390, \$75; SP-600IX26, \$345; Signal Generator LX-1, \$49; Hickok, #188, \$69; Ranger, \$20; Teletype printers, converters, etc. SX-111, \$205. Alltronics-Howard Co., Box 19, Boston 1, Mass. Tel. Richmond 2-0048.

SELL: DX-35 and VF-1. In excellent physical and working condx; \$60 plus shipping. K2JST, 1717 East "31st", North Little Rock, Arkansas.

FOR Sale: C-w. xmt, 6AG7, 6V6, 813, fully wired, new parts, \$45.00; Par-Metal rack, panels, shelves, 40 ft. high, \$20; 125w. mod. trans. UTC CVM3, driver S-8 unused, both, \$20; trans. cond. and chokes for three power supplies, high, low and mod. \$25. Local W2ADC, Box 201, Elmont, N. Y.

SELL: NC-303 like new, \$325.00; Viking Valiant, factory-wired, bought in 1960. A great buy at \$325, with D-104 mike. K2VXG, Walter Komsa, 92 Maple Ave., Wallington, N. J.

GLOBE-SCOUT 66 xmt, Knight VFO, Knight R100 rcvr w/s-meter and xtal calibrator, in xlt condx. Will accept any reasonable offer. Chuck Tyshko, COMMCO, HOBN, 2nd MARDIV, Camp Lejeune, N. C.

CANADIANS: For sale, 40 ft. self-supporting aluminum tower, 4 1/2 ft. sq. at the base, 8 in. square at the top. Complete w/37 ft. 2-in. pipe, thrust bearing and 1/4 in. guy wire for guying if necessary, \$125. Telorex heavy-duty rotor, 500 R1S, complete with control box and 75 ft. of cable, \$300; 88 ft. of Andrews type HQ Heliax cable with type N fittings both ends, \$100; special Collins 3-el. wide spaced 20 m. beam, only six months use, \$150; matching Collins 3 element wide spaced 15 mtr. beam, brand new, still in wood crate, \$125. Will sell both beams together for \$250. For further info contact, Martin Rosenman, VESMR, P.O. Box 508, Postal Station "F", Toronto 5, Ont.

KWS-1 (\$1,050); 75A4, three filters, 270G-3 sprk, (\$575); all units in top condition. R. Matthews, 4246 Woodfield Lane, Cedar Rapids, Iowa.

FB, Compact, Exciter, Navigator, \$110 H. S. Robb, W0BHA, Bird Island, Minn.

SALE: Globe 65A Hallicrafters S-86, in gud condx, \$50 ea. Leon Lutz, Roberts College, North Chili, N. Y.

COMPLETE 180 watt SSB/140 watt AM/180 watt c.w. station for sale. SX-101A with 2 sprks, 4 months old; B&W 5100B and 518B-B; D-104 mike, Mosley Tribander beam, YA-33SR and 348-20 rotator, 3 mos. old. Complete, you pick up. Sry, no shipping. \$875. Will also sell separately. Henry P. Segal K2-EIO/1, 96 Mayflower Ave., Stamford, Conn. Tel. DAVIS 5-3451.

SALE: Los Angeles or vicinity. Capitol Radio Institute Radio Engineering courses. In perfect condx. Complete course in radio engineering. Complete course in advanced radio broadcast engineering. Complete course in mathematics, algebra through calculus. Cost \$311. Best offer over \$60. Pick up. Write 724 North Crescent Hts. Blvd. Hollywood 46, Calif.

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FOR Sale: CBM-52334-A driver unit, from QGA-1 Sonar equipment; 615, 815, 8075, push-pull parallel 838s into line, 300 lbs. of audio and power supplies. All tubes included. Excellent, make offer. Arthur R. Koch, W2RMA, RD #3, Meadow Drive, Clay, N. Y.

CASH Only: 75A4 receiver \$500, Central Electronics 20A SSBSC exciter, \$125; Wilcox Gay two speed dual track tape recorder, \$60; Vacuum variable, 20-675 μ f, 10,000-3,000 volts, \$48.00. Prices do not include shipping. Write to C. J. Mozzochi, WILYQ, Room 13 Hurley Hall, University of Connecticut, Storrs, Conn.

