May 1963
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QST

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amateur radio

IN THIS ISSUE—SWEEPSTAKES CONTEST

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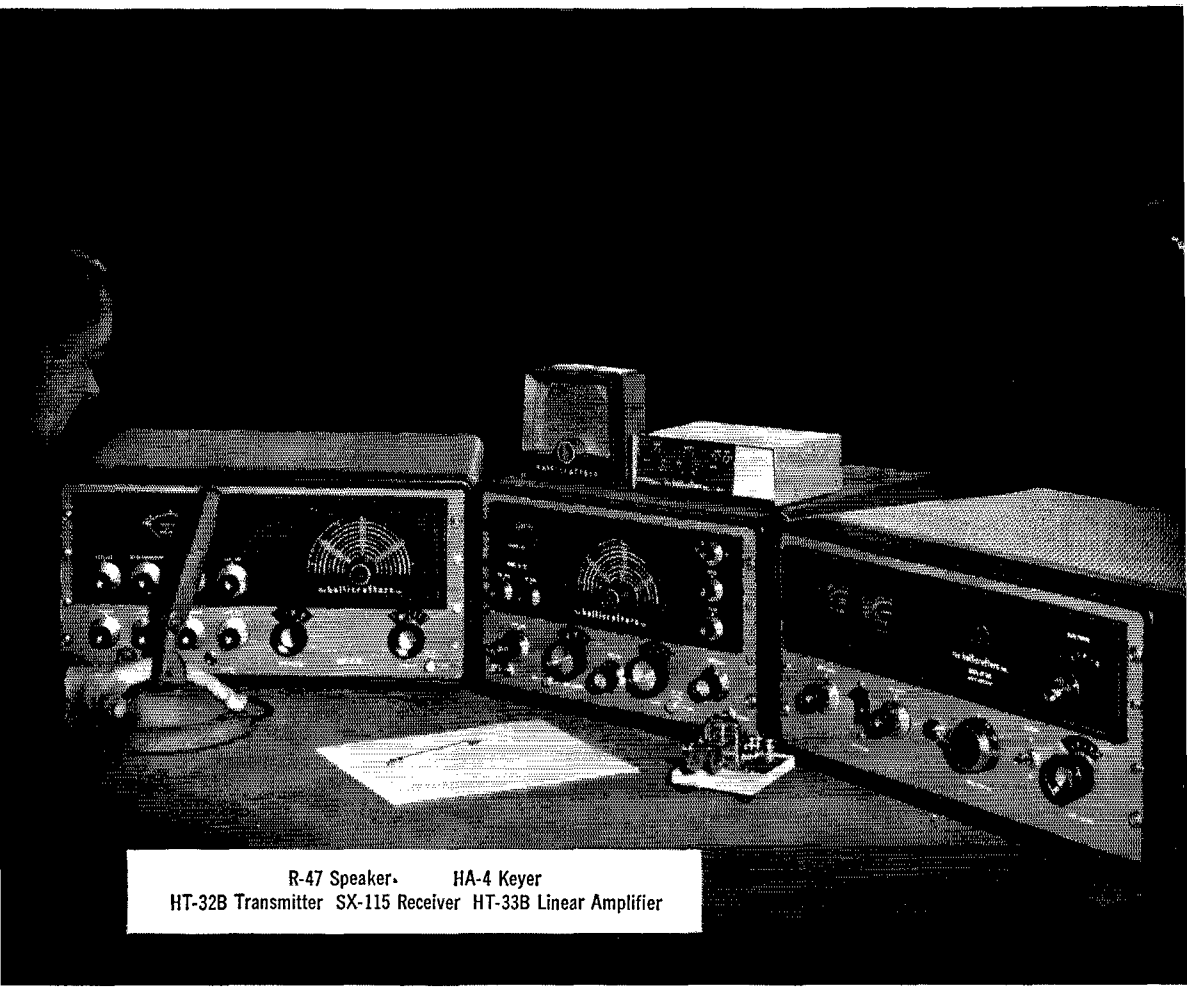


R-47 Speaker HA-4 Keyer
HT-32B Transmitter SX-115 Receiver HT-33B Linear Amplifier

The time-proven excellence of hallicrafters' HT-32B and HT-33B . . . the incomparable performance of the new SX-115 . . . the HA-2 and HA-6 transverters . . . and the fully transistorized HA-4 electronic keyer . . . now team up to bring you maximum flexibility and full coverage of 80 through 2 meters on SSB, CW and AM.

with 80 through 2
in one complete SSB/CW/AM station!

Examine these outstanding features

HT-32B TRANSMITTER.
FEATURES: Beam-deflection, high level sideband modulator for low-noise, high-stability signal, Hallicrafters' exclusive 5.0 Mc. quartz crystal filter with sideband rejection of 50 db. or more; CTO direct reading in kilocycles to within 1 kc.; 144 watts plate input (P.E.P. two-tone). Five band output (80, 40, 20, 15, 10 meters). All modes of transmission—CW, AM, SSB. Unwanted sideband down 50 db. or more. Both sidebands transmitted on AM Precision gear driven CTO. Exclusive Hallicrafters patented sideband selection. Logarithmic meter for accurately tuning and carrier level adjustment. Ideal CW keying and break-in operation, push-to-talk and full voice control system built in. Keying circuit brought out for teletype keyer.

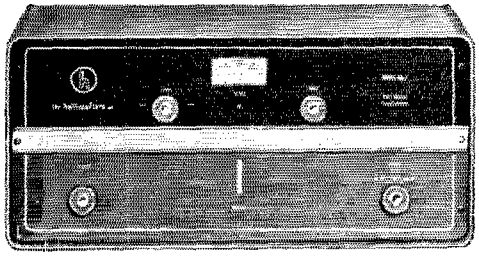
HT-33B LINEAR AMPLIFIER.
FEATURES: Rated conservatively at the maximum legal input. Third and fifth order distortion products down in excess of 30 db. Built-in R.F. output meter greatly simplifies tune-up. All important circuits metered. Maximum harmonic suppression obtained through pi-network. Variable output loading. Protection of power supply assured by circuit breaker. HT-33B is a perfect match to Hallicrafters' famous HT-32B in size, appearance and drive requirements. *CIRCUIT DETAILS:* This power amplifier utilizes a PL-172 high efficiency pentode operating in class AB1. The tube is grid-driven across a non-inductive resistor, thus assuring the maximum stability under all possible conditions. Band switching is accomplished by one knob which selects the proper inductance value for each band. The output circuit is a pi-network with an adjustable output capacitor, accommodating loads from 40 to 80 ohms. 2 panel meters are provided: one is circuit switched to measure grid current, screen current, plate voltage and R.F. output voltage. A second meter continuously monitors cathode current of the PL-172.

SX-115 RECEIVER.
FEATURES: High order of mechanical and electrical stability; linear tuning; constant tuning rate; separate noise limiters for SSB/CW/AM; amplified dual loop AVC with fast attack-slow release; spurious signal and image rejection better than 60 db. 1 kc calibration marks; transmitter-type VFO with differential TC; 100 kc crystal calibrator; crystal controlled 1st and 3rd conversion oscillators; selectable sidebands; selectivity variable in five steps from 500 to 5000 cycles; product detector for SSB/CW envelope detector for AM; I.F. type noise limiter for SSB/CW automatic threshold series type for AM; band gain equalization; audio inverse feedbacks; "S" meter functions with AVC off. *SENSITIVITY:* Less than 1 microvolt on AM—less than ½ microvolt on SSB/CW. *FREQUENCY COVERAGE:* Nine 500 kc segments covering 3.5-4.0 Mc.; 7.0-7.5 Mc.; 14.0-14.5 Mc.; 21-21.5 Mc.; 28.0-30.0 Mc.; (4 segments); and WWV.

HA-2—HA-6 TRANSVERTERS. A sensible, new approach to VHF operation! Engineered with the usual Hallicrafters precision, these transverters will convert your present 10-meter station to VHF . . . AM, CW, SSB, RTTY, FM capability. All modes of transmission and reception on your present equipment are useable with these units. A nuvistor front end in the receiver section provides excellent sensitivity and noise figure.

FEATURES: Converts received VHF signals down to 10 meters for reception. Converts 10-meter signal to VHF for transmission. 5894 tube in transmitter final amplifier can be driven up to 120 watts input. Can be driven by exciters with 10 to 100 watt capability. Built-in coaxial antenna relay.

HA-4 "T.O." KEYER. Compact design, employs digital techniques. Fully transistorized. **R-47 SPEAKER.** Designed for communications. Flat response from 300 to 2850 cps. Input impedance: 3.2 ohms.



HA-2—HA-6

The new ideas in communications are born at...

hallicrafters

Overseas Sales: Contact Hallicrafters Commercial Products Division.
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Beginning today, you can transmit and receive on 6 and 2 with one unit, the Collins 62S-1 VHF Converter, and without changing cables. The 62S-1 is a self-contained unit (using exciter's high voltage) and supplies a 3 to 5 db noise figure on receive... 160 watts PEP input on transmit.

You can use the 62S-1 to cover 49.6 to 54.2 and 143.6 to 148.8 mc (crystals for amateur bands provided). The 62S-1 is system engineered for the S-Line/KWM-2 and needs no additional power when used with this equipment. And here's something else. The Collins 62S-1 will convert most equipment operating in the 14.0 to 14.2 mc range.

Visit your Collins distributor and ask him to demonstrate the 62S-1. Once you've seen the 62S-1 perform, you won't want to be without it. While visiting your distributor, ask him about trade-in value of Collins S/Line equipment — you'll realize how little it costs to operate the finest.

COLLINS

QST

MAY 1963

VOLUME XLVII • NUMBER 5

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—CONTENTS—

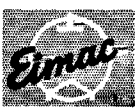
CHART YOUR COURSE TO EIMAC

for dependable, high quality power tubes

EIMAC TYPE	CLASS OF OPERATION / SERVICE	TYPICAL OPERATION — SINGLE TUBE								
		D.C. PLATE VOLTAGE	D.C. PLATE CURRENT (AMPERES)	D.C. SCREEN VOLTAGE	D.C. GRID VOLTAGE	APPROX. MAX. DRIVE POWER (WATTS)	APPROX. D.C. SCREEN CURRENT (AMPERES)	APPROX. D.C. GRID CURRENT (AMPERES)	APPROX. MAX. POWER OUTPUT (WATTS)	FILAMENT VOLTS / AMPERES
3-400Z	B / SSB	3000	.100 / .333[3]	—	0	32	—	.12	655	5.0 / 14.5
3-1000Z	B / SSB	3000	.240 / .670[3]	—	0	65	—	.30	1360	7.5 / 21.3
4CX250B[1]	AB1/SSB	2000	.1/.25[3]	350	−55[5]	0	0/.005[3]	0	300	6.0 / 2.5
	C/CW	2000	.25	250	−90	2.9	.019	.026	390	
	C/AM	1500	.20	250	−100	1.7	.02	.014	235	
4CX300A	AB1/SSB	2500[6]	.1/.25[3]	350	−55[5]	0	0/.004	0	400	6.0 / 2.5
	C/CW	2500[6]	.25	250	−90	2.8	.016	.025	500	
	C/AM	1500	.20	250	−100	1.7	.02	.014	235	
4CX1000A	AB1/SSB	3000	.25/.90[3]	325	−60[5]	0	−.002/.035	0	1680	6.0 / 10.5
4-65A	AB1/SSB	3000	.015/.065[3]	360	−85[5]	0	0/.006	0	130	6.0 / 3.5
	C/CW	3000	.112	250	−105	1.6	.022	.009	270	
	C/AM	2500	.102	250	−150	3.1	.026	.013	210	
4-125A	AB1/SSB	3000	.03/.105[3]	510	−95[5]	0	0/.006	0	200	5.0 / 6.5
	B/SSB[4]	3000	.02/.115[3]	0	0	16	0/.03	0/.055	240	
	C/CW	3000	.167	350	−150	2.5	.03	.009	375	
	C/AM	2500	.152	350	−210	3.3	.03	.009	300	
4-250A	AB1/SSB	3000	.055/.21	600	−110[5]	0	0/.012	0	400	5.0 / 14.5
	C/CW	3000	.345	500	−180	2.6	.06	.01	800	
	C/AM	3000	.225	400	−310	3.2	.03	.009	510	
4-400A	AB1/SSB	3000	.09/.30[3]	810	−140[5]	0	0/.018	0	500	5.0 / 14.5
	B/SSB[2][4]	3000	.07/.30[3]	0	0	40	0/.055	0/.10	520	
	C/CW	3000	.35	500	−220	6.1	.046	.019	800	
	C/AM	3000	.275	500	−220	3.5	.026	.012	630	
4-1000A	AB1/SSB	4000	.17/.48[3]	1000	−130[5]	0	0/.04	0	1130	7.5 / 21.0
	B/SSB[4]	4000	.12/.67[3]	0	0	105	0/.08	0/.15	1870	
	C/CW	4000	.70	500	−150	12	.137	.039	2100	
	C/AM	4000	.60	500	−200	11	.132	.033	1910	
3CX100A5 / 2C39A	C/CW[7]	800	.08	—	−20	6	—	.03	27	6.3 / 1.0
	C/AM[7]	600	.065	—	−16	5	—	.035	16	

[1] Ratings also apply to 4X250B.
[2] Ratings apply to 4-250A within plate dissipation limitation.
[3] Zero signal and maximum signal dc current.
[4] Grid and screen grounded, cathode driven.
[5] Adjust to give stated zero-signal plate current.
[6] For operation below 250 Mc only.
[7] At 500 Mc.

Above you see popular Eimac tube types suitable for ham transmitters. Remember this chart when you need a tube. And remember the name Eimac. It means power. Quality. Dependability. For Eimac has more know-how, more experience with power tubes than any other manufacturer. Your local Eimac distributor can supply you with any of these tubes listed and Eimac sockets to match. Or for complete data, write Amateur Services Department, Eitel-McCullough, Inc., San Carlos, California. Subsidiaries: Eimac, S. A., Geneva, Switzerland; National Electronics, Geneva, Illinois.



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Since 1934, amateurs everywhere have applauded the fine dependability, activity, high output, economical operation and hair-line accuracy of PR Crystals. Get PRs now for your rig, and you'll have the finest precision frequency control that money can buy!

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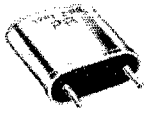
(All Z-2 Crystals calibrated with a load capacity of 32 mmfd.)



Third Overtone, PR Type Z-9A, 24,000 to 24,666 and 25,000 to 27,000 Kc., ± 3 Kc. . . $3.95 Net

6 Meters, Fifth Overtone, PR Type Z-9A, 50 to 54 Mc., ± 15 Kc. . . . . $4.95 Net

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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 areas shown to qualified League members holding Canadian or FCC amateur license, Genera or Conditional Class or above. These include ORS, OES, OPS, OO and OBS. SCMs desire applications for SEC, EC, RM and PAM where vacancies exist. OES, v.h.f. bands appointment, is available to Technicians and Novice, as well as to full-privilege amateur licensees.

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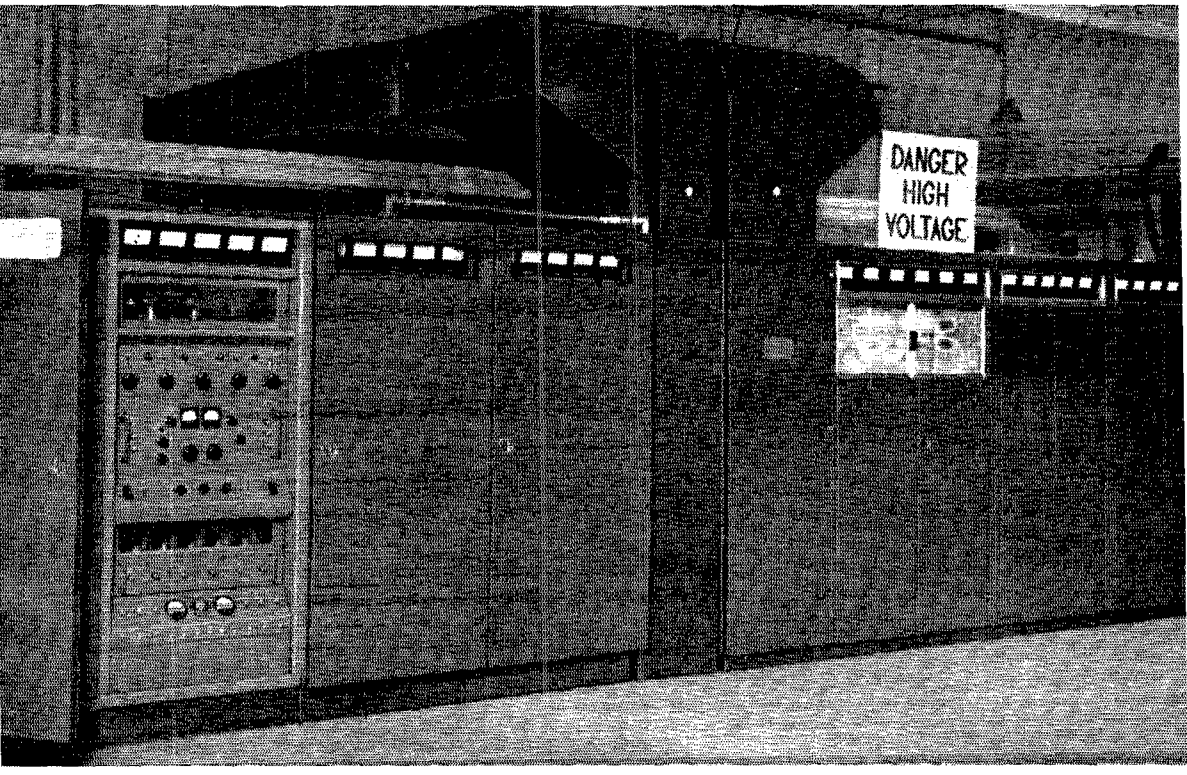
* Official appointed to act temporarily in the absence of a regular official.

GPT-200K

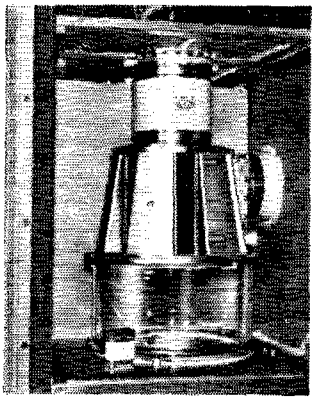
200 KILOWATTS



(AN/FRT-62)

This is a complete general purpose transmitter providing SSB, ISB, AM, compatible AM, CW, FSK and FAX modes of operation. Accuracy and resetability is 1 part in 10^8 per day with tuning in 100 cps steps from 2-28 mcs.

Conservative ratings provide reserve power for maintaining peak power under conditions of complex waveform transmission, such as 64 tone voice frequency modulation, while adhering to signal to distortion ratio of at least 35 db. The final amplifier in the GPT-200K is air cooled. This transmitter is capable of 20 kc bandpass at the 3 db points.



For complete detailed specifications, request TB 1014A.

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THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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

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132 Guild St., N.E., Grand Rapids 5, Mich.

Hudson Division

MORTON B. KAHN W2KR
22 Birch Hill Rd., Great Neck, N. Y.

Vice-Director: Harry J. Dannals W2TUK
RFD 1, Arbor Lane, Dix Hills, Huntington, L. I.

Midwest Division

ROBERT W. DENNISTON . . . . . WØNWX
Box 631, Newton, Iowa

Vice-Director: Sumner H. Foster . . . . . WØGQ
2315 Linden Dr., S.E., Cedar Rapids, Iowa

New England Division

MILTON E. CHAFFEE W1EFW
28 Reussner Rd., Southington, Conn.

Vice-Director: Bigelow Green W1EAE
236 Marlboro St., Boston 16, Mass.

Northwestern Division

R. REX ROBERTS W7CPY
37 Park Hill Drive, Billings, Mont.

Vice-Director: Robert B. Thurston W7PGY
7700 31st Ave., N.E., Seattle 15, Wash.

Pacific Division

HARRY M. ENGWICHT W6HC
770 Chapman, San Jose 26, Calif.

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

Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
428 Maple Lane, Danville, Va.

Vice-Director: Joseph F. Abernethy W4AKC
768 Colonial Drive, Rock Hill, S. C.

Rocky Mountain Division

CARL L. SMITH . . . . . WØBWJ
1070 Locust St., Denver 20, 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 20644, Municipal Airport Branch,
Atlanta 20, Ga.

Southwestern Division

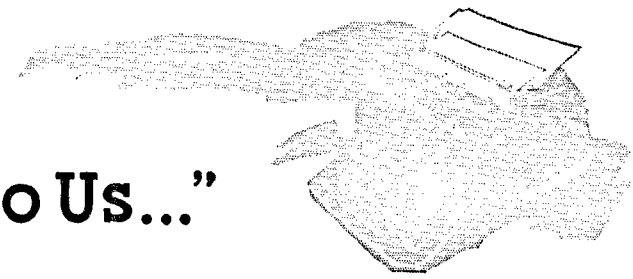
RAYMOND E. MEYERS W6MLZ
Box R, San Gabriel, Calif.

Vice-Director: Virgil Talbott W6GTE
1175 Longhill Way, Monterey Park, Calif.

West Gulf Division

ROEMER O. BEST W5QKF
P.O. Box 1655, Corpus Christi, Texas

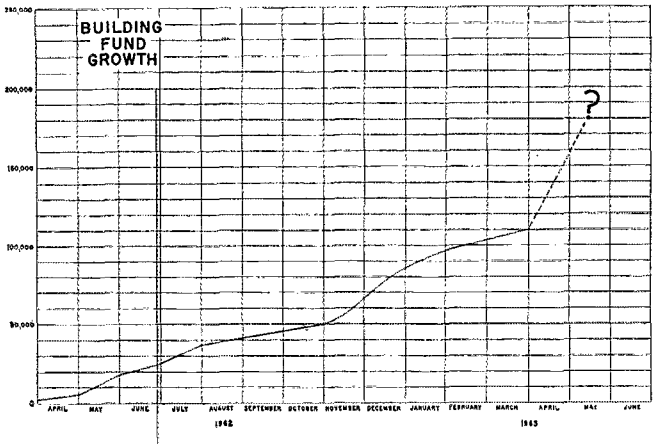
Vice-Director: Ray K. Bryan W5UYQ
2117 S.W. 61st Terrace, Oklahoma City 18, Okla.



"It Seems to Us..."

Our Building Fund — A New Challenge

IN the early days of the League, Hiram Percy Maxim and some of his amateur friends donated the funds to get our organization on its way to a successful career. By present standards, and in view of what happened since, the amount they contributed seems pitifully small. But it did the job, and their confidence in the future of amateur radio and the League was justified far beyond their wildest dreams. The foundations they laid half a century ago were strong ones, and we owe them a deep measure of gratitude.



From a few hundred members in 1914, the League has grown to over 100,000 today. From the voluntary efforts of a handful of individuals, we have enlarged the staff organization to 65 full-time people in the publication, communications, technical and administrative departments of our headquarters. During just the past 18 years, the number of amateurs and League members has tripled, yet our headquarters physical facilities have remained the same. The result is that our staff is attempting to carry on the League's work in outmoded, cramped quarters. Two years ago our directors decided — and wisely, I think — that a new headquarters building was a "must."

The League is in good financial shape. Thus we might have financed the construction by dipping into reserve funds and by going into debt. But these reserves had been slowly accumulated over a long period of years against the possible need of a rainy day, and it did not seem prudent to dissipate them in this way — let alone to incur an unpaid obligation.

An inquiry to our membership indicated overwhelming support for a campaign to raise the funds by individual contribution, and the directors decided to pursue that course at annual meeting last May. Morton B. Kahn, W2KR, has done an outstanding job as chairman of the building committee. The campaign got underway last year, and since then he and his committee have raised well over $100,000. More than 8000 members have participated and contributions continue to arrive steadily.

There are some members of the League who have been particularly successful in their business ventures, and who feel an obligation to amateur radio as the thing which first kindled their interest in a career in electronics. A small group of these men have joined together to create a fund of $75,000 — more than half the amount still outstanding — on condition that it will be matched dollar-for-dollar by the membership at large. The League is deeply grateful for this offer.

I believe this is a real challenge — for any future contributions which our members make will be matched by an equal amount from this public-spirited group. Thus, every dollar that is donated from now on will do the work of two dollars in completing the building project.

The generous response we have had from these old-timers will, I know, give an enormous lift to the Building Fund drive, and for the first time the goal is now in plain sight.

HERBERT HOOVER, JR., W6ZH

COMING A.R.R.L. CONVENTIONS

May 18–19—Pacific Division, Fresno, California
May 25 — *
June 1–2 — Oregon State, Eugene
June 7–9 — West Gulf Division, McAllen, Texas
June 15–16 — Rocky Mountain Division, Pueblo, Colorado
June 30 and July 1 — Saskatchewan Province, Moose Jaw
July 6–7 — West Virginia State, Jackson's Mill
Aug. 31 and Sept. 1 — Atlantic Division, Washington, D. C.
September 14 — Kentucky State, Lexington
September 28 — Ontario Province, Hamilton
October 4–6 — ARRL National, Cleveland, Ohio
October 11–13 — Southwestern Division, San Diego, Calif.
October 26–27 — Midwest Division, Wichita, Kansas
November 29–30 — Delta Division, Lafayette, Louisiana

** The Wisconsin State Convention shown in April QST should have been listed as a hamfest: see this month's Hamfest Calendar.*

See Page 41

PACIFIC DIVISION CONVENTION
Fresno, Calif. — May 18–19

The Pacific Division Convention will take place on Saturday and Sunday, May 18 and 19, in Fresno, California. Headquarters for convention activities will be the Towne and Country Lodge. A full slate of technical talks and demonstrations is planned, plus many interesting activities for YLs and XYLs. ARRL President Herbert Hoover, Jr., W6ZH, and Pacific Division Director Harry Engwicht, W6HC, are featured speakers, together with ARRL National Emergency Coordinator George Hart, W1NJM.

The pre-registration fee of $6.50 per person includes the convention banquet; requests should be postmarked not later than May 7. For further information on registration and motel reservations, contact the Registration Chairman, Howard Craven, W6DUD, P.O. Box 783, Fresno, California.

OREGON STATE CONVENTION
Eugene, Oregon — June 1–2

The Oregon State Convention will be held on Saturday and Sunday, June 1 and 2, in Eugene. Activities, which will center at the Eugene Hotel, will include several technical talks, various contests, group meetings, and a "swap-shop." An interesting program for the ladies is planned, including tours, a "make-a-purse" contest, and a fashion show. There will also be an opportunity for those arriving on Friday evening to register and get together informally. Convention activities will terminate with the convention banquet on Sunday afternoon.

Pre-registration will be $10.00 for amateurs, $5.00 for non-amateurs, through May 10; $1.00 additional for either, after this date. Full registrations will include the banquet, Sunday breakfast and Sunday meetings, Hospitality room and all other convention activities. Requests for tickets and hotel or motel reservations should be sent to O.A.R.A., 1075 West Hilliard Lane, Eugene, Oregon.

WEST GULF DIVISION CONVENTION
McAllen, Texas—June 7–9

The West Gulf Division Convention will be held on Friday, Saturday and Sunday, June 7, 8 and 9, in McAllen, Texas, at the newly completed McAllen Civic Center. Friday evening will be highlighted by the pre-convention party to be held at the Fairway Motor Hotel. Aeronautical mobile stations will be welcomed by the aeronautical welcoming committee; the convention site is next to the airport.

ARRL First Vice-President "Soupy" Groves, W5NW, will be the master of ceremonies on Saturday, when a number of speakers will be on hand. Jim Sage, of Southwestern Bell Telephone, will speak on the maser; R. W. Drobish, W9QVA, of Hallicrafters, will give a talk on "Operation World Wide"; and Irving Seligmann, W5UB, will speak on printed circuits. Also present will be Major Henry C. Becker, Chief of Army MARS; ARRL Technical Editor George Grammer, W1DF; Harold Vance, K2FF, of RCA; Wayne Green, W2NSD, of *73;* and Bill Ashby, K2TKN, of Cornell Dubilier.

During the course of the convention, there will be luncheons for v.h.f., s.s.b., RTTY and programs for the ladies. Initiations will be held for both the Royal Order of the Wouff Hong and SWOOP. Activities will conclude with the banquet on Sunday afternoon.

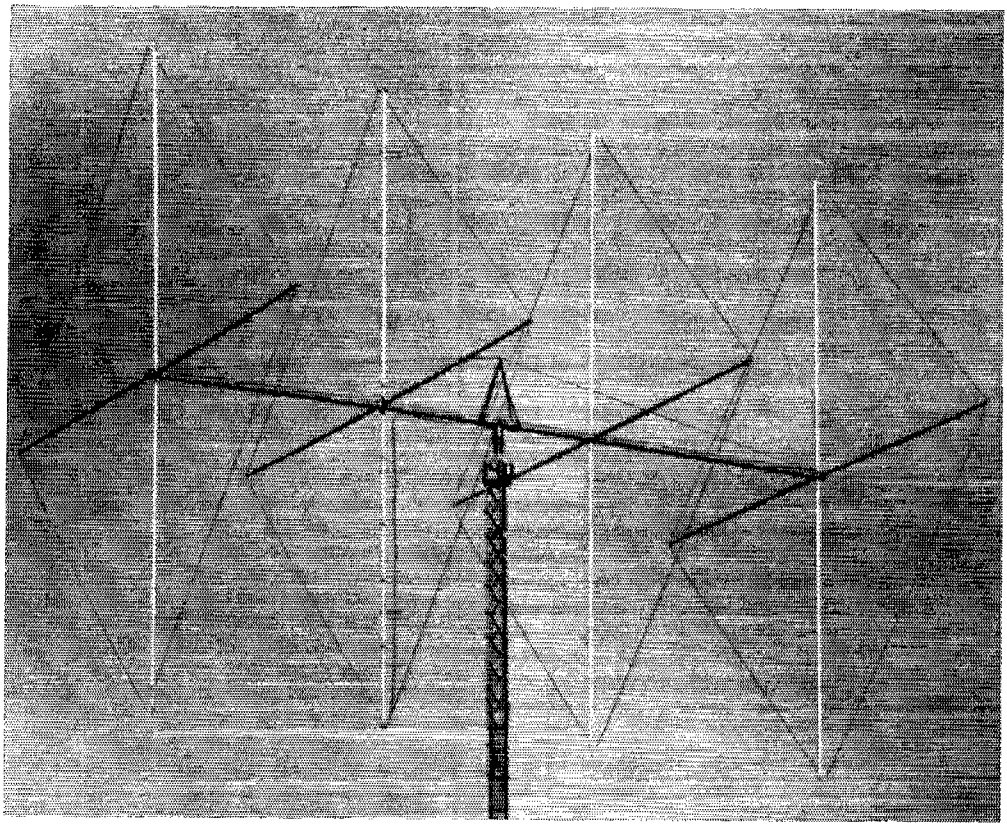
Registration is $10.00 in advance (including the pre-convention party) or $10.00 at the door and $1.50 extra for the party. For more information, contact the Magic Valley Radio Club, P. O. Box 3589, Station 1, McAllen, Texas.

ARRL NATIONAL CONVENTION
Cleveland, Ohio — October 4–6

Vacation planning time is here! Be sure to set aside a few days to attend the 13th National ARRL Convention, October 4–5–6, at Cleveland, Ohio. Cleveland is a great convention city with many attractions for all members of the family. Those coming long distances are fortunate indeed as the countryside will be decked out in its most beautiful fall colors.

Convention headquarters will be in a brand new section of the Sheraton-Cleveland Hotel

(Continued on page 164)



The four-element quad at WØAIW has a driven element (second from left in this view), reflector, and two directors. The boom and supports are aluminum tubing. Horizontal crossarms are broken by insulators to minimize coupling to the antenna. Continuous wire loops, with no stubs, are used for each element.

The Multielement Quad

BY LEE BERGREN,* WØAIW

THE quad made its appearance on the amateur bands shortly after World War II, and since that time it has been pretty much a controversial antenna. Probably the reason for this is that some of the information published and voiced over the air has not been correct. Whether or not the quad is superior to the Yagi can usually start an argument. However, unless all the conditions are fully defined, the argument has little or no meaning. Reviewing a few of the quad fundamentals is perhaps in order before going into the details of the four-element quad shown in the photographs.

The quad in its simplest form consists of a length of wire formed into a square with a side length of approximately ¼ wavelength. The wire diameter can vary several sizes with little effect on the antenna performance. The feed-point terminals are located either at the middle of one side or at one of the corners, as shown in Fig. 1.

* Radio Industries, Inc., 1319 Central Ave., Kansas City, Kansas.

The author discusses the results of his considerable experience with quad antennas in this article, and in addition gives constructional details of a four-loop quad that has given an excellent account of itself in DX work.

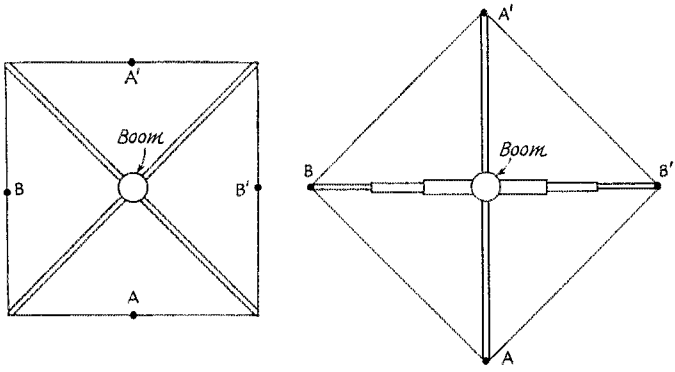


Fig. 1—Two quad loop configurations. In either case, feeding at *A* or *A'* will result in horizontal polarization; feeding at *B* or *B'* will give vertical polarization.

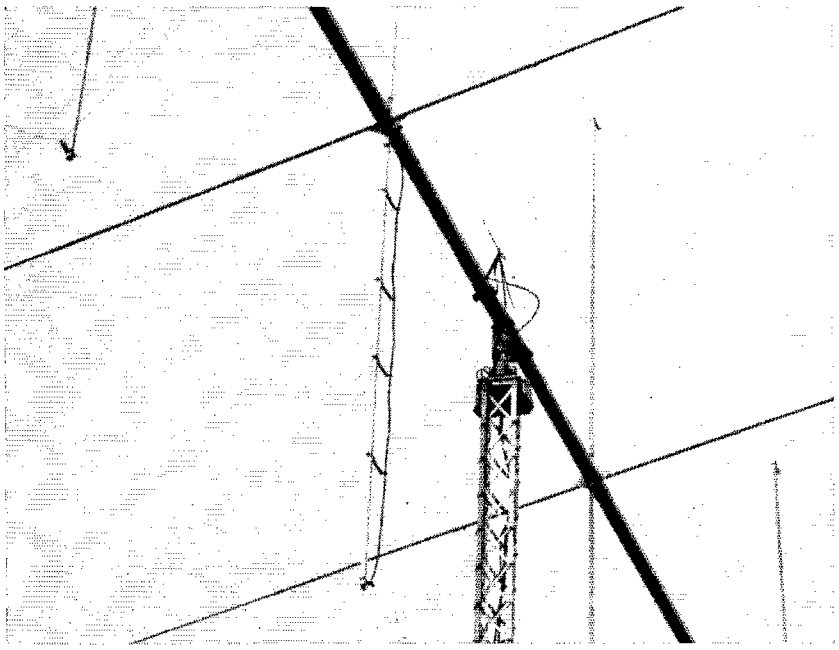
The popular quad configuration has been a driven element with a parasitic reflector. Not too much has been done with multi-element quads, and it seems to be popular belief that not too much could be gained by adding directors. Like many old wives' tales, this is far from the truth. It is well known that directors on a Yagi-type antenna will increase its directivity and gain, and it is equally true that the directivity and gain of quad-type antennas respond similarly.

Polarization

The polarization of the quad depends on where it is fed. If the feed point is at either the top or bottom, the antenna is horizontally polarized. If the feed point is at either side, the antenna is vertically polarized. Or, as illustrated in Fig. 1, feed points *A* and *A'* in either configuration will yield horizontal polarization and feed points *B* and *B'* will yield vertical polarization.

As a point of interest, the quad's response to polarization opposite to the one intended is down some 30 db. This can be proved mathematically and quite simply verified experimentally. Assume that the quad is used as a horizontally-polarized receiving antenna with an r.f. milliammeter inserted at point *A*, and that a balanced horizontal dipole transmitting antenna is located on the quad axis several wavelengths away. Power into the transmitting dipole is increased until the r.f. milliammeter in the quad reads full scale. Then if the quad is rotated 90 degrees about its center axis, the milliammeter reading will fall to near zero, showing that the response to vertical polarization is down more than 20 db. (20 db. is about the maximum that can be read from full-scale to near zero on a thermocouple-type meter.)

Why use horizontal polarization? Well, principally because this type of polarization is easier to work with. A horizontally-polarized quad with



Boom support, rotating mechanism, and feed. The coax cable is supported on standoffs from the lower half of the driven-element vertical crossarm, to reach the feed point at the lower corner of the quad loop.

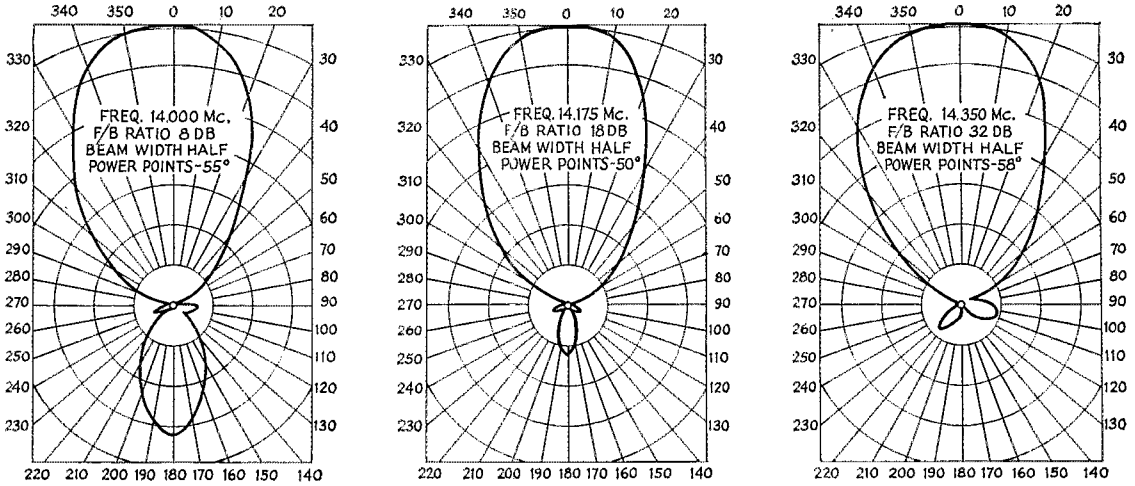


Fig. 2—Measured horizontal directional patterns of the four-element quad at three frequencies in the 14-Mc. band. Driven element resonated at the band center, directors adjusted for maximum gain at high-frequency end, reflector adjusted for maximum gain at low-frequency end.

the desired number of elements can be tuned at a convenient height above ground (¼ wavelength or so) and when put on the metal tower or pole it will still be in tune. If the antenna were vertically polarized, it would certainly be detuned when put on the tower. The reason for this, of course, is that the metal in the tower and the vertical transmission line would couple to the antenna elements, disrupting the current relationships that make it a directional antenna.

Of the two configurations in Fig. 1, the one with the feed points at the midspan has been most generally used. However, there are two good reasons why the quad should be fed at a corner. First, the vertical supports for all elements can be made of aluminum tubing. Since the antenna is horizontally polarized this metal in the vertical plane has essentially no effect on the performance and, as is well known, aluminum tubing of the hard-tempered variety is an excellent material for antenna construction. Second, the high-current points of the antenna are physically separated by a greater distance. Each element loop in a horizontally-polarized quad consists of two half waves in phase stacked vertically. The greater the physical separation of the high-current points in the two half waves, the lower the angle of maximum radiation in the vertical plane. The current distribution in a half-wave dipole is known to be approximately sinusoidal, so it seems safe to assume that the current distribution in a quad element is also sinusoidal. Using this hypothesis and by current summation, it can be shown that the stacking factor of the two half waves in phase in each element loop is improved by feeding at a corner rather than at the midpoint of a span.

Vertical-Plane Radiation

The gain and tuning of a quad antenna go hand in hand, but this is equally true of any multi-element parasitic-type antenna. The gain of amateur antennas is always referred to in the horizontal plane, because it is physically impracticable for the ham to determine experimentally what happens to the radiated wave in the vertical plane. The vertical pattern of a given antenna can be calculated, but this is the best that we can do.

But the value of a DX antenna is certainly more dependent upon what happens in the vertical radiation plane than in the horizontal plane. For a DX antenna it is foolish indeed to worry about a few db. horizontal gain and completely ignore where the radiated energy is in the vertical plane. Unfortunately, about the only control of the energy in the vertical plane is the antenna height and vertical stacking of elements. It is axiomatic that for long-haul communications the lower the vertical angle the better the results. The quad, with the two half waves stacked vertically in each element loop, will have a lower vertical angle than a comparable Yagi, both antennas being at the same height. Operationally, this means that a long-haul DX station will be heard earlier and longer on the quad than on a Yagi, both with comparable numbers of elements, boom length, and height.

Bandwidth

Another aspect of amateur parasitic beams that appears to be neglected is the gain-bandwidth characteristic. What is the gain of the antenna at the high end, middle, and low end of the operating band? Again, you can't have your cake and eat it too, and it must be decided what is wanted. Different approaches can be used to maximize the antenna gain-bandwidth, but in the final analysis the greater the bandwidth, the less the gain.

For instance, if maximum gain is desired at both 14.0 and 14.35 Mc. in any parasitic-type

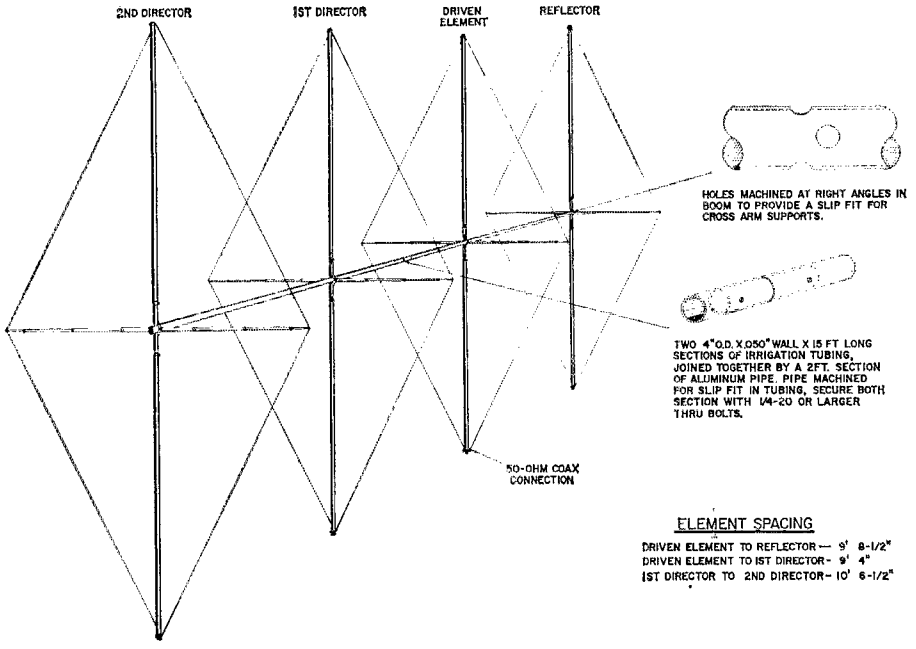


Fig. 3—The four-element quad.

antenna, the parasitic elements must be stagger-tuned. The four-element quad shown here was tuned for maximum forward gain with the driven element resonant at 14.175 Mc. The reflector was peaked at 14.0 Mc., and both directors were peaked at 14.35 Mc. Fig. 2 shows the horizontal-plane pattern at the three frequencies. Choosing other peaking frequencies for the directors and the reflector perhaps might improve the gain over the entire 14-Mc. band.

Feeding

The antenna and the feed line should always be considered as two separate and distinct problems. The antenna should be tuned as desired — for maximum gain or maximum front-to-back ratio. After tuning, the driving-point impedance should be determined and then the transmission line should be matched to this impedance.

If the impedances work out properly, a coax transmission line can be connected directly into two open terminals (as at *A* in Fig. 1). This at first would appear to have the bad effects of an unbalanced to balanced feed. However, the closed-circuit loop of the quad driven element provides a metallic return circuit for the transmission-line current and, in the writer's opinion, tends to maintain balance. The good pattern symmetry (Fig. 2) at the center frequency shown by the antenna described later gives support to this assumption.

Mechanical Considerations

The mechanical problems of a quad are more complex than the electrical problems. The wire loop elements are simple, but the supporting crossarms for the wire loops and the crossarm mounting to the boom can get complicated, cumbersome and difficult. Bamboo crossarms are structurally weak and do not stand the weather well. Fiberglas tubes for the crossarms are excellent but expensive. If consideration is given to the electrical design, aluminum tubing can be used for the crossarms.