SELL: HQ-110 in exc. condx, \$150; ship collect. C. A. Smith, K5MGD, 1635 Longview, Wichita Falls, Texas.

WANT: Harvey-Wells APS-50 power supply, RME VHF-152 converter. Durant Imboden, 2210 Grand, San Diego 9, Calif.

CRYSTALS for 2-80 meters; 25 cents each. Send for frequency list Stancor power xfrmer 1200 v.c.t. at 200 Ma., plus filament windings, \$4.75 each plus postage. W6IMC, 210 Alden Rd., Hayward, Calif.

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COLLINS 75A-1 amateur receiver, \$200; Johnson Viking Ranger, \$175; Naval type CRV 43067, radio xmtr, rcvr (xtals absent), \$15.00; Naval type CRV 50248 modulator-dynamotor (modulator absent), \$5.00 CRV 23485 remote control unit w/key, \$5.00; Vibroplex key, \$10. Everything like new condx. Mickey Weems, Box 728, West Columbia, Texas.

GONSET Super-12 mobile converter, sell \$42. In new condition. George Greenstein, 640 West 231st St., Bronx, N. Y. Tel. KI 8-4270.

SELL: Globe Scout 680, in gud condx, used only 20 hours, \$85.00. Bob Blattenberg, 258 Day Ave., Fairview, N. J.

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FOR Sale: Viking Valiant, in excellent condx; \$295; tube checker, I-177-A with MX-949 adapter, like new condx, \$35. All inquiries will be answered. W3YPL, 104 Johns Ave., Gettysburg, Penna.

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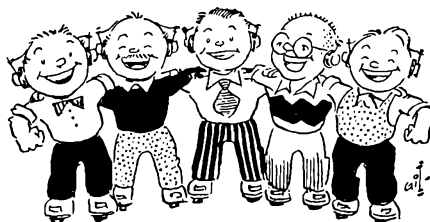
CLEANLY Wired, almost new Ranger xmtr, \$200; Gonset G66 mobile rcvr with Universal power supply, \$190; Gonset six-meter Communicator III \$200. F.o.b. 3150 Daisy, El Paso, Texas. Pete Williams, K5MBZ.