As previously shown, if the corner feed system is used and the antenna is horizontally polarized, the vertical crossarm support can be metal tubing. However, if the horizontal crossarm support is a continuous piece of metal the antenna will not tune, since the metal is in the plane of the horizontally radiated wave and is too close to self-resonance. However, no current will be induced in the horizontal metal-tubing supports if the supports are broken into sections by inserting two insulators on either side of the boom (see Fig. 4). Low-grade insulation material that has the required mechanical strength is all that is required — hardwood boiled in wax, or phenolic plastic, will be adequate. The crossarm supports can be fastened to the boom by a spider or run through the boom as described later.

A 4-Element Antenna

The construction details for the four-element 20-meter quad are illustrated in Figs. 3 and 4. A 30-foot length of 4-inch-diameter aluminum tubing is used as the boom support. The aluminum crossarm supports for the quad wires are mounted directly through holes bored at right angles in the boom at the appropriate element-spacing locations. The crossarms are held in position by bolting to a ¼-inch aluminum plate

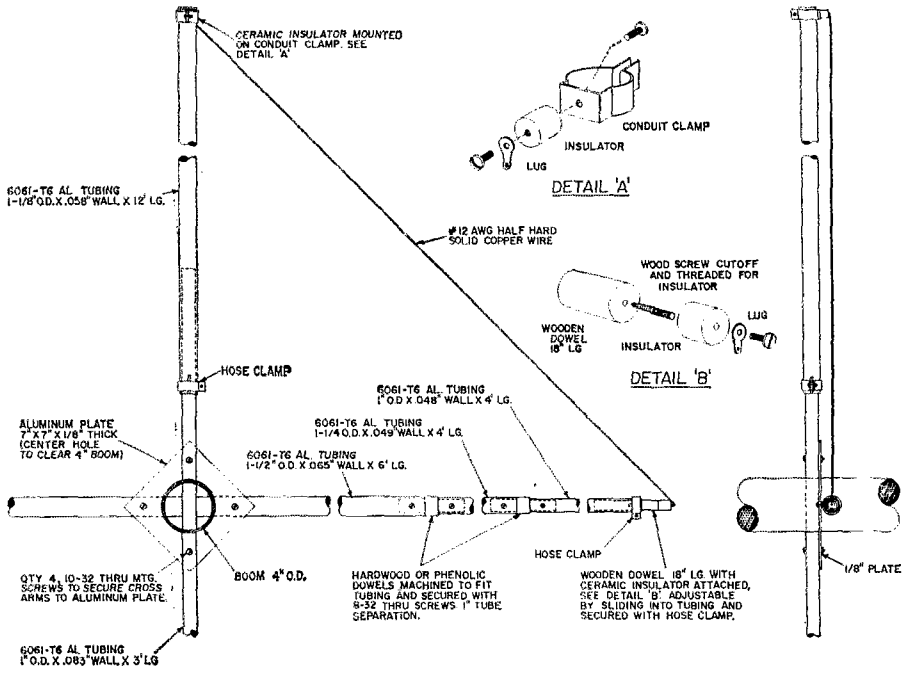


Fig. 4—Crossarm construction and mounting details.

between the two. The 30-foot boom is cut into two 15-foot pieces which slip over a 2-foot length of aluminum pipe machined to fit. This 2-foot length of pipe at the center of the boom provides material of adequate strength and thickness for bolting with clamps and adapters to the antenna rotator. The insulators in the horizontal crossarms, if made from hardwood, should be impregnated with wax or paraffin to limit the moisture absorption.

The quad wires can be adjusted to a square configuration by adjustment of the protruding lengths of the dowels on the horizontal arms and the adjustment of the positions of the conduit clamps on the vertical arms. At each point of support the wires are mounted to a ceramic insulator 1½ inches long. Although not shown in Fig. 3, it is advisable to put a vertical support at the center of the boom to which guy wires can be run from each end. This will take the droop out of the boom.

Tuning

The tuning of a multielement quad is straightforward. This one was tuned with the boom about 17 feet above the flat roof of a four-story building. It was adjusted for maximum forward gain as a receiving antenna using an r.f. milliammeter, connected directly to the two wires at the bottom corner of the driven element, as the indicator. The transmitting antenna was a balanced dipole at the same height as the quad and 1½ wavelengths away. Twenty-five watts into the dipole gave a good reading on a 100-ma. r.f. meter.

The total loop lengths were adjusted for maximum r.f. indication at the frequencies selected to give a good gain-bandwidth product. Stub tuning in each of the elements is a good way to start the tuning procedure, but for best performance the finally-tuned antenna should have no stubs. The current distribution in each loop element is best when the element is a continuous loop with no stubs. With the tuning mentioned earlier and the element spacing shown in Fig. 3, the following are the total loop lengths for each of the elements:

Driven Element	70 feet 1½ inches
Reflector	72 feet 1½ inches
First Director	69 feet 1 inch
Second Director	69 feet 4½ inches

The impedance at the terminals of the driven element is approximately 62 ohms, measured at the center of the 20-meter band, so 50-ohm coax connected directly to the terminals was considered to give an adequate match. Fig. 5 is a plot of the v.s.w.r. over the 20-meter band. Admittedly, this could be improved, but it was not considered to be worth the effort.

A few words concerning the horizontal pattern plots, Fig. 2, are in order. These measurements were made using the quad as a receiving antenna at a boom height of 75 feet. The signal was supplied by a horizontally-polarized antenna one-half

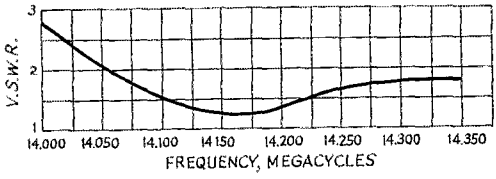


Fig. 5—Voltage standing-wave ratio in 50-ohm cable as measured across the 20-meter band.

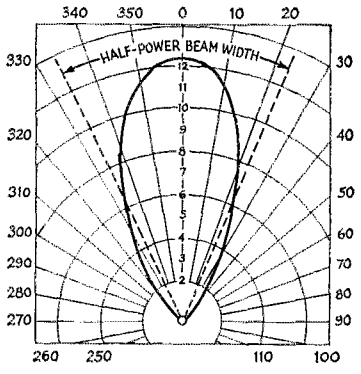


Fig. 6—Power pattern at 14,175 kc. showing the half-power beam width.

mile away. With the quad oriented head-on to the transmitting antenna, the power level at the transmitting end was set to give 3500 microvolts input to the receiver. This power level was held constant. As the quad was rotated for the pattern plot the input microvolts to the receiver were measured by comparing directly with a General Radio Type 1001A signal generator. This way the microvolts for each plotted point as the quad was rotated were accurately known.

Although, as previously stated, the horizontal gain of a horizontally-polarized antenna tells only part of the story, the pattern plots, Fig. 2, do give an indication of the merit of the four-element quad. Some conclusions can be drawn from these patterns. As indicated by the relative areas of the plots, a sharp cutoff of power gain occurs as the applied frequency is lowered from the frequency of optimum tuning, with a more gradual reduction of power gain as the frequency is raised. This then means that greater bandwidth is achieved by tuning the quad antenna for optimum operation near the low-frequency end of the desired range.

The directivity of an antenna can be calculated with fair accuracy using the half-power beam widths as taken from the plotted unidirectional power pattern.[1] Fig. 6 is the pattern plot, in power, of the four-element quad at 14.175 Mc. The calculated gain is 12.35 db. with respect to an isotropic source, or 10.2 db. over a half-wave dipole. The directivity less the ohmic losses is the gain of the antenna. If the antenna radiation resistance is not low, the ohmic loss can be neglected, and then the directivity and gain will be the same. This is a valid assumption for the quad because for a multielement parasitic antenna it does have a relatively high radiation resistance.

The author wishes to acknowledge the assistance given by WØIEV, WØPV, KØQIQ, and WØUI in making the electrical measurements on the antenna and in the preparation of this article.

QST

[1] Kraus, *Antennas*, Chapter 2, McGraw-Hill Book Co., New York.

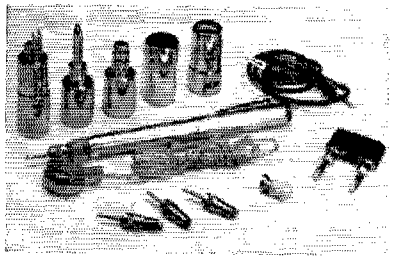
• New Apparatus

Transistor Signal Tracer

The pen-shaped device in the photograph is a transistorized signal tracer surrounded by accessory gadgets that add to its versatility. Called a Stethotracer, it measures only 5¾ inches long, ½ inch in diameter and weighs only 1½ oz. Powered by its own 1.5 volt penlight cell, the high gain transistor amplifier gives an amplification of about 1000 times over a frequency band of 50 c.p.s. to 100 kc. Output is rated at 0.3 volts peak-to-peak, across 600 ohms. Output appears at an extremely small socket mounted on the body of the Stethotracer. An earphone, shown just below the tracer in the photograph, is furnished with the package and has a cord and plug to fit the tracer.

Also furnished are several threaded accessory probes that screw onto the tip of the tracer. The tips include 0 db., 20 db., and 40 db. attenuater probes and an r.f. crystal diode probe for use as a detector-demodulator up to 200 Mc. These are shown at the bottom of the photograph. At the bottom right is an output adapter for connecting the Stethotracer to an oscilloscope or recording instrument. Just to its left is an earphone attachment for personal listening.

Arranged along the top of the photograph are other accessories which attach over the tip of the tracer. At the top left is the microwave demodulator for use with signals from 300 Mc. to 10,000 Mc., a



vibration pick-up head for detecting minute mechanical vibrations (we could hear the ticking of our watch with this probe), an input adapter for connecting the output of any device through a standard phono fitting, a miniature microphone, and a magnetic tape head for picking up signals directly from magnetic tape recordings. Although it is not shown in the photograph, a telephone-pickup induction probe is also available. The lead at the top right of the photograph is the ground clip lead.

The Stethotracer is turned on or off with the pocket clip switch attached to the body of the tracer. If you forget to turn it off, it will turn itself off when the tracer is clipped into the pocket!

The Stethotracer and most of the accessories are finished in a bright shiny chrome. It comes packaged in a pocket-size plastic box and is manufactured by Don Bosco Electronics, Inc., Littell Road, Hanover, New Jersey.

— *E. L. C.*

The old tuned-r.f. broadcast receiver may be bulky and funny-looking to modern eyes, but it's an excellent set for demonstrating where the fault lies in BCI cases. This is the author's favorite—the Philco Model 20.

Eighty-Meter BCI

BY DAVID T. GEISER,* WA2ANU

THE letters "BCI" stands for broadcast interference — the picking up of amateur transmissions by nearby broadcast receivers. Like all other forms of interference, the owner of the entertainment receiver thinks that it is all the fault of the transmitter owner. This is not the case, and the purpose of this note is to show how the interference arises and how it may commonly be shown to be the fault of the receiver.

The Superheterodyne

Even the least expensive radio receivers for sale nowadays use the superheterodyne circuit. This circuit has the advantages that it is possible to obtain good sensitivity and fair selectivity inexpensively. It has the disadvantage that extra measures are necessary (although rarely taken in broadcast receivers) to prevent the reception of short-wave signals.

Electronic circuits used in the signal portions of receivers fall into just two classes — amplifiers and detectors. In the simplest receiver, there will be one detector and one or more amplifiers. This is the form of the "tuned radio frequency" (t.r.f.) receiver (Fig. 1A). One unfortunate characteristic of a tunable circuit amplifying a signal is that it is very difficult to obtain the same amplification and selectivity at each end of the tuning range. However, this type of receiver can be made sensitive and selective if it is designed for a fixed low frequency.

The superheterodyne uses a t.r.f. receiver plus a detector and that special class of amplifier called an "oscillator." (An oscillator is an amplifier that creates a radio wave by reamplifying its own output. It has all of the faults of an amplifier, including the creation of harmonics.) The oscillator is designed to create a radio wave whose frequency differs from the desired signal by just the design frequency of the t.r.f. part of the receiver. The oscillator and desired signal meet in a detector (called the *first* detector or mixer) whose output is the *difference* between the desired signal frequency and oscillator frequency. This is amplified, detected, and changed to sound by the t.r.f. part of the receiver. This combination is called a "superheterodyne" (Fig. 1B).

Images

As the difference frequency is the amplified and detected signal, it is common for the receiver to be sensitive to an unwanted incoming signal. Let us imagine the t.r.f. section is designed to operate on 455 kc., a common choice. If the broadcast receiver is tuned to 900 kc., the oscillator would be operating on 1355 kc. If WA2ANU is operating on 1810 kc. in the 160-meter amateur band nearby, there is trouble. The difference between the frequency of the 160-meter signal and the oscillator is also 455 kc., and the t.r.f. part of the receiver amplifies and detects the ham signal!

The owner of the broadcast receiver is briefly amused, and then angry. After all, he *wants* to hear his radio program, not some ham. There ought to be a law against hams operating in the broadcast band! It is pointless to try to explain, without a demonstration, that his broadcast receiver actually is picking up short-wave signals. Ways to make such a demonstration are described later in this article.

* Components Engineering, L. M. E. Dept., General Electric Co., Utica, New York.

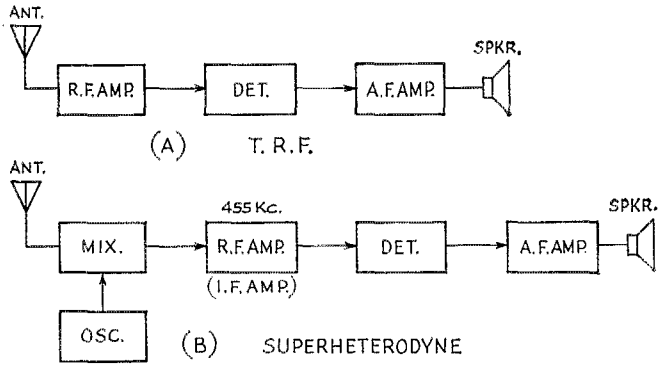


Fig. 1—Types of receivers. The t.r.f. type (A) is rarely made today for broadcast reception. The common type is the superheterodyne (B) but this circuit is susceptible to image interference (see text).

This kind of interference is called "image" interference, and to some extent, even the best superheterodyne circuits are susceptible to it. Use of one or more tuned radio frequency amplifiers between the antenna and the first detector is about the only effective design cure.

Harmonic Images

In the discussion of the oscillator it was mentioned that the oscillator generates harmonics. This means that the oscillator generates radio energy not only on the design frequency, but also on two, three, four, and more times the design frequency. This energy also feeds into the first detector. Some of this energy is in the short-wave bands, and if a short-wave signal frequency is 455 kc. from one of these harmonics, it also will be amplified and detected. Most of the difficulty in this area comes from interaction with the amateur 80-meter band (3500-4000 kc.). Only 280 kc. of the 1070 kc. of the broadcast band is free of this trouble on common receivers.

Figuring that the receiver local oscillator is exactly 455 kc. above the frequency indicated on the tuning dial, a little arithmetic shows that interference from the combination of the second oscillator harmonic and amateur 3500-4000-kc. signals may occur between 1067 and 1317 kc. and from 1522 kc. through the top of the broadcast band. The third oscillator harmonic causes trouble from 560 to 727 kc. and 863 through 1030 kc. The fourth oscillator harmonic causes difficulty from 536 to 659 kc.

The spaces between these segments of the broadcast band are not "safe," because the t.r.f. section (called the "i.f. amplifier") of individual receivers may be tuned anywhere between 450 and 470 kc., and some of the older models are tuned to even lower frequencies.

It should not be assumed that trouble is limited to the fourth or lower harmonics of the local oscillator. Where the amateur transmitter has been on 40 meters, the seventh harmonic of the oscillator has caused trouble. Fortunately, as the number of the harmonic goes up the tuned input circuit of the first detector becomes more selective, but it is still not proof against a powerful ham transmitter next door.

The Law

The FCC in Rule 12.133 says that amateurs must not cause interference to receivers "of modern design including adequate selectivity." Inexpensive superheterodynes may be able to separate broadcast stations adequately, but this is no indication of their ability to reject image interference.

The surest way to ruin neighborly relations is to flatly tell a broadcast listener (BCL) that he doesn't have a receiver of modern design. He knows how recently he bought it, and "it is modern."

The next surest path to ruin is to offer to "shut down the transmitter during your favorite program." This is taken as an admission of guilt. The proper offer is "I'll be glad to turn the transmitter on at any reasonable hour to help your serviceman test your receiver." The TVI slogan — cooperate, but operate — applies to broadcast interference also.

It *is* possible to get the idea across that the BCL does not have a receiver of modern design, without telling him so in just those words. Make it easy for him to discover it for himself. For a few dollars a good old automobile radio (6-volt) can occasionally be found — one that has one or two r.f. tuned stages before the first detector and can be converted to 115-volt a.c. power supply. An easier and even better approach is to find a good old t.r.f. receiver, like the Philco Model 20, and refurbish it. With no modification at all, it is absolutely immune to image interference.

Making the demonstration, ask to make a check against "another receiver" that meets the FCC requirements. Bring in the Model 20 (or other demonstration receiver you have previously tested), and drop about 15 feet of antenna loosely behind it. It will pick up any station receivable by a common broadcast receiver. Have a friend operate your rig. You will blast through the superheterodyne while the Model 20 plays on untroubled. For heaven's sake, don't say anything, except to invite the BCL to turn first one volume control, then the other, to see which radio the interference comes from. When the listener sees the difference, extra words will only injure relations.

If he asks you how his receiver should be "*fixed*," *advise him only to* seek help from his authorized radio serviceman — you are not a receiver expert and "don't want to advise him to do anything that might be harmful." There are two reasons for this advice: You have established the interference-free character of *your* transmissions, and the design of *his* receiver or reputation of its maker is none of *your* business.

I particularly like the Model 20 for demonstration because (1) it looks and is old, (2) it can compete with modern superheterodynes in sensitivity and selectivity, (3) its tone is good, and (4) it is common and inexpensive.[1]

Renewing an Old Receiver

In putting an old receiver into good condition, the first step is to remove all tubes from the sockets, and test them for operation and shorts. Before removing them, check which socket each is in. If their location does not agree with those on the tube location chart you will find in most receivers (located on the triple tube shield of the Model 20), you may be in for trouble from previous careless servicing and resulting damage.

Before placing the tubes in the sockets, replace the line cord plug with an Elmenco fused plug using 1-ampere fuses. Plug the cord into the power line and turn on the receiver switch. (If the receiver has been in a basement or other damp place for any particular length of time, it is best to postpone this firing-up until the chassis has received a gentle bake under a 100-watt light bulb — 12 inches away — for several days.) If the fuse blows, the transformer probably is shorted and must be replaced, unless the short can be traced to rectifier or filament wiring. Usually it is more profitable to replace the set than the transformer, and the original set is still useful for spares. However, if this "smoke" test is passed, connect the chassis to a water-pipe ground through an S-6 115-volt lamp, and check for lighting with each way of inserting the power plug. Any light at all means a line-to-chassis short, and may require replacing the transformer or some wiring. At this time it is well to replace the line cord, whether or not it looks good.

Unplug the set, and check B+ to ground for shorts, with the speaker cable plugged in. There will be high resistance to ground but, if you're lucky, no shorts.

Replace *all* capacitors under the chassis — usually there aren't many, and if the set is old, the original capacitors probably aren't in good condition.

Put back the tubes, give the set a long warm-up (half an hour or so) and, if you have or can borrow one, connect a signal generator or test oscillator to the antenna and ground posts through a 200-pf. capacitor. Set its output on 1400 kc., tune the receiver dial to 140, and adjust the trimmers on the tuning capacitor for maximum signal. If the signal generator is modulated, this means maximum tone volume.

It is always good to operate such a receiver with an earth ground attached to the ground terminal. It will be necessary to have some antenna, although it will be noted that signals are often louder *without* the ground attached (this is common and usable). Another method is to disconnect the ground from the GND post and connect it to the ANT post instead. This is usable, but is not recommended while making the demonstration at the home of the broadcast listener. Use of 15 feet of extra-flexible rubber-covered wire is sufficient there.

Comment

I cannot and do not say that manufacturers won't make receivers capable of interference-free reception in the broadcast band. There are more factors involved than engineering alone. It takes more materials and weight, meaning much more cost, to make a communications-quality receiver, and broadcast listeners just don't want to pay the price or give the space. Remember, in present-day dollars the ancient Model 20, when new, cost as much as a good present-day communications receiver.

There are, of course, other types of interference such as direct pickup of radio energy and its detection by audio amplifiers. This is not an image effect, it is not usually tunable, and the only cure is filtering and shielding.

Occasionally interference will be externally generated and transmitted in the broadcast band. This usually is the result of corrosion in rainspouts or the grounding circuits of power lines mixing a strong ham and b.c. signal to give a difference signal. Only correction of the corrosion can cure this trouble. QST

[1] Try second-hand furniture stores, Salvation Army centers, and similar outlets for used furniture.

FEEDBACK — *HBR-11 Circuit*

There is a misconnection in the HBR-11 circuit (page 39, April *QST*) that escaped both the editors and the author, despite numberless rechecks. The plate circuit of the second i.f. amplifier, V_6, is shown connected to the screen of the same tube. The lead from pin 5 should go only to the top of the i.f. transformer primary, and there should be no connection between this point and the screen, pin 6. The two 82K resistors in the screen voltage divider remain connected to the screen, of course.

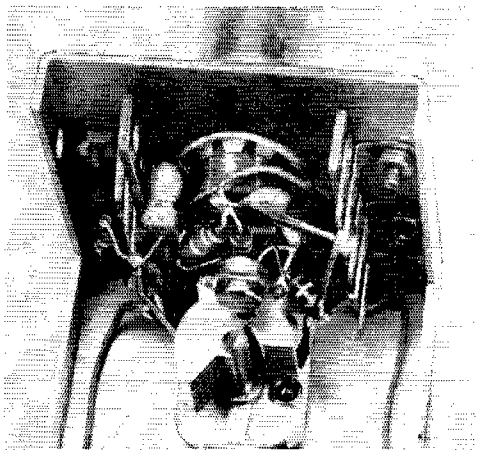
W6TC has also discovered that the connections to pins 1 and 5 in the coil drawing, page 17, March *QST*, are backwards. The top of the "B" coil should go to pin 5 and the bottom to pin 1.

Finally, to keep the record straight, W6GJS advises that the omission of the 250-pf. capacitor from the bottom of the 56K resistor to ground, in the plate circuit of V_7, was inadvertent. It is shown in the circuit on page 39 but not in the one on page 42; it should be added to the latter circuit for the sake of completeness.

Modernizing a Transistor Dip Meter

A Portable 2- to 230-Mc. Transistorized Grid-Dip Meter

BY E. LAIRD CAMPBELL,* W1CUT



This close-up view shows the oscillator transistor, Q_1, mounted astride the coil socket. Tie points on both sides of the socket facilitate the mounting of the other small components and insure that the lead lengths are kept short. The two leads running out at the bottom of the photograph are the 9-volt lead to BT_1 (right) and rectified r.f. output lead from CR_1 (left).

At the time this transistor "grid-dip" oscillator was originally described (1959 edition of *The Radio Amateur's Handbook*), there were no low-cost transistors available that would oscillate well into the v.h.f. range. Consequently, the original instrument was useful only through the ordinary communication frequencies, to 40 Mc.

Transistor technology has improved over the past few years and v.h.f. transistors are now quite inexpensive. In fact, the transistor used in this improved version of the dip-oscillator is rated by the manufacturer to oscillate to 1300 Mc., yet costs less than three dollars. Even though this unit uses conventional components, coil forms and sockets, it can operate without any difficulty up through the amateur 225-Mc. band. The improved dip-meter described here contains innovations from other transistor dip-meters that have been described from time to time.[1]

The oscillator circuit shown in Fig. 1 is basically of the Colpitts type. There is no d.c. current in the transistor oscillator from which a "dip" can be read as easily as from the grid current of a vacuum-tube oscillator, so the transistor unit must depend on another method for indication. When the transistor oscillator is coupled to an external tuned circuit at the same frequency, the r.f. voltage from the oscillator is less because some of the signal is absorbed from the oscillator by the external circuit. This change can be indicated by a rectifier-type meter, showing up as a dip in the reading when the oscillator is tuned through resonance with the circuit being checked.

In Fig. 1, r.f. energy from the oscillator is rectified by CR_1 and applied to a "meter sensitizer" (d.c. amplifier) circuit.[2] The sensitizer

* Technical Assistant, *QST*.

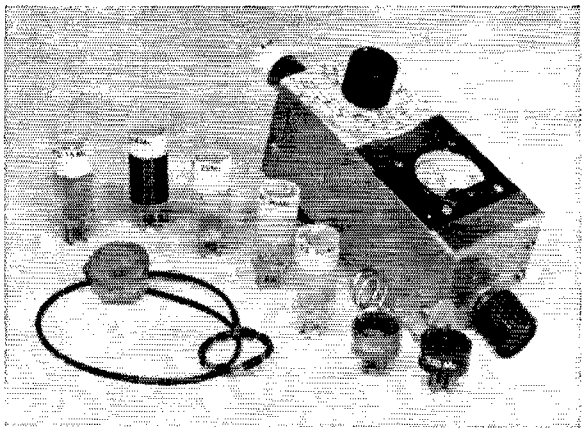
[1] Neben, "A Transistorized Grid-Dip Meter," *QST*, June, 1958.
Gunderson, "Transistorized Auditory 'Grid-Dip Meter,'" *QST*, August, 1961.

[2] Campbell, "Transistorized Meter Sensitizer," *QST*, November, 1957.

TABLE I

Frequency Mc.	C_1 (pf.)**	C_2 (pf.)**	L_1	R_1 (ohms)**
2–4	100	20	90 turns No. 30, ¾-inch diam., 1 inch long, close-wound	—
4–8	47	—	72 turns No. 28, ¼-inch diam., 1 inch long, close-wound	—
7.5–15	20	—	43T*	—
12–25	20	—	17*	—
23–50	10	—	7*	—
40–90	10	—	3T*	—
70–150	10	—	2 turns No. 10, ¼-inch diam., ¼-inch long	220
100–230	—	—	See Fig. 2	220

* No. 24 wire, ¼-inch diam., 32 turns per inch (B & W 3004 Miniductor), mounted inside 3¼-inch diam. polystyrene coil form (Amphenol 24-51D).
** Mounted in coil form with coil of same range. Capacitors are ceramic.



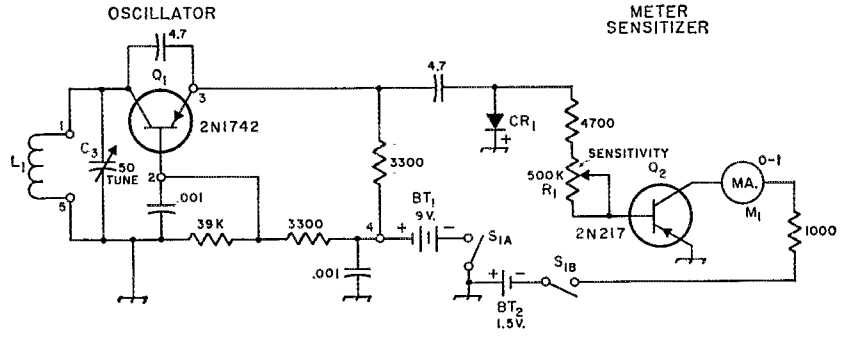
The transistor dip oscillator with its eight coils will cover 2 to 230 Mc. The link extension cord at the lower left allows coupling the oscillator to circuits in tight spots not accessible with the instrument itself. The two highest-frequency coils are mounted on forms that have been cut off close to the base.

allows a relatively inexpensive d.c. instrument to be used as an indicator.

Those who already have a model of the original dip-meter need only rewire the oscillator section as shown in Fig. 1. The close-up photograph shows how the transistor and other oscillator components are grouped around the coil socket to keep the lead lengths short — this is important, especially at high frequencies. The transistor has an advantage over a tube in this application, since there are no tube sockets or heater leads to worry about.

The circuit and battery power supply are all contained in a $2\frac{1}{4} \times 2\frac{1}{4} \times 5$-inch aluminum box (Bud CU-3004A). Only the "lid" half of the box has parts actually mounted on it. This facilitates disassembly, battery changing, and so on. A 5-prong miniature socket (Amphenol type 78-S5S) is mounted at one end of the Minibox, with the sensitivity control, R_1, at the other end. On top are the 0–1-ma. meter, M_1, and the tuning capacitor, C_3. A Japanese import meter is shown but the box is large enough to take a standard 2-inch instrument. The dial is white cardboard with an inked-on calibration; the hairline indicator is on a Lucite disk cemented with epoxy to the tuning knob.

Inside the Minibox, the components should be mounted as shown in the photographs. Four tie strips, two mounted at each end of the box, make convenient tie points for supporting the various components.



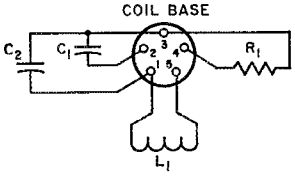


Fig. 1—Circuit diagram of the transistor dip oscillator. Numbered terminals in the r.f. oscillator circuit refer to pin numbers in the coil socket. Decimal values of capacitance are in microfarads, others are in picofarads; capacitors are ceramic. Resistances are in ohms; resistors are ½-watt.

BT_1—9-volt transistor battery (Eveready 216).
BT_2—1.5-volt type AA penlight cell (Eveready 1015).
C_1, C_2—See Table I.
C_3—50-pf. variable capacitor (Hammarlund MAPC-50-B).
CR_1—1N34A diode.
L_1—See Table I and Fig. 2
M_1—0–1-ma. miniature meter (Lafayette TM-400).
Q_1—2N1742 transistor.
Q_2—2N217 transistor.
R_2—0.5-megohm linear taper potentiometer (CTS-IRC Q11-133 or Mallory UA55L).
S_1—D.p.s.t. switch for above potentiometer (CTS-IRC-76-2 or Mallory US42).

As the diagram in Fig. 1 indicates, the coil forms also contain the bias resistors and feedback capacitors for each range. Although the values shown should work in most cases where the same type of transistor as shown is used, they may have to be changed somewhat if other types of transistors are substituted. Mount the coils near the open ends of the forms so that they can be tightly coupled to the circuit being checked. The resistors and capacitors should be placed near the bottoms of the forms so that they will be as far as possible from the coils. Several of the coils are made from a piece of B & W Miniductor stock inserted into the coil forms. See Table I for the coil data. A template is given in Fig. 2 for making the 100- to 230-Mc. inductor, which can be cut from a piece of sheet copper.

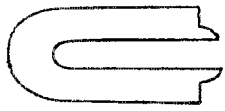
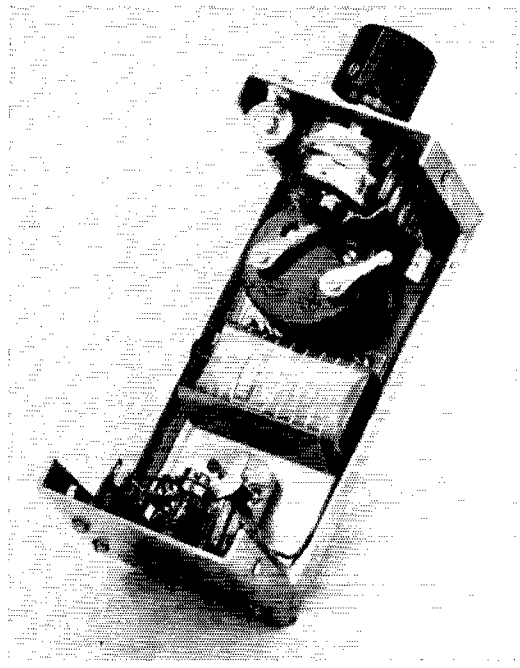


Fig. 2—100–230-Mc. inductor. The drawing is full size and may be used as a template.

The over-all view shows a link-extension gadget that allows coupling the dip meter into spaces too crowded for the instrument itself. It is made from a short piece of miniature coaxial cable, such as the Amphenol Sub-Minax. The cable ends are stripped back about eight inches, leaving only the center conductor. These are formed into 2-turn coils, the center conductor forming the loops, and then soldered back to the shield. One end of the cable is then cemented over a plastic cap which can be a cover from an old plastic pillbox. This cap must fit snugly over the end of the coil forms. To use the extension link, place the cap over the coil in use. Take the free end of the cable and couple the link to the circuit under test. The meter is adjusted and used the same way as it is without the link.

In operation, this dip meter shows no indication of the parasitic resonances which sometimes plague the vacuum-tube dippers. The meter is used in the same way as a vacuum-tube dipper and may be calibrated by the same methods. To use the instrument as a wavemeter, set the sensitivity control for half-scale reading and couple the dipper to the circuit under test. When the dip meter is tuned to the same frequency as the test circuit, the indicator pointer will "flick" up scale. QST



Bottom view of the dip oscillator with one half of the Minibox removed. The oscillator section is at the bottom, 9-volt battery and indicator meter are at the center, and the meter sensitizer section and penlight cell at the top, left. A clip holds the 9-volt battery in place, but the penlight cell's positive terminal is soldered to a ground plug. The negative terminal is soldered to a lead which helps to support the penlight cell.

Strays

WA4ISG has caused a new type of interference. His neighbor, in the pest control business, has some sort of an audio gadget which detects the gnawing of termites. But not when WA4ISG is on the air! The S1 signals of gnawing termites are completely drowned out by the S9 signals from WA4ISG.

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K5BBA tells us that not only does Bartlesville, Okla., have an unusually high percentage of DXCC hams (6 of the 141 hams in town are DXCC), but three of 'em live within a couple of blocks of each other. (And in the same area are five other hams.) Five of the six DXCC members work for the same oil company, three of them being in the same department. Guess what they talk about during the day!

K9LSB (Jack Forbing, 6311 Donna Road, Ft. Wayne, Indiana) has a supply of Russian callbooks that were assembled by the Polar Bears Radio Club (SL3ZO, Ornskoldsvik, Sweden). It lists nearly 1000 stations from the less populous Soviet republics, including such prefixes as UO5, UD6, UF6, UG6, UL7, UH8, UJ8, UA9 and UA0. The callbook lists call, name, QTH (street addresses for clubs only, not individuals), oblast/region, oblast number, and zone. Nor does this callbook list any of the UA1–6 information — only the prefixes listed above. $1.00 each, $5 for ten.

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If you like to include the flag of the United States on your letters to hither and yon, there's a 5¢ American Flag stamp now in circulation. Very handsome.

S. C. A. R. S.

BY ED JUGE*, W5TOO

Awright, you guys, let's hold it down. This meeting of the local chapter of the Society for Creative Amateur Radio Suggestions will now come to order. We got lotsa business to attend to tonight. Remember that our purpose is to draw up a list of proposals to send in to the League for recommendation to FCC. That way we only have to send one letter. The boys at the League will have to prepare all these copies, even though we aren't members.

"Now, you guys speak only when you're recognized, so we can keep this thing orderly. You'll all get your turns. First, let's hear from you Ancient Modulation addicts. Any suggestions? OK, you first, Frank, and please, no sermons, just make your point and sit down. Mmmm . . . yeah. . . . OK. That's the upper 15 kc. of 10? Any seconds to Frank's motion that we suggest limiting s.s.b. to the upper 15 kc. of 10 meters? . . . No, Herm, we gotta be broad-minded. We can't very well get rid of them altogether, and the Techs wouldn't want em all on 420 Mc. . . . OK, Doc, keep yer shirt on, you s.s.b. boys will get your chance in just a minute. Anybody else for the a.m. guys? . . . uh huh . . . OK, how many think we should ask to have s.s.b. limited to 250 watts p.e.p., since that stuff is supposed to be four times as effective as a.m. anyhow? . . . Now hold it, Doc, if you'd get yer s.w.r. below that 18 to 1, ya might not need to run them four 4-1000s at their maximum ratings. Wait yer turn, willya? . . . OK, nothing more from the a.m.ers? . . . Now, Doc, we'll let you start for the sidewi . . . er . . . sidebanders.

"Now, Doc, there might be some of them that wouldn't be able to scrape up the money to go s.s.b. within one year, and they sure wouldn't want to be put off the air. . . . No, I don't think we could do that either, after all, six is where most of the Technicians operate. What's that, Norm? . . . You're gonna suggest some changes that'll eliminate that problem? OK, we'll make a note of that then.

"If there aren't any more suggestions from the s.s.b. boys, let's hear your suggestions, Norm. . . . Uh huh . . . You say give 75 and 20 phone exclusively to the Techs. But where would that leave the Generals? . . . 15 meters and above, huh . . . I see. Hey, the rest of you guys sit down and let's have a little order here, OK? You had your chances. What about 6 meters, Norm, you want to keep it, or can we put the a.m. boys up there? . . . OK, fine.

"Whachasa kid? . . . Yeah, I guess that makes sense. Since the Generals on a.m. will have to stay on 6, and the s.s.b. boys in the upper 15 of 10 meters, I don't see why it would be unreasonable to give you Novices phone on 15 and all but the high end of 10, especially since we haven't anybody using those frequencies. . . . And what? . . . OK, we'll request that the term be extended to 5 years and made renewable.

"Say, we missed the c.w. boys. What you brass-pounders got to say for yourselves? . . . Well, speak up! . . . Doesn't anybody in this whole group operate c.w. any more? Careful, Norm, it's OK to admit thatcha don't operate c.w., but I wouldn't spread the rest of that stuff around if I was you. Frank Charlie Charlie might hear it and ask you to take the test again.

"OK, guys, I'll speak on behalf of the s.w.l.'s. We want to throw out the code and written tests. After all, the CBers are on the air, and all they have to do is request a license. Why should we have to go through all that old-fashioned garbage?

"Well, I guess we've covered most of the suggestions: Anything else before we close down? . . . Yeah, kid, there are about a thousand other hams in this area, but we're a select group. That's why there aren't more members. If we spread it around town about what we're trying to do, I mean about trying to get some laws passed that will make hamming better for hams all over the world, we'd get some of those lids in here who think things are OK now and shouldn't be changed. By the way, kid, thanks for comin' tonight, we're always glad to have a new Novice with constructive ideas join the group. We'd rather get you started on the right track than with that bunch of lids I was talking about.

"OK, I guess that winds it up. Meeting adjourned for this month, and I'll buy the coffee for all five of ya." QST

* 8613 Geronimo Trail, Fort Worth, 16 Texas

Strays

If you like to amaze your contacts by greeting them by name whenever you work them, you'll be interested in the Mosley QSO Index. This loose-leaf affair provides you with a method of indexing your QSOs so that operators' names can be "recalled" easily. Further info from Mosley Electronics, 4610 N. Lindbergh Blvd., Bridgeton, Missouri.

You'd expect a large number of hams to live near each other in such places as, say, New York City, or Rockland, Maine. But it was a surprise to hear from VE4UK that there are 10 VE4s living within a half mile of his antenna, and another six just a little farther than that. Winnepeg must have a pretty good percentage of the VE4 ham population.

1962 ARRL SWEEPSTAKES

C. W.-Phone-Club Results

COMPILED BY ELLEN WHITE,* W1YYM

THE DATES: November 10–12, 17–19, 1962. The times: 2300 GMT Saturday through 0801 GMT Monday of each weekend. The event: the 29th ARRL Sweepstakes, two big contests in one, for phone fanciers *and* c.w. connoisseurs. The turnout? Tremendous! The bands reverberated with CQ SS, well evidenced by over 2 yards of logs received for this popular event. More exactly, 2215 entries were reported, bigger than ever with code logs up just slightly and vocal versions up about 26% over the previous year. Missing from this impressive showing are reports from the Canal Zone (c.w.) and Hawaii, Canal Zone and Quebec (phone). Conditions in general were "live" with enough activity to compensate for the lowering m.u.f. Soapbox quotes really tell the picture of the big Sweepstakes the way it seemed to *you*, but call-area highlights tell a little of how it appeared to *us*.

CALL-AREA HIGHLIGHTS

1 Highlighting the endeavors of the first call area code-wise was the frantic race for section honors in E. Mass. When the smoke cleared, K1UAW had edged out W1NJL by virtue of one extra section to take E. Mass. honors *and* lead the New England Division with 196K. In case the call K1UAW still doesn't ring any bells, perhaps W8LQA will! Even though losing out by less than 600 points, a real heart breaker, W1NJL placed 2nd among 133 entries, no mean feat. Notable too were entries from 11 Rhode Islanders, dispensing 2600 R. I. exchanges. Now *you* didn't miss R. I. in '62, did you? Connecticut's W1VG reported an interesting clean sweep of all 73 in the first 17 hours of the first weekend.

Connecticut vocalists increased this SS, led by K1ANV for 67K. K1ANV and fellow club member K1HTV (Hamden Amateur Radio Assn.) took both section and club awards, phone *and* c.w. Topping all the W1-A3 entries was W1FRR of E. Mass., forsaking the power multiplier and accumulating 732 QSOs in 70 sections. Second high in New England vocally was the New Hampshire perennial, W1FZ; 84K based on 407/69.

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2 The second call area, New York and New Jersey, covers the heavily populated sections of SNJ WNY ENY NLI and NNJ. A glance at the lengthy tabulations in the Atlantic and Hudson Divisions will show you what we mean! The big code score for this SS therein was submitted by K2DGT, almost 200 QSOs higher than in '61, parlaying a 4-65A/75A4 for just under 275K; 2nd high nationally. Passing the illustrious 1000 contact figure were many with calls well known to SSers: K2DGT WA2WBH WB2APG (ex-W3DVF) W2AYJ and W2GGE. Close to 300 "twos" reported their c.w. results with some of those really *big* SNJ scores belonging to Frankford Radio Club members.

Fine figures were the rule in the phone version too as 134 reported success in all 5 sections of the call area. K2IEG of NLI turned in a dazzling verbal performance, topping 'em all with 815/73 for 178K. Barry feels himself fortunate in having a location almost entirely surrounded by salt water with no man-made noise. DX results too have been wonderful. Out WNY way K2GXI bettered his previous year's victory by over 40K to come up with 172K, section honors and 2nd-high phone amid the "twos."

* Ass't. Communications Manager, ARRL.

K2IEG (left) and W5KC (right) fill, respectively, slots #4 and 5 on our high phone figures. Barry topped his fellow NLI vocalists with 815/73 while Vince led 'em all in Louisiana with 802/73. W5KC has been licensed and active with the same call since 1920 and is a call known widely throughout ham radio. Vince puts to good use antennas such as: 20 meter full size 3-L beam, tri-bander, ¼ wave vertical groundplane on 40 and half-wave inverted Vee on 40 and 80. K2IEG has a dilly of a QTH, surrounded by salt water and enjoys his SSing immensely. Antennas at this choice location are vees and long wires for the lower bands (and 15) with their apexes at the 100′ tower level and a 5-L job on 20.

NOVICE CERTIFICATE WINNERS

KN1WPG	KN3SHI	WN5DQT	WN8CIE
KN1WXN	WN4FKI	WN5EEM	WN8DCQ
WN2CRL	WN4GAX	WV6WTD	WN8DGE
WN2DDA	WN4GPJ	WV6YAT	WN9DDM
KN3SGT	WN5BCT	KN7SRI	WNØBEA

3 The SS club competition, in particular the annual PVRC-FRC set-to, always initiates a raft of logs from the 3rd call area. W3GHM led the division's threes with 1325 exchanges in all 73 for 225K. Meanwhile ten E. Pa. masters of the continental tallied better than 1000 QSOs apiece making it plainly evident why that "3" was heard quite so often. Md.-Del.-D.C.'s K3JQU came close to 215K effectively using dipoles on 40 and 80 and a cubical quad on 20 and 15. Fifty-seven threes topped that once-magical and not so long ago 100K figure. W. Pa. too was comfortably there with 35 reporting results.

Again this year K3DVS returned on phone, this time operating K3KRF and coming up with 420/65 for 153K. Meanwhile MDD's W3ZKH repeats and repeats with that winning phone combination, this year leading with 701/73 and 153K, section and division phone champ. Both K3KRF and W3ZKH operations utilized 6 meters, something to note for point gatherers for '63. All told, 79 reported A3 results.

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4 The fourth area, encompassing the Delta, Great Lakes, Roanoke and Southeastern Divisions, brought forth a host of code activity *and* 7 scores topping 200K. Top banana among the code men was the voice of Oak Ridge, K4LPW, Mel working 1277/73 for 233K; 4th high nationally. Kentucky's K4GSU broke 2 coveted marks for 212K and 1192 QSOs, the leading contestant for his section sheepskin. Virginia, ever the scene of the big scores, saw W4KFC forsake the low power multiplier and work 1554/73 for 226K with W4RQR 216K and W4KXV 209K chasing mightily; almost 643K points for the PVRC at one fell swoop! Big contact totals were the rule too from E. Fla. where W4DQS brought in section honors with 217K and W4CKB close behind with 1148/73 while W4BJ was multi-opd to the tune of 1149 QSOs. Progressing further north we see a taut race in Georgia with K4BAI leading K4TEA by 16 two-ways. Out Guantanamo way KG4AM was keyed by KG4BM and proved extremely popular for the West Indies multiplier.

Virginia again accounted for the top phone performance, that of W4BVV talking up 650 in all 73 for 141K; radiating in fine fashion on 75-10 with a tri-bander, 40/80 dipoles, an 80-meter vertical and a 40-meter vertical beam. Maryland's W3AZD operated portable 4 during his Air Force stint at Charleston AFB, S. C., totalling 102,510 and making plans for the '63 SS back at home. E. Fla. put on a "good show" too with K4FWF talking up 600 in 73 for 131K and K4WIS breaking 100K with 512/68.

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5 The formula for getting there first with the most was compounded again with winning success by the champ of this SS, setting another record-breaking score. W5WZQ, South Texas winner, top scorer in this SS, established a new mark to go for, 1600/73 for 290K. Another 50 QSOs and 300K would have been shattered. It'll be easier in '63 fellas with a multiplier of 74 (73 sections *plus* VE8).

A top phone score (2nd high) in this competition came from the fifth district too, this time from Mississippi and K5MDX. Dave totalled a little over 285K with 1303/73; and not incidentally the 3rd high scorer *over all*, phone and c.w. The Delta Division phone fanciers turned in a couple of other big ones too, namely W5KC from Louisiana, active in 18 Sweepstakes, winning most of them over the past 25 years. Vince was 5th high phone with 802/63 for 175K. Out in the West Gulf Division K5MVK topped the boys from So. Texas with 151K, winning honors for section and division and placed 8th high among the A3 contingent.

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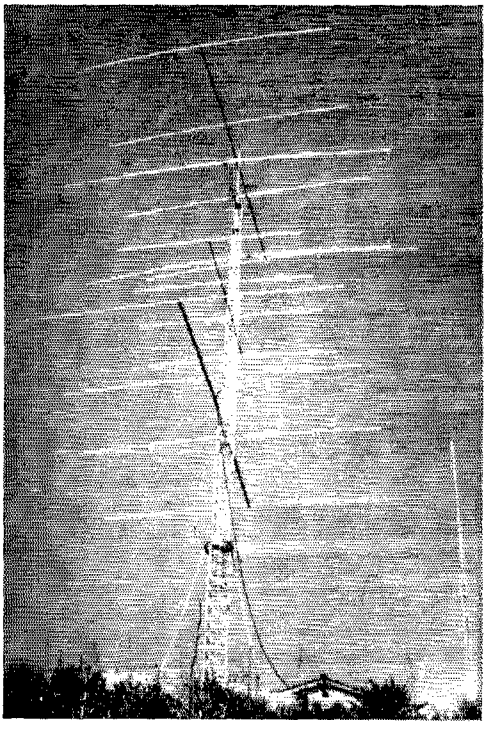
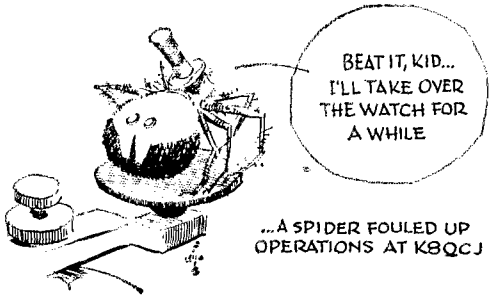


Winning for L. A. on c.w. for the past 3 go-arounds is K6CTV, ex-W9AOA and WØFID. Dick won for L. A. this SS, placed 2nd to W6HJT amid the Californians and scored close to 210K. The antenna system above includes the main radiating structure, a 78′ rotating crankup automatically controlled from the shack. Top to bottom: 4-L wide-spaced on 20 at 80′, 2-L 40-meter beam at 71′, 4-L 15 meter at 54′ and a 2nd 4-L 20-meter in phase with the top one.

6 The sixth district shows two big scores over 200K, W6HJT operating his station at Fallbrook, Calif. in the San Diego section, adding up over 215K and K6CTV, L. A. champ of over 51 with 209K, 2nd high W6. Hawaii competitors distributed close to 2000 contacts while even rarer ones such as SJV came through in an active manner. The closest section race in the Pacific Division was in San Francisco where WA6KUW/6 beat out W6WLV by a scant 15 two-ways.

Although K6VGW up Santa Clara Valley way upped his previous phone mark and topped his section with 564/68 for 113K, K6EVR was the voice heard throughout the land to the tune of 1324/73 for close to 289K; top phone, top six, top Los Angeles and 2nd high scorer in the entire Sweepstakes. Up SJV way W6KJS tallied the mostest in QSOs in the Pacific Division with 695 and a clean sweep.



7 The sevens include a variety of exotic multipliers including section c.w. champs Alaska KL7BJW 34,608; Idaho W7BSP 139,886; Montana K7CTI 146,000; Oregon W7TML 148,482; Washington W7PQE 139,248; Nevada K7SFN 65,406; Utah W7QDM 116,960; Wyoming K7QYG 142,715 and Arizona W7ZMD 154,710 — top scorer therein W7TML with 1023 exchanges.

All of the above sections showed on phone too with the "big" one arrived at through the vocalizing of W7BSW — 925/73 and 203K, third high phone nationally as well as Washington phone winner, working all phone frequencies from 75 through 2. Again winning section awards were W7CBY for Montana and K7PXI for Arizona.

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8 While some of the far west gang noted a tapering off of W8-activity you'd never know it by the length of the Michigan/Ohio/West Virginia tabulations! W8OYI of Ohio led 132 with 190K closely trailed by W8NBK with 185K, *both* topping the thousand QSO mark, and both knocking them off on 80-40-20-15. K8QJH of Michigan out-QSOd W8VPC to lead the section with 878/72 for 158K, topping 66 state entries. Down West Virginia way W8IDIE exchanged preambles with some 805 in 68 sections to top 100K and acquire another certificate.

From a vocal standpoint the Ohio race was a hair raiser. The photo finish once again found K8NPD in the lead with 82,109 and second spot to K8NPH 8 with 81,705. W8BNF turned the trick in Michigan with 331/67 and down in the Roanoke Division, K8YBU won a clear-cut West Virginia victory with 231 and a nice section total of 70.

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9 The big guns were on for sure in the Central Division code competition. In Illinois W9IRH led 105 entries with 1008 in 72 for 181K. Indiana was the scene of a masterful 3-band job turned in by the old pro W9IOP, keying 1477/73 for 269K, tops for section, division and third high c.w. score. No introductions needed either in Wisconsin with W9RQM leading the pack with 1161/73 and 212K. A tremendous division performance with all 3 section leaders cracking 1000 QSOs.

K9PNV returned again this year to top Indiana on phone with 13K points more than last year. However, W9JYJ led Illinois and the division with 420 oral exchanges in all 73 for close to 92K. Out in Wisconsin W9VSO duplicated this contact figure but section-wise worked 66 for 83K and the section award.

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Ø The Dakota-Midwest-Rocky Mt. contingents pounded brass mightily and came up with four scores topping 1000 QSOs! South Dakota's WØSMV made 145K on 1025/72, but North Dakota's KØIVQ ran under 150 watts to pick up the multiplier and lead the division with 146K. In Minnesota KØDHH broke 1000 two-ways too, for 174K. The Rockies was the scene of the top zero score with WØEWH knocking 'em off in Colorado for 1106 in 73 and 202K. The closest section battle was in the Midwest Division where KØVMZ out-keyed WØTDR for

Section check-off sheet used by K2KIR/1

W1	*W2*	*W3*	*W4*	*W5*	*W6*	*W7*	*W8*	*W9*	*WØ*	*VE*	*OTR*
CN	ENY	EPA	ALA	ARK	EB	ARIZ	MICH	ILL	COLO	MAR	ALAS
EM	NLI	MDD*	EF	LA	LA	IDA	OHIO	IND	IOWA	QUE	HAW
ME	NNJ	WPA	GA	MISS	SB	MONT	WVA	WIS	KANS	ONT	W. I.
NH	SNJ		KY	NMEX	SCV	NEV			MINN	MAN	C. Z.
RI	WNY		NC	NTEX	SD	OREG			MO	SASK	
VT			SC	OKLA	SF	UTAH			NEBR	ALTA	
WM			TN	STEX	SJV	WASH			NDAK	BC	
			VA		SV	WYO			SDAK	YUK	
			WF								

* In '63 MDD becomes MDC and DEL.

the Missouri certificate: just 20 exchanges apart. Notable scores were accumulated in Nebraska where WØASO racked up almost 190K on 1044/72 and in Iowa where KØGXR turned in 158K.

The big A3 log amid the zeros came from Missouri where KØUWZ talked up 512/66 and broke 100K. Meanwhile North Dakota was the scene of a heated battle as KØVWG edged out KØALV with a scant 800 points. Making the clean sweep yet again and continuing to put South Dakota on the radio-amateur map in a big way was WØPRZ with close to 88K. Logs from Kansas were a welcome sight this phone SS with KØTOA making voice segments on 40-20-15 add up to a section award. Nice QSO totals were noted in Nebraska from WØGYM and Colorado from KØVVV.

VE Four VE8s submitted their c.w. results and their activity gladdened the hearts of many of the faithful. VE8s RG CW DX and WW appear on the A1 tabulation with VE8RG really doing a splendid job from a difficult location, working 395 in 65 for 64K. Top code enumeration amongst our VE brethren was listed by VE7EH with a creditable 141,030. Manitoba leader VE4IM got close to 130K with 710 in all 73 and VE3DDU had to top 26 others to bring in the Ontario award. A close one took place in Alberta as VE6IZ edged out VE6TP for tops in his section.

Vocal activity up north was somewhat on the weak side but invigorated by the activities of VE6OR VE7CE VE3CRM VE4SD as well as a report too from VE8WW, phone as well as his code tally. Division-wise VE6OR led the boys with 308 in 61 for 38K working 75-15. K9HOL and W9VZP operated portable in Manitoba and tallied 45K, multi-op. In '63 let's have an expedition to Quebec, fellas!

3-time SS champ K3JQU this year topped MDD codesters with 215K. Ken scored high in Nev. in '38 as W6LVB/6 and La. in '50 as W5PKF. This official Coast Guard photo shows Commander Langenbeck, Coast Guard Communications Chief, in front of a homebrew 4-125A.

THE CLEAN SWEEP

Worked All 73 Multipliers

K1DIR	W3EQA	W3ZKH*	W5KC*	W8NBK
W1JYH	K3EST	K4BAI	K5MDX*	W8VPC
K1RUH	W3EVW	W4BVV*	W5PSB	W8YCP
W1TS	W3GHM	K4CFD	K5USE	W8ZJM
W1VG	W3GQF	W4CKB	W5WZQ	W9GFF
W2CXM	W3GRF	W4CVI	W6BVM	W9GIL
K2DGT	W3GRS	W4DQS	WA6ECF	W9IOP
W2FXN	W3HHK	W4DVT	K6EVR*	W9JYJ*
W2GND	W3IYE	K4FWF*	W6KJS*	W9LNQ
K2IEG*	K3JQU	W4IA	W6TMX	W9QYW
WA2IZS	W3JTC	W4JAT	W6YK	W9RCJ
W2MZB	W3KFQ	W4KFC	W7BSP	W9RQM
WA2OJD	W3KT	W4KXV	W7BSW*	K9VRU
WA2WBH	W3MFW	K4LPW	K7CTI	W9ZAB
K2ZYR	W3MWC	W4RQR	W7PQE	WØCXN
W3ALB	K3NZV	K4TEA	W7TML	WØEWH
W3CGS	W3PZW	K4TML	W8DCH	WØNCS
W3CTJ	W3QMZ	W4YFA	W8IBX	WØPRZ*
K3CYA	W3WJD		K8MTI	VE4IM

* Phone

Club Scores

In 1962, 94 clubs submitted sufficient valid entries to appear in the accompanying club tabulation, with 114 stations soon to receive special club awards for topping a minimum of 3 single-operator c.w. or phone club entries. It was another big year for the clubs with aggregate scores continuing on the rise, despite fewer entries from the top two. The Potomac Valley Radio Club copped the gavel by edging out that hard-to-beat Frankford Radio Club crew, with better than 107K points per member. In spite of almost 110K points/member, the FRC came up with a 2nd place listing but a first-class performance in our books! One of the big gains this year was the rise of the Suffolk County Radio Club from 8th to 3rd, topping the coveted million mark. Congratulations to all SCRC hands! Yet another million marker is the entry of the Rubber City SS Hotshots of Ohio, turning out 28 club members for an aggregate of 1,012,317. Increases too were noted in the performances by the South Jersey Radio Assn., up 150K. Up was the Germantown Radio Club of Pa., too, from 26th to 7th, f.b.! The Connecticut Wireless Assn. rose 110K points and from 42nd to 11th rose the Nashua Mike and Key Club of New Hampshire.

On the debit side, 41 clubs missed listing due to fewer than the minimum 3 entries being submitted. All awards to go in mid-May.

C. W. WINNERS, 29TH A.R.R.L. SWEEPSTAKES

Section	*Call*	*Score*	*Transmitting Equipment*	*Receiving Equipment*	*Bands Used*
E. Penna	W3GHM	224,931	Valiant	2B	80, 40, 20, 15
Md.-Del.-D. C.	K3JQU	214,985	5763-5763-2E26-4-125A	51J-4	80, 40, 20, 15
S. N. J.	WB2APG	185,310	6AH6-5763-5763-6146s	HQ-170C	80, 40, 20, 15
W. N. Y.	K2INP	134,033	HT-40	HRO; NC-125	80, 40, 20, 15
W. Penna.	W3YOZ/3	143,360	HT-32-Warrior	HQ-170C	80, 40, 20, 15
Illinois	W9IRH	180,540	Invader	75A-4	80, 40, 20, 15
Indiana	W9IOP	268,549	HT-32A	SX-115	80, 40, 20
Wisconsin	W9RQM	211,791	V.f.o.-807-813	HRO50T	80, 40, 20, 15
No. Dakota	K0IVQ	145,728	V.f.o.-Meteor	RME4350A, 4301	80, 40, 20, 15
So. Dakota	W0SMV	144,864	Ranger-Courier	HRO50T	80, 40, 20
Minnesota	K0DHH	174,213	DX-100	SX-96	80, 40, 20, 15
Arkansas	WA5CBL	184,770	HT-37	SX-101A	40, 20, 15
Louisiana	W5BUK	172,288	100V	SX-101	80, 40, 20, 15
Mississippi	K5RUO	163,080	Viking I	HQ-170	80, 40, 20
Tennessee	K4LPW	233,053	HT-32	SX-101A	80, 40, 20
Kentucky	K4GSU	211,680	HT-32A; Ranger-811A	75A-4	80, 40, 20, 15
Michigan	K8QJH	158,040	32S-1	75S-3	80, 40, 20, 15
Ohio	W8OYI	190,440	Viking I; DX-100	75A-4	80, 40, 20, 15
E. N. Y.	WA2HLH	111,960	DX-40	S40A, QF1	80, 40, 20, 15
N. Y. C.-L. I.	K2DGT	271,845	4-65A	75A-4	80, 40, 20, 15
N. N. J.	WA2WBH	195,456	100V	75A-4	80, 40, 20, 15
Iowa	K0GXR	158,242	GSB100-813	75A-3	80, 40, 20, 15
Kansas	K0BHM	99,705	Apache; GSB101	SX-111	80, 40, 20, 15
Missouri	K0VMZ	120,060	HT-37	HQ-170	80, 40, 20, 15
Nebraska	W0ASO	189,720	V.f.o.-6146-4-125	Homebuilt	80, 40, 20, 15
Connecticut	K1HTV	175,500	Apache	HQ-170	80, 40, 20, 15
Maine	W1DEO	51,750	KWM-2	KWM-2	80, 40, 20, 15
E. Mass.	K1UAW	195,660	V.f.o.-Bandbox-807-813	HQ-145	80, 40, 20, 15
W. Mass	W1JYH	170,090	V.f.o.-803s	75A-3	80, 40, 20, 15
N. H.	K1RTB	113,768	Pacemaker	HRO50	80, 40, 20, 15
R. I.	K1LPL	120,600	TBS50-807s	S108	80, 40, 20, 15
Vermont	W1SWX/1	82,400	Ranger	HQ-170	80, 40, 20, 15
Alaska	KL7BJW	34,608	4-400A	SX-88	40, 20
Idaho	W7BSP	139,886	Valiant	SX-100	40, 20, 15
Montana	K7CTI	146,000	V.f.o.-6CL6-807; HT-20	HQ-129X	160, 80, 40, 20, 15, 10
Oregon	W7TML	148,482	813s	75A-4	80, 40, 20, 15
Washington	W7PQE	139,248	32V-2	75A-1	80, 40, 20, 15
Hawaii	KH6DKI	68,913	HT-32; DX-100B	HQ-170	40, 20, 15
Nevada	K7SFN	65,406	DX-40	SP-600	80, 40, 20
Santa Clara V.	K6VVA	198,450	HT-32A	SX-101A	80, 40, 20, 15
East Bay	WA6BBJ	137,160	DX-100	S40B, QF1	80, 40, 20, 15
San Francisco	WA6KUW/6	55,440	Apache	75A-4	40, 20, 15
Sacramento V.	K6ORT	100,568	32V-1	75A-4	80, 40, 20, 15, 10
San Joaquin V.	K6RTK	113,815	Viking I	75A-3	80, 40, 20, 15
No. Carolina	W4LYV	136,350	32V-3	75A-4	80, 40, 20, 15
So. Carolina	W4BWZ	90,366	Apache	SX-71	80, 40, 20, 15
Virginia	W4KFC	226,300	V.f.o.-4-400As	75A-2	80, 40, 20, 15
West Virginia	W8DIE	108,800	V.f.o.-4-400	75A-2	80, 40, 20, 15
Colorado	W0EWH	201,845	Valiant	NC-300	80, 40, 20, 15
Utah	W7QDM	116,960	DX-40	NC-300	80, 40, 20, 15
New Mexico	W5CK	148,664	Apache	2B	80, 40, 20, 15
Wyoming	K7QYG	142,715	Apache	SX-101A	80, 40, 20, 15
Alabama	K4CFD	162,213	20A-837s	2B	80, 40, 20, 15
E. Florida	W4DQS	217,175	Invader	75A-4	80, 40, 20, 15
W. Florida	W4MLE	141,113	Apache	——	80, 40, 20
Georgia	K4BAI	190,074	HT-18-807-100TH	75A-2	80, 40, 20, 15
West Indies	KG4AM	140,415	5100B	HRO60	40, 20, 15
Los Angeles	K6CTV	209,273	100V	75A-4; RME 6900	80, 40, 20, 15
Arizona	W7ZMD	154,710	DX-100	2B	80, 40, 20, 15
San Diego	W6HJT	215,280	32S-1	75S-3	80, 40, 20, 15
Santa Barbara	W6YK	85,191	HT-37	NC-303	40, 20, 15
No. Texas	K5RHZ	191,984	Ranger	HQ-145	40, 20, 15
Oklahoma	K5OCX	166,320	Apache	75S-1	80, 40, 20, 15
So. Texas	W5WZQ	290,540	Valiant	HQ-170	80, 40, 20, 15
Maritime	VE1MX	43,403	DX-40	HQ-129X	80, 40, 20
Quebec	VE2AYU	53,131	803	HRO	80, 40, 20, 15
Ontario	VE3DDU	86,514	Ranger	75A-4	80, 40, 20, 15
Manitoba	VE4IM	129,575	GSB100	SX-101A	80, 40, 20, 15
Saskatchewan	VE5IN	44,992	Invader	HQ-170	40, 20, 15
Alberta	VE6IZ	52,841	Ranger	NC-303	80, 40, 20, 15
B. C.	VE7EH	141,030	DX100	AR-88	160, 80, 40, 20, 15, 10
Yukon-N. W. T.	VE8RG	63,944	HT37	2B	80, 40, 20, 15

Quotes

"Any station complaining he was unable to work VE8 this contest has only himself to blame as many times I called *CQ SS* without results." — *VE8RG*. . . . "Once more into the fray after a couple of years lay-off due to moving problems, etc. and unfortunately not quite ready. The familiar ending, however, and sure enjoyed working the old gang." — *VE3AHU*. . . . "My apologies to the fellows I couldn't work because of a continuously running v.f.o." — *VE8DX*. . . . "It's a trying situation from up here and I averaged about one call in 15 minutes but sure had to work hard to get them." — *VE8CH*. . . . "It was a very enjoyable two weekends even if I had to drive 600 miles round trip just to get home to operate the rig. I took part last year using my old call VE8BC and I can see why my score was so low. The band sounds twice as crowded down here so guess I just wasn't being heard." — *VE5IN* . . . "Last entered (and won) the 1950 SS, in VE8-land; my how operating conditions have changed!" — *VE6FN*. . . . "Was thrilled to work W9IOP (his Nr. 1202!) in the wee hours Sunday of the 2nd weekend on 3.5. His signal dominated the band. I had to sit back and admire a master's technique." — *VE2YX*. . . . "My 2nd SS and missed the first part of the first weekend, blew the last fuse for the amplifier, and was plagued by acute QRN the 2nd weekend. All in all I managed to triple last years' score." — *KØZTV*. . . . "What could be more maddening than for your last section to call you and not be able to copy him through the QRM, especially since I had to quit 15 minutes later!" — *KØIJL*. . . . "What's with these characters who never even send *date* to me on c.w.?" — *KØFPC*. . . . "Bettered last year's score as KØRTI by 15 contacts and 3 sections with 12 less hours. 20 was a lifesaver!" — *KØRTI*, opr. WØYQ. . . . "Where were Maine, Vt. and KZ5? Troubles? Wife had operation between weekends, had to get a sitter

PHONE WINNERS, 29TH A.R.R.L. SWEEPSTAKES

Section	*Call*	*Score*	*Transmitting Equipment*	*Receiving Equipment*	*Bands Used*
E. Penna.	K3KRF	81,705	TX1-200V	2B; 75S-3	75, 40, 20, 15, 10, 6
Md.-Del.-D. C.	W3ZKH	153,300	HT-37	75S-3	75, 40, 20, 15, 10, 6
S. N. J.	WB2BGH	46,116	Apache	SX-100	75, 40, 20, 15, 10
W. N. Y.	K2GXI	172,074	5100-100V	75A-4	75, 40, 20, 15
W. Penna.	K3SIQ	25,200	HT-32B	HQ-170	75, 40, 20, 15, 10
Illinois	W9JYJ	91,761	100V	SX-115	75, 40, 20, 15, 10
Indiana	K9PNV	74,727	Apache; G50; 2E26s	75S-1; G50	75, 40, 20, 15, 6, 2
Wisconsin	W9VSO	83,160	Invader	75A-4	75, 40, 15
No. Dakota	KØVWG	47,817	Phasemaster II-I.A-1	2A	75, 40, 20, 15
So. Dakota	WØPRZ	87,600	32S-1-G-77	75A-4; 75S-3, G77	75, 40, 20, 15, 10
Minnesota	KØQQS	49,824	HT-37	SX-111	75, 40, 20, 15
Arkansas	K5ALU	131,342	Valiant	HQ-120X	75, 40, 20, 15, 10
Louisiana	W5KC	175,638	HT-37	HRO-7-GSB-1	75, 40, 20, 15
Mississippi	K5MDX	285,357	6C4-5763-6146-4-125A; 5763-SB10-4-12FA	HQ-110-HC-10	75, 40, 20, 15
Tennessee	WA4FJH	12,120	Apache	Mohawk	75, 40, 20, 15, 10
Kentucky	WA4AXL	40,590	Valiant; Sixer; Ranger II	NC303, Sixer	20, 15, 10, 6
Michigan	W8BNF	65,828	32S-1	75S-1	75, 40, 20, 15
Ohio	K8NPD	82,109	32V-2; SB-10	SX-96	75, 40, 20, 15
E. N. Y.	WA2CLQ	69,517	Viking 11; GSB100	HQ-100C	75, 40, 20, 15
N. Y. C.-L. I.	K2IEG	178,376	32V-3; 51SB	75A-3	75, 40, 20, 15
N. N. J.	W2JKH	75,122	812H	14-tube Super	75, 40, 20, 15
Iowa	KØJGH	38,250	Ranger	KT200	75, 15, 10
Kansas	KØTOA	59,182	32S-1	75S-3	40, 20, 15
Missouri	KØUWZ	100,584	Viking II; HT-37	HQ-170C	75, 40, 20, 15, 10
Nebraska	WØGYM	57,392	32S-1; 30L-1	75S-3	75, 40, 20, 15
Connecticut	K1ANV	67,000	KWM-2; 30L-1; Gonset IV	KWM-2; 75S-1; 2B	75, 40, 20, 15, 2
Maine	W1GKJ	66,033	5100B; LPA-1	HQ-170	75, 40, 20, 15
E. Mass.	W1FRR	102,480	4CX100A	——	75, 40, 20, 15, 2
W. Mass.	K1NWF	36, 509	Ranger	NC-270	75, 40, 20, 15, 10
N. H.	W1FZ	84,146	100V	75A-4	75, 40, 20, 15, 10, 6, 2
R. I.	W1YRC	34,104	Viking II	SX-71	75, 40, 20, 15
Vermont	K1AEG/1	39,730	SB10	Mohawk	75, 40, 20, 15
Alaska	KL7AIR	20,412	KWM-2A-30L-1	KWM-2A	40, 20, 15
Idaho	W7NGA	8832	813s	NC-300	20
Montana	W7CBY	41,391	32V-3	BC-342, Conv.	75, 40, 20, 15
Oregon	K7MLO	46,640	SB10	2B	75, 40, 20
Washington	W7BSW	202,575	32S-1; Gonset 2/6	75S-3; Gonset	75, 40, 20, 15, 10, 6, 2
Nevada	K7QPK	63,180	32V-1	HQ-170	75, 40, 20, 15, 10
Santa Clara V.	K6VGW	112,710	Apache; Pawnee; Swan175	HQ-140XA	75, 40, 20, 15, 10, 2
East Bay	W6KG	137,034	100V	75A-4	40, 20, 15
San Francisco	WA6AUD	29,097	TX1	HQ-170	75, 40, 20, 15
Sacramento V.	WA6PVT	8109	Cheyenne	SX-42	75, 40, 15
San Joaquin V.	W6KJS	101,470	100V-4-1000A	75A-4	75, 40, 20, 15
No. Carolina	WA4AAL	40,545	DX100	S20R	75, 40, 20
So. Carolina	W3AZD/4	102,510	Eldico SSB	SX-100	75, 40, 20, 15
Virginia	W4BVV	141,489	32S-1; DX100	75S-1; Mohawk	75, 40, 20, 15, 10
West Virginia	K8YBU	31,340	HT-37-4-1000	75A-4	75, 40, 20
Colorado	KØVVV	77,319	Valiant	RME4350A	40, 20, 15
Utah	W7ZKL	52,470	DX-100; Marauder	NC-300	40, 20, 15
New Mexico	W5PQA	75,402	KWM-2	KWM-2	40, 20, 15
Wyoming	W7QPV	20,299	KWS-1	75A-4	40, 20, 15
Alabama	W4DS	31,780	HT-32-LPA-1	75S-3, Comanche	75, 40, 20, 15, 10
E. Florida	K4FWF	131,400	HT-37	SX-101	75, 40, 20, 15
W. Florida	WA4FIJ	17,967	Invader 2000; Twoer	NC-300	75, 40, 20, 15, 2
Georgia	K4KAZ	55,477	SB10	SX-100	75, 40, 20, 15, 10, 6
West Indies	KP4BHR	36,414	Ranger	NC-303	20, 15, 10
Los Angeles	K6EVR	288,721	CE100V	75A-4	40, 20, 15, 10
Arizona	K7PXI	60,888	DX-100	BC-312N, conv.	75, 40, 20, 15, 10
San Diego	WA6OJJ	51,660	DSB-100	2B	40, 20, 15
Santa Barbara	WA6JQG	18,300	HT-37; HT-41	2B	75, 40, 20, 15
No. Texas	K5IID	107,100	Valiant	HQ-110	75, 40, 20, 15, 10
Oklahoma	K5HWO	94,185	KWM-2	KWM-2	75, 40, 20, 15
So. Texas	K5MVK	150,960	Ranger; HT-37	75A-2; 75A-4	75, 40, 20, 15, 10
Maritime	VE1NV	8436	Valiant; HT-30	HR-20	75, 20
Ontario	VE3CRM	33,187	Apache	Mohawk	75, 40, 20, 15
Manitoba	VE4SD	27,030	Viking II	HQ-140X; HF10-20	75, 20, 15
Saskatchewan	VE5NX	2,223	DX-40	Rio 9R4	75, 20, 15
Alberta	VE6OR	76,092	HT-37; LA-1	HQ-170	75, 40, 20, 15
B. C.	VE7CE	37,820	Valiant	NC-300	75, 40, 20, 15, 10
Yukon-N. W. T.	VE8WW	2375	431B	51J-4	20

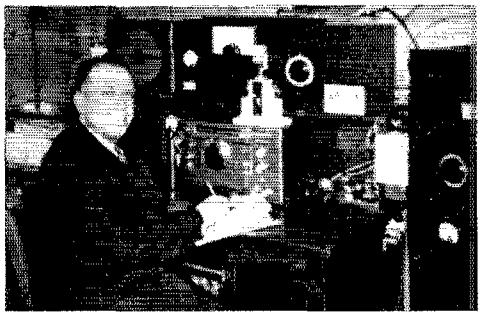
for kids in order to get on the 2nd weekend. Hmmm? Does that make me multi-op.?" — *WØCUC/Ø*. . . . "Sure wish I could have heard a KL7." — *WØJPH*. . . . "Might be interesting to know what section *CNJ* is, one Novice gave it to me that way eight times!" — *KØEQF*. . . . "Next year I'll have to use the Wouff Hong on OM Murphy." — *KØGCJ*. . . . "I'm hopeful my score will be a new high for Nebraska and a score that one of the Nebr. gang will top in '63." — *WØASO*. . . . "Enjoyed handing out Montana to all the gang." — *KØOBF/7*. . . . "Couldn't beat my '59 score, guess I'm a little rusty after a 2-year absence." — *WØTDR*. . . . "There are more 6s than there are amateurs." — *anonymous*. . . . "Hope my arthritis never gets to my wrist." — *KØGZP*. . . . "Disappointed to have lost the logs for about 16 contacts, which included KG4AM and two other new sections." — *WAØBMW*. . . . "Are you sure there isn't a lowest scoring Novice certificate?" — *WN8DOM*. . . . "Again the finest and most harrowing event in the amateur calendar has come and gone leaving memories of another better-than-ever SS. Conditions were very good, courteous and skillful operating, clean sigs and good sportsmanship were the order of the day. Each year my admiration and respect increases for the operating skill and sheer endurance of the leading operators. Life's darkest hour: 2 days before the SS, a roaring power leak drowned out all signals over the spectrum. At the last moment it was found and removed by the Columbus and So. Ohio Electric Co. troubleshooter. Many thanks to him and many many more thanks to the ARRL staff for this fine activity." — *K8IKO*. . . . "Did my best to break 50K but didn't quite make it. Weather in Central Ohio poor the first weekend. Worked some of the hard ones with relative ease but never did hear KH6. Heard W. Fla. only once and couldn't raise him then went almost down to the wire before I heard and worked *two* W. Va.!" — *W8APC*. . . . "There is more to this long concentrated contest type operation than meets the eye. In the middle of my exchange with KØFLY, a very excited looking brown & black spider popped out of the rig

and furiously searched the operating table. Not only did he seriously disrupt contest activities but he chased my "FLY" away!" — *K8QCJ*. . . . "Fine conditions on 40, best I've seen for both SS weekends." — *W8CXS*. . . . "Very few repeats this year, guess the guys are using Operating Aid #6 to good advantage." — *W8UPH*. . . . "Believe me it isn't *easy* to completely forget the second weekend of the contest." — *K8HLR*. . . . "I suggest beginners listen to W1AW tube-table code practice. This should reduce the number of repeats asked in the SS," — *W8IBX*. . . . "This year I did it the easy way — as an s.w.l., working only the 73 sections then calling SS for about four hours." — *W2GND*. . . . "My 2nd contest as a General and just missed VE8. Is this the highest ENY score for a 15-year old?" — *WA2HLH*. . . . "Completed an exchange with VE6NX and the whole country opened up on us!" — *W1SWX/1* (Vermont). . . . "How *does* one go about getting a thousand *contacts?*" — *KN1WXN*. . . . "Taking time out to watch TV football games doesn't win an SS. Oh well, my team won anyway." — *K1DIR*. . . .

CLUB SCORES

Club	*Score*	*Valid Entries*	*C. W. Winner*	*Phone Winner*
Potomac Valley Radio Club	6,534,178	61	W4KFC	W3ZKH
Frankford Radio Club	6,439,255	58	W3GHM	W3ZSS
Suffolk County Radio Club (N. Y.)	1,066,212	44	W2BXS	W2JQZ
Rubber City Sweepstakes Hotshots (Ohio)	1,012,317	28	W8QYI	W8BFH
Florida DX Club	960,501	9	K4TML	.....
South Jersey Radio Assn.	894,851	49	W2DAJ	W2ORA
Germantown Radio Club (Pa.)	774,463	24	K3MNJ	K3KRF[1]
Connecticut Wireless Assn.	742,618	9	W1JYH	.....
Miami Valley Amateur Radio Contest Society (Ohio)	740,307	11	W8CEA	.....
Southern California DX Club	695,046	4	K6CTV	.....
Nashua Mike and Key Club (N. H.)	620,708	17	K1RFB	K1AEG/1
Lake Success Radio Club (N. Y.)	610,656	17	K2DGT	K2JTW
Order of Boiled Owls of Ohio	566,395	5	W8IBX	.....
Milwaukee Radio Amateurs' Club	566,335	15	W9QYW	W9VSO
West Central Radio Assn.	524,949	4	W9IOP	.....
Lynchburg Amateur Radio Club (Va.)	497,613	8	W4PTR	K4SHE
Motor City Radio Club (Mich.)	496,383	15	W8MPD	W8BNF
Central Michigan Amateur Radio Club	490,583	6	W8VPC	.....
Waltham Amateur Radio Assn. (Mass.)	485,471	7	W1NJL	K1QJT
Sioux City Amateur Radio Assn. (Iowa)	484,496	17	W0CXN	K0JFZ
West Park Radiops (Ohio)	483,524	12	K8CFH	K8AAG
Wisconsin Valley Radio Assn.	432,730	8	W9RQM	.....
Order of Boiled Owls of New Mexico	423,531	6	W5CK	.....
Union County Amateur Radio Assn. (N. J.)	409,295	7	WA2VBH	.....
Tusco Radio Club (Ohio)	399,184	8	W8NBK	.....
Hamden Amateur Radio Assn. (Conn.)	384,281	8	W1HTV	K1ANV
Westside Amateur Radio Club (La.)	377,871	6	W5HUK	.....
Hamfesters Radio Club (Ill.)	369,236	5	W9IRH	.....
North Penn Amateur Radio Club	333,902	15	W3JSA	W3EWE
Inglewood Amateur Radio Club	327,343	9	K6JBV	K6HFZ
Ohio Valley Amateur Radio Assn.	309,376	5	W4CVI	.....
Roanoke Valley Amateur Radio Club (Va.)	307,079	12	K4IKF	K4EQT
Horseshoe Radio Club (Pa.)	298,693	28	W3KQD	K3SIQ
Sioux Falls Amateur Radio Club (S. Dak.)	294,533	3	W0SMV	.....
Bronx High School of Science Radio Club	288,605	11	WA2UFE	W2JGQ
Forx Amateur Radio Club (N. Dak.)	267,282	7	K0IVQ	WA0AAD
Order of Boiled Owls of New York	262,241	3	W2AYJ	.....
Joliet Amateur Radio Society (Ill.)	255,517	5	W9RCJ	.....
York Radio Club (Ill.)	253,390	4	W9ZAB	.....
Tri-Town Radio Amateur Club (Ill.)	240,708	9	W9GMS	.....
Canton Amateur Radio Club (Ohio)	230,250	11	K8VLU	W8YAB
Northwest Amateur Radio Club (Ill.)	244,631	13	K9YRA	K9RNQ
Massillon Amateur Radio Club (Ohio)	217,420	3	K8ZBY	.....
Arrowhead Radio Amateurs (Minn.)	215,054	5	K0IJL	.....
Atlanta Society of Teenage Radio Operators	209,855	6	.....	K4KAZ
Parma Radio Club (Ohio)	195,485	9	K8WOT	K8NPH/8
Indian Hills Radio Club (Ohio)	186,141	4	K8RMK	.....
Starved Rock Radio Club (Ill.)	177,413	10	W9NIU	K9MQI
West Jersey Radio Club	152,626	3	W2SJB	.....
Amateur Radio League of Manitoba	144,843	3	.....	.....
Oxford Circle Radio Club (Pa.)	136,469	6	K3JIV	.....
Fort Myers Amateur Radio Club (Fla.)	132,506	3	W4KET	.....
Nittany Amateur Radio Club (Pa.)	118,594	11	W3NEM	K3AHY
Chiburban Radio Mobileers (Ill.)	118,299	4	.....	W9QXO
20/9 Radio Club (Ohio)	117,555	3	K8OTM	.....
Metuchen YMCA Radio Club (N. J.)	115,770	3	.....	.....
Kanawha Radio Club (W. Va.)	110,480	4	.....	.....
Littleton High School Amateur Radio Club (Colo.)	104,054	6	.....	.....
5 Towns Radio Club (N. Y.)	103,806	7	WA2RUB	K2CTK
Notre Dame Amateur Radio Club (Ind.)	102,995	6	K9VRU[2]	K9RHN/9
Telco Amateur Radio Club of Manhattan	102,535	7	W2LQP	.....
Waupaca Amateur Radio Club (Wisc.)	98,926	3	K9YRC	.....
Upper Arlington Radio Club (Ohio)	97,596	4	K8EDQ	.....
Oak Park and River Forest High School Radio Club (Ill.)	96,913	6	K9YON	.....
Larkfield Amateur Radio Club (N. Y.)	93,963	4	WA2GGB	.....
West Suburban YMCA Amateur Radio Council (Ill.)	93,620	5	K9DWG	.....
Radio Amateurs of Greater Syracuse	88,910	10	W2EMW	WA2PQG
West Philadelphia Radio Assn.	87,423	3	.....	.....
Chicago Radio Traffic Assn.	85,778	3	W9HPG	.....
Emerson Hamsters Radio Club	82,701	3	WA6NON	.....
Detroit Amateur Radio Assn.	79,593	4	W8IXJ	.....
Columbus Amateur Radio Assn. (Ohio)	78,582	4	W8DWP	.....
Chicago Suburban Radio Assn.	74,060	5	K9UCG	.....
Sandia High School Amateur Radio Club (N. Mex.)	71,634	6	K5WME	K5VDI
Short Skip Radio Club (Pa.)	69,053	4	.....	.....
Blackstone Valley Amateur Radio Club (R. I.)	64,560	10	K1QFU	W1YRC
200 Radio Club (Mass.)	62,328	7	K2KIR/1	W1SBW
Forestville Amateur Radio Assn. (Conn.)	60,740	3	.....	W1CKA
New Ulm Radio Club (Minn.)	59,285	4	W0AXH	.....
Sammamish Totems Amateur Radio Society (Wash.)	58,374	3	.....	.....
Stuyvesant High School Radio Club (N. Y.)	51,515	3	WA2TKL	.....
Saint Clair Amateur Radio Club (Ill.)	51,455	4	K9ZFR	.....
Montrose County Amateur Radio Club (Colo.)	47,828	5	W0WME	.....
Nutley Amateur Radio Assn. (N. J.)	44,785	4	.....	.....
Mohawk Radio Club (N. Y.)	44,387	9	WA2ZGQ	.....
Mount St. Michael Radio Club (N. Y.)	43,984	7	WA2KAJ	.....
Shoreline Amateur Radio Club (Conn.)	23,860	3	.....	.....
Springfield Amateur Radio Club (Ohio)	21,951	3	.....	.....
Forest City Amateur Radio Club (Ohio)	20,175	3	.....	W8SJH
Anacostia High School Amateur Radio Club (D. C.)	18,186	4	.....	K3OKJ
Island Radio Club (Mich.)	16,844	4	K8ALG	.....
Philadelphia Wireless Assn.	14,890	3	.....	.....
Trenton Wireless Assn. (N. J.)	6,417	3	.....	.....
Washington Square Amateur Radio Society (N. Y.)	1,256	3	WA2EFN	.....

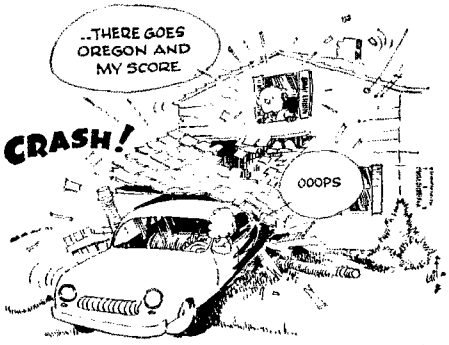
[1] K3DVS, opr. [2] K9RHN, opr.



Another top c.w. score from the Central Division features the results of W9RQM, Wausau, Wis. (211,791 with 1161/73). In use during the hassle was a homebrew rig and HRO50T. Radiators include a 80-meter zepp, ground plane on 40 and a rotary 8JK with tuned feeders on 20-15-10. Reno won his first Wisconsin award 27 years ago with 256 QSOs in 59 sections, participated in every SS since that time, won his section award for all post-war affairs and "says" he's due for retirement!

OT K4LPW is another versatile ham. This year he won for Tennessee on c.w. with 233K, 4th high nationally. Mel's XYL did a fine job on the photo showing some of the station: Navigator, electronic keyer, antenna tuner, SWR bridge, 250-watt linear (not in use during the SS), SX43, SX101A, GMT clock, select-o-jet and keying monitor. First SS was In '35 and many years of ham activity starting in '27 as 3ATZ and then on to W3DGM and thence to K4LPW in '56.

"Impressed by the gentlemanly behavior of all participants, their cooperation in repeating and their QRS for slower ops." — *W4HOS*. . . . "KP4AM kept signing KG4, guess he got out of Guam just before the storm hit." — (let's keep *this* one anonymous! — *Ed.*). . . . "Since operating under my present call I've worked all sections in the past 9 Sweepstakes." — *W4CVI*. . . . "Couldn't find Nevada." — *W4LYV*. . . . "Came in 2nd in NLI last year and doubled my score for '62 but with the numbers I heard I probably came in fifth!" — *WA2FPV*. . . . "I shared times on the air with my neighbor, WV2ZWP." — *WN2BAY*. . . .



W2EWZ WAS GOING GREAT UNTIL HIS XYL BACKED THE FAMILY CAR INTO A SIDE PORCH

. . . "Managed to get 72 sections the first phone weekend and my big moment came when WA4FXV/VE8 came back to my CQ SS for #73." — *K4FWF*. . . . "Use of sideband definitely an asset but its still a.m. that brings home the bulk of my contacts." — *K5MVK*. . . . "It has been some years since the northeast has produced one of the top phone SS scores and I'm convinced we're at a geographical disadvantage. However, this annual get together with the old gang is always a barrel of fun." — *K2GXI*. . . . "Very pleased to hear some big scorers going on phone this year after the major drop-off in '61. A top scorer has to keep on plugging even when things seem down but I may have overdone this as I worked several hours after midnight which were minimum contact periods. I came to the end of my 40 hours on a good 40 QSO/hour, this could have cost me the 300K score. I wasn't getting out as well as last year on sideband especially." — *K5MDX*. . . . "Very interesting phone contest. Next year I'll operate longer since this was just a fact-finding expedition. In '63 we're out to win!" — *VE3DQL*. . . . "Seeing that S. C. is fairly rare in a phone SS I made it a point to get on. It shouldn't have been any trouble this year!" — *W3AZD/4*. . . . "Hard to win on phone this year with only one weekend of operation." — *K3DVS*, opr. of *K3KRF*. . . . "Phone handicaps: 5 small harmonics age 2-8, and an OM with an expired Novice class ticket. — *K4SHE*. . . . "My first real try at a phone SS and very pleased with the results." — *WA2CLQ*. . . . "Thanks to all who took time out to give me a phone exchange even though not participating." — *WA4AAL*. . . ; "Made a 1500 mile round trip with W9VZP to put VE4 on the air." — *K9HOL/VE4*.

C. W. SCORES

Twenty-Ninth Sweepstakes Contest

Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is award winner for that Section unless otherwise indicated. . . ; Likewise the "power factor" used in computing points in each score is indicated by the letter A or B. . . . A indicates power up to and including 150 watts (multiplier of 1.25 c.w., 1.5 phone), B over 150 watts (multiplier of 1). . . . The total operating time to the nearest hour, when given for each station, is the last figure following the score. . . . Example of listings: W3GHM 224,931-1235-73-A-39, or final score 224,931, number of stations 1235, number of sections 73, power factor of 1.25, total operating time 39 hours. . . . An asterisk denotes Novice certificate winners. A double asterisk denotes Technician certificate winners. Multi-operator stations are grouped in order of score following single-operator station listings in each section tabulation.