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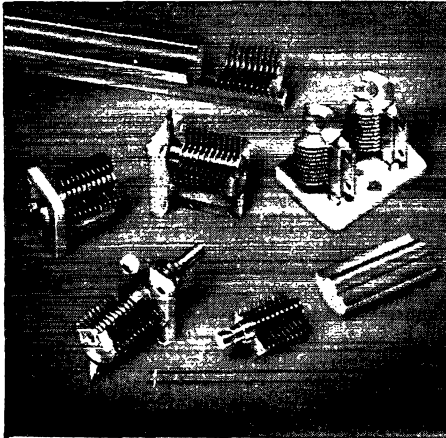
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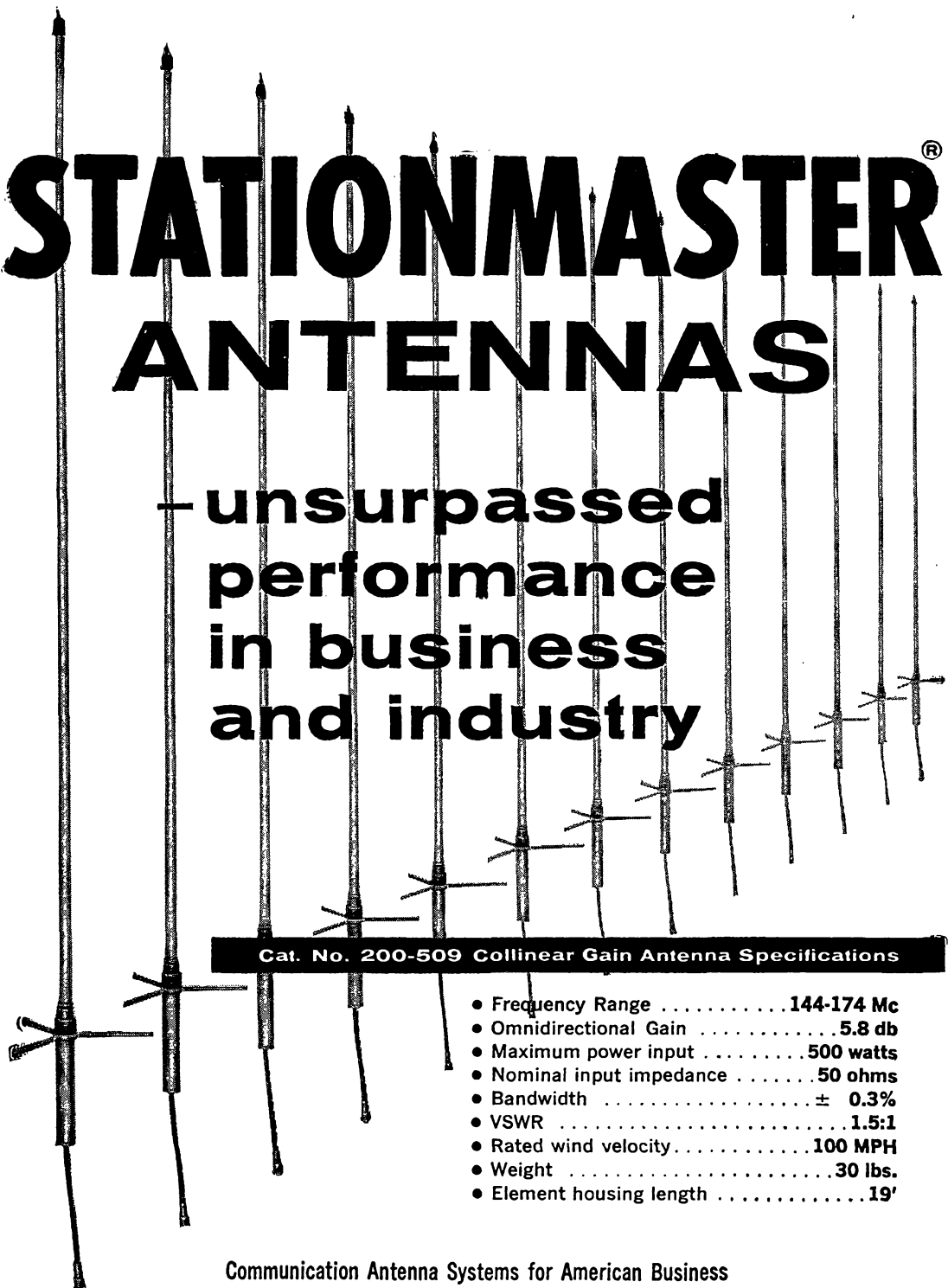
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Index of Advertisers