ATLANTIC DIVISION

Eastern Pennsylvania

W3GHM	224,931-1235-73-A-39		
W3ALB	210,970-1156-73-A-39		
W3BES	210,060-1167-72-A-40		
W3CGS	206,681-1133-73-A-40		
W3HHK	206,590-1133-73-A-40		
W3MWC	206,408-1136-73-A-40		
W3WJD	198,651-1091-73-A-40		
W3KFQ	184,508-1011-73-A-36		
W3MFW	182,500-1000-73-A-39		
W3CPS	169,110- 963-72-A-40		
W3NOH	158,875-1025-62-A-34		
W3CTJ	150,198- 827-73-A-32		
W3KT	137,240- 752-73-A-32		
W3GR8	136,875- 750-73-A-31		
K3JCI*	132,600- 780-68-A-29		
W3BIP	129,600- 720-72-A-38		
W3KDF	128,700- 780-66-A-35		
K3MNJ	123,930- 729-68-A-38		
W3WPG	121,410- 684-71-A-40		
K3MBS	119,456- 693-69-A-40		
K3LYI	118,830- 702-68-A-40		
W3JSA	117,683- 663-71-A-39		
K3MCO	104,081- 647-65-A-39		
W3EQA	104,025- 579-73-A-28		
W3QMZ	103,879- 712-73-B-39		
K3JGJ	101,888- 627-65-A-29		
K3JNP	101,516- 589-69-A-35		
W3DAO	100,800- 560-72-A-36		
K3JLI	100,625- 576-70-A-37		
W3BB	97,825- 602-65-A-32		
W3EAN	93,450- 672-70-B-20		
W3EER	91,253- 529-69-A-40		
K3HTZ	90,185- 534-68-A-37		
K3IPK	89,066- 566-63-A-22		
W3ISE	84,980- 607-56-A-37		
W3SOH	84,500- 520-65-A- –		
W3OCU	83,020- 593-70-B-24		
W3ORU	81,472- 620-67-B-25		
K3JIV	80,000- 500-64-A-32		
K3NFA	75,350- 548-55-A-39		
K3HNP	74,700- 500-60-A-36		
W3LSG	68,240- 429-64-A-24		
W3ADE	67,238- 489-55-A-32		
K3DKC	66,400- 417-64-A-27		
K3LJZ	61,138- 365-67-A-36		
K3NDG	57,960- 415-58-A-36		
W3GSD	56,650- 412-55-A- –		
K3NBU	54,990- 425-52-A-28		
K3NGH	54,934- 391-57-A-32		
W3AEM	51,030- 405-63-B-29		
W3BYX	49,020- 344-57-A-20		
W3BUR	48,600- 324-60-A- –		
W3DBX	46,398- 277-67-A-30		
K3LSC	46,278- 432-54-B-34		
W3EML	45,792- 324-54-B-25		
K3ANU	45,225- 335-54-A-14		
K3OMP	41,438- 326-51-A-40		
K3LOW	38,028- 287-53-A-20		

K3JHF	35,798-	337-43-A-26	
K3NJW	31,797-	277-46-A- –	
K3KRF	30,438-	244-50-A-24	
K3OIO	26,910-	207-52-A-11	
W3NCW	25,175-	190-53-A-24	
K3JSZ	22,895-	241-38-A-32	
W3JET	20,445-	176-47-A-21	
K3PSU	19,150-	193-40-A-26	
W3WJC	18,000-	144-50-A-16	
K3RBN	15,965-	210-31-A-23	
K3RFB	14,620-	172-43-B-25	
K3UUO	14,350-	140-41-A- –	
K3LWY	13,489-	164-33-A-38	
K3RBA	11,456-	118-39-A-14	
W3NHX	10,620-	118-36-A-14	
W3CBH	9934-	117-35-A-19	
K3TYL	9900-	120-33-A-28	
K3MUT	9375-	129-30-A-26	
K3MVO	8208-	115-36-B-16	
W3SDE	7128-	99-36-B- 7	
W3MDO	5985-	86-27-A- 9	
W3ABZ	5175-	69-30-A- 7	
K3LWQ	3825-	77-20-A- –	
KN3SGT*	3440-	61-28-A-36	
W3FXK	3220-	56-23-A- 9	
W3ARK	2520-	63-20-B- –	
K3QDA	2135-	47-19-A-10	
KN3SYV	2071-	44-19-A-38	
K3NQV	1934-	47-17-A-11	
K3RTU	1640-	41-16-A-11	
W3GSY	1425-	38-15-A-11	
W3QKU	1313-	38-14-A- 5	
K3QJV	1088-	30-15-A- 7	
W3LEZ	910-	26-14-A- 2	
KN3SME	845-	28-13-A-10	
K3ALL	810-	27-12-A- 2	
W3DVC	780-	26-12-A- 1	
K3NTD	480-	24- 8-A- 4	
K3NCO	375-	25- 6-A- 5	
K3RZB	350-	20- 5-A- –	
KN3TOY	300-	14-10-A- 8	
K3QPS	158-	9- 7-A- –	
K3IOK	38-	5- 3-A- 1	
K3MFI	3-	1- 1-A- 1	
K3QFH	3-	1- 1-A- 1	
K3TEM	3-	1- 1-A- 1	

W3GOQ (W3ß AHX GOQ) 127,090- 716-71-A-38

W3EVW (W3ß EVW MQC) 109,500- 600-73-A-36

W3MKA (K3ß HWX SPS, W3ß VDN) 74,820- 550-58-A-20

W3ABT (5 oprs.) 73,276- 482-61-A-35

K3PNI (K3ß IPK PNI, KN3ß OSF) 68,244- 447-61-A-33

K3NUM/3 (K3ß DFK KPV) 38,710- 400-49-B-22

W3OLG (W3ß OLG VUF WN8) 23,055- 174-53-A-21

Md.-Del.-D. C.

K3JQU	214,985-	1200-73-A-39	
W3EIV	188,150-	1060-71-A-39	
W3GRF	172,736-	950-73-A-38	
K8NZV	164,433-	901-73-A-40	
K3EST	157,406-	870-73-A-38	
W3IYE	156,048-	855-73-A-39	
W3JTC	153,300-	840-73-A-39	
W3AEL	144,900-	805-72-A-33	
W3PZW	141,182-	967-73-B-37	
W3MFJ	136,938-	789-70-A-39	
W3MVB	130,640-	736-71-A-39	
W3MCG	126,360-	702-72-A-33	
W3FRZ	119,700-	685-70-A-38	
K3JIQ	112,003-	631-71-A-34	
K3CYA	110,960-	608-73-A-19	
W3KA	108,675-	630-69-A-36	
W3KDP	107,800-	616-70-A-30	
W8RNY	106,600-	657-65-A-30	
K3JYZ	104,650-	598-70-A-40	
W3TMZ	104,370-	590-71-A-18	
W3NBR	98,378-	528-66-A-19	
W3GAU	80,750-	495-68-A-17	
W3KWB	79,479-	476-67-A-37	
W3ZQ	70,898-	412-69-A-33	
W3IPO	61,975-	370-67-A-24	
W3BKE	59,000-	500-59-B-36	
W3DRD	54,968-	349-63-A-18	
K8MMN	52,050-	348-60-A-31	
K3GVE	51,910-	358-58-A-27	
W3HVM	50,388-	348-58-A-23	
W3IWJ	42,600-	357-48-A-17	
K3JOZ	40,761-	326-63-B-29	
W3WV	40,754-	288-71-B-19	
W3WU	38,125-	250-61-A-18	
K3LYW	33,630-	236-57-A-24	
W3KZQ	32,330-	244-53-A-18	
K3OKC	31,955-	298-44-A-25	
K3QDD	31,713-	298-43-A-19	
W3JO	30,195-	198-61-A- 6	
K3OMI	28,875-	210-55-A-26	
K3NKV	25,080-	210-48-A-18	
K3QNH	22,860-	255-36-A-29	
K3RNL	22,660-	210-44-A-26	
W3TN	21,800-	218-40-A-24	
K3RPG	21,730-	213-41-A-23	
W3YKQ	20,008-	151-53-A-17	
K3QOO	18,219-	138-53-A-26	
W3LDD	18,000-	200-36-A-18	
K3PZE	14,250-	144-40-A-19	
K3COO	13,530-	124-44-A-11	
K3QFG	13,140-	147-36-A-11	
W3PRC	7920-	100-32-A-10	
K3TVF	7088-	105-27-A-24	
K3MCY	6815-	100-29-A-24	
K3JJA	6800-	85-32-A-15	
K3RGG	6416-	89-29-A-12	
W3HRE	6383-	111-23-A-23	
W3QC	3720-	62-24-A- 7	
W3CVE	2088-	72-29-B- 8	
K3KAJ	638-	26-10-A- 3	
W6HOH/3	380-	19- 8-A- –	
K3OKJ	120-	8- 6-A- 1	

W3GQF (6 oprs.) 192,629-1058-73-A-40

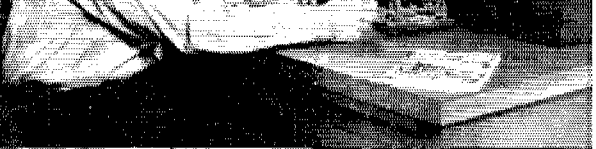
W3FYS (W3FYS, W6HOH) 166,500- 925-72-A-40

W3DVO (K2HWL, W3DVO) 132,192- 972-68-B-39

W3TSA (K3PWX, W3UYC) 495- 18-11-A- 3

Southern New Jersey

WB2APG	185,310-	1044-71-A-40	
W2HDW	154,785-	913-68-A-32	
WA2IZS	127,750-	700-73-A-35	
WA2BLV	123,200-	704-70-A-33	
W2QDY	113,940-	633-72-A-40	
W2DAJ	103,500-	600-69-A-40	
W2FYS/2	102,510-	603-68-A-38	
K2ERC	95,713-	590-65-A-40	
WA2WLN	94,960-	599-64-A-38	
K2CPR	88,020-	489-72-A- –	
K2OEA	74,520-	414-72-A-25	
WA2CUB	74,095-	511-58-A-24	
W2REB	57,888-	421-55-A-33	
WA2IEK	52,164-	415-63-B-30	
W2EBW	51,606-	424-61-B-38	
W2TLO	50,750-	351-58-A-29	
W2SDB	45,725-	310-59-A-27	
W2ESX	43,138-	497-35-A-30	
K2JXX	37,669-	308-49-A-17	
WA2JCF	32,665-	278-47-A-20	
WA2HJF	26,250-	210-50-A-25	
W2QVW	21,664-	164-53-A- 8	
K2BG	21,500-	250-43-B-15	
K2BZK	18,960-	158-48-A- –	
WA2MES	17,105-	157-44-A-19	
WA2KBI	16,072-	200-41-B-17	
W2TBD	14,493-	188-31-A-16	
WA2KWO	14,438-	165-35-A-19	
W2HBE	10,774-	111-39-A- 9	
WA2OVR	10,453-	113-37-A-16	
K2HBY	6930-	99-28-A-22	
W2APD	6365-	67-38-A- 9	
K2EJW	4840-	88-22-A-14	
W2LY	4725-	70-27-A-10	
W2OQN	3640-	52-28-A- 7	
W2DMU	2550-	51-20-A-10	
WA2ZZQ	2541-	57-19-A-10	
W2BEI	978-	23-17-A- 3	
W2BLV	900-	30-12-A- 4	
WV2WLM	861-	30-13-A- 7	
W2FZP	675-	30- 9-A- 6	
WB2ENJ	513-	25- 9-A- 6	
W2FXN (W2FXN, W3SQX)	160,053-	883-73-A-30	
WA2NGS (WA2s KUP NGS)	50,485-	440-46-A-39	
K2PWV (K2PWV, K3BPL)	43,733-	343-51-A-37	
WA2KWS (WA2s KWS OAA)	38,438-	308-50-A-37	
W2PAZ (K2EJW, W2PAZ)	3425-	69-20-A-10	



Western New York

K2INP	134,033-	780-69-A-38	
W2WOE	94,315-	726-65-B-39	
WA2LKW	83,325-	510-66-A-34	
WA2JWV	82,770-	539-62-A-40	
W2PGU	79,658-	565-57-A-26	
WA2THY	76,403-	501-61-A-37	
WA2IBJ	72,034-	506-57-A-32	
K2KWZ	56,198-	383-59-A-23	
W2SSC	55,376-	350-61-A-12	
W2EMW	41,300-	236-70-A-22	
K2LMX	36,875-	287-50-A-23	
WA2HZO	34,744-	273-51-A-17	
WA2UVN	30,709-	225-57-A-36	
W2GVH	27,500-	250-44-A-21	
WA2JZM	26,228-	269-39-A-27	
K2HVS	25,644-	190-55-A-22	
WA2SEY	14,629-	128-47-A-22	
W2IYB	14,500-	145-40-A-12	
WA2SXH	13,490-	148-38-A-28	
WA2SSJ	11,408-	120-39-A-23	
K2ODI	11,008-	119-37-A-20	
WA2KKP	9315-	140-27-A-13	
WA2KQK	6634-	107-31-B- 9	
WA2QMJ	6606-	80-35-A-14	
W2CCZ	5003-	69- 29-A-6	
K2YMM	4453-	69-26-A-15	
K2UAN	2680-	70-16-A-13	
K2GQU	2600-	50-26-B- 5	
W2LLJ	1260-	36-14-A-12	

W2CXM (4 oprs.) 96,433- 662-73-B-39

K1AWR/2 (4 oprs.) 26,049- 231-57-B-18

W2TOP (W2TOP, WA2CUZ) 21,720- 185-48-A-22

WA2UKA (WA2UKA, WB2ABD) 10,773- 145-31-A-24

Western Pennsylvania

W3YOZ/3	143,360-	1027-70-B-40	
K3IWC	113,344-	701-65-A-37	
K3NIC	102,838-	595-69-A-40	
W3KQD	79,563-	475-67-A- –	
W3LIV	66,330-	402-66-A-33	
K3PYS	62,428-	416-61-A-22	
W3NEM	57,813-	463-50-A-37	
K3OOU	49,388-	442-45-A-31	
K3QEW	44,250-	300-59-A-27	
K3ELL	35,168-	261-54-A-33	
K3QHO	21,000-	210-40-A-16	
W3QZF/3	19,950-	214-38-A- –	
W3QPF	17,438-	155-45-A- –	
K4ZQK/3	16,875-	150-45-A-10	
W3JHG	15,210-	170-36-A-18	
K3MPB	15,008-	215-29-A-31	
K3OWN	13,320-	144-37-A-13	
K3EXE	12,516-	166-31-A-20	
W3EFW	11,310-	116-39-A-24	
K3RGV	10,175-	110-37-A-17	
W3OEQ	9920-	125-32-A-11	
W3VXZ	9313-	150-25-A-13	
K3NXO	8621-	105-33-A-11	
K3NWD	8525-	110-31-A-19	
K3MNP	8550-	95-36-A-12	
KN3SHI*	5386-	71-31-A-25	
W3VK	3240-	36-36-A-10	
K3PCE	1350-	32-18-A- 3	
W3EJA	1092-	26-21-B- 5	
K3GIH	1063-	25-17-A-15	
KN3T8X	236-	11- 9-A- 5	
W3LQD	120-	8- 6-A- –	
KN3SDA	105-	7- 6-A- 5	
K3LVO	100-	8- 5-A- 2	

K3HKK (K3s AKR STG) 1060- 29-16-A-21

CENTRAL DIVISION

Illinois

W9IRH	180,540-	1008-72-A-40	
W9ZAB	175,383-	961-73-A-38	
W9RCJ	169,817-	931-73-A-40	
W9IPT	163,800-	936-70-A-39	
W9CLH	141,400-	810-70-A-36	
W9GFF	137,514-	755-73-A-37	
W9LNQ	129,119-	708-73-A-29	
W9ZYD	128,800-	740-70-A-35	
W9BUD	125,720-	905-70-B-40	
K9ZXG	115,920-	682-69-A-40	
W9WHF	98,505-	599-66-A-39	
K9ZSE	93,968-	561-67-A-38	
K9VZL	81,065-	524-62-A-34	
K9YRA	79,283-	488-66-A-31	
K9MBW	68,040-	438-63-A-39	
K9DWG	66,650-	431-62-A-32	
K9UFJ	61,305-	405-61-A-28	
K9FEN	59,856-	398-61-A-25	
W9GMS	57,333-	324-71-A-26	
K9CCG	52,813-	325-65-A-23	
W9KLD/9	52,448-	336-63-A-23	
K9YON	52,113-	379-54-A- –	
W9HPG	50,995-	329-62-A-31	
K9QOV	49,518-	343-58-A-39	
WA9DOC	46,103-	342-54-A-26	
K9FRC	45,173-	318-57-A-27	
K9RPX	43,660-	299-59-A-36	
K9GSD	41,275-	320-52-A-37	
W9OKI	40,000-	250-64-A-18	
WA9BKW	38,793	263-59-A-20	
W9AMU	37,059-	243-61-A-13	
K9SLK	35,775-	270-53-A-29	
K9YOH	33,325-	217-62-A-28	
W9REC	33,311-	212-63-A-31	
W9MQZ	32,846-	233-57-A-20	
W9YES	32,175-	215-60-A-18	
W9ZSQ	30,308-	229-54-A-21	
K9QOB	30,188-	246-50-A-16	
WA9APT	29,680-	224-53-A-24	
W9ALR	29,018-	230-53-A-35	
K9RKU	27,300-	210-52-A-20	
WA9BMG	25,551-	251-51-B-19	
W9NIU	25,347-	250-51-B-28	
W9YYG	25,025-	182-55-A-11	
W9ZEN	24,750-	180-55-A-19	
W9YDQ	24,439-	172-57-A-15	
W9EET	23,940-	171-56-A-14	
W9AGM	23,850-	180-53-A-12	
W9AA/9[2]	23,581-	194-49-A-16	
K9CZV	23,200-	201-58-B-16	
W9YCZ	21,385-	182-47-A-18	
K9ZFR	19,845-	203-42-A-26	
K9ZIA	19,795-	214-37-A-27	
K9UCR	19,575-	174-45-A-15	
K9AUD	17,650-	180-40-A-31	
W9IEU	16,256-	147-45-A-10	
K9JUU	16,195-	158-41-A-14	
K9RVF	15,469-	145-45-A-27	
K9UTL	14,852-	160-47-B-13	
W9MLR	11,986-	112-43-A-18	
K9LSN	11,130-	107-42-A- 8	
W9OKM[3]	11,040-	120-46-B- 9	
W9MAK	10,968-	107-41-A- 4	

Leading Ohio takes a lot of doing, just see that c.w. list! W8OYI did it in '62 with 190K, using a Viking I and DX100. A well-known SSer, W8OYI has been in yearly since the contest began and continues to find pleasure in the November event. Joel plans bigger things this year with a good tri-band beam.

QST for

W9IBC	10,635-	115-37-A- 9
K9DVK	10,540-	136-31-A-22
K9BQL	10,128-	120-34-A-14
W9YYY	10,080-	96-42-A-17
W9VOO	9595-	101-38-A-10
WA9ATA	9135-	103-36-A-25
W9YNK	7740-	87-36-A-11
W9ACS	7672-	100-31-A- 6
W9GCX	7350-	105-35-B-17
W9VBV	7263-	83-35-A- 6
K9IWS	6120-	91-34-B-12
WA9ATD	5501-	86-27-A-25
K9KZW	5473-	100-22-A- 7
WN9DDM*	4750-	100-25-A-30
W9RTY	4650-	78-24-A-10
WN9FAR	4428-	87-22-A-35
K9UQN	4260-	72-24-A- 8
W9GEX	3100-	63-25-B-11
K9EIV	2070-	38-23-A- 4
WN9FUI	1995-	42-19-A-15
WA9AWP	1658-	41-17-A- 9
WN9DCN	1615-	41-17-A-12
W9WR	1472-	32-23-B- 4
K9IVV	1200-	25-20-A- 7
K9DCV	1085-	32-14-A-12
K9ISP	1080-	27-16-A- 3
WN9FBC	1045-	42-11-A-16
W9CWH	994-	27-15-A- 4
WN9DJS	956-	30-15-A-23
WA9AJF	948-	25-15-A- 3
WN9CCP	900-	26-15-A- 7
WN9DXA	881-	27-15-A-25
W9TAL	553-	17-13-A- 1
WN9CHG	420-	23- 8-A-23
K9LRK	254-	15- 7-A- 3
WN9BJX	225-	15- 6-A- 5
WN9EKJ	188-	13- 6-A- 7
WN9ENA	113-	10- 5-A- 6
W9DNM	35-	4- 4-A- 3
WN9EXP	5-	2- 1-A- –
K9UFK	3-	1- 1-A- 1
W9EJX (4 oprs.)	650-	26-10-A- –

Indiana

W9IOP	268,549-	1477-73-A-40
K9DHN	123,040-	783-64-A-40
K9VRU*	102,492-	702-73-B-33
K9RGM	90,990-	508-72-A-31
WA9AUM	75,000-	500-60-A-31
K9LVK	65,505-	397-66-A-40
K9UKM	62,754-	416-61-A-23
W9CNG	28,000-	200-56-A-18
K9AUE	27,930-	196-57-A-13
W9DGA	26,000-	200-52-A-10
WA9CVI	17,755-	140-53-A-26
K9HYV	14,333-	139-42-A-17
W9QLW	13,500-	125-54-B-13
W8ZLH/9	12,765-	111-46-A-16
K9RZE	8260-	121-35-B-14
K9ATY/9	6885-	87-34-A-11
K9KRN	4495-	63-29-A- 6
K9OYK	4453-	142-13-A-20
WN9DVD/9	3000-	48-25-A-38
K9PUI	1313-	25-21-A- 2
WN9BHI	1305-	29-18-A-14
K9PYO	1085-	31-14-A- 8
W9AQW	450-	18-10-A- 1
K9MAN	40-	4- 4-A- 1
K9HGB/9	23-	3- 3-A- 1
W9VNE	4-	2- 1-B- 1
K9DHE (K9s DHE SOP)	17,900-	186-40-A-28

Wisconsin

W9RQM	211,791-	1161-73-A-40
K9KGA	148,860-	827-72-A-40
W9QYW	127,020-	696-73-A-29
W9SZR	121,650-	677-72-A-34
K9LGU	119,963-	689-70-A-40
W9FBC	96,220-	566-68-A-37
W9ZB	73,307-	413-71-A-20
K9DAF	72,463-	469-62-A-35
W9GIL	63,875-	350-73-A-20
K9YBC	52,500-	350-60-A-33
W9KXK	50,660-	298-68-A-27
W9BLQ	49,708-	339-59-A-27
K9ELT	49,660-	382-65-B-17
W9JQE/9	38,800-	243-64-A-31
K9IMM	33,665-	258-53-A-36
W9DTE	32,918-	200-66-A-23
K9WIE	27,626-	215-53-A-16
WA9AIB	27,560-	209-53-A-15
K9GDF	26,903-	211-51-A- –
W9TXF	25,245-	198-51-A-23
K9IME	21,715-	204-43-A-22
K9WDM	20,081-	162-51-A-15
WA9AVZ	18,800-	165-47-A-15
K9ESU	15,050-	140-45-A-18
W9KQD	11,100-	115-40-A- 7
K9AXB	9818-	93-42-A- –
W9RKP	8800-	110-40-B- 6
W9IHN	6962-	59-59-B- 9
W9WUQ	3053-	58-22-A-26
W9DYG	2645-	51-23-A- 3
K9FEW	1063-	27-17-A- 4
K9IPS	660-	22-12-A- 7
W9UDK	394-	18- 9-A- 1
W9CHD	360-	18- 8-A- 2
WN9FAB	149-	11- 7-A- 3
WN9ERI	120-	8- 6-A- 4
W9HHX (K9s CHT GDF)	109,633-	658-69-A-40
W9FLP (K9s IAX KGC ZMF)	76,822-	552-71-B-36
W9YT (4 oprs.)	43,513-	411-53-B-16

DAKOTA DIVISION

North Dakota

KØIVQ	145,728-	821-71-A-34
KØQWY	58,960-	353-67-A-19
KØQYD	20,138-	181-45-A-10
KØKLG	8556-	100-37-A- –
KØRSA	113-	8- 6-A- 1
KØMPH/Ø	3-	1- 1-A- 1
WØHSC (5 oprs.)	107,019-	779-69-B-40
KØOSV (KØs OSV OSW)	100,568-	623-68-A-40
KØPVH/Ø (2 oprs.)	3-	1- 1-A- 1

South Dakota

WØSMV	144,864-	1025-72-B-40
WØCUC/Ø	96,250-	550-70-A-33
WAØBMW	53,419-	436-55-A-30
KØZTV	18,960-	158-48-A-16
WØWUU	18,260-	166-55-B-14

Minnesota

KØDHH	174,213-	1002-70-A-40
KØBPO	152,739-	861-71-A-34
WØJP*H	144,720-	804-72-A-40
KØIJL	116,100-	648-72-A-27
WØPBJ	77,420-	556-70-B-25
KØWWW	75,644-	469-65-A-40
KØRPW	70,434-	436-67-A-33
KØZXE	70,166-	447-65-A-38
KØDKZ	57,038-	351-65-A-28
KØBCL	48,685-	379-65-B-30
WØAIH	38,163-	215-71-A-10
WAØAXH	32,633-	237-57-A- –
KØGIP	28,223-	214-53-A-32
WØQZR	25,000-	250-40-A-40
KØFZG	17,200-	162-43-A-26
WAØAHV	8873-	95-39-A-14
WØRXL	8820-	98-45-B-13
WAØAHX	8585-	108-34-A-20
KØGCJ	8338-	115-39-A-28
KØBYW	6859-	96-31-A-20
WNØBEA*	5985-	73-36-A-25
KØBFT	5950-	73-34-A-17
WAØAXG	4750-	78-25-A-14
WØKUI	4600-	60-28-A-14
KØJOA	3510-	54-26-A- –
KØWYV	3408-	47-29-A-10
WNØCCB	870-	34-12-A-15
WNØDBW	338-	15- 9-A- 5
WØYC (4 oprs.)	101,258-	584-69-A-35

GALS HAD FUN, TOO

KØAOZ (6 oprs.)	33,018-	293-47-A-32
WØOEZ (KØs GPI OIV TMY)	15,275-	130-47-A-19

DELTA DIVISION

Arkansas

WA5CBL	184,770-	1042-72-A-40
K5USE	166,896-	944-73-A-40
K5TYW	71,923-	508-71-B-25
W5RIT	31,644-	210-61-A-20
WA5AVR	22,230-	173-52-A-22
W6RNY/5	12,980-	118-44-A-20
K5WVC	3105-	46-27-A- 7

Louisiana

W5BUK	172,288-	987-70-A-39
K5CKD	122,570-	726-68-A-31
W5ERR	105,485-	622-68-A-39
WA5BBC	67,425-	471-58-A-34
K5UAR	32,396-	245-53-A-25
K5IGW	29,198-	229-51-A-30
W5JMY	25,200-	145-64-A-19
WA5ALI	25,185-	233-46-A-24
W5YZL/5	16,335-	150-44-A-19
WA5BXF	5214-	79-33-B-10
WN5CBQ	3139-	47-27-A-19
WA5BDT	3025-	110-11-A-14

Mississippi

K5RUO	163,080-	924-72-A-40
K5BQS	53,509-	378-57-A-37
K5MCV	49,748-	375-54-A-34
K5ZUW	30,038-	223-54-A-34

Just 21 QSOs out of first on phone was K5MDX of Miss. This Delta Div. champ puts out a walloping signal on 75 through 15. Dave too specializes in DX 245 confirmed on A3). In use during the contest was a homebrew 4-125A, and antennas are dipoles on 75 and 40 and a tribander up 50'.

WN5BMC	1639-	38-19-A-15
WN5CKM	1551-	39-17-A-11
K5YEL	439-	14-13-A- 6

Tennessee

K4LPW	233,053-	1277-73-A-40
W4WZC	162,413-	921-71-A-40
W4SQE	105,350-	602-70-A-40
WA4CGA	65,363-	381-70-A-33
K4EJQ	55,160-	410-56-A-28
WA4FDR	44,530-	292-61-A-24
WA4CGI	12,349-	135-37-A- 9
K4ASQ	7995-	104-39-B-12
K4QZV	7790-	82-38-A- 8
WN4GAX*	7425-	119-30-A-33
WN4FZV	6023-	79-33-A- –
WN4HRG	5003-	73-29-A-27
W4ROG	2100-	40-21-A- 6

GREAT LAKES DIVISION

Kentucky

K4GSU	211,680-	1192-72-A-39
W4CVI	109,592-	601-73-A-27
W4YFA	92,528-	507-73-A-33
K4QPJ	88,725-	551-65-A-40
W4GSH	56,048-	453-62-B-30
W4YDL	33,512-	284-59-B- –
K4NJX	33,481-	250-55-A-22
K4LIE	21,503-	141-61-A- –
WN4KEY	1540-	41-16-A-10

Michigan

K8QJH	158,040-	878-72-A-39
W8VPC	145,635-	798-73-A-40
W8CQN	138,600-	770-72-A-40
W8DUS	126,810-	728-72-A-40
W8DQL	114,240-	719-64-A-36
W8MPD	105,525-	630-67-A-38
K8GKX	91,175-	524-70-A-37
K8JXK	84,525-	500-69-A-33
K8QLL	83,680-	523-64-A-35
K8ZOA	82,863-	476-70-A-35
K8NJW	78,809-	474-67-A-24
W8TJQ	76,590-	444-69-A-40
W8PXA	75,038-	435-69-A-27
K8GJD	66,581-	400-67-A-21
W8TRN	65,048-	413-63-A-36
W8CRD	62,921-	403-63-A-33
K8FND	61,305-	402-61-A-30
K8YWR	60,938-	375-65-A-36
W8CXS	57,015-	362-63-A-34
W8LXJ	52,530-	515-51-B-24

W8MSK	52,068-	353-59-A-25
W8PVI	51,900-	346-60-A-28
W8BS	48,990-	285-69-A-26
W8VWY	47,125-	331-58-A-29
W8QENO	46,818-	314-61-A-38
K8QCJ	42,268-	323-53-A-24
K8YNB	40,193-	351-46-A-35
K8UGG	40,163-	320-51-A-24
W8DMI	39,000-	325-60-B-21
K8DRZ	37,620-	268-57-A-38
K8BTN	32,066-	254-51-A-21
WA8BNQ	30,140-	274-44-A-32
W8FX	26,058-	303-43-B-21
W8CLH	23,345-	161-58-A-18
K8HLR	21,935-	214-41-A- 9
WA8COZ	21,285-	198-44-A-17
K8TAH	16,625-	176-38-A-21
W8KTR	15,413-	139-45-A-20
K8ALG	15,200-	160-38-A-18
WN8CIE*	13,855-	177-34-A-39
WA8BQK	12,195-	140-36-A-25
K8UJG	11,865-	115-42-A-10
K8CVV	11,550-	118-40-A-17
K8OVJ	8700-	87-40-A-15
W8EGI	7290-	81-36-A- 5
K8MDH	5438-	79-29-A-15
K8LIX	4900-	56-35-A-13
K8QBM	4433-	61-29-A- 8
WN8CZI	3308-	63-21-A-11
WN8FVD	3203-	64-21-A-21
W8OCK	2820-	47-24-A- 8
WA8CID	2530-	49-22-A-16
WA8ASV	1620-	36-18-A- 7
WN8DIK	1360-	36-16-A-30
K8VJV	1294-	36-15-A-10
WA8BJD	1238-	28-18-A- –
WN8EUD	1050-	44-12-A-18
K8DHG	825-	22-15-A- 6
WN8CYQ	786-	22-17-A-18
WN8CFG	450-	23- 8-A- 9
WN8FQF	144-	12- 5-A-12
K8SPZ	125-	10- 5-A- –
WN8COR	23-	3- 3-A- 3
W8UA (WA2EBM, K8DCP, W8GTL)	45,017-	387-59-B-23
K8TAS (K8s TAS VTR)	23,730-	174-56-A-25
WA8AEG (2 oprs.)	23,625-	176-54-A-16

Ohio

W8OYI	190,440-	1058-72-A-38
W8NBK	185,055-	1014-73-A-37
W8IBX	178,640-	983-73-A-40
K8MTI	176,660-	968-73-A-40
W8CEA	144,025-	823-70-A-34
W8CJN	133,125-	750-71-A-37
K8RMK	128,340-	767-72-A-38
K8VLU	127,400-	728-70-A-40
K8SMA	125,138-	709-71-A-35
W8DQG	113,645-	675-68-A-37
W8CYB/8	112,000-	640-70-A-37
W8ZJM	110,869-	614-73-A-28
K8CEH	110,500-	650-68-A-34
W8DCH	109,865-	602-73-A-39
K8IPS	108,630-	605-72-A-37
K8RFU	103,845-	606-69-A-34
W8UEX	100,485-	566-71-A-30
W8OLO	88,145-	521-68-A-36
K8WOT	86,100-	615-70-B-31
K8ZBY	84,755-	506-67-A-35
K8OTM	84,525-	490-69-A-39
W8EXI	83,038-	511-65-A-35
W8LUZ	79,275-	453-70-A-30
K8IDG	78,401-	456-69-A-32
W8JSU	78,100-	440-71-A-27
W8LHV	77,280-	448-69-A-36
W8NWR	75,825-	508-60-A-35
W8SJC	75,195-	557-54-A-39
W8VQI	*74,885-*	*455-66-A-37*

K1HTV keyed fast and furiously and finished with top honors for Connecticut. Rich used 80 through 15 as many section champs did and ended up with 176K, leading a goodly number of section code specialists. Equipment line up included an Apache and HQ170.

W8UPH	71,490-	476-60-A-25
W8DHG	65,410-	422-62-A-40
K8 3XT	64,753-	441-59-A-37
K8NYM	63,175-	361-70-A-38
W8DWP	61,600-	352-70-A-30
W8GFH	61,893-	354-69-A-27
K8EKG	55,849-	468-49-A-23
K8COT	55,734-	457-64-B-36
W8YCP	52,122-	358-73-B-15
W8LOF	51,460-	333-62-A-16
W8APC	49,781-	373-67-B-29
W8YPT	48,612-	363-67-B-14
WA8AJZ	46,601-	372-51-A-32
WA8BIC	45,495-	337-54-A-37
W8HQK	44,616-	338-66-B-33
K8IKO	43,310-	284-61-A-31
WA8AJE	42,333-	287-59-A-19
W8KCN	41,468-	293-57-A-36
K8ATQ	41,103-	309-55-A-31
K8ZJI	40,784-	280-59-A-39
W8CLD	40,744-	314-53-A-18
WA8AHK	39,668-	385-43-A-26
K8WOU	39,150-	265-60-A-28
W8MXO	38,927-	291-67-B-25
K8UNP	37,575-	251-60-A-23
K8EDQ	35,746-	295-61-B-23
W8ILC	33,835-	292-67-A-10
W8AJW	33,778-	229-59-A-10
K8NMG	30,870-	221-56-A-19
K8DBW	30,393-	272-46-A-26
WA8AJC	30,225-	233-52-A-19
W8ETU	29,150-	212-55-A-10
K8CVJ	28,358-	203-57-A-25
W8KMF	28,350-	203-56-A-25
W8JUP	27,500-	200-55-A-16
K8VAK	27,485-	239-46-A-21
K8ANA	26,456-	210-51-A-18
W8NAL	26,000-	200-52-A-22
K8ZSZ/8	23,865-	258-37-A-22
WA8AVH	22,825-	217-44-A-32
K8CTP	21,875-	175-50-A-11
K8SWE	21,480-	179-60-B- –
W8VZE	21,063-	170-50-A-19
K8ZXM	19,740-	168-47-A-24
WA8CDW	18,300-	157-48-A-24
K8PYD	15,040-	128-47-A-11
W8CAR	14,523-	159-37-A- –
WA8BRY	12,650-	120-44-A-23
W8NHO	12,118-	131-37-A-29
WA8ADA	12,086-	150-33-A-20
WA8BZR	11,813-	108-45-A- 7
K8PDF	11,808-	152-41-B-20
W8HR	11,800-	118-40-A-17
W8OYL	11,603-	137-34-A-15
K8BBH	11,448-	126-38-A-15
W8AL	10,911-	152-29-A-19
K8VKC	10,560-	133-32-A-16
WN8DCQ*	9956-	156-27-A-37
K8WWN	9842-	135-37-B-19
WN8CUO	9611-	124-33-A-35
K8GKJ	8973-	101-37-A-30
W8AJH	8880-	111-32-A-16
W8ENH	7410-	76-39-A- 7
W8RAA	7200-	80-36-A- 7
W8CHT	6840-	73-38-A- 5
W8KFC	6290-	68-37-A-10
K8BAB	5994-	69-35-A-13
W8VDF	5429-	72-39-B-12
K8AOP	5250-	80-30-A-14
K8LGB	4973-	78-26-A-12
K8BQY	4288-	70-32-B- 3
W8AEW	3575-	73-25-B-19
K8HHF	3375-	50-27-A- 4
WN8COX	3328-	62-22-A-34
K8YML	3203-	61-21-A-21
K8DFW	3185-	49-26-A-10
K8RZH	3019-	55-23-A-14
W8PBS	2805-	51-22-A-18
WN8CWX	2756-	61-21-A-32
K8MMZ	2750-	55-20-A- –
WA8DZS	2700-	56-20-A-20
WN8CKS	2585-	48-22-A-14
K8WDS	2565-	59-18-A-16
WA8ADJ	2363-	53-27-A- –
K8TKA[5]	2160-	36-24-A- 3
W8DAE	2040-	60-17-B- 3
WN8BYC	1980-	46-18-A-13
K8ZDA	1564-	34-23-B-12
WA8BOD	1190-	35-14-A-12
W8TGG	940-	25-16-A-22
W8DDG	900-	25-18-B-19
W8DIH	840-	25-14-A-12
WN8CWW	675-	31-10-A-14
WN8DLD	520-	16-13-A- 4
W8YAB	450-	15-12-A- 2
K8RXD	255-	17- 6-A- 3
W8AJR	90-	9- 4-A- 2
WA8BVY	60-	6- 4-A- 4
WN8ELZ	8-	2- 2-A- 2
WN8DOM	5-	2- 1-A- 6

K8SPC (K8s SPC TRR) 45,825- 312-59-A-38
WA8EZW (WA8s BVZ EZW) 29,380- 230-52-A-32
K8SWX/8 (K8s RHW SQX, WA8DHK) 18,200- 236-32-A- –

HUDSON DIVISION

Eastern New York

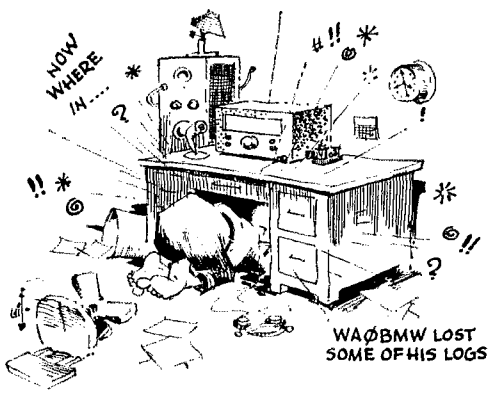
WA2HLH	111,960-	630-72-A-33
WA2OJD	88,622-	609-73-B-38
WA2VYS	58,255-	383-61-A-34
WA2PPE	52,141-	355-59-A-24
WA2VBW	34,542-	306-57-B-24
WA2DRP	21,780-	199-44-A- –
WA2KHV/2	20,813-	185-45-A-13
WA2KSD/2	15,755-	138-46-A-15
WA2PDU	13,905-	156-36-A-22
WA2KAJ	13,493-	130-42-A-24
WA2LYP	12,875-	206-25-A-16
WA2VJJ	10,804-	101-43-A-17
WA2MIF	8066-	128-27-A-23
WA2YHA	7945-	114-28-A-21
K6JPT/2	5691-	83-29-A-25
WA2PUM	3548-	66-22-A-10
WA2RUD	2083-	50-17-A- 5
WV2YIO	1948-	41-19-A-15
W2IP	700-	20-14-A- 6
WN2CDV	585-	20-13-A- 2

N. Y. C.-L. I.

K2DGT	274,845-	1506-73-A-40
W2AYJ	174,816-	1214-72-B-36
W2BXS	156,060-	867-72-A-40
K2ZYR	148,281-	813-73-A-38
W2CWD	135,548-	829-66-A-39
WA2FJA	126,720-	706-72-A-30
W2MZB	110,653-	610-73-A-30
W2DUS	103,675-	638-65-A-36
WA2RUB	95,600-	600-64-A-38
K2JOK	90,703-	514-71-A-34
WA2DNQ	81,015-	492-66-A-39
WA2GGB	72,000-	451-64-A-39
WA2FPV	70,680-	383-62-A-34
WA2YLL	70,275-	471-60-A-39
K2JQO	56,560-	404-56-A-30
WA2DHF	54,325-	410-53-A-34
WA2SJC	46,375-	265-70-A-21
WA2RMP	46,315-	315-59-A- –
W2IRV	44,800-	280-64-A- –
W2MUM	42,625-	275-62-A- –
WB2CKS	42,331-	263-65-A-27
WA2PJL	40,390-	291-56-A-20
W2GKZ	39,162-	323-61-B-14
WA2IUQ	34,185-	318-43-A-31
WA2ODA	33,660-	374-36-A- –
WA2SVP	33,565-	284-49-A-22
W2UNS	31,913-	345-37-A- –
W2DUN	31,453-	274-46-A-22
WA2UFE	31,000-	310-40-A-29
WA2VQV	30,791-	244-51-A-33
K2AJR	30,615-	315-39-A-25
WA2YHK	28,300-	283-50-B- –
WA2IMH	28,063-	225-50-A-18
W2NCG	27,326-	174-63-A-40
WA2QGU	26,775-	238-45-A-33
WA2TKL	26,730-	253-44-A-33
WA2VJE	26,706-	233-45-A-21
WA2QJU	25,436-	200-51-A-15
WA2EXP	25,100-	255-40-A-31
WA2YBL	24,745-	212-49-A-25
WA2OBQ	24,610-	214-46-A-31
WA2RUE	22,055-	251-36-A-32
W2AIZ	19,879-	257-31-A-28
WA2UXZ	18,900-	181-42-A-15
K2CMV	18,275-	170-43-A- –
W2DQN	17,930-	165-44-A-17
WA2BQN	16,810-	165-41-A-39
WA2TZV	16,690-	187-36-A-34
WA2ZGQ	15,138-	174-35-A-14
WA2ITR	14,918-	153-39-A-13
WA2JIS	14,794-	133-45-A-22
WA2PXI	13,545-	155-36-A-17
W2UAL	13,120-	164-32-A-12
W2VL	13,064-	92-71-B-17
WA2VFV	12,188-	167-30-A-23
W2DID	11,475-	136-45-A-10
WB2CAV	11,440-	146-32-A-16
K2BTT	10,553-	101-42-A- –
W2TUK	10,325-	118-35-A- 4
WA2IBF	10,082-	71-71-B- 8
WA2IKN	9481-	106-37-A-21
WA2UNH	9375-	126-30-A-25
WA2VDA	8663-	105-33-A-25
WA2SJQ	7576-	105-29-A-13
WA2WGV	7050-	94-30-A-18
W2III	6898-	89-31-A-14
W2KKW	6383-	112-23-A-15
W2HAE	6250-	100-25-A-12
W2CUQ	8558-	82-42-A- –
W2BPA	6090-	87-35-B-17
WA2YHV	5280-	90-24-A-14
WA2LKY	5096-	76-27-A- –
WN2CRL*	4655-	69-29-A-21
WA2CXA	3795-	66-23-A-12
WA2RJZ	3640-	56-26-A- 9
WA2DTY	3509-	63-29-B- 8
WA2PVQ	3125-	50-25-A- 8
WA2TMW	3063-	49-25-A-10
K2OHK	3025-	62-20-A- –
WN2AKW	2535-	40-26-A-14
WA2QMQ	2402-	57-17-A-13
WA2URD	2375-	50-19-A- 5
WV2YDN	2020-	53-16-A-23
WA2HYH	2019-	48-17-A-15
K2CTK	2000-	40-20-A- 4
W2TNI	2000-	50-16-A- 7
K2PNK	1913-	51-15-A-13
WA2DSR	1864-	38-21-A- –
WA2AFO	1665-	37-18-A- 9
W2HAJ	1463-	39-15-A- 8
WA2TBW	1295-	38-14-A-14
W2FEI	1280-	34-16-A-13
WA2VKO	1238-	33-15-A- 5
WN2BAY	1103-	32-18-A- 6
WA2EFN	1088-	35-16-B- –
WV2ZSF	938-	29-15-A- –
W2AJI	920-	23-16-A- –
WN2DWK	919-	30-15-A-16
WN2CJW	648-	19-14-A-14
WA2RYF	600-	20-12-A-11
WA2ZVC	563-	28- 9-A- 4
WA2YTL	550-	23-10-A- 8
WV2ZWP	420-	19-12-A- 9
WA2TZY	385-	15-11-A- 4
WA2PZD	285-	19- 6-A- 2
WA2RZI	210-	21- 4-A- 9
K2HW	180-	12- 6-A- 2
W2FPF	175-	10- 7-A- 3
W2NHH	123-	7- 7-A- 3
K2JZF	120-	8- 6-A- 4
WA2GLU	120-	10- 6-B- 1
WN2DTV	65-	7- 4-A- 2
WA2UZM	48-	6- 4-B- 1
WA2RZJ	40-	4- 4-A- 1
WA2TYU	34-	5- 3-A- 1
W2OQI	10-	2- 2-A- 1
K2JOG	3-	1- 1-A- –

WA2BQK (K2OFD, WA2BQK) 139,338- 795-71-A-38
WA2JLI (WA2s JLI RSM) 59,813- 416-58-A-34
W2HJ (WA2s DES QFB TNZ) 26,500- 213-50-A-18
WA2PXB (6 oprs.) 21,335- 256-34-A- –
WA2QAJ (4 oprs.) 17,490- 218-33-A-22
WB2BDK (WB2BDK, WN2DBY) 14,680- 201-32-A-40
WA2WIP (WA2s WIP ZDS, WN2DPZ) 6525- 89-30-A-15
WN2DAL (WN2s DAL DTH) 2231- 65-17-A-24
WA2YHS (WA2s YDB YHS) 338- 15- 9-A- 5
K2VSP (K2VSP, WV2YIO) 250- 13- 8-A- 3

For many years a big scorer from Ohio was W8LQA. This SS the call was new but the style the familiar winning one signing K1UAW. Roland keyed a winning combination in active E. Mass., edging out competition and posting division c.w. honors with 196K.



Northern New Jersey

WA2WBH	195,456-	1071-73-A-39	
W2GGE	150,912-	1048-72-B-39	
W2DMJ	136,094-	815-67-A-35	
W2NNL	129,855-	787-66-A-37	
W2TSL	128,520-	758-68-A-39	
W2GBY	97,185-	627-62-A-40	
W2LQP	92,400-	560-66-A-27	
K2CCF	92,029-	537-69-A-39	
K2HMH	83,625-	560-60-A-40	
W2SJB	77,268-	500-62-A-28	
WA2JAM	72,080-	546-53-A-39	
W2EWZ	67,774-	460-59-A-39	
W2WXN	66,079-	397-67-A-40	
W2TPJ	58,080-	352-66-A-17	
WA2BGW	57,960-	420-69-B-40	
W2DRV	46,888-	341-55-A-17	
WA2ONH	45,900-	360-51-A-24	
WA2MYB	44,660-	319-56-A-33	
W2IBZ	44,413-	329-55-A-22	
W2GND	43,800-	240-73-A-15	
W2ABL	42,700-	280-61-A-17	
W2CAH	41,775-	280-60-A- –	
WA2MYS	40,560-	312-52-A-19	
WA2IRS	37,020-	313-48-A-23	
W2PDG	35,000-	250-56-A-20	
WA2ZKO	29,383-	256-46-A-34	
W2LRO	26,198-	250-42-A-14	
K2SBW	25,000-	251-40-A-34	
K2KFP	25,419-	210-49-A-17	
W2ZBP	25,028-	214-47-A-17	
W2ECO	24,960-	208-47-A-27	
WA2HQ	24,008-	292-33-A-13	
WA2SRK	22,440-	265-34-A-19	
W2NEB	21,230-	194-44-A-13	
W2COG	15,210-	156-39-A-20	
W2LAM	14,850-	150-40-A-25	
WA2VCQ	14,375-	125-46-A-12	
WA2PJB	12,540-	170-38-B-16	
WA2DZB	11,548-	152-31-A-19	
WA2YIX	10,631-	126-35-A-11	
WA2WSB	10,260-	109-38-A- 7	
W2BVE	9625-	110-35-A- 9	
WA2QCM	5000-	100-20-A- 7	
W2EHN	4118-	61-27-A- 5	
WA2SZO	3750-	60-25-A- 8	
W2SLZ	3278-	57-23-A- 9	
WN2DJA*	2813-	45-25-A-25	
WN2CRP	2385-	53-18-A-22	
WV2ZVU	1876-	46-19-A-10	
WA2QPX	2153-	64-14-A- 5	
WA2ZDN	2035-	37-22-A-10	
WV2YXJ	2003-	47-18-A- 9	
WN2CZM	1350-	31-18-A-18	
WA2TIM	1318-	33-17-A- 8	
WN2CRX	1290-	45-12-A-24	
W2FSL	1250-	25-20-A- –	
WB2AEJ	921-	36-11-A-10	
WA2IRN	855-	29-12-A- 4	
W2HL	480-	16-15-B- 3	
WA2ZRR	331-	22- 6-A- 6	
W2BQK	180-	12- 6-A- 4	
WA2TMT	20-	4- 2-A- 1	
WA2REM	8-	2- 2-A-17	
WA2RGZ (WA2RGZ, W8IDM)	96,525-	585-66-A-40	
K2YNT (6 oprs.)	70,210-	508-56-A-36	
WA2JHE (WA2s APT JHE)	38,000-	400-38-A-26	
K2GQ (5 oprs.)	34,225-	370-37-A-23	
K2PTI (K2PTI, WA2AGX)	22,000-	223-40-A-24	

MIDWEST DIVISION

Iowa

KØGXR	158,242-	895-71-A-40	
WØCXN	150,015-	822-73-A-39	
KØPUB	136,080-	763-72-A-32	
WØFZO	82,500-	500-66-A-26	
WØBSY	69,700-	410-68-A-31	
WØLBS	53,070-	351-61-A-40	
WØEQN	47,685-	295-66-A-18	
KØHCT	43,916-	366-49-A-36	
KØASI	40,479-	309-53-A-25	
WAØASL	38,985-	350-46-A-35	
KØQWM	37,800-	272-56-A-25	
KØKGS	36,120-	260-56-A-23	
WØNCS	27,010-	148-73-A-20	
WØSDV	24,910-	188-53-A-21	
KØAUU	24,900-	249-50-B-30	
WAØEFT	13,781-	124-45-A-11	
KØYHN	11,651-	120-39-A-15	
WØATA	6840-	76-38-A- 7	
WAØABN	4290-	67-26-A-13	
WØJTC	4200-	70-30-B-11	
WØQVA	4200-	70-30-B- 4	
WAØACX	3625-	73-20-A- 5	
KØVEJ	2043-	43-19-A- 7	
WAØDFF	1850-	38-20-A-31	
WNØCZA	385-	14-11-A- 8	
KØFJD	143-	10- 6-A- 8	
KØAAR (KØs BGG EER)	50-	5- 4-A- 2	

Kansas

KØBHM	99,705-	730-69-B-30	
WØBYV	57,820-	490-59-B-24	
KØEQF	34,220-	242-58-A-35	
KØHLC	33,131-	234-57-A-18	
KØPFV	30,638-	220-57-A-34	
WØEZF	16,688-	135-50-A-25	
KØGZP	13,770-	108-51-A-15	
WAØDVD	9850-	103-40-A-22	
KØJJV	2548-	49-26-B- 6	

Missouri

KØVMZ	120,060-	696-69-A-39	
WØTDR	116,610-	676-69-A-40	
WØSGG	93,755-	553-68-A-37	
WØQWS	71,370-	475-61-A-39	
WØWYJ	68,843-	411-67-A-17	
KØGSV	66,625-	415-65-A-35	
KØVSH	74,816-	426-71-A-30	
KØCWP	55,598-	360-63-A-36	
WAØDPN	40,950-	264-63-A- –	
KØDEQ	40,718-	268-61-A-23	
KØKWR	31,281-	230-55-A-25	
WAØBGV	18,221-	179-43-A-17	
KØJWN	13,350-	135-40-A-15	
KØDYM	12,364-	141-44-B-13	
K5DUP/Ø	11,078-	106-42-A- 7	
KØFPC	10,580-	92-46-A- 9	
WØKIK	8800-	111-32-A-22	
KØKYM	4930-	70-29-A- 7	
KØRWL	3438-	57-25-A-11	
WØBAZ/Ø	2875-	50-23-A-11	
WNØBYX	2250-	49-20-A-25	
KØUPL	336-	14-12-B- 1	
WØDNN	316-	12-11-A- 5	
WNØCWV	123-	8- 7-A- 5	

Nebraska

WØASO	189,720	1044-72-A-40	
WØNYU	160,470-	900-72-A-40	
WØUOW	105,484-	613-69-A-40	
WØEGK	48,240-	304-64-A-22	
KØQVM	30,250-	220-55-A-21	
WØOKO	18,500-	187-40-A-19	
KØPTL	11,981-	110-45-A-30	
WAØBYK	2070-	35-24-A- –	
KØKEK	363-	15-10-A- 4	

NEW ENGLAND DIVISION

Connecticut

K1HTV	175,500-	975-72-A-39	
W1BIH	151,760-	1087-70-B-37	
W1AW	142,000-	1000-71-B-34	
W1BD	86,176-	486-71-A- –	
K1LBH	85,085-	504-68-A-32	
K1QKZ	58,025-	422-55-A-27	
W1QAK	53,580-	376-57-A-22	
W1ILV	50,848-	457-56-B-29	
W1FTX	50,418-	301-67-A-18	
W1ZJJ	40,050-	268-60-A-33	
W1VG	35,040-	240-73-B-20	
W1TS	33,580-	184-73-A- –	
W1TX	33,060-	232-57-A-19	
W1ICP	29,792-	266-56-B- –	
W1IKE	29,700-	220-54-A-15	
W1OPB	23,863-	211-46-A-26	
K1TFA	23,115-	210-46-A-19	
W1NJM	22,442-	229-49-B- 8	
K1BJV	17,325-	158-44-A-16	
W1VVA	16,400-	160-41-A- 8	
K1WKK	15,173-	154-42-A-26	
K1SWA	12,600-	170-30-A-21	
W1ANO	8550-	91-38-A-22	
W1RZG	6372-	119-27-B- 7	
W1ECH	5805-	86-27-A- 7	
K1VJE	5075-	73-28-A-17	
W1EFW	4428-	77-23-A- 7	
W1YYM	3800-	52-30-A- 3	
K1SNB	3713-	70-22-A-16	
K1QPN	3190-	45-29-A- 4	
K1VQJ	3108-	57-22-A-18	
K1NNC	2940-	50-24-A- 5	
W1WPO	2500-	100-10-A- –	
KN1WXN*	2146-	52-17-A-13	
K1NTR	1908-	55-18-B- 8	
K1VII	1678-	32-22-A-14	
K1YIG	796-	27-13-A- 6	
W1WEE	750-	20-15-A- 9	
KN1VIJ	25-	5- 2-A- 1	
KN1YHM (2 oprs.)	330-	21- 8-A-13	

Maine

W1DEO	51,750-	300-69-A-32	
K1MBM	22,658-	171-53-A-14	
K1VXZ	2425-	54-20-A-15	
W1CRP	1823-	27-27-A-10	

Eastern Massachusetts

K1UAW	195,660-	1088-72-A-40	
W1NJL	195,073-	1099-71-A-40	
K1DIR	170,729-	946-73-A-39	
K1RUH	133,134-	734-73-A-39	
K1MEM	92,125-	550-67-A-27	
K1SNO	70,303-	463-61-A-40	
W1AQE	52,920-	378-56-A-24	
W1RND	42,700-	280-61-A-25	
W1KEE	41,820-	350-60-B-36	
K1CUD	41,648-	309-54-A-23	
K2KIR/1	41,100-	274-60-A-18	
K1TQJ	40,185-	284-57-A-35	
W1PLJ	37,178-	321-58-B-32	
K1UCA	36,890-	227-68-A-40	
K1IUS	19,800-	240-33-A-19	
K1TSD	17,556-	211-42-B-14	
K1RWZ	17,550-	156-45-A-20	
K1NUD	17,394-	223-39-B-40	
K1TCE	15,725-	185-34-A-17	
K1VHS	15,035-	194-31-A-26	
W1BOD	14,620-	170-43-B- 5	
K1UDU	14,210-	203-35-B-12	
K1RHZ	7155-	83-36-A-10	
K1LAD	6500-	100-26-A-11	
K1RMR	6416-	94-29-A-14	
K1DAT	6004-	79-38-B- 5	
K1SHX	1950-	93-22-A-10	
W1EIQ	4858-	67-29-A- 7	
K1DIW	3135-	57-22-A- 4	
W1RSR	2650-	53-25-B- 8	
K1TIE	2405-	37-26-A-19	
W1CMW	2365-	43-22-A-17	
K1YNA	2350-	47-20-A- 4	
KN1WPG*	2070-	47-18-A-31	
KN1W1U	1444-	40-15-A-16	
KN1VXB	1120-	28-16-A- 7	
W1JSM	1105-	26-17-A- 5	
K1VGM	945-	27-14-A- 6	
W1IUY	200-	10- 8-A- 4	
WØAYV/1	193-	11- 7-A- 2	
KN1YFD	30-	4- 3-A- 3	
W1VTT	2-	1- 1-B- 1	

Western Massachusetts

W1JYH	170,090-	1165-73-B-33	
W1EOB	158,832-	1103-72-B- –	
K1EZD	95,880-	564-68-A-36	
K1IJU	81,675-	546-60-A-32	
K1OOV	55,024-	331-67-A-40	
W1WF	28,554-	217-53-A-15	
K1BSH	23,676-	306-31-A-27	
K1LSW	18,375-	175-42-A-23	
W1CVI	10,170-	118-45-B-22	
W1DYQ	10,000-	160-25-A-23	
K1NWF	4556-	70-27-A- 6	
K1WQQ	2-	1- 1-B- 1	

New Hampshire

K1RTB	113,768-	698-66-A-40	
W1ET	100,030-	717-70-B-32	
K1NBN	89,460-	568-63-A-27	
W1PYM	76,640-	479-64-A-31	
K1PMY	65,604-	501-66-B-36	
K1RKH	47,212-	407-58-B-25	
K1KRP	45,019-	368-49-A-34	
W1PEG	37,634-	311-62-B-39	
K1UHE	37,395-	278-54-A-11	
K1PIA	34,655-	239-58-A-19	
K1HK	22,880-	260-44-B-10	
W1CTW	22,100-	170-52-A-27	
K1QLK	12,465-	141-36-A-14	
K1MOZ	8897-	111-41-B- 5	
KN1WPM	1339-	37-17-A-24	
K1SLE	293-	14- 9-A- 5	
K1TZZ	135-	9- 6-A- 1	

W9IOP, need more be said? Larry concentrated on 80-40-20 using an HT32A and SX115 *indoors* and a 100′ tower *outdoors* supporting 15 over 20 over 40 rotary beams, using the insulated guys fed as an inverted Vee for 80. Results: tops for Indiana, leading Central Division c.w. score, third high code tally nationally. That youthful appearance (after years of SSing as W2 W8 and W9IOP) is attributed by Larry to ham radio keeping him too busy for other normal "vices."

W1DUB 3- 1- 1-A- 1
K1CXP (K1s CXP SIE)
55,655- 514-42-A-33

Rhode Island

K1LPL 120,600- 720-67-A-40
K1LDK 104,720- 658-64-A-40
K1BBK 53,280- 444-60-B-40
K1BAZ 37,189- 321-47-A-40
W1SXX 26,130- 201-52-A-25
K1QFI 4290- 75-24-A-14
K1USD 1488- 48-14-A-14
K1JLD 1080- 28-16-A- 5
K1TTD 105- 7- 6-A- 2
K1ORM 15- 3- 2-A- 1
W1DDD (K1s QFT TTD)
6380- 89-29-A-10

Vermont

W1SWX/1 82,400- 515-64-A-30
K2UPD/1 34,720- 248-56-A-10
W1FP8 15,860- 130-61-B- –

NORTHWESTERN DIVISION

Alaska

KL7BJW 34,608- 316-56-B-28

Idaho

W7BSP 139,886- 775-73-A-40
W3ZWA/7 92,016- 653-71-B-35
K7ELR 46,270- 340-56-A-33
K7GTZ 24,368- 181-54-A-19
W7ZRF 15,645- 149-42-A-30

Montana

K7CTI 146,000- 800-73-A-32
K7NHV 121,186- 725-67-A-33
K0OBF/7 106,445- 701-61-A-40
W7EWR 28,666- 248-63-A-20
K7UTV 26,138- 205-51-A-18
K7QCO 21,220- 186-46-A-39
W7FLB 2178- 51-22-B- 3

Oregon

W7TML 148,482-1023-73-B-40
W7TDK 135,788- 771-71-A-40
W7DIS 110,340- 619-72-A-40
K7PBZ 70,082- 547-67-B-38
W7IAQ 47,475- 327-60-A-33
K7JMJ 26,633- 205-53-A-33
K7UJO 24,317- 200-49-A-19
K7QZF 20,708- 252-33-A-38
W7OTV 13,050- 148-36-A-14
K7GIP 12,031- 139-35-A-20
K7MJW 10,916- 108-41-A-10
W7LLI 4785- 90-22-A- 5
K7IWD 3675- 70-21-A- 6
W6YG (4 oprs.)
85,819- 501-69-A- –

Washington

W7PQE 139,248- 768-73-A-39
K7KPM 102,850- 613-68-A-40
K6REU/7
101,254- 609-67-A-40
W7IUS 92,480- 544-68-A-36
W7OEB 90,525- 639-71-B-34
K7GPG 86,598- 520-67-A-35
W7ZVY 78,055- 469-67-A-40
K7IAI[9] 73,600- 460-64-A-40
K7EXT 72,025- 430-67-A-38
W7PDU 70,350- 437-67-A-33
K7BVZ 59,904- 419-72-B-37
K7LCA 56,425- 370-61-A-33
K7JCA 54,670- 313-71-A-28
K7JRE 54,259- 346-63-A-31
W7JC 48,165- 372-65-B-39
W7WIB 44,758- 303-61-A-20
K7AIB 42,772- 315-68-B-24
K7KAA 36,400- 263-56-A-22
K7BZE 36,075- 242-60-A-26
K7QWC 32,419- 228-57-A-29
K8GSP/7 31,793- 238-54-A-18
K7OUW 25,500- 205-50-A-31
K7QMF 21,321- 156-46-A- –
W7TEU 19,440- 144-54-A-13
K7LAE 15,373- 145-45-A-20
W7TIQ 11,400- 114-40-A- –
W7ETO 8621- 105-33-A-13
W7MEA 6675- 89-30-A-11

K7QYG MUFFED HIS SECTION ...EVEN AFTER ARRANGING A SKED

K7MWF 6020- 86-28-A-10
K7MWK 4031- 66-25-A-20
K7QJN 3529- 47-31-A- 7
KN7SRI* 2530- 47-23-A-23
KN7TYT 461- 25- 9-A-13
K7KKA (K7s KKA OGM)
5076- 67-31-A- 7

PACIFIC DIVISION

Hawaii

KH6DKI 68,913- 375-62-A-22
KH6EVT 55,920- 466-60-B-39
KH6HAA 38,076- 334-57-B-31
W8KWC/KH6
35,796- 314-57-B-35
W7UXP/KH6
25,850- 220-47-A-19
KH6DIG 23,173- 204-46-A-25

Nevada

K7SFN 65,406- 409-65-A-31
W7VIU 46,080- 362-64-B-20
W7CRT 23,760- 199-48-A-12
K7LPF 2358- 42-23-A- 3

Santa Clara Valley

K6VVA 198,450-1107-72-A-40
W6UTV 137,870- 811-68-A-31
K6AYB 87,150- 498-70-A-33
WA6NYK 81,220- 528-62-A-39
W6JKJ 77,350- 459-68-A-29
K6BPB 45,600- 309-60-A-33
WA6TCF 44,475- 299-60-A-18
WA6AQY 35,063- 258-55-A-27
W6CLZ 34,220- 295-58-B-25
W6KHS 31,421- 258-49-A-19
W6ISQ 23,078- 181-51-A- 8
K6GWQ 22,143- 276-34-A-28

WA6RCJ 13,152- 141-48-B-34
WA6NPA 12,041- 126-39-A-13
WA6RND 3560- 89-16-A- 9
WV6VAS 578- 21-11-A-24
WV6WXL 23- 3- 3-A- 2
WB6AZI 15- 3- 3-A- 1
WA6GFY (W6CUF, W7WJB)
108,701- 768-71-B-31
WA6GMO (WA6s GMO GWS NJU)
80,520- 503-66-A-35
K6TQO (K6TQO, WA6BTN)
29,951- 247-61-B-17

East Bay

WA6BRJ 137,160- 768-72-A-39
W6TMX 136,328- 747-73-A-38
WA6ECF 127,750- 700-73-A-33
W6TYM 116,915- 703-67-A-39
WA6UQM 50,478- 337-61-A-35
WA6KLL 45,979- 308-61-A-31
WA6VAT 31,125- 210-60-A-20
WA6KJZ 13,950- 124-45-A-10
WA6LGE 11,100- 103-44-A-16

San Francisco

WA6KUW/6
55,440- 352-63-A-20
W6WLV 52,841- 337-63-A-37
W6PIS 9522- 105-46-B- 8
K6NCG (K3DDW, K9IHG)
99,619- 585-69-A-39

Sacramento Valley

K6ORT 100,568- 583-69-A-35
W6OKK 72,313- 456-65-A-37
W6EGX 48,195- 306-63-A-34
WA6TVA 29,925- 210-57-A-27
W6MIZH 12,128- 147-33-A-18
WA6PZT 4241- 59-29-A-15
K6LGU 2231- 61-15-A- 6
K6RFT 699- 24-13-A- –

San Joaquin Valley

K6RTK 113,815- 675-68-A-37
W6MYP 82,829- 495-67-A-40
W6BVM 71,467- 508-73-B-23
W6SRU 52,190- 308-68-A-27
K7GTK/6 47,351- 311-61-A-36
W6TKF 36,882- 350-54-B-22
WB6ACM 35,400- 237-60-A-19
WA6TZN 27,096- 216-53-A-30
WA6VPN 14,880- 124-48-A-31
W6QXF 9750- 75-52-A-17

ROANOKE DIVISION

North Carolina

W4LYV 136,350- 764-72-A-38
WA4CXR 99,746- 607-67-A-38
WA4JUI 87,300- 495-72-A-39
W4BDU 46,200- 330-56-A-37
W4AHY[10] 44,800- 280-64-A-18
WA4AQE 43,586- 301-59-A-33
K4BYN 36,685- 220-67-A-18
W4OMW 21,465- 159-54-A-12
K4MWB 17,883- 156-46-A- 7
W4VON 12,749- 111-47-A-12
WA4FFW 11,310- 118-39-A-11
K4DWU 3510- 54-26-A- –
WN4ISW 41- 6- 3-A- 9

South Carolina

W4BWZ 90,366- 542-67-A-31
K4ADU 87,150- 500-70-A-37
W4ZRH 86,955- 527-66-A-28
K4IEX/4 57,913- 351-66-A-14
K4AVU 32,450- 279-59-B-13
W4JA 21,450- 195-55-B-13
K4DOF 4604- 66-29-A- 8

Virginia

W4KFC 226,300-1554-73-B-40
W4RQR 215,895-1190-73-A-40
W4KXV 209,328-1147-73-A-40
W4CKD 189,920-1047-72-A-40
W4YGY 177,589-1003-71-A-32
W4PTR 171,820- 969-71-A-39
W4JAT 165,345- 906-73-A-34
WA4JFY 153,595- 906-68-A-40
W4DVT 150,289- 824-73-A-40
K4MXF 135,630- 754-72-A-40
W4NH 131,250- 750-70-A-36
W4IA 127,476- 701-73-A-38
W4GF 123,638- 708-70-A-37
W4TKR 123,451- 698-71-A-40
W4ZM 113,680- 650-70-A-31
W4HTV 112,729- 654-69-A-32
K4PQL 109,294- 653-67-A-40
W4PNK 107,610- 635-68-A-27
W4VBX 103,675- 638-65-A-34
W4WBC 102,240- 576-71-A-37
W4DLA 76,314- 554-69-B-39
W4SNU 66,728- 432-62-A-30
K4IKF 64,739- 388-67-A-21
K4FJW 59,365- 384-62-A-32
K4YAM 50,800- 324-64-A-34
K4QKY 48,400- 440-55-B-37
K4WYT 47,938- 325-59-A-33
W4JTR 37,449- 337-65-B-20
W4FZG 34,790- 284-49-A-18
K4YDL 28,700- 206-56-A-35
W4NLC 24,480- 208-48-A-29
WA4DBB 19,665- 139-57-A- –
K4PSD 18,948- 143-53-A-27
W4WRG 16,451- 161-41-A-11
W4SXE 14,040- 108-52-A-11
W4FJ 14,000- 112-50-A-10
W4HVG 11,408- 117-37-A- –
K4IYK 10,625- 125-34-A- 9
K4UEO 9900- 110-36-A- 8
W4TVT 8265- 114-29-A-12
W4JXD 7343- 89-33-A- 8
K4DBD 5974- 90-27-A-16
WN4GPJ* 4860- 76-27-A-29
WA4CKX 2613- 60-19-A-13
WN4HHP 2363- 64-18-A-24
WN4EUL 135- 15- 4-A- 9
W4JUJ 20- 10- 1-B- 1
K4WHN 13- 3- 2-A- 1
K4ORQ (K4ORQ, WA4IVL)
119,103- 679-71-A-40

West Virginia

W8DIE 108,800- 805-68-B-40
K8HID 78,750- 500-63-A-22
K8ZNI 42,900- 341-52-A-35
WA8AZH 15,750- 140-45-A-30
WN8DGE* 4400- 98-20-A-21
K8MNG 300- 12-10-A- 1

ROCKY MOUNTAIN DIVISION

Colorado

W0EWH 201,845-1106-73-A-40
K0VFN 90,919- 567-65-A-40
WA0CVS 88,441- 538-67-A-30
W0ETU 65,400- 430-60-A-27
W0MYR 58,713- 385-61-A-27
W0YQ[11] 55,046- 355-63-A-26
K0GVA 26,260- 204-52-A-16
W0WME 18,759- 175-43-A-12
K0ECD 10,500- 101-42-A-11
W0HEP 5053- 82-31-B-12
W0EXS 2860- 44-26-A- 7
W0GSP 2546- 51-21-A- 6
W0ANA[12] 1580- 40-20-B- 1
W0EPE 1035- 23-18-A- 6
WN0DAB 304- 15- 9-A-25
K0GEU 70- 7- 4-A- 1
K0FRJ 50- 5- 4-A- 1
K0IQD 35- 4- 4-A- 4
K0VFZ (K0VFZ, W0CHH)
1658- 41-17-A- –

Utah

W7QDM 116,960- 695-68-A-40
W7WMO 74,119- 445-67-A-37
K7RAJ 56,425- 386-61-A-36
K7SAW 47,127- 326-59-A-38
W7BAJ 38,052- 302-63-B-17
W7POU 29,325- 175-68-A-23
K7OXR 23,400- 180-52-A-27
W7MWR 20,250- 162-50-A-11
K7RVI 4388- 69-26-A- 4

New Mexico

W5CK 148,664- 836-71-A-35
K5UYF 104,805- 618-68-A-28
W5NTM 73,590- 449-66-A-28
K5WME 68,475- 415-66-A-32
W5DZA 60,044- 374-65-A-35
K5BTL 36,540- 316-58-B-15
WN5BCT* 19,013- 194-45-A-40
K5QLN 13,725- 123-45-A-12
K5VDI 2790- 48-24-A- 4
W5DAB 120- 8- 6-A- 4

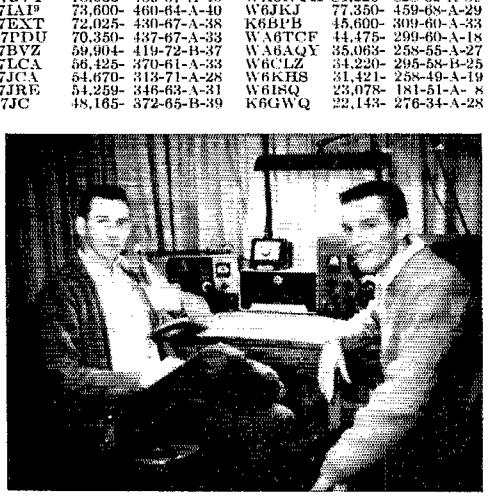
Wyoming

K7QYG 142,715- 840-68-A-40
K7KAX 122,880- 803-64-A-39
K7ORN 22,440- 200-48-A-30
W7HRM 5120- 80-32-B- 4

SOUTHEASTERN DIVISION

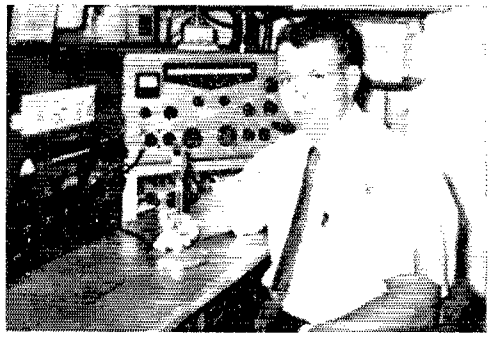
Alabama

K4CFD 162,243- 905-73-A-38
K4HPR 115,020- 651-72-A-36
WA4BDW 71,294- 473-61-A-40
W4BYR 59,780- 540-61-B-37
WA4WCJ 49,664- 301-67-A-21
WA4BSE 7863- 87-37-A-24
K4ESX 4650- 81-24-A-12
WA4AQV 3713- 55-27-A- –



Top phone in Southern Texas and West Gulf division leader is K5MVK of Houston. Don is shown seated at his operating post demonstrating winning technique to his buddy K5JCC (1960 phone SS section winner). Watch out for both these lads in '63!

K6EVR topped 'em all on phone for '62 with 1324/73 vocal exchanges and placed 2nd only to W5WZQ in over-all score. Ron specializes in contests and DX, presently showing 303 confirmed on his combined DXCC and 249 confirmed phone. Operation was concentrated on 40-20-15-10 with a CE100V and GS100; antennas were 3-L beams on 10 and 20, 4 elements on 15 and 2 elements on 40.



K4GRA 203- 9- 9-A- 1
K4BSK (K4s I8SP WOP)
32,860- 255-53-A-12
K4OVG (K4OYG, W4KGB)
9350- 102-40-A-27

Eastern Florida

W4DQS 217,175-1192-73-A-40
W4CKB 204,948-1148-73-A-36
K4TML 166,140- 923-72-A-32
W4GOG 138,618- 809-69-A-40
W4JNE 138,600- 770-72-A-38
K4JLD 137,831- 780-71-A-35
W4BRB 132,330- 810-66-A-38
W4JTA 131,963- 774-69-A-40
W4HUE 129-200- 760-68-A-40
W4LVV 128,599- 729-71-A-40
K8SXX/4
115,500- 700-67-A-33
K4NVD 68,543- 481-57-A-28
W4KET 66,880- 434-64-A-25
W4QVJ 59,138- 415-57-A-17
K4KOD 54,354- 369-59-A-21
W4NTF 41,423- 263-63-A-33
W4SMK 41,175- 271-61-A-30
W4ZXI 24,550- 223-44-A-20
W4WYJ 24,451- 250-49-B-11
W4ZOK 21,359- 202-53-B-31
W4KJL 18,742- 160-47-A-13
K4RQE 10,795- 69-62-A-26
WA4EEN 10,720- 136-32-A-17
K4KDN 8550- 113-38-B- 6
WA4CPN 6888- 100-29-A-10
WN4FKI* 5950- 106-28-A-34
W4RTX 5040- 63-32-A- –
WN4ITK 3190- 50-26-A-34
K4EN 1260- 28-18-A- 4
WN4HO 1200- 31-16-A-23
WN4JYB 304- 17- 9-A- 8
W4BJ (K4s FMA JWM)
158,562-1149-69-B-40

Western Florida

W4MLE 141,113- 795-71-A-39
K4VFY 91,260- 516-72-A-33
WN4IMC 1710- 36-19-A-27
WA4ECY (7 oprs.)
54,404- 469-58-B-40
K4CAY (K4VNJ, WA4DCN)
435- 15-12-A- 5

Georgia

K4BAI 190,074-1042-73-A-39
K4TEA 187,063-1026-73-A-40
K4KSH/4
126,000- 700-72-A-37
K4VHC 81,900- 506-65-A-24
K4EEK 76,296- 607-66-B-27
K4RWY/4 44,200- 340-52-A-37
W4HOS 29,295- 189-62-A-26
WA4ARE 14,963- 133-45-A-27
WA4FTM 9225- 92-41-A-22
K4DKJ (K4s DKJ QPL)
28,000- 224-50-A-22
K4ZIM (K4s RWY ZIM)
27,600- 230-48-A-18

West Indies

KG4AM[13] 140,415- 851-66-A-37
WP4BJG 210- 14- 6-A- 4

SOUTHWESTERN DIVISION

Los Angeles

K6CTV 209,273-1182-71-A-40
K6ASL 165,960- 922-72-A-33
W6SBB 160,913- 923-70-A-36
K6JBV 152,163- 881-70-A-40
WA6AYU 112,815- 655-69-A-35
W6NKR 112,350- 642-70-A-37
W6VUZ 92,334- 545-67-A-35
WA6KNE 88,172- 661-67-B-34
W6ANB 87,584- 650-68-B-33
K6STI 86,595- 508-69-A-37
W6VNJ 84,252- 623-68-B-31
W6GEB 81,250- 500-65-A-30
WA6UHM 80,936- 615-67-B-30
WA6NON 80,400- 508-64-A-33
WA6NHC 80,031- 497-65-A-31
W6SRT 76,045- 454-67-A-28
W6OEO 70,000- 440-64-A-40
W6JNX 68,640- 560-64-B- –
WA6FVA 67,410- 428-63-A-31
WA6MUK 62,730- 310-63-B-40
WA6GDS 58,823- 382-62-A-29
W6CRV 43,200- 290-60-A-25
WA6SNK 34,271- 248-57-A-17
WA6KHK 32,830- 271-49-A-38
K6EGF 28,669- 210-55-A-22
K6UYK 21,315- 174-49-A-14
K6HCY 17,640- 180-49-B-13
WA6UTF 17,640- 174-42-A-14
W6ACL 14,700- 98-60-A-23
K6KDE 13,961- 112-51-A-12
W6QAE 13,438- 125-43-A-20
K6EEZ 11,498- 110-42-A- –
K6ZSL 11,425- 151-30-A-27
WA6PFY 11,280- 141-32-A-24
WV6YAT* 7466- 98-33-A-34
WA6UYV 6072- 80-37-B- 7
WV6WSN 4620- 84-22-A- –
K6DLY 4286- 65-27-A- 7
WA6USU 3315- 78-17-A-12
WA6TJC 2888- 83-14-A-24
W6VAG 2363- 54-18-A-18
WA6TMY 2156- 40-23-A-13
WN6AKZ 2070- 61-18-A-26
WV6WWW 2065- 72-14-A-25
WN6AHY 231- 19- 5-A-11
WV6YLW 109- 16- 3-A- 7
WV6VHS 50- 11- 2-A- 5
WV6WHG 23- 5- 2-A- 1
WA6SLF (WA6s SLF WTX)
42,560- 306-56-A-32
WA6LJT (4 oprs.)
12,675- 130-39-A- –
W6TOI (4 oprs.)
731- 26-13-A- –

Arizona

W7ZMD 154,710- 860-72-A-35
K7DHL 43,935- 306-58-A-35
K7SVW/7 40,095- 297-54-A-34
K7PSU 12,600- 122-42-A-33
WA2GQX/7 5363- 65-33-A- 9
KN7UMB 438- 19-10-A-14

San Diego

W6HJT 215,280-1241-72-A-39
K6LLI 122,820- 715-69-A-35
K6BHM 106,928- 611-70-A-30
WA6DBC 47,520- 352-54-A-27
WA6RUS 47,381- 333-57-A-33
WA6WYM 43,463- 285-61-A-40
WA6FYW 40,838- 303-54-A-15
K6STZ/6 33,640- 232-58-A-38
WA6ZLD 10,388- 142-30-A-19
WV6WTD* 7310- 86-34-A-39
WV6WZT 6300- 84-30-A- –
WA6QBN 2595- 59-11-A-13

Santa Barbara

W6YK 85,191- 590-73-A-35
WA6PHZ 42,703- 295-58-A-38
K6LBV 42,675- 289-60-A-27
WA6TIG 24,500- 200-49-A-34
K6LZU 15,683- 124-51-A-22
W6PPZ[14] 11,750- 100-47-A- 9
W6BHZ (K6s JIV OGT,
WA6CPM)
44,025- 298-60-A-26

WEST GULF DIVISION

Northern Texas

K5RHZ 191,984-1082-71-A-40
K5VLN 184,689-1042-71-A-40
W5DWO 80,190- 621-66-B-37
K5ZAI 74,340- 502-63-A-40
K5IJW 63,665- 376-68-A-36
W5ADB 57,038- 351-65-A-33
K5PSL 44,855- 294-61-A-35
W5LMI 29,025- 221-54-A-15
K5SOD 24,310- 211-52-A-28
K5DEB 15,960- 134-48-A-11
K5HFR 13,050- 117-45-A-10
K5HGF 12,000- 120-40-A-16
K5IMC 11,466- 144-42-B- 5
K5YKO 9389- 104-37-A-14
WN5EEM* 3900- 64-26-A-15
WA5AUH 461- 23- 9-A- 4
K5WAT (4 oprs.)
40,185- 284-57-A-20

Oklahoma

K5OCX 166,320- 931-72-A-37
W5EUL 96,320- 612-64-A-39
W5CKT 66,560- 417-64-A-24
K5CPS 20,300- 204-50-A-14
WN5DQT* 8408- 91-38-A-25
WN5CTC 7110- 81-36-A- –
K5FSU 12- 3- 2-B- 1
K5FQR (K5s FQR WWA)
25,090- 194-52-A- –

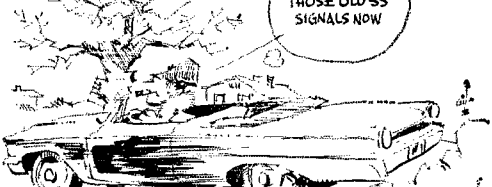
Southern Texas

W5WZQ 290,540-1600-73-A-39
W5PSB 212,521-1169-73-A-34
K5LWL 119,925- 738-65-A-34
K5RPC 112,285- 695-68-A-39
K5HDU 80,719- 523-63-A-34
W5LJT 61,950- 426-59-A-21
K5YFU 43,706- 281-63-A-13
W5LSZ 33,855- 222-61-A-36
WA5ABG 27,235- 210-52-A-24
WA5AUA 22,881- 173-54-A-18
K5LQJ 9810- 112-38-A-22
WA5AXS 9405- 109-36-A- 9
WA5AFL 8510- 95-37-A-18
WA5CVK 5945- 86-29-A-17
WA5DBC 3853- 69-23-A-13
WA5A00 2002- 47-22-B-13
K5MHG 220- 12- 8-A- 4

VE3AO 6882- 93-37-B-11
VE3CQH 6075- 68-36-A-21
VE3CGJ 4165- 61-28-A-12
VE3EVZ 3000- 50-24-A- 5
VE CWH 2500- 40-25-A-11
VE3FAS 2250- 46-20-A- 2
VE3AUU 2024- 44-23-B- 2
VE3ECY 338- 15- 9-A-10
VE3FGV 338- 14-10-A-16
VE3FHQ 135- 9- 6-A- –
VE3UOT (5 oprs.)
67,158- 542-63-B-34
VE3VX (4 oprs.)
52,350- 351-60-A-36
VE3RIT (3 oprs.)
23,600- 200-59-B-34

Manitoba

VE4IM 129,575- 710-73-A-37
VE4ZX 11,918- 115-42-A-15
VE4KZ 8726- 91-39-A-15
VE4UM (4 oprs.)
12,148- 120-43-A-30



CANADIAN DIVISION

Maritime

VE1MX 43,403- 327-54-A-25
VO2NA 24,833- 231-43-A-28
VE1DB 11,914- 131-46-B-14
VO1AW 3656- 62-25-A- 9
VE1AJH (VE1s AHK AJH)
6870- 121-24-A-21

Quebec

VE2AYU 53,131- 407-67-B-39
VE2BAE 41,595- 360-47-A-22
VE2BMK 12,188- 200-25-A-16
VE2YX 9800- 127-32-A-15
VE2BLK 5658- 74-32-A-23

Ontario

VE3DDU 86,514- 517-67-A-33
VE3BZW 82,425- 471-70-A-33
VE3ACB 64,278- 378-68-A-32
VE3TT 60,693- 374-65-A-36
VE3DUS 59,413- 340-70-A-28
VE3AHU 53,066- 402-53-A-30
VE3DH 37,836- 257-59-A-17
VE3MI 36,383- 300-49-A-36
VE3ON 24,851- 213-47-A-17
VE3EZM 22,705- 243-38-A-22
VE3BPJ 19,125- 151-51-A-30
VE3IZ 12,195- 136-36-A-10
VE3ES 8000- 100-32-A- 8

Saskatchewan

VE5IN 44,992- 354-64-B-25
VE5JU 34,668- 241-59-A-34
VE5BK 31,831- 235-55-A-19
VE5JI 23,715- 191-51-A-15

Alberta

VE6IZ 52,841- 336-63-A-27
VE6TP 52,368- 305-71-A-22
VE6HH 45,080- 327-56-A-37
VE6FN 42,920- 300-58-A-31
VE6QI 42,225- 285-60-A-25
VE6MA 29,260- 212-56-A-27
VE6AJC 24,360- 205-48-A-28
VE6AHJ 18,233- 143-51-A-40

British Columbia

VE7EH 141,030- 784-72-A-39
VE7AGN 38,100- 314-60-B-24
VE7ARQ 35,768- 251-57-A-39
VE7AC 34,650- 275-63-B-28
VE7JL 30,523- 219-58-A-32
VE7BKT 27,775- 202-55-A-38
VE7BID 25,575- 189-55-A-33
VE7BDP 19,744- 203-39-A-25
VE7ALT 2779- 59-19-A-10
VE7BJV (VE7s AGF BDJ BJV)
23,460- 184-51-A-39

Yukon-N. W. T.

VE5RG 63,944- 395-65-A-23
VE5CW 9343- 103-37-A-16
VE8DX 3465- 52-28-A- 4
VE8WW 72- 6- 6-B- –

[1] K3JJG, opr. [2] K9ZVE, opr. [3] W9YYG, opr. [4] K9RHN, opr. [5] K8NMG, opr. [6] W1WPR, opr. [7] Hq. staff, not eligible for award. [8] K7APJ, opr. [9] WA2BEX, opr. [10] K8JLF, opr. [11] KØRTI, opr. [12] WØETT, opr. [13] KG4BM, opr. [14] W6JTA, opr.

(*Continued on page 170*)

A. C. in Radio Circuits

Part III—Q and Resonant-Circuit Bandwidth

BY GEORGE GRAMMER * W1DF

In Part II of this series (in April *QST*) you were introduced to some of the characteristics of resonant circuits. On this same subject, another thing you'll hear a lot about and read a lot about is **Q**. This is a number tacked on to coils and capacitors, and circuits formed by them, to give some idea of their characteristics. With its help, and with some simplifying assumptions, a good deal of calculation can be saved in gauging the operation of circuits.

One definition of Q is that it is the ratio of reactance to resistance. Thus in Fig. 1 the Q of the combination of X_L and R_L is equal to X_L divided by R_L. R_L may be a separate resistor, as shown. On the other hand, it may be the resistance of the coil itself. This internal resistance can't be separated from the coil, of course, but it *acts* just the same as though it were in series with a lossless coil.

The Q of a capacitor is found in the same way — that is, the Q is equal to the reactance, X_C, divided by the resistance, R_C. Internal resistance here acts the same as in the case of the coil.

Thus the definition of Q applies to components having internal resistance. But it also applies to a circuit formed by the component and an *external* resistance in series with it. In such a case the internal and external resistance have to be added together to find the value of R that is to be used in the formula. Since added external resistance can only raise the total resistance, the Q always goes down when resistance is added in series.

*Technical Director, ARRL.

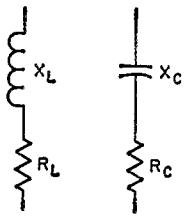


Fig. 1—The Q of a component is the ratio of its reactance to its resistance.

There is no way to lower the internal resistance of a coil or capacitor, and thus raise the Q, except by building a better component.

Qs of Components

Capacitors have much better Qs than coils, ordinarily. At least, this is true of the types of capacitors used in radio-frequency circuits where Q is important. These capacitors nearly always are made with either mica or air as the insulator or **dielectric** between the plates. The Qs of such capacitors run well over 1000 as a general rule. This means that their internal losses are very small — in other words, the internal resistance is very small. Coil losses run much higher. A really good coil, one wound with large wire, with spaced turns of rather large diameter (a few inches) and with a minimum of supporting material (such as a few thin strips of insulation) may have a Q as high as 500. The Q of a coil wound of small wire on a form a quarter of an inch or so in diameter, with a powdered-iron **slug** for adjustment of the inductance, may be as low as 25 at high frequencies.

You can see that in Q we have a sort of figure of merit for a coil or capacitor. For a given value of reactance, the higher the Q the lower the internal losses. The Q is important not only because of these losses as such, but because of its effect on the operation of a resonant circuit.

If you've been wearing your thinking cap, you've caught on to one point we haven't mentioned. Since reactance varies with frequency, the Q of a coil or capacitor can't be expected to be the same at all frequencies. Unless, that is, its resistance changes in exactly the same way as its reactance. It just happens that over a limited frequency range the resistance of a coil made for radio-frequency use does tend to move along with its reactance. Over such a frequency range — which is usually the useful range for that coil — the Q doesn't change a great deal. But it does change some.