ACF Electronics Div.	116
Adirondack Radio Supply	151
Alrex Radio	163
Allied Radio Corp.	183
Alltronics-Howard Co.	169
Amateur Electronic Supply	150
American Crystal Co.	169
American Electronics Co.	164, 169
American Radio Relay League	114, 136, 148, 171, 173, 174, 181
Arrow Electronics, Inc.	122, 141
Ashe Radio Co., Walter	152
Barker & Williamson, Inc.	142, 146
Barrington Electronics	154
Barry Electronics Corp.	134
Belden Mfg. Co.	165
Bonn Co., Lew	163
British Radio Electronics, Ltd.	136
Brown Electronics, Inc.	132
Burgess Battery Company	138
Burghardt Radio Supply	167
Burstein-Applechee Co.	169
Call-D-Cal	175
Centimeg Electronics	165
Central Electronics	113
Clarostat Mfg. Co., Inc.	17
Collins Radio Co.	2
Communication Products Co., Inc.	183
Communications Equipment Co.	171
Cornell-Dubilier Electric Corp.	124
Cosmos Industries	122
Crawford Radio, The	158
Cubex Co.	148
Cush Craft	144
Custom Electronics, Inc.	152
Douglas Instrument Lab.	160
Dow-Key Co. Inc., The	154
DXerama	174
Edwards Co., W. H.	154
Elco	129
Eitel-McCullough, Inc.	4
Electro-Voice, Inc.	125
Electronic Supply	155
Electrophysics Corp.	142
Epsilon Records	156
Evans Radio	158
F-Z Way Towers	108, 156, 158, 160, 162
Finney Co., The	127
Fort Orange Radio Distributing Co., Inc.	157
Freck Radio & Supply Co.	174
Gardiner & Co.	144
General Electric Co.	100
Glas-Line Co., The	140
Globe Industries, Inc. (Electronics Div. (Belleville, N. J.))	162
Gonser Div.	107, 117
Gotham	104, 105
Groth Mfg. Co., R. W.	160
Hallcrafters Co., The	1, 95
Ham-Swap	162
Hammarlund Mfg. Co., Inc.	109, 160
Harrison Radio	149
Harvey Radio Co., Inc.	145
Heath Co.	101-103
Henry Radio Stores	137, 172
Hornet Antenna Products Co.	123
House of Antennas	169
Instructograph Co., Inc.	148
International Instruments, Inc.	166
Johnson Co., E. F.	96-99
Key Electronics	159
Knights Co., The James	131
KTV Tower & Communication Equipment Co.	146
Lafayette Radio	161
Lampkin Labs, Inc.	167
Lettine Radio Mfg. Co.	172
L W Electronics Lab	10
Master Mechanics Mfg. Co.	136
Master Mobile Mounts, Inc.	133
Mercury Enterprises	158
Millen Mfg. Co., Inc., James	182
Mosley Electronics, Inc.	111, 119
National Radio Co., Inc.	Cov. III
Nell Co., The	126
Neison Publishing Co.	171
North Hills Electronics, Inc.	154
Organs & Electronics	134
P & H Electronics, Inc.	130
Pausan Co.	138
Penta Labs, Inc.	136
Petersen Radio Co., Inc.	5
Radio Shack Corp.	139, 147
Raytheon Mfg. Co.	106
RCA Electron Tube Div.	Cov. IV
Rider Publisher, Inc., John F.	150, 153
Savoy Electronics, Inc.	170
Shure Bros., Inc.	128
Skylane Products	130
Solar Electronics Corp.	175
Sonar Radio Corp.	167
South Bay Electronics Co.	171
Swartzlander Radio, Ltd.	167
Sylvania Electric Products, Inc.	112
Tapedcode	152
Tapetone, Inc.	166
Technical Materiel Corp.	7
Tecraft	118
Tel-Instrument Electronics Corp.	173
Telex	173
Telrex, Inc.	115, 150, 173, 174
Tennalab	175
United Transformer Corp.	Cov. II
Van Sickle Radio Supply Co.	175
Vesto Co., Inc.	170
Vibroplex Co., Inc., The	140, 175
Webster Electric	144
Webster Mfg. Co.	120
Wilson, Inc., Willard S.	162
World Radio Labs	143, 164
Zelle, Joseph	174
Zimco Alarms	173



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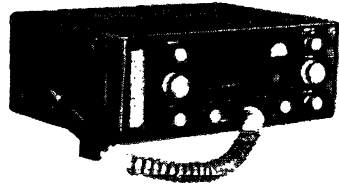
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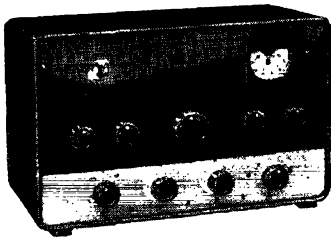
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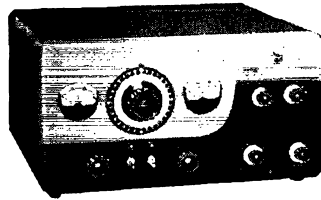
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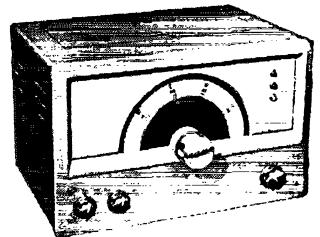
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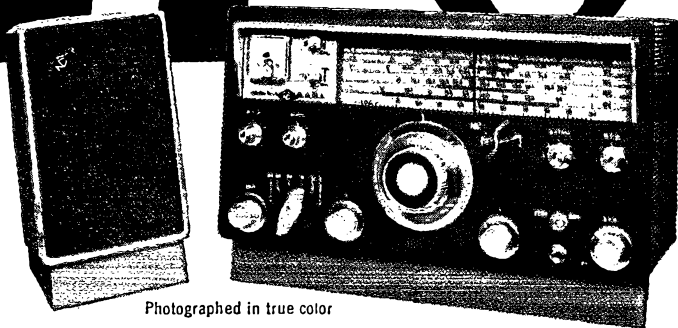