Tuned-Circuit Q

Besides its application to inductance and capacitance singly, Q also is used to rate a resonant circuit. Looking at the resonant series circuit

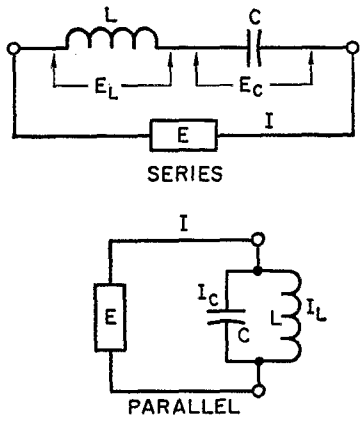


Fig. 2—Series and parallel resonant circuits.

of Fig. 2, the Q can be defined as the ratio of E_L to E; that is, it is the ratio of the **resonant voltage** to the voltage applied to the circuit. Obviously, the Q is also equal to E_C/E, since E_L, and E_C are equal (because the reactances are equal) at the resonant frequency.[1]

In the parallel circuit of Fig. 2 the Q is equal to I_L/I, or to I_C/I, as you can readily see by analogy to the series circuit.

If we change the frequency slightly, either circuit is no longer exactly resonant. In the series circuit the two reactances no longer balance each other completely; there is some reactance left, and it impedes the flow of current. So the current decreases, and along with it the voltages developed across the coil and capacitor. In the parallel circuit, moving the frequency a little away from resonance — say, a little higher — will cause the current through the capacitor to increase because the capacitor's reactance becomes slightly lower. But the current through the inductance will *decrease*, because the inductive reactance becomes slightly higher. The two currents no longer cancel each other: thus the **line current,** I, becomes larger.

Parallel Resonance

We'll be dealing mostly with parallel-resonant circuits in our amateur equipment. There are two common cases. In the first, shown in Fig. 3A, we're interested in the voltage, V, that develops across the terminals of the circuit at and near the resonant frequency. The source of energy is assumed to be a generator, G, for convenience. (Actually, the energy will be introduced into the circuit by some other means in a practical case.) In the second case, Fig. 3B, the source of energy, G, is outside the circuit and the thing of interest is the current, I, flowing into the circuit. In both these circuits the Q is determined by the value of the resistance, R, in relation to the inductive reactance of L, just as though these two formed an independent circuit. We can forget the capacitor because its losses are so low, in nearly all cases, that practically all the circuit resistance is in the coil. Thus the Q of the circuit at the resonant frequency is the Q of the coil.

Take Fig. 3A first. We will assume a circuit tuned to 3500 kc. The generator, G, has a constant output of 1 volt while its frequency is varied around 3500 kc. If the Q of the circuit is 100, the voltage V at 3500 kc. will be 100 volts. If we change the frequency to, say, 3600 kc., V will be only around 17 volts as shown by the $Q = 100$ curve in Fig. 4, although there is still 1 volt coming from G. At 3800 kc., V would be only 6 volts, and so on. Most of the resonant rise in voltage takes place quite near the resonant frequency. This is characteristic of all circuits having fairly high values of Q. It means that the circuit "responds" only to frequencies close to resonance. Such a circuit is **sharp,** or **selective.**

(The voltage in this curve is given in relative or percentage terms, since the same ratios will hold for the same circuit no matter what the actual voltage applied through G.)

High- and Low-Q Circuits

Now suppose that we have a circuit tuned to the same frequency, but having a Q of only 10. In terms of *percentage* response, it would look like the one marked $Q = 10$ in Fig. 4. This response is not sharp like that of the $Q = 100$ curve. At 3800 kc. it is still giving 50 percent as

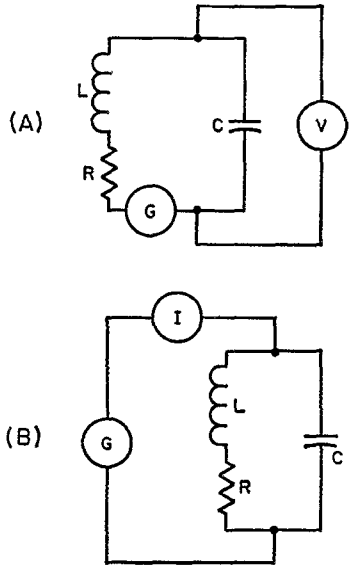


Fig. 3—Parallel-resonant circuits as seen from the inside (A) and outside (B). These terms refer to the way in which energy is introduced into the circuit.

[1] This is a useful approximation when the Qs of the coil and capacitor are reasonably high — say 8 or more. It is not strictly accurate unless the coil and capacitor both have exactly the same Q. This is seldom the case, but if the component Qs are at all high the error is negligible.

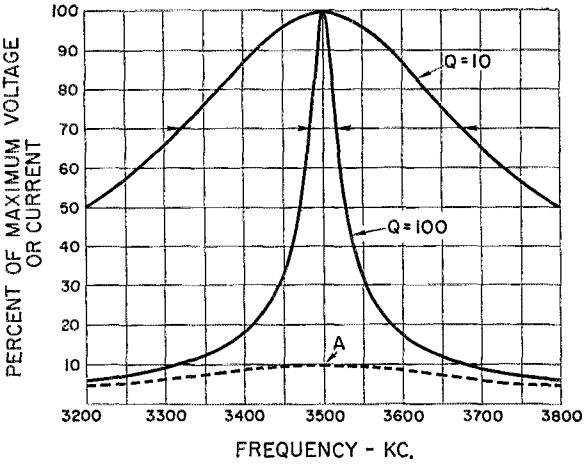


Fig. 4—Resonance curves showing the effect of circuit Q on the voltage measured by the circuit of Fig. 2-11A as the frequency of the applied voltage is varied from below to above the circuit's resonant frequency.

much voltage as at resonance, against 6 percent for the circuit having a Q of 100. Such a curve is **broad**, or "non-selective." Both sharp and broad types of response have their uses.

Incidentally, if we had 1 volt from G in both circuits, the resonant voltage in the $Q = 10$ circuit actually would be only one-tenth as large as that from the $Q = 100$ circuit. This is shown by the curve marked A in Fig. 4.

Parallel Impedance

The circuit of Fig. 3B is supplied energy from the outside rather than the inside, and the generator G is assumed to give a constant output voltage as the frequency is varied. As we saw earlier in the parallel circuit it is the *line current*, I, that changes when the frequency is varied. This current is smallest at the resonant frequency, and rises as the frequency is shifted to either side of resonance.

We could get a rather good idea of how the line current will depend on the circuit Q simply by looking at the curves of Fig. 4 upside down. However, it is generally more useful to think of the **parallel impedance** of the circuit, in preference to thinking of current variations. To get the relative impedance variation, we turn the curves right side up again. In other words, the same curves can be used to show either the resonant voltage rise in a series circuit or the impedance rise in a parallel circuit. As given in Fig. 4, both are on a percentage basis. The actual values of volts in the series case, or ohms in the parallel case, depend on the actual reactance of L and C at the resonant frequency, and also on the Q of the circuit[2].

The impedance of a parallel circuit operated near resonance is usually considered to be purely resistive. Strictly speaking, this is true only at the exact resonant frequency. As soon as we move the frequency from resonance we get reactive effects. However, in most cases we can ignore them because we operate the circuits so near resonance that the impedance is very close to being a pure resistance.

Bandwidth

Radio-frequency signals in a form useful for communication do not consist of just one single frequency, even though we usually speak of a signal's being "on" such-and-such a frequency. The signal actually occupies a **band** of frequencies. The width, as measured in cycles or kilocycles, depends on the kind of modulation used. An ordinary phone transmission occupies a band at least twice as great as the highest audio frequency in the modulation. This highest frequency might be 4000 cycles, in which case the **bandwidth** of the signal would be twice 4000, or 8000 cycles (8 kc.) If such a phone signal is centered on a **carrier** frequency of 3950 kc., it actually will use a band of frequencies lying between 3946 and 3954 kc.

All of the frequencies within such a band must pass through our selective circuits. Otherwise we wouldn't get the full benefit of the intelligence-bearing part of the signal. It is therefore useful to know just how wide a band a selective circuit will pass. The limits of a circuit's **pass band** are generally taken to be those points where the response in voltage is "down" to approximately 70 per cent of the response at exact resonance. Seventy per cent in voltage represents a 2-to-1 reduction in power, so these points are often called the **half-power** or **— 3 db. points.**[3] They have been marked by small arrows on the curves in Fig. 4. By close inspection you can see that the circuit with a Q of 100 has a bandwidth of about 35 kc. while the one with a Q of 10 has a bandwidth of about 350 kc.

(Part IV, in an early issue, will discuss coupled circuits and selectivity.—*Editor.*) QST

[2] In the series circuit, the resonant voltage is Q times the applied voltage. In the parallel circuit, the resonant impedance is Q times the reactance of either L or C (they both have the same value of reactance at resonance).

[3] Sometimes the bandwidth is based on a 2-to-1 reduction in voltage; that is, a 4-to-1 reduction in power. This is the "6-db. bandwidth".

Hamfest Calendar

Arkansas — The 14th annual Ozark hamfest will be held on May 4 & 5 at the Crescent Hotel, Eureka Springs, Ark. Write to Dwight O. Nichols, W5AAE, 34 Ridgeway, Eureka Springs, for further info.

California — The San Fernando Valley RC will hold its 7th annual hamfest and radio show on Sunday, June 2, at the Glen-Aire Country Club, 3910 Stansbury Ave., Sherman Oaks. There will be exhibits of ham gear, and an attendance of about 1500 is expected. This is the first year that the hamfest is being held in a private park. Admission fee is $1.00 for adults and 50¢ for children 12 and under. For further info contact Skip Holt, WA6HXK, 14621 Morrison St., Sherman Oaks, Calif.

District of Columbia — The National Capital VHF Society, Inc., of Washington, will hold its 3rd annual hamfest and picnic at Marshall Hall Amusement Park, Marshall Hall, Charles County, Maryland, on May 26. Talk-in stations on 50.4 and 145.92 Mc. Registration $1.00. For further info contact Clarence Carvell, K3EIW, 2820 Curtis Drive, SE, Washington 21, D. C.

Florida — The St. Petersburg Amateur Radio Club will hold a hamfest on May 12, at Phillippe Park, near Safety Harbor, Fla., beginning at 0800. The program includes the SPARC Swap-O-Rama, so bring all your trading gear. There are recreational facilities for the children, shelter, and refreshments available. Free coffee and doughnuts for early birds. Bring your own picnic lunch. Admission is $1 for the entire family. Watch Florida *Skip* for full details.

Georgia — The Atlanta Radio Club will hold a dinner and dance at Pritchett's Dining Room, Decatur, on Saturday, June 1. The price for this was not firm at press time, and so for further info contact Jim Giglio, 1378 Metropolitan Ave., SE, Atlanta 16. On the next day, Sunday, June 2, the club will hold its 35th annual hamfest in the auditorium of the Lenox Square Shopping Center, located on Peachtree Road at Lenox Road. No registration or admission charge. There will be various prizes, including some for homebrew equipment for various classes of licensee. There will be transmitter hunts on six and 75, and various net and MARS meetings. Talk-in transmitters on 3995 and 50.55. For further info contact Gary Chambers, K4MDC, 3039 Francine Drive, Decatur, Ga.

Illinois — The Western Illinois RC hamfest will be held on May 26 at Eagles Alps, North 5th St., Quincy, Ill., starting at 10 P.M. Registration $2 advance, $2.50 at the gate. For tickets contact Commander Richard Phares, 708 South 22 St., Quincy, Ill.

Illinois — The Streator Radio Club will hold its annual pre-hamfest dinner-dance on June 1 at the Pine Towers Restaurant on Route 23 north of Streator. Dinner will be served at 7:30, and there will be dancing from 10 until 1 A.M. There will be a display of homebrew gear — bring along your pride and joy. Lots of other surprises. Price is $2.75 per person, including dinner, dancing, and entertainment. The Starved Rock hamfest will be held the next day. Send your reservations to Bert Evans, 230 Water St., Streator, Ill.

Illinois — The Starved Rock Radio Club Hamfest will be held June 2 at the La Salle County 4-H Home and Picnic Area Southwest of Ottawa (same place as last year), on route 71. From Chicago and Davenport Areas, follow Route 80 to Route 23, turn South on Route 23 to South end of Illinois river bridge at Ottawa and West on route 71 to Hamfest site. From towns in southern parts of Illinois follow Route 51 to 71 and east to Hamfest or use Route 23 to 71. Follow big yellow Hamfest signs. Free swap section. Good exhibits of latest ham gear. Free coffee and doughnuts 1000 to 1030 CDST. Hamfest site is a short drive from Starved Rock State Park and recreational areas. Good home-style food available on the grounds. Registration in advance is $1.50 and must be postmarked before May 25. $2.00 at the gate. For additional information and registration write George E. Keith, W9QLZ/W9MKS, RFD#1 Box 171, Oglesby, Illinois.

Illinois — The Kishwaukee Radio Club is holding a ham swapfest in the Hopkins Park Shelter House, DeKalb, Ill., on Sunday, May 5, from 10 A.M. until 4 P.M. A $1 admission donation will be expected, but no commission will be charged for equipment sold, bought, or swapped. For further info, contact Al Brand, WN9CHN, 415 E. Sycamore St., Sycamore, Ill.

Indiana — The 4th annual Columbus hamfest will be held on May 19 at the Bartholomew County 4-H Fairgrounds, located two miles south of Columbus, Indiana, at the intersection of Highways 31-A and 58. This is a family affair and picnic facilities will be available. For further info contact Scott Henkle, K9VXZ, R.R. #6, Columbus, Indiana.

Kansas — The Neosho Valley ARC hamfest will be held on Sunday, May 5, at Blue Stem Hall, west of Emporia. Registration is 50¢. Covered dish picnic at noon. For further info contact Arthur W. Musgrave, WØZGB, 420 Neosho St., Emporia, Kansas.

Kansas — The Central Kansas RC will sponsor its 15th annual hamfest in Salina at Kenwood Park on June 2. Registration $1 per person — each person to bring a covered dish. Drinks to be furnished by the club. Bingo for the ladies and children. Contests and prizes. To be held rain or shine. For further info contact Irv Nocks, KØEDW, Assaria, Kansas.

Kentucky — The 4th annual Breaks Interstate hamfest will be held at Breaks Interstate Park on June 9. Take along your family, friends, and a basket lunch. Refreshments, food, and lodging also available at the park. For overnight accommodations, write Superintendent, Breaks Interstate Park, Breaks, Va. For information, contact Jackie Tom Hewlett, W4EON, Langley, Kentucky.

Louisiana — The Southwest Louisiana Amateur Radio Club will hold a Hamfest and Fish Fry at Prien Lake Park, Lake Charles, on May 4 and 5. The cost of the fish fry and one other meal is $2.50 before April 24, $3.00 after that date, and $1.00 for children under 12. The program includes a fish pond, swap shop, a place to display gear for sale, fun and games for the kids. For further info and registrations contact Lou Fontenot, WA5ARV, Route 3, Box 185 D. C., Lake Charles, La.

Mexico — The Liga Mexicana De Radio Experimentadores will hold their 31st annual convention at San Luis Potosi, in the state of the same name, on May 23, 24, and 25. The theme of the convention will be the Emergency Net. A full program is planned, including tours for the ladies to various handcraft workshops, to the town of Santa Maria, and other social activities. For further info contact Anthony Pita, XE1CCP, Paseo de Echegaray 106, Bosques de Echegaray, Mexico.

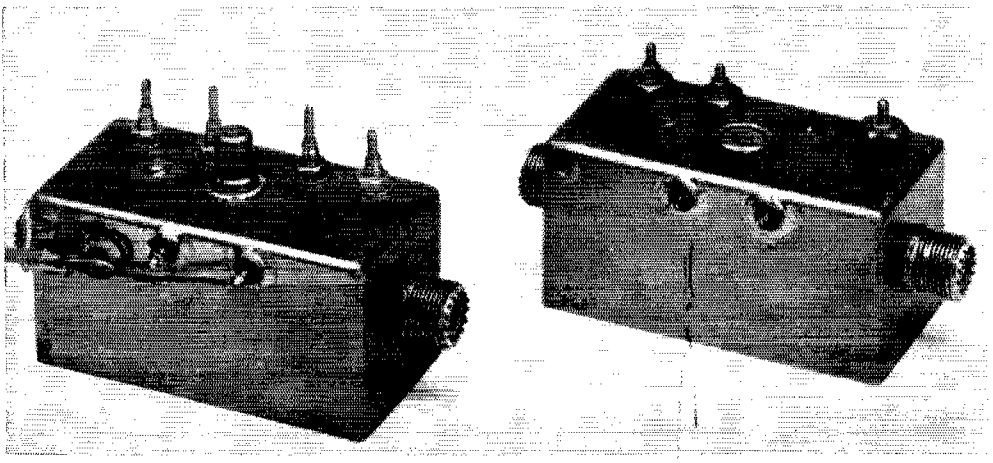
Missouri — The Kansas City DX Club plays host to the annual WØ-DXCC meeting to be held at the President Hotel, 14th and Baltimore, Kansas City, beginning at 1 P.M. on Saturday, May 11. Registration is $6.75, and includes dinner. Make your reservations with Harold Suman KØOYQ, 5920 Nall, Mission, Kans. Hotel reservations should be made directly with the hotel, but will be taken care of by the Committee if your request is made with your registration remittance.

New York — The Rome Radio Club will hold a Ham Family Day on June 2, starting at 1:00 P.M. There will be a chicken and steak dinner at 1700, programs for hams, XYLs and harmonics. The main speaker will be Hal Vance, K2FF. Tickets are $5 for adults, and $1.75 for children under 12. Send your reservations to F. E. Chrestien, W2MSM, Rome Radio Club, Inc., P.O. Box 721, Rome, N. Y.

New York — Western New York hamfest, Saturday, May 11, at Doud Legion Post, Buffalo Rd., Rte 33, Rochester. Technical talks, WNY code sending contest, special Novice award, women's program, plus open house at radio museum and Old Timer's Luncheon at nearby Holcomb. Registration and banquet only $4.75. Registration for all events $2.50. Send check of money order to Rochester Amateur Radio Association, P. O. Box 1388, Rochester 3, N. Y.

Pennsylvania — The Bucks County ARC will hold its annual installation dinner on May 4. Contact Hedwig Grant, K3GSV, P. O. Box 311, Bristol, Pa., for further info.

(Continued on page 164)



Two of the W1REZ Nuvistor preamplifiers. At the left is one for 50 or 144 Mc., shown with tube and power cable in place. The model at the right is for 432 Mc.

Grounded-Grid Nuvistor Preamplifiers

Stable and Easily Adjusted R.F. Amplifiers for 50 Through 450 Mc.

BY RAYMOND F. BOHMER,* W1REZ

MANY articles have been published in which 6CW4 Nuvistors have been used as neutralized r.f. amplifiers. The purpose of this discussion is to familiarize the reader with the advantages of the grounded-grid configuration, and to provide constructional information for 50, 144, 220 and 432-Mc. preamplifiers.

The neutralized amplifier yields good results, but slight variations in construction and in components used may result in the need for a neutralizing device quite different in value from that used in the original model. A properly designed grounded-grid stage, on the other hand, should be quite easy to build and adjust. With suitable isolation and circuit design, it should have highly satisfactory noise figure and gain, up through the 420-Mc. band. The preamplifiers shown have the following desirable characteristics:

1) Adjustable and selective circuits in both input and output.

2) Input impedance suitable for direct connection of coax.

3) Optimum impedance matching of both antenna and cathode.

4) D.c. isolation of the input circuit.

5) Minimum circuit losses.

6) Basic circuit adaptable to wide frequency range.

These conditions are achieved by the use of double-tuned capacity-coupled input and output circuits of similar design, tapping down on the coils where required, to match low impedances. The circuits thus retain reasonable operating Q, and provide better selectivity than is normally expected of grounded-grid circuitry, yet with stability and ease of adjustment superior to neutralized stages. The input impedance of the 6CW4 is very low, when it is operated as a grounded-grid amplifier, hence the tapping down of the cathode on L_2, the secondary of the input transformer. Tapping down for the low-impedance input and output coupling is conventional.

The minimum required coupling (C_2) is used between the two coils of the input circuit. This coupling will function only when the two coils are in resonance. Any change from resonance that may occur in the primary will reduce coupling to the secondary. When this occurs, the coupling capacitor presents a small amount of capacitance across the cathode coil to ground, approaching the small total value of the capacitor as a direct short to ground across L_1 is approached. When this preamplifier is used with an antenna changeover relay, operation remains stable with the input either open or shorted. In neutralized circuits, stability may be dependent upon maintaining the design load on the input circuit, and oscillation may occur when this load is removed or changed. Such oscillation may increase the dissipation of the tube, with adverse effect on its life expectancy.

D.c. isolation of the cathode and input circuits,

* VHF–UHF Associates, P.O. Box 1068, Fairfield, Conn.

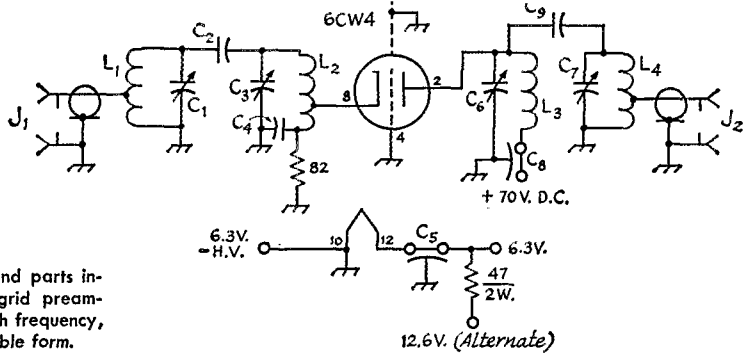


Fig. 1—Schematic diagram and parts information for the grounded-grid preamplifiers. Where parts vary with frequency, they are given below in table form.

C_1, C_3, C_6, C_7—0.7 to 9-pf. glass piston trimmer (JFD VC-3G; VHF-UHF Associates E-1008). Not used in preamplifiers for 50 and 144 Mc. C_6 not used in 432-Mc. model.

C_4—1000-pf. standoff or button capacitor, eyelet type (Allen Bradley SS5A or Centralab ZA-102).

C_5, C_8—1000-pf. *feedthrough capacitors*, (Allen-Bradley FA5C or Centralab MFT-1000).

J_1, J_2—Coaxial chassis connector.

Capacitor values below are in pf.

	50 Mc.	144 Mc.	220 Mc.	432 Mc.
C_2	4.7	4.7	1.5	1.5
C_9	1.5	1.5	1.5	33

Coils below, for 50 and 144 Mc., are wound on ¼-inch ferrite-slug forms (CTC PLS6D, white dot). Coils for 220 and 432 Mc. are air-wound.

50 Mc.

L_1, L_4—15 turns No. 26 Formvar, close-wound. Tap at 4 turns.

L_2—Same as L_1, but 14 turns.

L_3—Same as L_1, but no tap.

144 Mc.

L_1, L_2—5 turns No. 18 silver-plated, spaced one diam. Tap at 1 turn.

L_3—6 turns No. 22 Formvar, spaced wire diam.

L_4—Same as L_1, but no tap.

220 Mc.

L_1—4 turns No. 18 silver-plated, ¼-inch diam., spaced wire diam.

Tap 1 turn from bottom. Solder across C_1.

L_2—Same, but tap at 2¼ turns.

L_3—3 turns like L_1. Solder directly from C_8 to socket pin.

L_4—Same as L_3, but tap 1½ turns up. Solder across C_7.

432 Mc.

All coils made from ⅛ by 0.02-inch copper strap, silver-plated, ⅜-inch i.d.

L_1—3 turns, 1/16-inch spaced, ⅜-inch leads. Solder across C_1. Tap with same material at 1½ turns.

L_2—Same, but solder from C_3 to C_4.

L_3—Same, but 3/32-inch spaced, ½-inch leads. Solder from tube pin to C_8.

L_4—4 turns same as L_1. Tap at 1½ turns. Solder across C_7.

through C_2, provides for use of antenna systems of the grounded type, wherein the inner conductor of the coax makes a d.c. short to ground when the input coil is tapped directly for the coax. The double-tuned output circuit works in a similar manner.

The two-coil tapped-down arrangement also permits a fairly large number of turns, an important consideration in the use of coil-and-capacitor circuitry at 220 and 420 Mc. It will be seen from the photograph and coil table that, as a result of the circuit design and care taken with the layout to keep lead inductance to an absolute minimum, the 432-Mc. preamplifier has coils of respectable size. In all probability, the circuit and layout would be found practical at frequencies up to slightly above 500 Mc.

Construction

A manufactured case is used, but dimensions are given, and a duplicate can be made readily from flashing copper, thin sheet brass, or printed-circuit stock, if the builder so desires. A shield across the middle of the case isolates the input and output circuits. The heater wiring is on the input side. The lead from C_5 to the tube socket should be heavy wire or copper strap. The shield is notched for the Nuvistor socket, which is positioned so that the cathode and one heater pin are on one side (the upper portion in the photograph) and the plate pin on the other. The grid pin and the other heater pin are soldered to the shield,

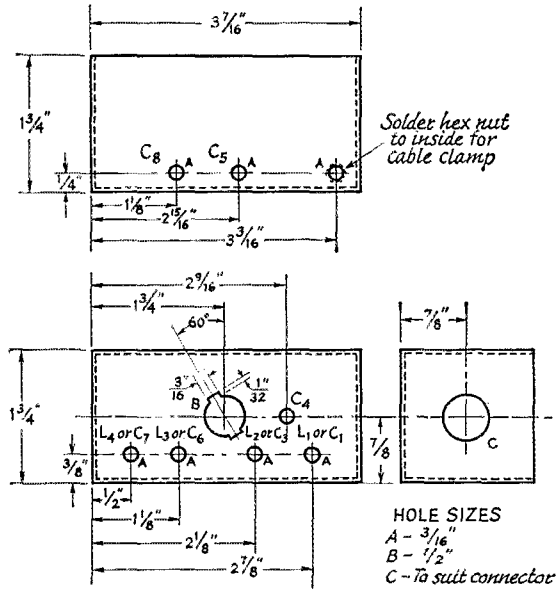
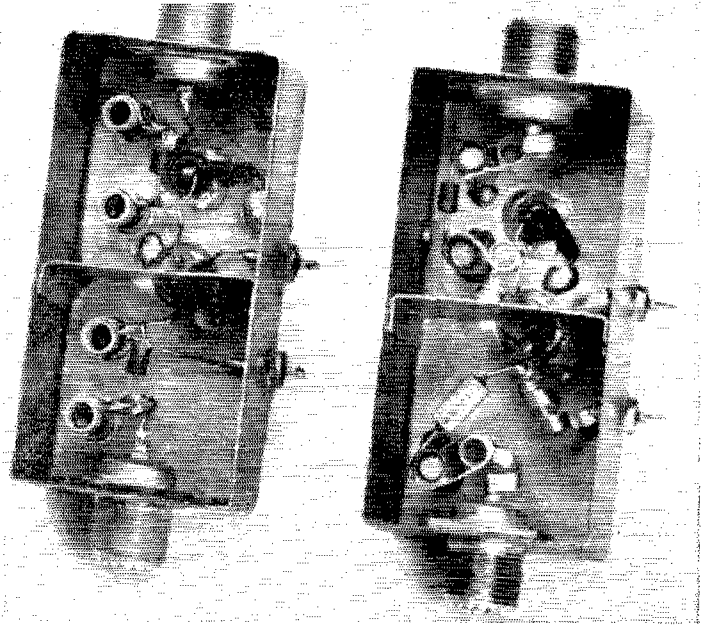


Fig. 2—Details of the case used for the preamplifier. *This is available from Hudson Tool & Die Co., or it may be made from flashing copper or sheet brass.*



Interior of the preamplifiers for 144 and 432 Mc. Note that the latter, right, is wired with ⅛-inch copper strap, silver-plated, the stock used for the coils. Slug-tuned forms are used in the 50- and 144-Mc. models, air-wound coils and glass piston trimmers in those for 220 and 432 Mc.

directly over the socket. Heater and plate voltages are brought in on feedthrough capacitors.

The 144-Mc. and 50-Mc. preamplifiers use slug-tuned coils, and are practically identical in appearance. The 220-Mc. and 432-Mc. models are tuned by means of cylindrical glass trimmers. Less expensive plastic or ceramic trimmers may be substituted. All four circuits have trimmers in the 220-Mc. amplifier (not shown in the photographs), but the 432-Mc. plate coil is resonated by the output capacitance of the tube. If the layout and coil information are duplicated carefully this coil will not require adjustment. Hence, as will be seen from the top-view photograph, the 432-Mc. amplifier (right) has only three adjusting studs. A slip-on cover, not shown in the photographs, completes the r.f.-tight enclosure.

Adjustment

If a sweep generator is available, the preamplifier can be adjusted to give a flat response across the desired frequency range. The owner of a noise generator may want to experiment with tap positions, but lacking a noise generator the builder will achieve approximately optimum results merely by peaking all controls except the input circuit for maximum gain, at the center of the desired tuning range. The input circuit should be adjusted for best signal-to-noise ratio, using a weak signal.

Plate voltage for the 6CW4 should be about 70, though the value is not critical, so long as input to the tube is kept below about one watt. Common practice is to draw power from a higher-voltage source, through a dropping resistor, as this gives better overload characteristics than when a low supply voltage is used, directly. Overloading in this case is not a problem, however, as it will occur, if at all, in stages following the preamplifier.

The Nuvistor may be operated from a 12-volt heater source, if a 47-ohm 2-watt dropping resistor is inserted in the 12-volt lead outside the preamplifier. QST

Strays

The Foundation for Amateur Radio, Inc., with headquarters in Washington, D.C., is receiving applications for its second awarding of the John Gore Memorial Scholarship, for either graduate or undergraduate study, full or part time. The scholarship pays $250 for the academic year, and is subject to renewal. To be eligible, an applicant must have completed one year in an accredited college or university and must be enrolled in a course leading to a degree in electronics or a related science. He must also be a radio amateur licensed by FCC and holding at least a General Class license. Preference will be given to applicants from the area serviced by the Foundation (the District of Columbia, Maryland, and Virginia) although those living elsewhere are not excluded. Requests for application should be made not later than May 20, 1963, and should be addressed to: Chairman of Scholarship Award Committee, FAR, Inc., 7605 Westfield Drive, Bethesda 14, Maryland.

The Foundation for Amateur Radio, Inc., is a non-profit organization devoted to the advancement of amateur radio. It is composed of trustees representing radio clubs in the Washington-Baltimore area. John Gore, W3PRL, in whose honor the scholarship is named, was until his death in 1960 the president of the Foundation.

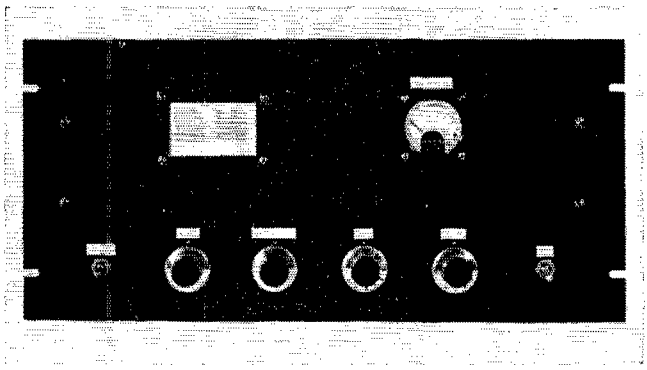


Fig. 1—This crystal-controlled v.f.o. delivers a fundamental frequency range of 3500 to 3600 kc., permitting coverage of most of the higher-frequency bands.

A Crystal V.F.O.

BY FRANK W. NOBLE,* W3QLV

When W1RF's article appeared in the October 1962 issue, we felt sure that it would renew interest in crystal-controlled variable-frequency systems. By limiting the coverage on 80 and 10 meters and making use of the frequency multiplication already available in most transmitters, W3QLV has a unit comparable to the "Ultimate Exciter" in most other respects, but vastly simplified.

A BETTER transmitter frequency control would result if it were possible to cover a continuous range of frequencies while retaining most of the stability of a normal crystal oscillator.[1] A previous article [2] has shown that the frequency of a 20-Mc. crystal oscillator may be shifted 100 kc. or more by the use of an inductance in series with the crystal. While this system allows the coverage of a large frequency range with few crystals, it has two disadvantages. The first is that since the coil is relatively unstable compared to the crystal, and since it is an important part of the frequency-determining circuit, the stability of the oscillator must be considerably less than that of a normal crystal oscillator. The second disadvantage is that expensive crystals must be used.

In the unit shown in the photographs, the frequency variation is produced by changing the value of a capacitance shunting the crystal. Since air-dielectric variable capacitors are much more stable than coils, and since the capacitor is not such an important part of the frequency-determining circuit, the stability of the oscillator should approach that of a normal crystal oscillator. The variation obtainable with this arrangement is much smaller than that which may be effected by use of a series coil. However, sufficient variation may be obtained, in the circuit used here, to provide coverage between spot frequencies spaced 1 kc. apart. Inexpensive easily-available surplus FT-243 crystals may be used, so the chief investment, so far as crystals are concerned, is the time spent in grinding or etching them to exact frequency.

The 1-kc. intervals are produced in a heterodyne system in which a total of 20 crystals yields 100 spot frequencies, as shown in the chart. Since the author is interested primarily in 40- and 20-meter c.w., the output of the system is designed to cover the range of 3500 to 3599 kc. When used with the usual frequency multiplier, coverage is provided for the useful (c.w.) portion of the 40-meter band, all of the 20- and 15-meter bands, and the lower 800 kc. of the 10-meter band. Clearly, the principle and extensions thereof can be used to cover other frequencies. The chief virtues of this particular circuit are its abject simplicity and low cost.

The circuit of the system is shown in Fig. 2. Briefly, two 6AU6 crystal-controlled oscillators feed a 6BA7 mixer whose output is tuned to the difference between the two oscillator frequencies. The output of the mixer is amplified in a stage using a 5763. The 6AL5 is the rectifier in a peak-reading voltmeter circuit. This circuit serves as a resonance indicator and provides a general check on the operation of the unit. The meter normally reads between 50 and 100 peak volts r.f., depending on crystal activity and the settings of the tuned circuits.

* 10004 Belhaven Road, Bethesda 14, Maryland.

[1] Harvey, "The Ultimate Exciter," *QST*, October, 1962.

[2] Shall, "VXO — A Variable Crystal Oscillator," *QST*, January, 1958.

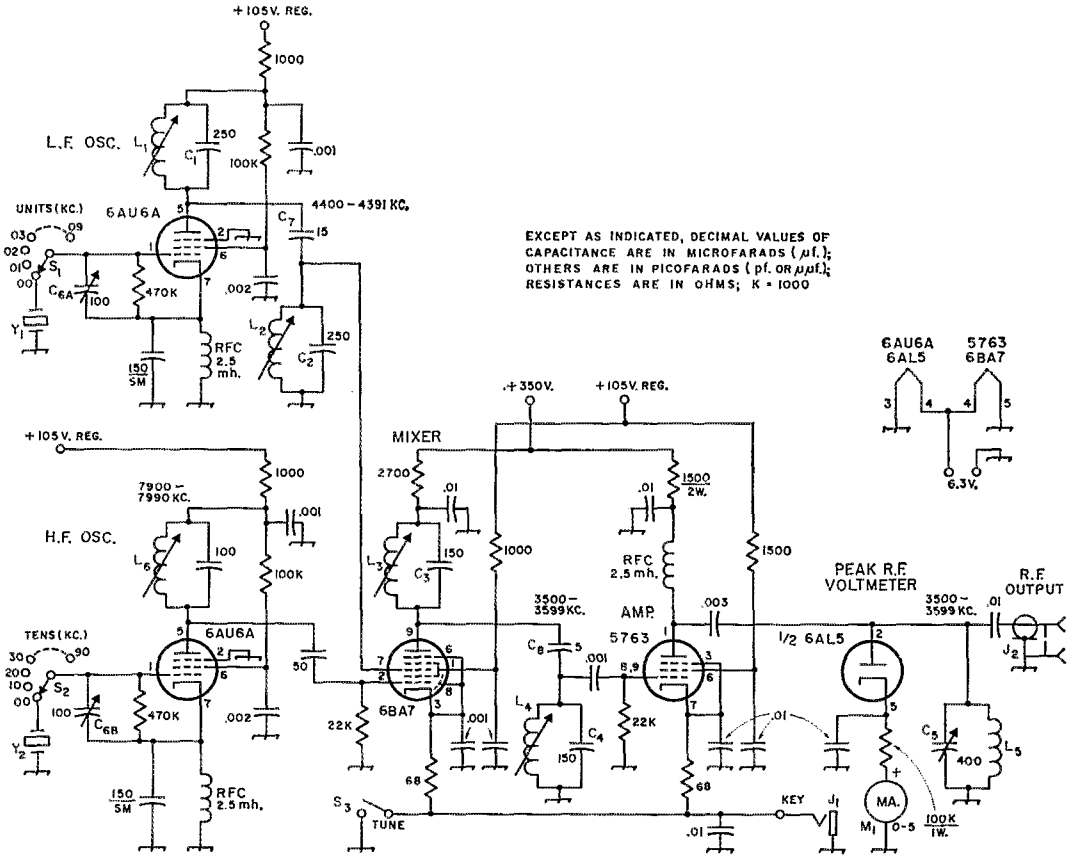


Fig. 2—Circuit of the crystal-controlled v.f.o. Fixed capacitors of decimal value are disk ceramic; others are mica or NPO ceramic, except SM indicates silver mica. Unless indicated otherwise, resistors are ½-watt composition. Component labels not listed below are for text-reference purposes.

C_5—Broadcast-replacement-type variable capacitor.
C_6—Differential capacitor; see text.
J_1—Open-circuit jack.
J_2—Chassis-mounting coaxial connector (SO-239).
L_1, L_2—Iron-slug inductor, approx. 5 μh. (Miller 4405 or equivalent).
L_3, L_4—Iron-slug inductor, approx. 14 μh. (Miller 4406 or equivalent).
L_5—Approximately 5 μh.; 15 turns No. 20 d.c.c., close-wound on 1-inch ceramic form.
L_6—Iron-slug inductor, approx. 4 μh. (Miller 4405 or equivalent).
S_1, S_2—Single-pole 12-position rotary switch (Mallory 32112J, 2 positions not used).
S_3—S.p.s.t. toggle switch.
Y_1, Y_2—See text and chart.

Oscillator Frequencies

Before discussing the circuit in detail, a word about the choice of oscillator frequencies is in order, since there are many possible combinations that will produce the desired output frequencies. Obviously, crystals whose harmonics fall in the amateur bands must be avoided, since the oscillators are not keyed, but run continuously for best stability. Similarly, crystals whose significant harmonics will produce beats close to the desired mixer output frequency should not be used. Finally, there must be sufficient separation between the fundamental frequencies of both oscillators and the desired output frequency to permit suppression of the oscillator frequencies with simple circuitry in the output of the mixer.

While there are still many combinations that would meet these requirements, the particular choice in this instance was made for the practical reason that many of the exact frequencies that are needed are available on the surplus market,[3] while all others may be ground or etched from surplus crystals which are slightly low in frequency.

Circuit Details

The grid-plate oscillator (ARRL *Handbook*) was chosen for both frequencies chiefly to simplify the switching problem. Since one side of the crystal is grounded in this circuit, a single-pole

[3] U. S. Crystals, 1342 South La Brea Ave., Los Angeles 19, Calif., and others.

Chart Showing Output Frequency for Various Combinations of Oscillator Frequencies

S_1		00	01	02	03	04	05	06	07	08	09
Y_1 (Kc.)		4400	4399	4398	4397	4396	4395	4394	4393	4392	4391
S_2	Y_2 (Kc.)	*Output Frequencies*									
00	7900	3500	3501	3502	3503	3504	3505	3506	3507	3508	3509
10	7910	3510	3511	3512	3513	3514	3515	3516	3517	3518	3519
20	7920	3520	3521	3522	3523	3524	3525	3526	3527	3528	3529
30	7930	3530	3531	2532	3533	3534	3535	3536	3537	3538	3539
40	7940	3540	3541	3542	3543	3544	3545	3546	3547	3548	3549
50	7950	3550	3551	3552	3553	3554	3555	3556	3557	3558	3559
60	7960	3560	3561	3562	3563	3564	3565	3566	3567	3568	3569
70	7970	3570	3571	3572	3573	3574	3575	3576	3577	3578	3579
80	7980	3580	3581	3582	3583	3584	3585	3586	3587	3588	3589
90	7990	3590	3591	3592	3593	3594	3595	3596	3597	3598	3599

crystal switch may be used without danger of interaction between neighboring crystals.

Referring to the chart, the higher-frequency oscillator covers the range of 7900 to 7990 kc. in steps of 10 kc. and feeds the local-oscillator grid of the mixer. The latter is important. In normal mixer operation, the local-oscillator grid is driven from below cutoff into conduction. This produces relatively large components in the output of the mixer at the local-oscillator frequency and its harmonics. The higher in frequency these components are, the easier they are to filter out.

The lower-frequency oscillator covers the range of 4400 kc. to 4391 kc. in 1-kc. steps, and feeds the signal grid of the mixer. To minimize unwanted components of this oscillator signal in the output of the mixer, the fundamental signal from the oscillator should not be too large, and the harmonic content should be low. For the latter reason, two tuned circuits, L_1C_1 and L_2C_2, coupled only by a small capacitance (C_7), are used between the 4400-kc. oscillator and the mixer. The most important spurious signals will be produced by beats between the 4th harmonic of the 7900-kc. oscillator and the 8th harmonic of the 4400-kc. oscillator, and between the 6th harmonic of the 7900-kc. oscillator and the 10th harmonic of the 4400-kc. oscillator. In some parts of the tuning range, these beats lie so close to the output frequency that it would be impractical to attempt to filter them out in the mixer output circuit or following stages. Therefore, the 8th and higher harmonics of the 4400-kc. oscillator harmonics producing these beats must be attenuated to negligible value before reaching the mixer input.

Frequency coverage between adjacent spot frequencies is obtained by variation of capacitance across the crystals as explained earlier. To obtain maximum variation, a differential capacitor, C_6, is used. With such a capacitor, the capacitance across the crystal in one oscillator may be increased as the other is decreasing, thereby lowering the frequency of one oscillator as the frequency of the other is increasing. The nominal spot frequencies shown in the chart are centered in the range of C_6, to provide a variation of at least 500 cycles either side of the nominal frequency.

Two tuned circuits, L_3C_3 and L_4C_4, loosely coupled through a small capacitance (C_8), in the output circuit of the mixer, form a rudimentary bandpass filter to pass the range of 3500 to 3600 kc. while discriminating against the 4400-kc. signal from the lower-frequency oscillator in particular and other garbage in general.

The 5763 amplifier is conventional. This stage raises the output level and adds its attenuation to undesired frequency components. A 400-pf. tank capacitor is used principally to provide sufficient capacitance range to compensate for a reasonable amount of reactance in the coax line used in simple capacitive coupling to a following stage. It is advisable to keep this line as short as possible. If there is some reason why the line must be longer than a few feet, low-capacitance cable (RG-62 U) should be used, otherwise it may be necessary to use low-impedance coupling. (I have used up to 20 ft. of RG-62/U successfully.)

The key is in the cathode circuit of both the mixer and the amplifier. The arrangement is ideally suited for break-in operation. Although both oscillators run continuously, as mentioned earlier, their fundamental and harmonic frequencies fall outside amateur bands and no signal is heard with the key open.

Crystal Adjustment

In adjusting the crystals to the exact frequencies shown in the chart, hydrofluoric acid, a fume hood, and extreme caution were used. The dangerous nature of this acid cannot be overemphasized. More details on safe procedure will be found in earlier issues of *QST*.[4] It is important to do all frequency checking with the crystals in their proper holders and sockets, and in the circuit in which they are going to be used. The crystals should be adjusted to the frequencies shown in the chart with C_6 turned to mid-position.

The checking procedure will depend to a certain extent on the equipment available. I used a thoroughly warmed-up stable communications

[4] Newland, "A Safe Method for Etching Crystals," *QST*, January, 1958.

Ellison, "Hints & Kinks," *QST*, October, 1958; also ARRL *Hints and Kinks for the Radio Amateur*, Volume 6, page 48.

receiver to zero-beat the 7.9-Mc. crystals against harmonics of a 10-kc. standard. When this job was completed, the receiver was set to 3500 kc. by means of the standard, the 7900-kc. crystal was selected, and the 4400-kc. crystal was adjusted to make the mixer-ouput signal zero-beat against the standard at 3500 kc. in the receiver. Then the 4399-kc. crystal was adjusted to produce a 1-kc. beat against the standard harmonic at 3500 kc. The 1-kc. difference was determined by connecting an accurately-calibrated audio oscillator to a loudspeaker and forming an acoustic beat in the ear. With the 3501-kc. crystal on frequency, the b.f.o. was turned on, and the 3501-kc. signal was tuned to zero beat in the receiver. Taking care that the receiver setting was not disturbed thereafter, the 3502-kc. crystal was switched in and its frequency adjusted to produce a 1-kc. beat in the receiver. The same procedure was followed in successively adjusting the remaining crystals in the lower-frequency oscillator, adjusting each crystal to produce a 1-kc. beat with the receiver tuned to zero beat at the frequency of the preceding crystal. It is realized that this procedure produces a cumulative error, but it is adequate if done carefully. A frequency counter, such as those used by crystal manufacturers, would facilitate matters, to say the least.

Construction

Fig. 1 is a panel view of the unit. Components are assembled on an 8 × 17 × 3-inch aluminum chassis fitted with a standard rack panel 8¾ inches high. A calibration table for the band in use may be slipped into the chart frame at the upper left of the panel. The output voltmeter is to the right. Along the bottom, from left to right are the a.c. switch for the built-in power supply, controls for the output tank capacitor (C_5), the frequency interpolator (C_6), the two crystal switches, and the key-override switch (S_3).

The power supply is not described since any well-filtered supply delivering approximately 350 volts at 100 ma. or more will serve. The regulated voltage needed may be obtained by the use of a VR tube operating from the same supply.

It will be noted that if the 4.4-Mc. crystal-switch dial is calibrated 00 to 09, and the 7.9-Mc. switch is calibrated 00 to 90, a direct reading in terms of kc. above 3500 is provided. This reading will be correct within a few hundred cycles, depending on the setting of the interpolator.

A top view of the unit is shown in Fig. 3. In line, from bottom to top at the center of the chassis are the 7.9-Mc. oscillator coil and tube, the 4.4-Mc. oscillator tube and its two output coils in separate shielding cans. Progressing to the left, we see the mixer tube and dual plate coils (also individually shielded), the 5763 amplifier tube and its output coil (in the larger rectangular can). To the left of the latter coil is a 6H6 which is electrically interchangeable with the 6AL5 in the r.f. voltmeter circuit. The remainder of the chassis is devoted to power-supply components.

Fig. 4 shows the layout on the under side of the chassis. Octal tube sockets are used as crystal sockets. An attempt was made to keep the capacitance low between switch leads and to ground by keeping the leads spread out, and spaced from the chassis.

The differential interpolating capacitor C_6 is made up by ganging two standard midget variables with their shafts oriented so that one capacitor is at maximum when the other is at minimum. Since the rotors must be insulated from ground and from each other, each capacitor is shaft-mounted on a heavy block of insulating material, and insulated shaft couplers are used to couple the two capacitor shafts together, and to the panel control. The capacitors shown in Fig. 4 are 50-pf. units. Since it was subsequently found that these capacitors barely covered the necessary range, they were replaced with 100-pf. units which provide a more substantial margin. The 100-pf. units should have double bearings to improve the mechanical, and consequently the electrical, stability.

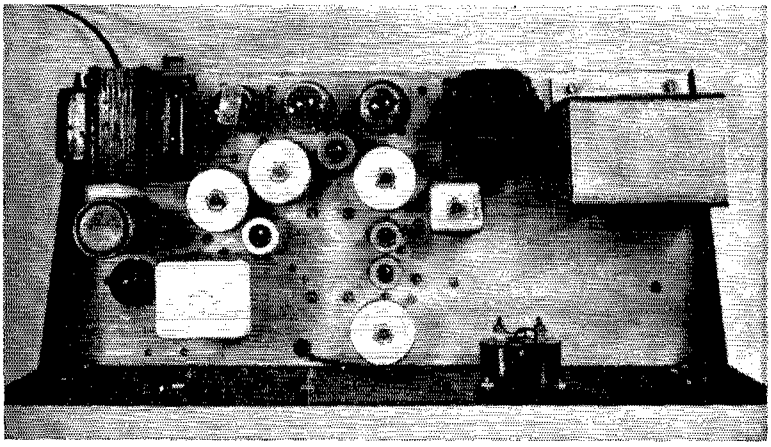


Fig. 3—Plan view, showing the general arrangement of components on the chassis. Exact placement is not critical.

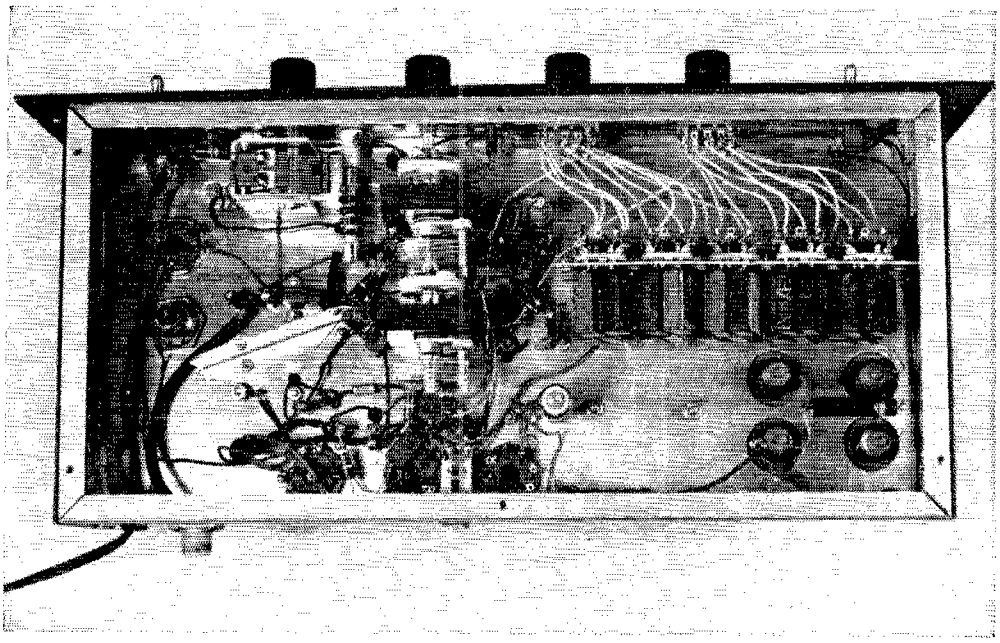


Fig. 4—Bottom view, showing mounting of the crystals and the differential interpolating capacitor. The capacitor at upper left is the output-amplifier tank capacitor.

Tune-up Procedure

If the receiver is well shielded, a "sniffer" probe may be used to resonate the tuned circuits. The center wire of a small coaxial cable is connected to the antenna terminal and the cable shield is connected to the ground terminal of the receiver, taking care to minimize the length of the exposed center wire. The cable is cut at any convenient length. At the free end of the cable about half an inch of the inner conductor is exposed and the shield is trimmed back flush to the outer sleeve.

Now set S_1 to 05, and place the probe in close proximity to Pin 7 of the 6BA7. Adjust the slugs in L_1 and L_2 for a maximum signal in the receiver at 4395 kc. Now set S_2 to 50 and place the probe near Pin 2 of the 6BA7. Adjust L_6 for a maximum signal at 7950 kc. Next place the probe near Pin 8 of the 5763 and adjust L_3 and L_4 for a maximum signal at 3555 kc. Now swing C_5 to near maximum capacitance while observing the r.f. voltmeter. The meter should peak at about 70 volts. The Q of L_5C_5 is so high that the circuit should be retuned when changing frequency by more than 25 kc. on 80 meters. The other tuned circuits need never be touched again. It will be found that when L_5C_5 is resonated, the output voltage will remain within 70% of its midband value over the entire range of output frequencies.

I conclude by affirming that the considerable amount of time required to etch the crystals to proper frequencies is a good investment in satisfaction. It is a pleasure not only to know where you are but also to be able to go exactly where you want to be. QST

Strays

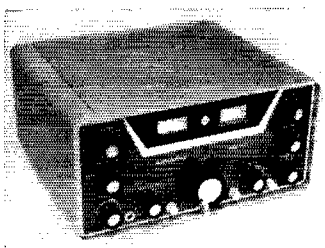
WA5CHN lives next-door to a fellow who makes and repairs boats, and he finds that old sailboat masts make excellent radio masts.

—•••—

A reporter was sent to an old folks' home for some interviews on how to live long. He approached one man and asked, "Tell, me, to what do you attribute your longevity?" The old man thought for a minute and replied, "Well, I have always lived a quiet life, never drank or smoked — I guess that is how I have lived to be 93." The next man, who was 98, claimed it was because of lots of fresh air and exercise. The reporter, wishing to get something other than these stock answers, went over to a man who looked positively ancient. His hands shook, his eyes were blurry, and his hair was a snowy white. The reporter asked him the same question. In a quavering voice the old timer answered, "Well, son, I'm a ham. I stay up until 4 A.M. every night, chasing DX. Then I get up at 6 and chase some more DX. I drink 20 bottles of beer a day and smoke three packs of cigarettes. I guess that's what does it." The reporter was amazed at this unusual reply and said, "My goodness, man, that is fabulous. Would you mind telling me just how old you are?" The old man replied, "Not at all — I'm just thirty-two." — *W9HJL*

• Recent Equipment —

The Hallicrafters SX-117 Receiver



THE SX-117 is a triple-conversion amateur-band receiver using 13 tubes and four semiconductors. Covering 500-kc. segments, it has a crystal-controlled front end and a smooth-acting dial mechanism that permits direct frequency read-out to better than one kilocycle.

One of the first surprises in examining this receiver is its light weight. At only 18½ lbs., and about one cubic foot of volume, this is a compact little package that should be a natural for the Field Day fan and DXpeditioneer. It should be no trick at all to lash this to your back and swim ashore at almost any tropical island, leaving the heavier transmitter and primary power for Jeeves.

The SX-117 actually gives performance comparable to that of Hallicrafters' top receiver, the SX-115, which was reviewed on these pages in the March, 1962, issue. It has achieved this performance, while cutting some $200 from the price, by using a less-expensive cabinet, a less-expensive dial mechanism (but one that has a fine action), fewer tube shields, by supplying fewer crystals (four additional crystals must be purchased to obtain the same frequency coverage as the SX-115), and through a number of other technical and mechanical economies.

A block diagram of the receiver is shown in Fig. 1. Signals arriving from the antenna are amplified in the 6DC6 r.f. amplifier (V_1), and then passed to the 6EA8 first mixer (V_2). The r.f. amplifier can be peaked up by means of a panel-mounted PRESELECTOR control.

The injection voltage for the first mixer comes from a crystal-controlled oscillator through a cathode follower, the injection voltage always being on the high side of the signal frequency. Nine crystals are required in order to cover the amateur bands 80 through 10 (the ten-meter band tunes in four 500-kc. segments) plus the 10-Mc. WWV frequency. However, only five crystals are supplied as standard equipment — the crystals for WWV and three of the 10-meter segments must be obtained separately. (The one 28-Mc. crystal which is furnished covers the segment 28.5-29.0 Mc.) Turning the BAND SELECTOR switch on the panel chooses the appropriate crystal and tuned circuits.

Output from the first mixer is fed to the first i.f. amplifier, which is tunable and thence to a second mixer whose injection voltage is supplied by a v.f.o., V_6. This v.f.o. is gang tuned with the first i.f. and the second mixer grid through the panel TUNING control. The tuning range of the v.f.o. is 500 kc., giving a constant tuning rate on all bands. Since the tuning dial is calibrated from 0 to 500, frequency may be read directly by adding the figure showing on the tuning dial to the frequency shown by the band selector control. The "feel" of the tuning dial, incidentally, is one of the best that we have run across.

The output of the second mixer is 1650 kc., and this goes through one i.f. amplifier stage at that frequency (V_7) and to a third mixer, V_8. Here a switchable crystal oscillator produces either a 1600-kc. or a 1700-kc. signal which, by means of the FUNCTION switch, selects the upper or lower sideband at the third i.f. frequency of 50.75 kc. A NOTCH FREQ control varies the notch frequency within the 50.75-kc. bandwidth, and is useful in eliminating heterodynes.

A SELECTIVITY SWITCH gives three positions of selectivity — 0.5, 2.5 and 5 kc. bandwidths at the -6 db. points, according to the instruction manual, by switching in different values in the 50-kc. tuned circuits.

Signals are detected in either a product detector (V_{10}) (s.s.b. and c.w.) or in an envelope detector (V_{11}) (a.m.). A section of the 6BE6

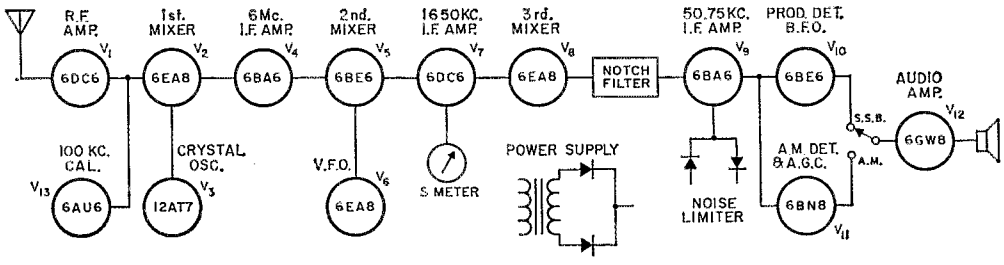
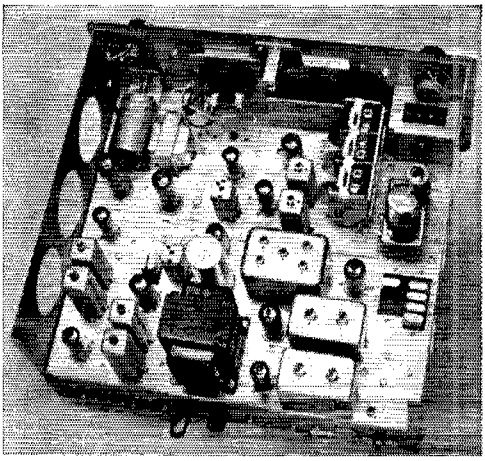
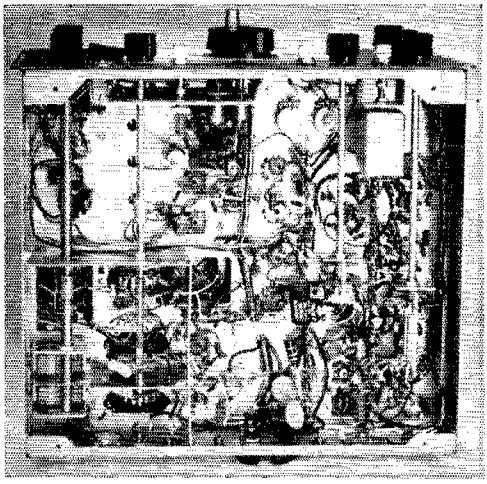


Fig. 1—Block diagram of the SX-117.





At the left above, a top view of the SX-117 receiver. At the right in the photo are five crystals which determine the various 500-kc. tuning segments, and sockets for additional crystals. Also to the right in this top view, in a small sub-chassis mounted above the main deck, is the 100-kc. crystal calibrator. At the far left, the cylindrical can just behind the panel contains the control for the notch filter. The other two crystals visible to the rear of this and to the right are for upper and lower sideband selection. Terminals along the rear edge of the chassis provide for the usual loudspeaker connection, receiver muting, antenna input (there is a ⅝-inch hole punched out so that you can add an SO-259 connector in lieu of the phono plug provided), and grounding. The photo at the right is a bottom view of the SX-117 receiver.

product detector functions as b.f.o. — its pitch is controlled by a front-panel control. Another three-position front-panel switch controls the noise limiter and the calibrate oscillator. The noise limiter consists of a pair of silicon diodes in an i.f.-type limiter which is most effective in reducing impulse noise on c.w. and s.s.b. The calibration oscillator uses a 100-kc. crystal.

One section of V_{11} acts as a.g.c. amplifier and rectifier. A.g.c. functions at all times, even on c.w., there being no way to disable it. Fast-attack, fast-release is automatically selected for a.m., while fast-attack, slow-release is automatically selected for c.w. and s.s.b. operation when the FUNCTION switch is operated.

General coverage may be obtained by plugging additional crystals into the auxiliary oscillator sockets. Between 85 kc. and 3.0 Mc. it is also necessary to couple an external tuned circuit (Model HA-10) between the antenna and the LF ANTENNA jack.

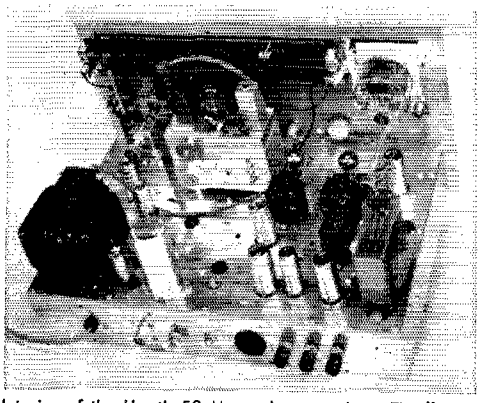
Arranged along the rear apron of the receiver are jacks (phono type) for antenna input, l.f. antenna input, v.f.o. output, and crystal oscillator output, and a terminal strip for speaker connections and receiver muting. — *R.L.B.*

Hallicrafters SX-117 Receiver

Height: 7¾ inches.
Width: 15 inches.
Depth: 14¾ inches.
Weight: 18½ lbs.
Power requirements: 105 to 125 volts, 50/60 cycles, 70 watts.
Price class: $400.
Manufacturer: Hallicrafters Co., Chicago 24, Ill.

The Heathkit 50-Mc. S.S.B. Transmitter, Model HX-30

ALMOST from the earliest s.s.b. activity on lower bands, discerning v.h.f. men have known that this mode has great possibilities for extending the reliable working range on 50 Mc. and higher bands. Real popularity for s.s.b. has been slow in developing on the v.h.f. scene, however, mainly because of the cost and complexity of suitable gear.



Interior of the Heath 50-Mc. s.s.b. transmitter. The "penthouse" just in back of the panel is the v.f.o. assembly. Power supply components are at the lower left. VOX circuits are in the right rear corner, with audio and balanced-modulator stages toward the panel. The 50-Mc. r.f. stages are hidden behind the dial drive, at the upper left.

The would-be v.h.f. sidebander has had two principal roads open: he could build a complete setup himself, or he could make (and more recently, buy) a heterodyne unit that would reproduce on a v.h.f. band the signal generated by a transmitter designed for lower frequencies. Neither way was entirely satisfactory. Building the works was beyond the capabilities of many v.h.f. men, quite a few of whom were just getting into amateur radio. Purchase of a sideband rig for 80 through 10 meters was a pretty expensive approach, especially for the fellow interested only in 50 Mc. or higher bands – and there are thousands of such hams today.

Thus the new Heathkit HX-30 should receive a warm welcome from the many progressive v.h.f. enthusiasts who have been looking for a simpler and less costly way to "go sideband." It is a complete low-powered transmitter for 50 Mc., capable of putting out a high-quality signal on c.w. and a.m., as well as s.s.b. While it is not inexpensive, it costs far less than would the generation of a signal of comparable quality and power, using gear for the h.f. bands as a starter. Construction and adjustment, while far from simple, should be within the capabilities of anyone who understands the use of a simple oscilloscope, and has had some experience in working with advanced kits or other construction projects.

How It Works

In the jargon of the sidebander, the HX-30 is a "phasing rig." For simplicity of construction and permanence of adjustment, much of the transmitter is built on phenolic circuit boards. There are four of these printed circuit assemblies. The largest carries the speech amplifier, audio filter, 90-degree audio phase-shift network, modulator, carrier oscillator, and balanced modulators. In this 5-tube assembly (one 12AX7 and 4 12AT7s) impulses from the microphone are fed through three speech stages, whose frequency response is confined to the useful speech range between 300 and 3000 cycles. These drive the modulator through a 90-degree audio phase-shift network. The carrier is generated at 11.5 Mc. by a crystal oscillator, and this and the phase-shifted audio are fed to the balanced modulators. Output from this board is 11.5-Mc. energy with c.w., a.m., or s.s.b. characteristics, upper or lower sideband, depending on the setting of the mode switch.

Then follows the heterodyne oscillator and mixer board. Here the signal goes to the grid of a 6U8 pentode, the first mixer. The triode portion of this tube is a crystal-controlled 30.5-Mc. oscillator, whose output beats with the 11.5-Mc. energy to produce a 42-Mc. signal at the grid of a second mixer, a 6CB6. We now have to look at a third circuit board to describe the development of the signal logically. This is a v.f.o. assembly, of which more will be said later. From it comes energy at any frequency between 8 and 9 Mc., which is also applied to the second-mixer grid, where it beats with the 42-Mc. signal to produce output at 50 to 51 Mc. Changing the heterodyne oscillator crystal to 31.5 Mc. gives output between 51 and 52 Mc., and so on.

Energy coming from the second mixer is in the form to be radiated, but it is at a very low power level, so two amplifiers follow. The first is a 6AK6, which is part of the oscillator-mixer circuit board assembly. Then follows a 6360 output stage, which feeds the antenna or an external linear amplifier. Output is 8 to 10 watts s.s.b. or c.w., and 2 to 3 watts a.m. A 61-Mc. series trap in the second mixer grid circuit is tuned to remove the second harmonic of the 30.5-Mc. oscillator, which might otherwise cause spurious signals to be radiated.

A fourth circuit board contains voice control and anti-trip stages. These may be used or not, as the operator prefers. The tendency among v.h.f. men is to not use these features at first, their functions somehow seeming foreign to anyone whose voice operating experience has been confined to the monologue type of communication. Push-to-talk control is also provided for, and this is usually a first step in the direction of full automatic control of the send-receive function for the s.s.b. newcomer in v.h.f. work. Three tubes are used in the VOX and anti-trip circuits.

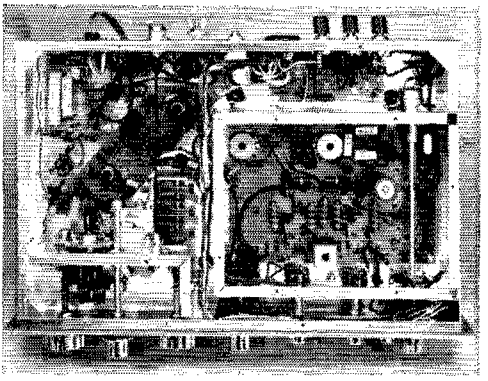
The v.f.o. is perhaps the most interesting part of the HX-30, at least to stability-conscious souls who tend to decry the use of v.f.o. control in v.h.f. work generally. Those who have admired the stability of the v.f.o. used in the Heath Shawnee and Pawnee v.h.f. transceivers will find the ideas used therein developed still further in the HX-30. The principal reason for the superior stability of this transmitter is, however, the fact that one observes the fundamental-frequency characteristics of the oscillator on 50 Mc. Where a frequency control oscillator is used to heterodyne to a v.h.f. band there is no multiplication of frequency instability, a major factor in the drift and mechanical wobbliness of v.h.f. transmitters where frequency multiplication is involved.

The HX-30 v.f.o. is the pentode section of a 6CH8, with its tuned circuit covering 8 to 9 Mc. The triode portion of the tube is a crystal oscillator offering a choice of two crystal frequencies in the same range. Output is taken from its cathode, and the two oscillators share a common bandpass circuit for coupling to the second mixer grid. Both operate at low power level, and are lightly loaded, for optimum stability. The tube and most components are on a circuit board which is mounted on the top of a metal box housing the frequency-controlling elements of the v.f.o. The latter are thus well isolated from the heating effects of the tube. The small enclosure is also completely rigid. The result is a variable oscillator almost immune to vibration, and only slightly affected by heating.

The small amount of heating can be compensated for by adjustment of a differential capacitor in the now familiar circuit used by this manufacturer and others. Each half of the capacitor is in parallel with another capacitor in the frequency-controlling circuit. One has a zero temperature coefficient, the other a negative coefficient. The operator may thus select the amount of temperature compensation to suit the requirements of the circuit and its environment. In practice one has the choice of eliminating initial warmup drift, or that due to environmental heating, which is a longer-term matter. Adjusting for the latter, which begins to show after the first few minutes of operation, will result in substantially no drift in normal use. A warm-up period of at least 10 minutes is desirable for best results.

Construction and Alignment

The builder of this kit should begin by reading the well-written instructions carefully. This is



Bottom view of the HX-30, with its shield plate removed. Three of the printed-circuit boards are visible. The large enclosure at the right houses the audio, carrier oscillator and balanced-modulator stages. A small assembly above it carries the VOX circuitry. At the left are the heterodyne oscillator and mixer circuits. The small compartment, left, is the final plate circuit.

definitely not a beginner's job. Becoming familiar with the functions of the various circuits will pay off later in achieving proper adjustment of the equipment, and the early pages of the book contain a good explanation of the complete rig. Construction time is given as 30 hours, but this does not include sorting and identification of parts (an unnecessarily complex job, it seems to this writer), studying the book, or adjusting the completed rig. The HX-30 was the writer's first major kit job, in more than 40 years of building radio gear of various kinds, and he found it both interesting and instructive. From opening the boxes, to the first 50-Mc. QSO with the HX-30, was something on the order of three times 30 hours, but we enjoyed it the whole way. The few minor troubles encountered were mainly

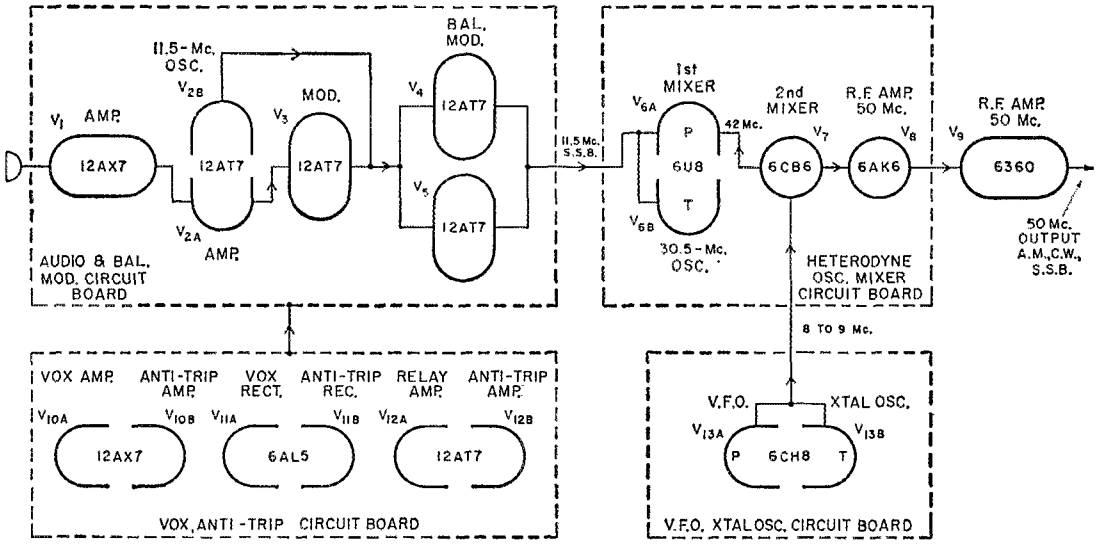


Fig. 1—Block diagram of the HX-30 50-Mc. sideband rig, showing the various circuit-board assemblies in broken lines. The signal is generated at 11.5 Mc. and then heterodyned twice to 50 Mc. Nominal tuning range is 50 to 51 Mc. This can be raised by substituting other crystals for the 30.5 Mc. one used with V6B.

the result of none-too-careful reading of some of the more complex steps in the assembly procedure. We did feel, however, that clarity and understanding would be served if a bit more technical detail were included here and there.

It also seemed to this builder that someone with a mania for fancy drives and linkages designed the layout. At least two examples of this show, where to all intents and purposes direct front-panel knob control would have served at least as well. And some controls that the experimenter type of ham would like to have accessible are not brought out to the front panel at all. Notable examples are the output loading controls, which are merely knob-equipped extension shafts brought up vertically inside the cabinet. (The cabinet lid has no finger hole or other provision for easy lifting.) One of these, the output coupling control, is driven through a string-and-pulley system of true "Rube Goldberg" nature.

The v.f.o. drive and dial are complex mechanically, though here it is more justified, as the end result is a smooth-running drive and a nice-appearing dial scale. Readout of the dial is not particularly accurate, however, and there is nothing that can be done about this. Adjustment of coil inductance and padder capacitance leaves you with a dial that is quite a bit off at several points in its one-megacycle coverage. Perhaps this is just as well, for it serves to remind the user that no dial of this kind should be relied upon entirely.

The writer also found the alignment instructions unnecessarily hard to follow, in that they make no attempt to explain what is supposed to be happening electronically, but merely give a step-by-step process with no more detail than appears in the instructions dealing with assembly. In attempting to work out a procedure that everyone can follow, the instruction writers apparently develop a "Connect red lead to terminal A" philosophy that carries over into alignment. This may be entirely satisfactory where the equipment is a beginner's first transmitter, but some knowledge of operating principles is mandatory if the builder of equipment as complex as s.s.b. gear is to achieve optimum results. The kit makers are not in the electronics teaching business, to be sure, but it would do no harm to have some technical explanation of the tuneup procedure and objectives written into the instructions. The detailed explanation of the circuit, mentioned earlier, is a good start, but more technical information in the alignment instructions would be helpful.

On the credit side, the book stresses over and over that this *is* a complex business, and that all steps should be followed implicitly. It also emphasizes that an oscilloscope check on performance is highly desirable. In this we heartily concur, and almost every experienced sidebander will agree that a scope is an indispensable tool, if one would really know what his sideband rig is doing.

Several steps in putting the HX-30 on the air are made simple by proper use of its built-in meter. This is equipped with a dual sensitivity adjustment when it is used to indicate transmitter output. A 500K control and a 270K resistor are connected in series with the meter, when it is connected to Test Point 5, the output indicating position. This is enables the operator to set the meter for any convenient range, and a spring-release pushbutton (on the pot control) is available to short out these resistors. This gives a fine indication for carrier rejection adjustments, leaving only the 100 microampere meter to indicate current rectified by the output-indicating diode. The spring release prevents the momentary lapse by the operator that could blow the meter to bits if it were left connected and the mode switch changed over for a.m. or c.w. operation. The four other test positions enable the builder to check operation of the transmitter all along the line.

Routine adjustments can be carried out entirely with this meter, once the equipment is working properly. For initial checks a volt-ohmmeter, a sine-wave audio generator, a dummy load and a scope are needed, and a selective, stable and accurately-calibrated receiver is helpful, too. With these, and some knowledge of their use in sideband work, adjustment is relatively simple and straightforward — even enjoyable.

In use at W1HDQ the HX-30 has done very well indeed. Suppression of unwanted sideband and carrier are good, and the voice quality excellent. Experienced sidebanders pay it the ultimate compliment: "Say, that doesn't *sound* like a phasing rig!" When sideband contacts begin to come hard, as they inevitably do with today's growing but still limited activity, the a.m. mode works out well. On c.w., the HX-30 is superb. Mixer keying and rock-steady v.f.o. control deliver results to please the most discriminating practitioner of the art of communication with the hands. It took only a few hours operation with this rig to sell the writer on the advisability of converting his entire station to heterodyne-type equipment, for 144, 220 and 420 Mc. — but that's another story.

— *E. P. T.*

Heathkit HX-30 50-Mc. S.S.B. Transmitter

Height: 10⅛ inches.
Width: 16⅝ inches.
Depth: 10 inches.
Weight: 40 pounds.
Power requirement: 115 volts a.c., 77 to 95 watts, depending on mode.
Price Class: $190, in kit form.
Manufacturer: Heath Company, Benton Harbor 9, Mich.

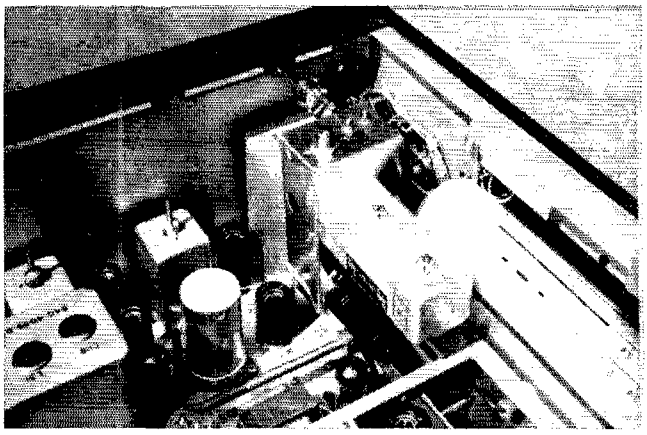


Fig. 1—Here is the filter assembly installed in the Collins 75A-4. It plugs into the V-7 socket in the receiver. The shaft of the selectivity switch, S_1, is carried out through a slot in the end of the receiver case, using a universal-joint shaft coupler and a panel-bearing assembly. Note that all adjustment points are readily accessible.

Improving the C.W. Selectivity of the Collins 75A-4

An Easily-Applied Crystal Filter

BY BRUCE E. MONTGOMERY,* W4BFR

THE need for a high order of c.w. selectivity on the amateur bands is obvious to all who do more than casual operating. The 500-c.p.s. mechanical filter in the Collins 75A-4 receiver provides sufficient selectivity to cope with many interference conditions, but there are still times when a 500-c.p.s. passband seems mighty wide. For example, FB8XX and ZD9AM were recently heard working contest-style simultaneously on 7001 kc. and 7002 kc., respectively.

Old-timers will remember when communications receivers achieved high selectivity with a quartz crystal filter using a single crystal at intermediate frequency in a bridge circuit that made use of the series resonance and high *Q* of the crystal to provide a high degree of selectivity at the peak, but depending on several i.f. transformers to give skirt selectivity. This is in contrast to modern mechanical filters that have a flat-topped selectivity curve with steep sides and good skirt selectivity.

The plug-in crystal-filter assembly described here is of the old-fashioned variety, and adds its sharply-peaked selectivity to the steep-sided mechanical-filter selectivity. The result is a sharply-peaked response with steep sides and improved skirt selectivity, since the crystal filter does add some worthwhile attenuation at the skirt of the selectivity curve. The following table shows the narrowing of the selectivity curve at the 6-db. and 60-db. points in the crystal-filter No. 1 and No. 2 selectivity positions.

The first column shows the selectivity of the F455J-05 mechanical filter alone. A word about these selectivity figures is in order. The data on the 500-c.p.s. mechanical filter is the manufacturer's published specification information. More exact data is given later. The data with the crystal filter in the circuit was taken by careful reading of the 75A-4 kilocycle dial and S meter, so this is subject to some reading and calibration error.

Table I

Decibels Down from Maximum	*Crystal Filter Position — Bandwidth in Kc.*		
	Off	*No. 1*	*No. 2*
6 db.	0.5	0.14	0.09
60 db.	2.0	1.5	1.3

The crystal-filter assembly plugs into the V-7 socket, which is for the 12AX7 slot-rejection tube. The 12AX7 plugs into the assembly and the rejection tuning continues to operate normally. A 6BA6 i.f. tube is added in the assembly to make up for the insertion loss in the crystal-filter circuit. The amplification of this stage is adjusted to produce 0-db. gain when the crystal is out. The gain drops less than 3 db. in the NO. 1 position and about 6 db. total in the NO. 2 position. This loss of gain is of no consequence since the 75A-4 has ample reserve.

The addition of this adapter results in a combination of the high "nose" selectivity of the crystal filter and the skirt selectivity of the mechanical filter.

*6520 Bridgewood Valley, N.W., Atlanta 5, Georgia.

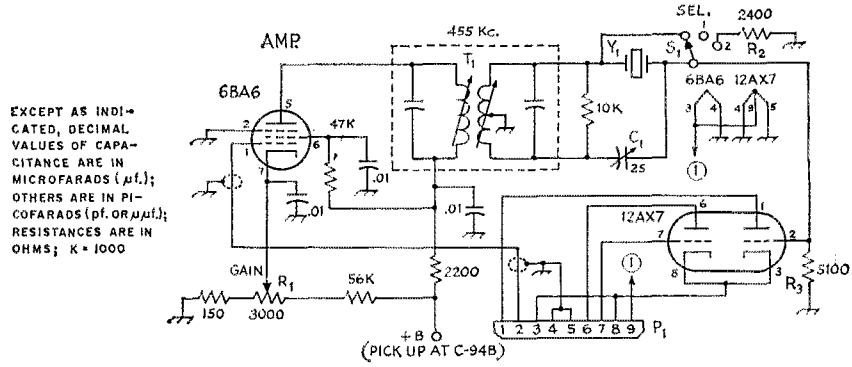


Fig. 2—Circuit of the crystal-filter adapter. Fixed capacitors are disk ceramic; resistors are ½ watt.

C_1—4.5–25-pf. ceramic trimmer (Centralab 822-A2).
P_1—9-pin miniature plug (Amphenol 86-893).
R_1—Linear control.
S_1—Single-pole 3-position rotary switch (Mallory 3215J, 3 of 5 positions used).
T_1—455-kc. i.f. transformer, center-tapped secondary (Miller 912-C-3).
Y_1—455-kc. ± 50 c.p.s. series resonance crystal (Petersen Radio type Z-9).

The over-all result is a substantial improvement in the ability to separate c.w. signals. At W4BFR, the crystal selectivity switch is normally left in the NO. 1 position for general c.w. operations, and moved to the NO. 2 position only when conditions demand it.

The crystal-filter assembly is also useful when used with a 2.1- or 3.1-kc. mechanical filter instead of the 500-c.p.s. unit. The peak selectivity remains about the same, since the broad peak response of the mechanical filters does not contribute to the narrow-band selectivity. The skirt selectivity broadens out toward the limit set by the mechanical filter, but does not reach it since the crystal-filter skirt selectivity does make a contribution. The result is a useful increase in the c.w. selectivity over that obtained using a 2.1- or 3.1-kc. filter alone.

The Electrical Circuit

The schematic of the crystal-filter assembly is shown in Fig. 2. This is a version of the crystal-filter circuit that was, until recently, almost universally used in communications-type receivers. The basic design originated back in the 1930s. An extensive analysis of this type of filter is given in the *Radiotron Designer's Handbook*[1] for those interested.

P_1 plugs into the V-7 socket in the 75A-4 to pick up the pin connections and bring them up into the assembly. All pins except No. 2 go to the same numbered pins of a 9-pin socket in the assembly that takes the 12AX7 tube. Pin 2 on P_1 goes to the grid of the added 6BA6 i.f. tube. Gain control R_1 allows adjustment of the gain of this amplifier. The plate circuit of the 6BA6 feeds a 455-kc. i.f. transformer whose secondary is designed to feed push-pull diodes. Instead, it feeds the crystal and the neutralizing capacitor, C_1. This capacitor is adjusted to cancel signal feedthrough because of the crystal parallel capacitance. The only energy that passes is that through the crystal acting as a series-resonant circuit of high Q. The filter load resistors, R_2 and R_3, are in series with the series L, C, and R of the crystal and reduce the effective Q to control the selectivity. The higher the value of this load resistance, the wider the passband. The resistance values chosen give the selectivities shown in the table when switch S_1 is in the OFF, NO. 1 or NO. 2 position. In the OFF position, the crystal is shorted and selectivity is controlled completely by the mechanical filter.

It is necessary that the center frequency of the F455J-05 filter and the series-resonant frequency of the crystal match up closely to achieve a successful end result. A careful measurement of the center frequency of my 500-c.p.s. filter, using a BC-221 frequency meter, indicated that it was 455 kc. ± 50 c.p.s. Word from Collins Radio is that the F455J-05 filter production tolerances are 455 kc. ± 150 c.p.s. on the center frequency, and the bandwidth at the 6-db. points is 500 c.p.s. ± 25 per cent, or 375 to 625 c.p.s. In our case, the series-resonant peak of the crystal turned out to differ from the center of the passband of the mechanical filter by almost 150 c.p.s. Operation is quite satisfactory, although very little more difference could be tolerated without obtaining unsatisfactory performance.

Construction

All of the components and hardware are standard catalog items. The photographs show the layout of the components in the Bud Minibox (CU-3016A). If any variation from the arrangement is contemplated, it is important that the controls remain accessible when the assembly is installed in the receiver. Also, it is important that stray capacitance that may bypass signal energy around the crystal be kept to a minimum. The i.f. transformer trimmers, and gain control R_1 are accessible from above. The neutralizing

[1] 4th ed., Chapter 26. Edited by F. Langford-Smith; available from Tube Division; Radio Corporation of America, Harrison, N. J.

capacitor C_1 is reached from the rear through the hole in the side of the Minibox cover.

The selectivity switch, S_1, is mounted on an aluminum angle with the shaft projecting upward at a shallow angle. The shaft is coupled to a panel-bearing assembly through a universal-joint coupler (Millen 39005), and the bearing shaft projects through the slot in the end of the receiver case, and a suitable control knob is installed. The reason for the angular mounting of S_1 and use of the universal coupling will be explained later.

The mounting of P_1 so that it could plug into the receiver V-7 socket presented somewhat of a problem. The solution was found by mounting P_1 in the end of a 7-pin, 1¾-inch tube shield. The end of the shield is reamed out to accept P_1. The tube shield is shortened to 1½ inches, but cut so as to leave two ears that are bent outward 90 degrees and drilled. The shield then bolts to the end of the Minibox. To hold P_1 in place, another similar tube shield is used. The end is reamed out enough to clear the pins in P_1. It is then slotted down the side, and a strip about 1/16-inch wide is removed so that the shield can be compressed and slipped inside the outer shield with the reamed end pressing against P_1. The length of the inner shield must be cut so that when the assembly is bolted in place, the inner shield presses firmly against socket P_1. P_1 must be oriented properly to fit into the V-7 in the 75A-4 chassis. The reason that the shaft of switch S_1 comes out at a shallow upward angle is because the plug-in tube shield assembly turns out to be too short.

All power is obtained through the V-7 socket except B plus for the 6BA6 i.f. tube that was added. A lead comes out of the bottom of the filter assembly and is connected to C-94B under the 75A-4 chassis.

Adjustment and Use

Adjustment of the filter poses no particular problems. First, pick out a 100-kc. calibrator harmonic that gives an above-S9 reading on the S meter. Make a note of the actual reading. Next, install the filter assembly in the V-7 socket and install the control shaft for S_1 and make the B-plus connection. Carefully tune the receiver to find the crystal peak response. Adjust the slug trimmers on T_1 for maximum response. The primary trimmer peaks in a normally sharp manner. The secondary trimmer tunes very broadly, however, and the S meter must be watched closely to see the peak.

The adjustment of C_1 must be done with care. Turn off the calibrator, or tune away from it. With no antenna connected, advance audio and r.f. gain controls so that substantial noise is apparent in the headphones, but the receiver must not be overloading. This adjustment can best be done with the 2.1- or 3.1-kc. mechanical filter switched in. Turn the b.f.o. off. Now, with a nonmetallic trimmer tool, carefully turn C_1 while listening closely to the noise. Somewhere near mid-range the noise will change in character.

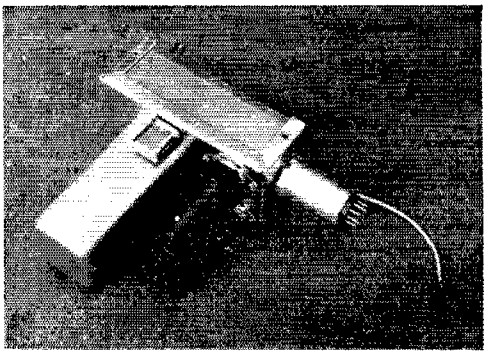


Fig. 3—This is the complete filter assembly ready to install in a Collins 75A-4. The quartz crystal is the small unit against the i.f. transformer. The top tube is the 12AX7, and the one to the rear is the 6BA6 that was added. The plug to go into the 75A-4 socket and the lead to pick up receiver B plus are also clearly shown.

It will decrease slightly in pitch and intensity. This is the point where C_1 neutralizes the capacitive coupling through the crystal, and gives the narrowest and most symmetrical passband. If, when tuning through a c.w. signal a rejection notch is found on either side of the peak response, a slight readjustment of C_1 needs to be made.

Now, with S_1 at OFF, set gain control R_1 to give the same S-meter reading on the calibrator signal as was recorded before the filter was installed. When S_1 is in the NO. 1 position, the gain should drop less than ½ S unit, and about 1 S unit in the NO. 2 position.

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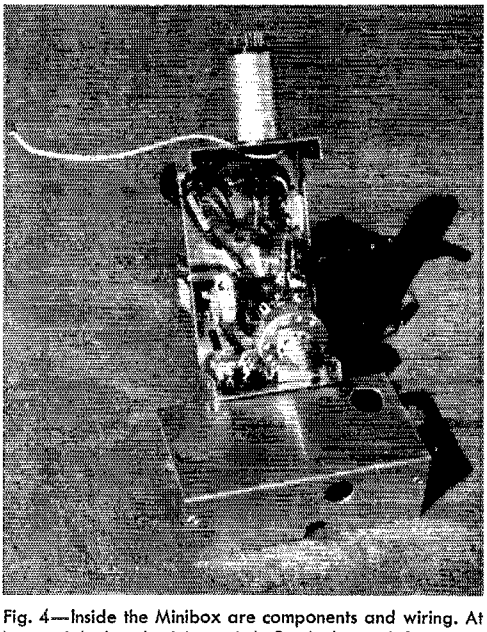


Fig. 4—Inside the Minibox are components and wiring. At lower right is selectivity switch S_1. At lower left is gain control R_1. The neutralizing capacitor, C_1, is to the left near the center.