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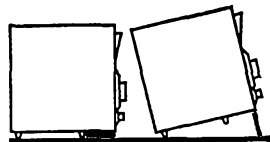


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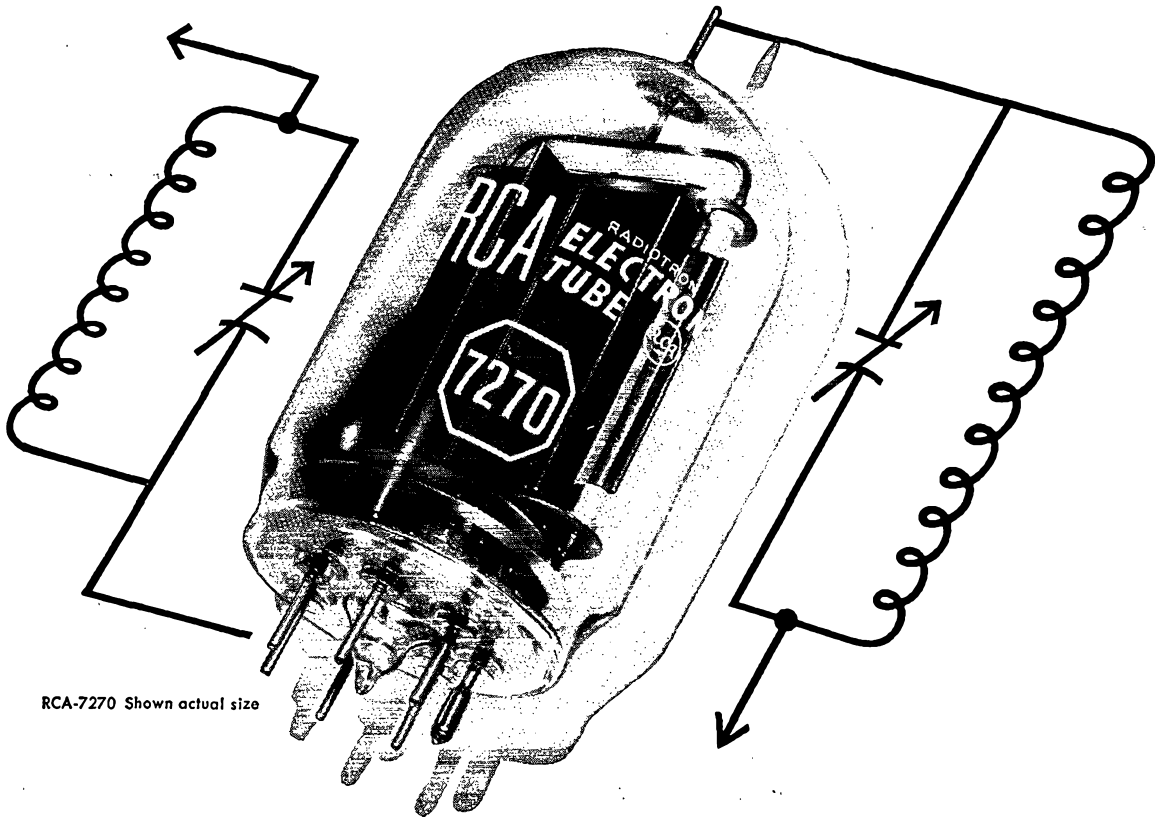
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Typical Operation in Amateur Service to 54 Mc

Type of Service	CW	AM	SSB (AB1) ▲
Heater Volts	6.3	6.3	6.3
DC Plate Volts	1250	1000	1250
DC Grid No. 2 Volts	300	400	400
DC Grid No. 1 Volts	-80	-107	-50
DC Plate Ma	250	190	185*
Required Driver Power Output Watts (approx.)	4	4	4.5*
Useful Output Watts (approx.) ●	225	130	135*

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 ●Measured at load of output circuit having 90% efficiency



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