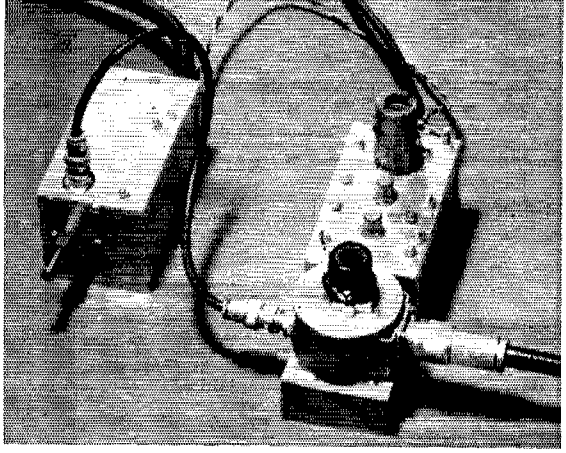


Fig. 1—Front end of the 2300-Mc. receiver. The box at the left contains the local oscillator. The mixer is the cylindrical assembly in the right foreground, with the cable from the antenna entering from the right. The i.f. preamplifier is just to the rear of the mixer. Knob on the top of the mixer is a tuning adjustment which was found to be unnecessary.

Pulse: A Practical Technique for Amateur Microwave Work

Part IV — Receiving Equipment for 2300 Mc.

BY ROBERT F. GUBA,* W1QMN AND JOHN T. ZIMMER,** W2BVU

THE 2300-Mc. receiver described in this final article, when used with the pulse transmitter previously described and four-foot parabolic-dish antennas, is capable of detecting signals well beyond a 150-mile over-the-horizon range. The r.f. and i.f. portions of the receiver are hardly different from some of the simpler surplus radar amateur work on 1215 Mc. What makes long-range performance possible is that this wide-band receiver is used for pulse, rather than c.w. Pulse is the wide-band form of emission for which the radar type of receiver is optimized. Using a wide-band receiver for c.w. constitutes a mismatch of signal bandwidth to i.f. bandwidth and results in a serious loss in signal-to-noise ratio.

Receiver Features

A block diagram and general description of the pulse receiver were given in Part I. The receiver is complete; nothing additional but earphones or speaker is needed to receive pulse effectively. Reasonably good reception is possible without the special threshold detector and p.r.f. filter included here.

The r.f. portion consists of a cavity mixer and a one-tube local oscillator. These and a 3-stage i.f. preamplifier are shown in Fig. 1. The mixer is a 1N21-series diode, in a quarter-wave resonant coaxial cavity made from standard-sized copper tubing. The 2C40 local-oscillator design was obtained from a *QST* article by W2RMA, of some years back.[1]

The main i.f. amplifier, the threshold detector, p.r.f. filter, audio amplifier and power supply are constructed on a 10 × 12 × 3-inch chassis. This assembly, Fig. 2, can be remotely located from the front-end assembly, and interconnected with it by means of a coaxial cable for the i.f. signal and a power cable for the B-plus and heater voltages.

The over-all i.f. amplifier has a center frequency of about 30 Mc., though any frequency from 20 to 60 Mc. is satisfactory, provided that a bandwidth of about one megacycle can be maintained. A low-noise design with Nuvistor cascode input is used here, but it should be possible to adapt surplus i.f. amplifiers with good results.

The combination of threshold detector and p.r.f. filter is effective in detecting pulses barely exceeding the noise level at the output of the second detector. The threshold detector uses a multivibrator circuit, as shown in Fig. 3, and works as follows: V_3 and V_4 comprise a one-shot or monostable multivibrator, producing a single square output wave only when triggered by V_1, a video amplifier which also inverts the polarity of the positive output of the second detector. Negative noise peaks and pulses are therefore applied to the grid of V_4 by way of V_2 and C_4. R_2 is adjusted so that V_3 is normally cut off and V_4 is conducting. When a negative peak from V_1 cuts off V_4, the multivibrator "flips," and V_3 conducts for a time before returning to the original conditions. Duration of the positive pulse at the plate of V_4 is determined by C_4 and the 1.5-megohm grid resistor of V_4. For values given, the pulse out of the multivibrator is about 35 microseconds long.

The amplitude of the negative pulse required to trigger V_4 can be varied by means of R_2. This control and the video amplifier gain control, R_1, therefore serve as threshold level adjustments. The multivibrator threshold is set so that, in the

*376 Central St., West Acton, Mass.
**Slough Road, Harvard, Mass.

[1] Koch, "Simplified Oscillators for 2300 Mc.," *QST*, February 1948. One of these oscillators also appears in the ARRL *Handbook*, 1951 to 1954 editions.

absence of a pulsed signal, it is triggered by noise peaks several times per second. When even a weak signal appears, there is a pronounced increase in the triggering rate. When a moderately strong signal with the correct p.r.f. appears, a noise-free tone is produced at the output of the p.r.f. filter. Difference between the signal and no-signal output conditions is quite distinct, and the effect is similar to that of a squelch circuit. With freedom from a constant level of background noise, searching for weak signals is relatively easy on the ears.

The three stages following the threshold detector make up a very narrow-band audio amplifier centered at 1000 cycles. Most of the selectivity is provided by a 1000-cycle filter formed by inductor L_1, resonating with C_9, between V_5 and V_6. A small but important amount of filtering is provided in the cathode circuit of V_{5A}. Capacitor C_6 removes undesired high-frequency components of the multivibrator square wave, so that they will not overload the following triode amplifier. The LC filter uses a high-Q toroid to obtain an audio bandwidth as small as 10 cycles. The result is that unless the square waves produced by the threshold detector-multivibrator have a p.r.f. of exactly 1000 cycles, there is little output from the audio amplifier. The net effect of these circuits is a signal-to-noise ratio somewhat comparable to that obtained with narrow-band c.w. on lower frequencies.

The Main I.F. Amplifier

The main receiver chassis is seen in Fig. 2. It is recommended that this general arrangement be used, but exact wiring details are not important except in the case of the i.f. amplifier circuitry. The three i.f. amplifier stages, Figs. 4 and 5, are in a line along the lower side of the chassis as seen in Fig. 2, with the input stage toward the left where there is little neighboring wiring. The second detector is near the video amplifier. In order to reduce cost, identical fixed inductors are used to tune each stage. The exact frequency is not important, so long as each is tuned to the same frequency. Since the coils resonate with the capacitance of the interstage wiring, as well as the sum of the input and output capacitances of the tubes, the wiring layout between each pair of tubes must be identical. Similarly, the coils should be identical, though it is not important exactly how they are wound. Layout of the amplifier is shown in Fig. 5. The wiring of the plate circuit of the last stage is not critical, as a variable capacitor, C_{16}, allows for differences in circuit capacitance.

The Q, and therefore the bandwidth, of each i.f. stage is determined by the plate load resistance (in the output stage, the detector load resistance appears in parallel with the plate load). For a value of 4700 ohms, the Q is 10, so the bandwidth of each stage is about three megacycles. Over-all bandwidth, including the preamplifier, approaches one megacycle, but it will depend on alignment.

Variable inductors could be used for each stage, to avoid the need for careful layout and permit exact alignment. A small coil such as the Miller type 5403, 1.6 to 2.8 μh., should work well, or similar surplus slug-tuned coils could be used. An inductance of the proper value will resonate at 30 Mc. with a 12-pf. capacitor.

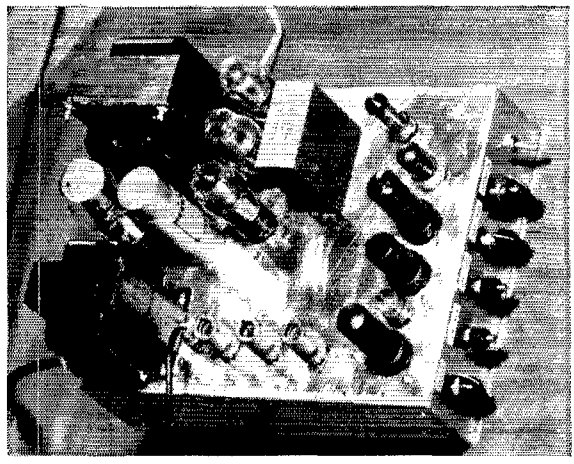


Fig. 2—Top view of the main receiver chassis. Controls are for i.f. gain, video gain, threshold stability, audio gain, audio bandwidth and power on-off, reading from bottom up. The first row of tubes are the video and audio stages. Power supply components are at the rear, and the i.f. amplifier stages are the three small shielded tubes in a row at the edge of the chassis. A bottom plate is required to shield the i.f. from stray 30-Mc. signals.

P.R.F. Filter

The toroid, L_1 in Fig. 3, used for high selectivity in the 1000-cycle filter, has a Q of approximately 200 by itself, and effective circuit Q of about 100, due to loading by R_4 and R_5. The toroid lists for $15.20. A Freed F-804 ($6.60) would give a Q of 70, and be entirely adequate. Suitable toroids may be available on the surplus market. Qs as low as 20 to 30 would still give good results. Inductance values other than those given can be used by changing R_4 and R_5 in the same proportion. Example: if the inductance is increased 10 times, to 0.5 henry, R_4 becomes 2.2 megohm and R_5 1 megohm.

Capacitor C_9 is actually several capacitors in parallel. A 0.47-μf. capacitor is used with enough 0.01-μf. or 0.0047-μf. capacitors in parallel to resonate the toroid to exactly 1000 cycles. These capacitors should be low-loss mica, mylar or "vitamin Q" types, to preserve circuit Q.

Mixer

Proper mixer operation is very important, as it determines the receiver noise figure. Crystal diodes of the 1N21 series have letter suffixes from A to F, each giving progressively lower noise figure and costing more. The following table should help the amateur in deciding which diode he can afford:

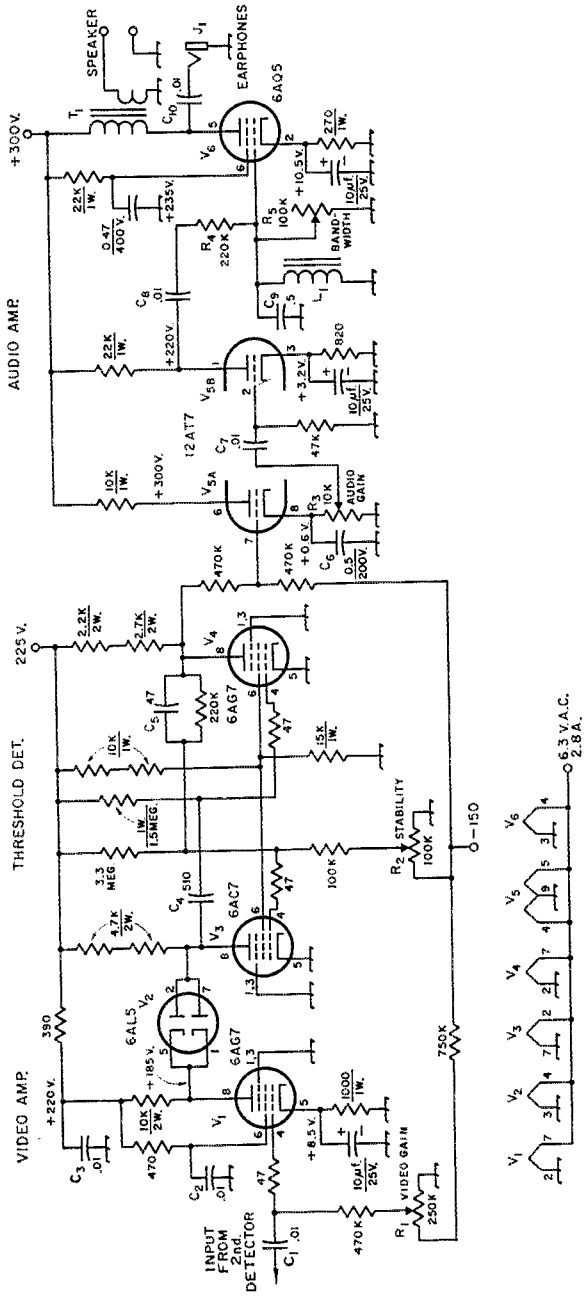


Fig. 3—Schematic diagram of the video amplifier, threshold detector and audio stages. Resistors are ½ watt, 10 per cent tolerance, unless specified. Decimal values of capacitance are in µf., others in µµf., unless specified. Those marked with polarity are electrolytic.

C_1, C_2, C_3, C_7, C_8, C_{10}—Paper or ceramic, any tolerance.

C_4, C_5—Mica, 10 per cent.

C_6—Paper, 20 per cent.

C_9—0.5 µf.; see text.

J_1—Phone jack.

L_1—50-mh. high-Q toroid (Freed F-1755). See text.

R_1, R_2, R_3—2-watt potentiometer.

R_4—See text.

T_1—Audio pentode output transformer (Stancor A3822).

Diode	*Noise Figure, db.*	*Net Price*
1N21B	10.3	$0.68
1N21C	8.3	1.02
1N21D	7.3	3.41
1N21E	7.0	4.48
1N21F	6.0	11.90

Noise figures given are typical values obtained when the diode is operated at 3060 Mc., and followed by an i.f. amplifier having a 1.5-db. noise figure. Mounting of the mixer to the preamplifier is important, as the diode forms part of the amplifier input circuit. The mixer cylinder must be well grounded to the preamplifier chassis, so that it will not act as an i.f. pickup loop and cause the amplifier to oscillate.

Construction of the microwave mixer uses tools similar to those used in making the transmitter oscillator, Part III. Details of all parts and a cutaway view of the complete assembly are given in Fig. 7. Following is the sequence for assembling the mixer. Attach the center rod to the end disk with the hole, using a 6-32 screw, and solder with a propane torch. Attach the receptacle that receives the pin end of the 1N21 diode to the center rod. This is a demountable base, made for reversible-case cartridge-type diodes, and is available from any manufacturer of microwave diodes. A substitute can be made from ¼-inch brass rod 7/32 inch long, drilled out 3/32 inch at the center. Slot it for most of its length with a thin saw blade, and bend the fingers in slightly so that it will make good contact to the diode pin. Clamp the base in the notch on the center rod, and solder the connection, being careful not to fill in the slots with solder. Attach this assembly to the outside cylinder, and align the 9/32-inch hole in the cylinder wall with the crystal receptacle on the center post, using a crystal diode. Clamp securely, and solder the end disk to the outside cylinder. A damp rag should be wrapped around the center rod to prevent the diode pin receptacle from becoming unsoldered. Clamp the other end disk to the top of the cylinder and solder securely.

To mount the l.o. connector, center and clamp the nut supplied with the UG-1094/U connector over its hole, and solder, being careful not to flow solder into the nut threads. The l.o. probe can then be screwed in or out, to adjust the injection level. A second nut threaded onto the probe can be used to lock it in position, once the desired level is obtained. This and the method of attaching the signal probe to the cylinder are shown in Fig. 7.

The mixer is attached to the preamplifier by two brackets. A clearance hole is first cut in the wall of the preamplifier chassis, large enough to clear the crystal bypass capacitor, C_1, which is assembled later. Details of the bracket depend on the chassis used for the preamplifier. Before mounting the crystal diode, cut a piece of 2-mil Teflon sheet slightly larger than the crystal bypass plate. Carefully cut a true ¼-inch hole in the center of the dielectric. Wrap a layer of Scotch tape around the base of the diode to prevent it from shorting against the wall of the out-

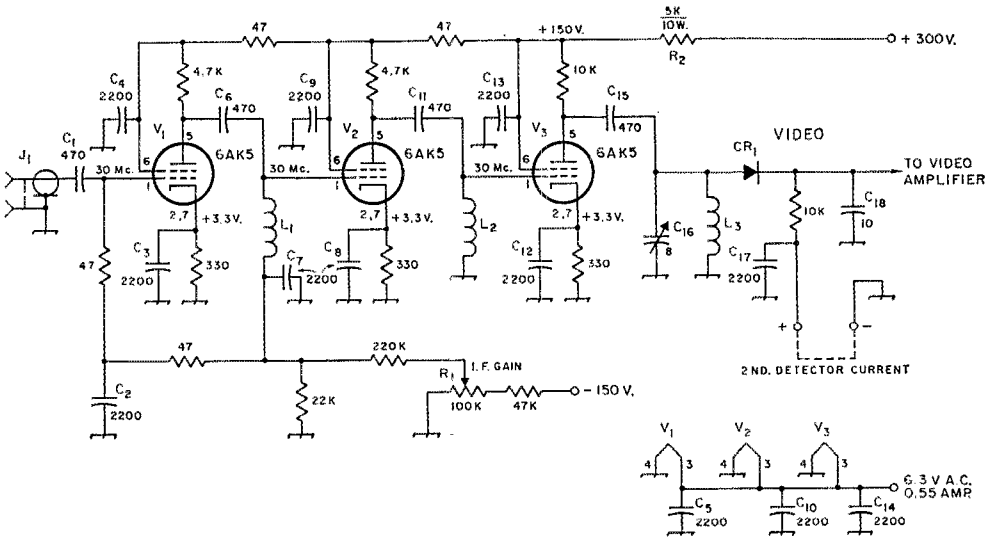


Fig. 4—Main i.f. amplifier. Values of capacitance are in pf. Resistors are ½-watt composition, 10 per cent, unless specified.

C_1–C_{15} incl.; C_{17}—ceramic disk.
C_{16}—1–8-pf. cylindrical trimmer (Erie 532B).
C_{18}—10 pf., 10 per cent, mica.
CR_1—Crystal diode, 1N60, 1N67, 1N295 or equiv.
J_1—Coaxial receptacle, BNC type.
L_1, L_2, L_3—2.2 μh., 32 turns No. 24 enam., close-wound on ¼-inch diam.
R_1—2-watt potentiometer.
R_2—5000 ohms, 10 watts, wire-wound.

side cylinder. Slide the capacitor plate and the Teflon sheet over the diode. Insert it into the mixer cavity and seat the diode flange firmly against the capacitor plate. Tape the capacitor plate to the outside cylinder so that the crystal can be removed without disturbing the capacitor. A small beryllium spring finger mounted on a standoff insulator holds the crystal in place, and serves as the i.f. signal connection.

Local Oscillator

The *QST* and *Handbook* material by W2RMA [1] describes two oscillators for 2300 Mc., using the 2C40 tube. Both have been constructed and used with the receiver described here, with good results. Several other approaches are open, the most obvious being to use the oscillator from a surplus microwave unit. A few such possibilities are mentioned at the end of this article. Amateurs familiar with varactors may want to multiply the output frequency of a tunable oscillator operating at 1200 Mc. or lower. The transmitter oscillator and local oscillator of the APX-6 immediately suggest themselves for this application. Such an oscillator could be located at the operating position and connected to a varactor mounted in the mixer at the antenna. This arrangement could be quite simple, as only a milliwatt or less power is required for l.o. injection at 2300 Mc.

I.F. Preamplifier

The i.f. amplifier has a noise figure of only slightly more than 1 db., due mainly to the Nuvistor cascode input stages. Low-loss coils at L_1, L_2 and L_3 in Fig. 6 are important, as is the small value of coupling capacitance, C_2. This transforms the low impedance of the crystal up to the higher value which is optimum for the 6CW4 at 30 Mc. A critical value of cathode bypass is used for C_6. This should be wired into the circuit with ¼-inch leads, to tune out the cathode lead inductance of the first stage. L_1 can be made like L_3, if desired.

The three tubes of the preamp should be arranged in line, with components mounted close to the tube sockets they serve. Lead lengths should be kept to ½ inch or less. The 6CW4–6AK5 wiring should be like that of the main i.f. amplifier. Since the preamp makes an extremely sensitive 10-meter front end, a shielded chassis such as a Minibox, and a 6AK5 tube shield, should be used. The dropping resistors and bleeder in the B-plus circuit are arranged so that the supply voltage will not be excessive during warm-up periods.

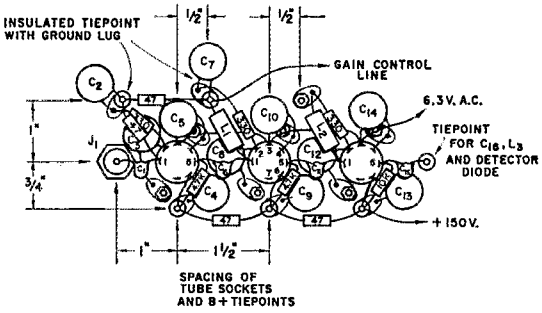


Fig. 5—Wiring and parts layout for the 30-Mc. i.f. amplifier of Fig. 4. Arrangement of components should be approximately as shown, to provide stable operation.

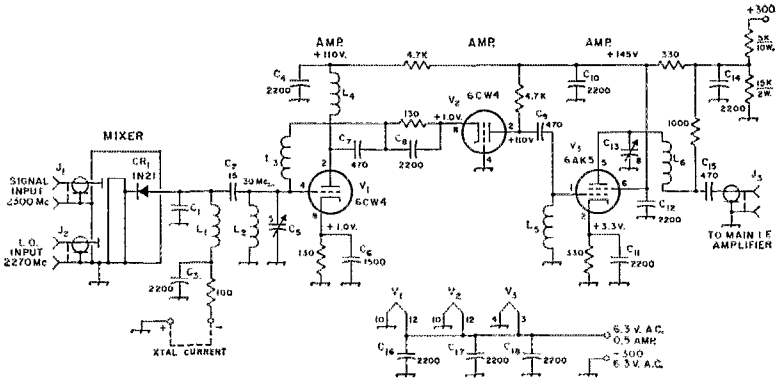


Fig. 6—2300-Mc. crystal mixer and 30-Mc. i.f. preamplifier. Capacitors are ceramic d sk, (CD Tinymike) values in pf., 20 per cent, unless specified. Resistors are ½-watt composition.

C_1—Bypass capacitor built onto mixer assembly; see Fig. 7.
C_3, C_4, C_8, C_{10}, C_{11}, C_{12}, C_{14}, C_{16}, C_{17}, C_{18}—2200-pf ceramic disk (CD Tinymike L10D22).
C_7, C_9, C_{15}—470-pf. ceramic disk (CD Tinymike L10T47).
C_2—15 pf., 10 per cent, mica.
C_5—5-pf. cylindrical trimmer (Erie 532A).
C_6—Critical lead length; see text. (CD Tinymike L10D15)
C_{13}—8-pf. cylindrical trimmer (Erie 532B).
CR_1—1N21-series crystal diode; see text.
J_1—Coaxial receptacle, UG-58/U (Type N).
J_2, J_3—Coaxial receptacle, UG-1094/U (Type BNC).
L_1—22 μh., plus or minus 10 per cent (Delevan 1537-44)
L_2—1.3 μh., 21 turns No. 24 enam., close-wound on ¼-inch diam. form.
L_3—22 μh., 65 turns No. 32 enam., close-wound on ⅜-inch diam. form; see text.
L_4, L_5 L_6—2.2 μh., 32 turns No. 24 enam., close-wound on ¼-inch diam. form.

Operation

Before reception is attempted, the l.o. injection, i.f. amplifier and threshold detector should be checked out. Operate the main receiver chassis first, without the preamplifier or local oscillator connected. Before applying power, set the i.f. and video gain controls at maximum (fully clockwise) and the remaining potentiometers fully counterclockwise. After turning on power, the VR tubes should light up in a few seconds, and the voltage after R_2, Fig. 4, should read about 150, as soon as the heaters warm up. Other voltages should read about as given in Fig. 4.

Connect a speaker or earphones to the output, turn the audio gain and bandwidth controls fully clockwise, and turn the i.f. and video gain controls fully counterclockwise. As the stability control is turned up slowly, a popping sound should be heard, followed by a weaker squeal, whose pitch varies with rotation. Leave the stability control set just below where the popping is first heard.

The main i.f. amplifier can be aligned with a signal source such as a grid-dip oscillator, using a few inches of wire in the input BNC connector as an antenna. Connect a milliammeter in the second detector circuit, as indicated in Fig. 4. Place the bottom cover on the chassis, and turn the i.f. gain full on. The 30-Mc. signal source should be coupled to the input so as to give about 1-ma. output current. Without changing input coupling, tune the signal source until a frequency is found which gives the highest current when the output stage is peaked by adjusting C_{16}. This is the center frequency of the response of the three stages together, and is about 31.5 Mc. for the receiver shown.

Next, connect power to the i.f. preamp and the local oscillator, but do not connect the l.o. or i.f. signal cables. Check the cathode voltages of the preamp. With the preamp and mixer completely assembled, connect the preamp to the main receiver with a 50-ohm cable, and tune the signal source to the center frequency of the main i.f. amplifier. With a few inches of wire connected to the signal-input jack of the mixer, peak C_5 and C_{13} to the i.f. signal, with the meter showing about 1 ma. Move the signal source away, or use a 2300-Mc. signal later, to peak C_5 accurately.

To check mixer operation, remove the jumper from the crystal-current meter terminals on the preamp, and connect a 1-ma. meter with the polarity shown. Decouple the l.o. probe, J_2, from the mixer cavity as far as possible, and connect a short coaxial cable from the l.o. Adjust the l.o. output for 0.3- to 0.8-ma. crystal current. Increase injection by threading the l.o. probe farther in, if necessary. When the proper level is obtained, lock J_2 in place with the jam nut. The meter can be removed and the jumper replaced.

The receiver is now ready for use on 2300 Mc. It will be found that front-end thermal noise is capable of continuously triggering the threshold with the video and i.f. gain at maximum. The most sensitive condition for weak signals is with the i.f. gain near maximum and the video gain turned down until the threshold is triggered on noise peaks a few times per second. The i.f. gain control is then used for minor adjustment of the triggering rate. It should not be left turned

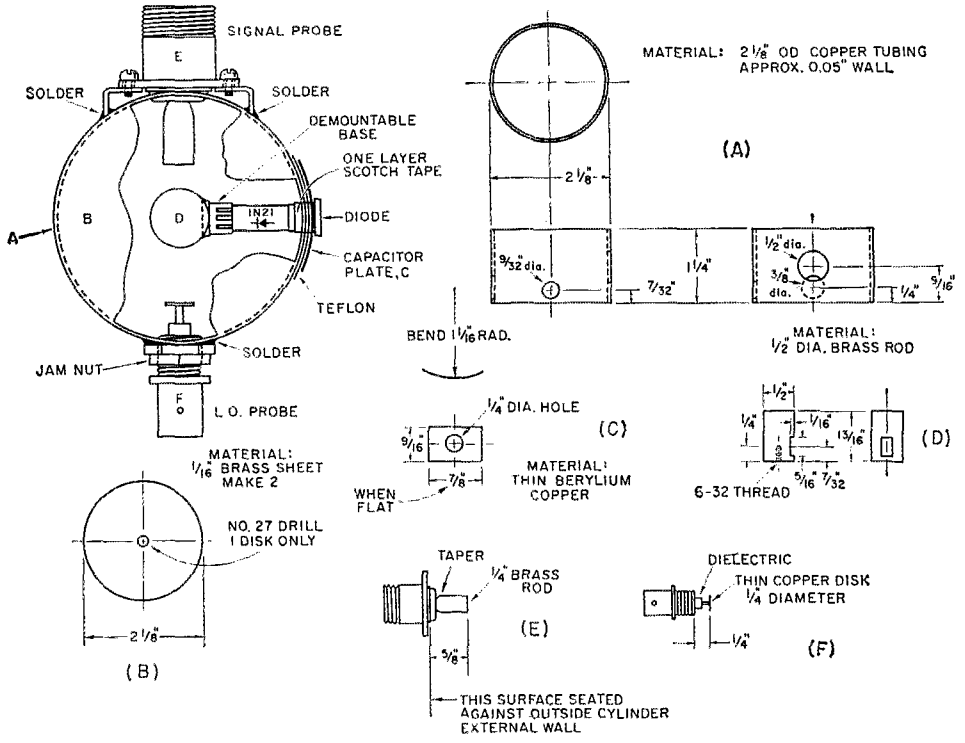


Fig. 7—Cutaway view of the crystal-mixer assembly, with details of individual parts. As may be seen from Fig. 1, the mixer cavity is mounted adjacent to the end of the i.f. preamplifier. The head of the diode, and its external bypass capacitor, project through a rectangular hole cut in the end of the preamplifier case. A ¾ by ¼-inch spring finger on a standoff insulator makes contact to the diode, to take off the 30-Mc. i.f. output.

down for long periods, as the B-plus voltage after the main i.f. dropping resistor, R_2, will be excessive in this condition. No trouble has been experienced with this, but if it becomes a problem it can be eliminated through the use of a VR-150 regulator after R_2.

The final step is to check the tuning of the p.r.f. filter, by varying the transmitter p.r.f. and watching for the peak in audio output.

Conclusions

We have gone to considerable length to describe a practical pulse station for 2300 Mc., but it should be emphasized that this is only one of many possible approaches. Our equipment could be improved in many ways, and could be adapted to 3300 Mc. with only minor modification. There are also many intriguing possibilities

(*Continued on page 168*)

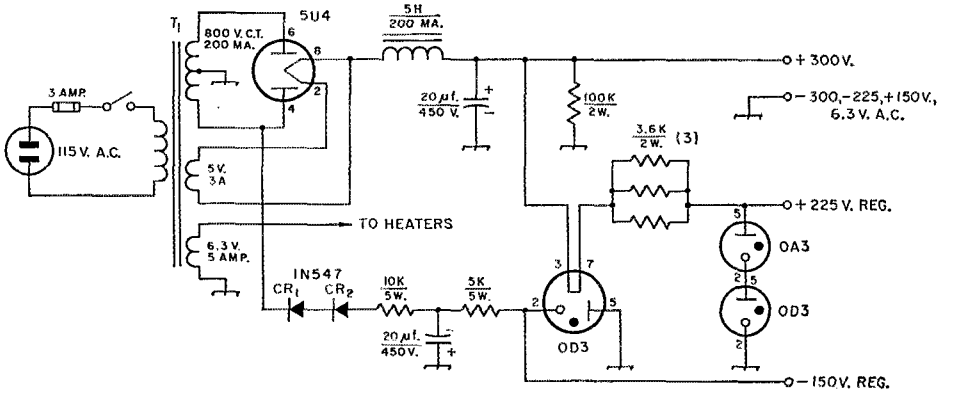
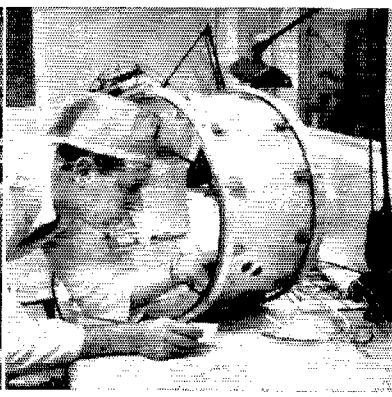
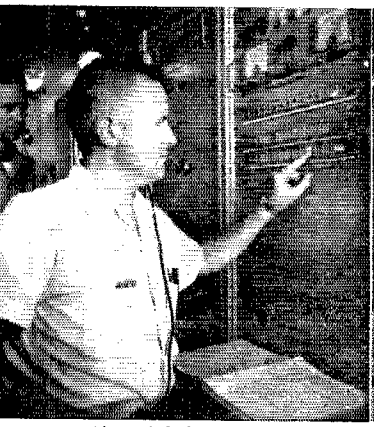


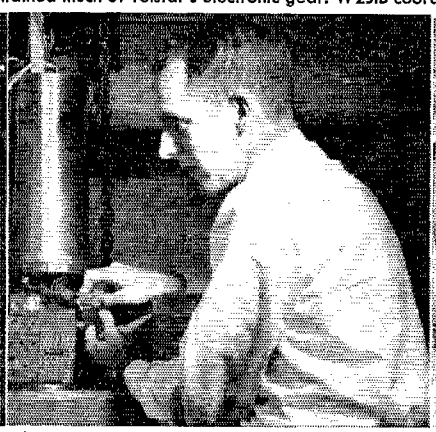
Fig. 8—Power supply for the 2300-Mc. receiver. Capacitors are electrolytic, polarity as indicated. T_1—Stancor 8412, or equivalent.

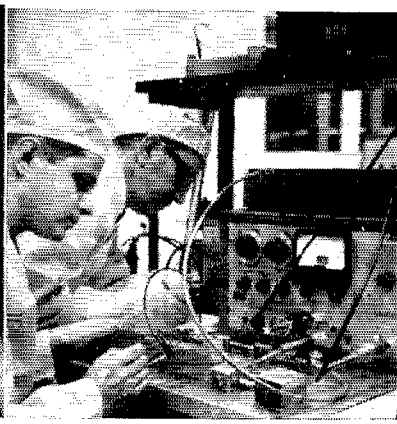
Hams in the Telstar Project



Quite a number of the Bell Telephone Labs engineers involved in the design, construction, launch, and operation of Telstar were hams. This page will introduce some of them to you. Above left, Joseph Oleckniche, WB2EYM, adjusts the beacon antenna on a Telstar model in the anechoic chamber at Hillside, N. J. The chamber, lined with pyramids of impregnated plastic foam to absorb radio energy, allowed engineers to communicate with the satellite as if it were in echo-free space. WB2EYM is a laboratory mechanic, and worked on the assembly and testing of Telstar. Above center, Richard Turrin, W2IMU (standing) and Lewis Lowry, ex-KN2KEK, listen for the first signals at the Holmdel, N. J., ground station. W2IMU worked on the design and construction of the phase-lock tracking receiver, while Mr. Lowry was in operations management. Above right, Bill Schober, W2JIB examines the hermetically sealed connector in the 20-inch aluminum canister which later contained much of Telstar's electronic gear. W2JIB coordinated circuit design changes.







Above left, Bruce McLeod, K2QXW (foreground) checks out the command encoder in the Bell Laboratories telemetry van parked at Cape Canaveral. K2QXW participated in launch preparations and operations. Above center, Frank Witt, K2TOP, prepares the Telstar command decoder unit, containing 37 transistors and 191 diodes. K2TOP was in charge of a group developing some of the solid-state circuits and investigating the effects of radiation on certain semiconductor devices. Above right, John Gainey, W2LCO (right) and an associate conduct transmission tests on Telstar's intermediate r.f. amplifier. W2LCO assisted throughout the project in the mechanical design of units for the electronics assembly. Below, left are some of the hams who were stationed at the Andover, Maine, station. Standing l. to r. are Ronald Wells, W1WSV; Leonard Dryer, W1DCC; Eddie Snyder, K1YFA; Kenneth Field, K1LSC; and Rodney Rouse, K2LVE. Kneeling, John Jacobsen, W1VXD, and Gerard DeBonis, W1YWF.

In the photo at the right below is Robert Brandt, W2CQB, tuning the phase-lock receiver at the Holmdel ground station. (Our special thanks to W2NJR, Assistant Chief Engineer for AT&T, who supplied this info.)

Series-Resonant Bypassing for V.H.F. Applications

BY STEVEN E. SUMMER,* WA2KYF

A CARDINAL rule of v.h.f. construction is to connect bypass capacitors with the shortest possible lead lengths but, unlikely as it may seem at first, long leads and smaller values of capacitance may provide more effective bypassing than the 500- and 1000-pf. units now commonly used.

At 50 Mc. and above, the lead inductance and internal inductance must be considered when selecting bypass capacitors. In the v.h.f. region the leads can be used as the inductive elements in series-resonant circuits. Such a circuit is a theoretically-ideal bypass, having close to zero impedance at a single frequency. Series-resonant bypassing is impractical over a wide band, and on lower frequencies, but in single-band v.h.f. converters and transmitters it may be highly effective.

In using ceramic-disk or dog-bone capacitors of 1000 pf. or less, the internal or plate inductance may be neglected. Similarly, the resistive losses need not be considered, since they have no effect on the resonant frequency. Table I gives lead lengths and capacitance for series-resonance at frequencies commonly encountered in amateur v.h.f. work. These values were derived mathematically, but they can be checked experimentally. Simply twist the leads together and check for resonance with a grid-dip meter.[1]

How does this method compare with conventional bypassing? At 144 Mc. a ceramic disk capacitor of 1000 pf. with ¼-inch leads has an impedance of 10 ohms. In comparison, a 25-pf. capacitor with 1-inch leads has close to zero impedance. If the load impedance is high, the first capacitor would be sufficient, but for applications such as screen or cathode bypassing it might cause trouble. Also worth consideration are the greater ease of soldering and the lower possibility of heat damage with longer leads.

Transistors are appearing more widely in v.h.f. construction all the time. Their low load impedance calls for a lower value of bypass impedance than would be acceptable in tube circuitry. Series-resonant bypassing offers many advantages over more conventional methods, and can be applied in most v.h.f. applications. QST

* 80-58 250 St., Bellerose 26, New York.

Table I

Values of capacitance in pf. required for resonance at frequencies commonly encountered in amateur-band v.h.f. work, for leads of ¼, ½ and 1 inch in length.

Frequency Mc.	¼-Inch Leads	½-Inch Leads	1-Inch Leads
48–50	800	400	200
72	390	180	91
96	220	100	56
144	100	47	25
220	39	20	10

[1] Information in Table I is for total lead length twice that given. That is, the middle column infers two ½-inch leads, or one ¼-inch and one ¾-inch, etc. Values are approximate, and will depend on arrangement of leads. For example, a 10-pf. capacitor with 1-inch leads connected together and formed into a circular loop resonates at 220 Mc. The same leads running parallel about $\frac{5}{16}$-inch apart resonate up around 275 Mc.

If the capacitor is to be installed at some point where it is accessible with a dipper coil, short the terminal being bypassed to ground with a screwdriver blade or some other low-inductance device, and check for resonance. Adjust the lead length (either side of the capacitor) for resonance at the middle of the desired frequency range. Another good check, particularly in screen bypassing of transmitter amplifier stages, is to set up your favorite system for checking neutralization, and then trim the capacitor lead length until the best indication is observed.

Series resonance is rather broad, so precise adjustment may not be necessary. Of the various arrangements indicated for a given frequency in Table I, the high capacitance and short lead combination is preferable as there will be less likelihood of unwanted coupling to other circuits. Example: For 144 Mc., a 100-pf. capacitor with ¼-inch leads would ordinarily be preferable to a 25-pf. with 1-inch leads.—*Editor.*

Strays

There's a "swap" net operating in the Los Angeles section on Tuesday and Thursday mornings at 0800 local time on 14,267. Each check-in is given three minutes to list gear available for swap. Money must not be mentioned!

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ZS6BEV (Dr. Hennie Meyer, 316 Van Riebeeck Medical Buildings, Schoeman St., Pretoria, Republic of South Africa) would like to hear from other hams who, like himself, are ophthalmic surgeons.

College and university ham stations in the U. S. and Canada are banding together in a new organization called the Association of Collegiate Amateur Radio Clubs (AC-ARC). It was organized by members of the Gopher Radio Club (WØYC) at the University of Minnesota. A monthly newsletter is being mailed to the 32 college stations that have joined. For further info contact WØYC, Pioneer Hall, University of Minnesota, Minneapolis, Minn.

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS,* W1FZJ

144-Mc. Moonbounce

WE have received reports from several sources (all second-hand) concerning a near contact by W6DNG with OH1NL. We don't know how W6DNG does it but if the tapes of his reception of K1HMU's two-meter moonbounce signals are any indication he must really have a way-out receiving system. We are unable to obtain confirming information from either end of this not-quite two-way contact between California and Finland. The fact remains, however, that apparently signals were heard both ways although no two-way contact was established. Obviously it is not much more difficult to moonbounce from California to Finland than it is to go from California to Arizona by way of the moon. I have a feeling that many potential two-meter moonbounce enthusiasts are not really concerned that the circuit is possible. I would be the last to say that no effort was required but I must point out that the possible results are certainly more than worth the effort involved. The efforts and the resultant installations made by W6DNG, K1HMU, and OH1NL are certainly noteworthy and deserving of the highest praise. They give the lie, however, to the usual excuses given for not making an effort at moonbounce. Nobody gave them anything. Nobody donated any dishes or lent any high-powered transmitters, or built any receivers for them. Their biggest assets are a large supply of gumption and stick-to-it-iveness and a firm conviction that it *can* be done.

* P. O. Box 334, Medfield, Mass.

Michael Czysch, LU3DCA, well-known Argentine v.h.f. operator, and his wife Marguerita, in the hamshack of W5TGQ, Houston, Texas, during a recent flying visit to this country.

V.H.F. Get-Togethers

Three large v.h.f. gatherings are in the immediate offing and should provide considerable entertainment from coast to coast. The first two are occuring on the same date — April 26 and 27. The perennial "Dayton Hamvention" occurring on the week end of April 26, 27 starts off with a v.h.f. banquet Friday evening and promises to be a real don't-miss-it-this-year type get-to-gether. On Saturday and Sunday the Swampscott Hamfest will sponsor a considerable v.h.f. program at the annual affair held at New Ocean House in Massachusetts. The third doing is the first (that we have heard of at least) all-v.h.f. Jamboree to be held at the Lafayette Hotel in Long Beach, California, come June 14 to 16. This Jamboree is the first large event on the west coast promoted solely for radio amateurs interested in the u.h.f., v.h.f. and microwave. The Jamboree is sponsored by the Microwave Society of Long Beach. Inquiries should be addressed to P.O. Box 3303, Long Beach 3, California.

International V.H.F. — U.H.F. Convention

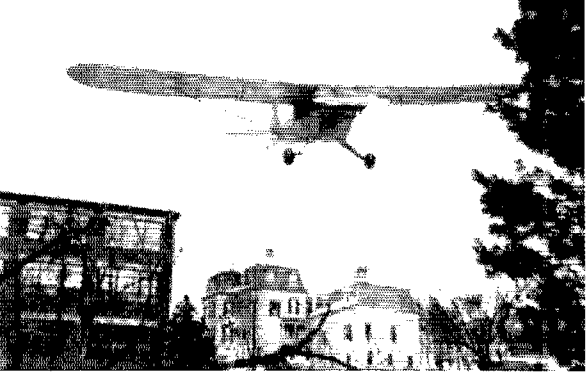
The 9th International V.h.f. Convention will be held in London May 18; sponsored jointly by the Radio Society of Great Britain and the London U.h.f. Group. Place: Kingsley Hotel, Bloomsbury Way, London, W.C. 1, near RSGB Headquarters. American amateurs who may be traveling in Europe at the time are invited to attend.

In the morning there will be an exhibit by firms serving the v.h.f. field, and a display of home-built gear entered in the competition for an annual cup award. There will be a technical program in the afternoon. Evening festivities will be presided over by the president of RSGB. Guests will include Dr. J. A. Saxton, of the DSIR Radio Research Station, Dr. R. L. Smith-Rose, renowned radio propagation authority and former RSGB President, and Edward P. Tilton, W1HDQ, V.H.F. Editor of *QST*.

Further details and registration forms may be obtained from Mr. F. E. A. Green, G3GMY, Hon. Secretary, V.h.f. Committee, 48 Borough Way, Potters Bar, Middlesex.

144 Mc. and Up

The "States Worked" boys who operate 144 Mc. and up are still going at it hot and heavy and slowly forging ahead. Down in Melbourne, Florida, K4LXC, who has really been putting in labor and time on 144 Mc. writes that on March 10 of this year he worked W3SDZ in Milton, Pennsylvania for another new state for each of them. The contact was made between 1345 and 1433 EST with signals very strong at both ends. John sez that later in the day, during the midnight to 1:00 A.M. sked, Vic was still punching through with a good signal. During that same week W4FJ was also arriving in Melbourne via two meters with a good signal but no contact was made.



(left) Aeronautical mobile on v.h.f.! Must be during the June v.h.f. contest. (right) We refer you to Frank, W1EHF, for results of low-flying aeronautical mobiles who have been too interested in contest contacts.

A new addition to the "States Worked" box for 144 Mc. is James, W5BEP in Longview, Texas. James writes that there was a good two-meter opening on March 12 when he and W5FYZ worked W4ZNV in Memphis, Tennessee. He also worked W5LDV, K5TUP, and K5SDM in Houston about 220 miles but as he sez "nothing unusual in that, it's usually a pipeline contact". The Tennessee contact gives James nine states, three call areas and about 1000 miles for the "box". He's running 500 watts of s.s.b. to a single 4X150A feeding a 10 over 10 at 115 feet. All equipment is homebrew except 10-B exciter. On six meters he's running 300 watts of s.s.b. to a single 4-125. Antenna is a 5-element at 100 feet. K9AAJ has raised his total by working K4IXC in Florida on November 14 and WØYSJ in North Dakota on January 31. This brings his score up to thirty-three states worked on 144 Mc. In Salina, Kansas, WØJAS worked a new one last October. It was K7IDD in Utah for state number 19. Buz sez that K7IDD has recently completed his big final for two for some of the serious operators.

Two reports were received reporting aurora on February 9. One from W4HJQ (via W4HHK) the other from W1JSM. Paul, W4HHK missed that night so has no new ones to report, but Don, W1JSM sez it was the best aurora in a year and a half. Although he did not work anything new he surely worked 'em. States worked from Don's QTH in Waltham, Massachusetts were New York, New Jersey, Ohio, Indiana, Pennsylvania, West Virginia, Delaware and Toronto, Ontario. Wonder what Don's score is for two meters! He's a very active fellow on v.h.f. and besides catching any and all auroras he's busy building a converter for 432 Mc. and a 32-element collinear array for that band.

Paul (W4HHK) and Tom (W4HJQ) have continued their 144-Mc. skeds on s.s.b. and the sked between W4RFR and W4HHK has also been maintained. In Kenosha, Wisconsin W9JOJ is now on 2-meter sideband operating at 145.050 every night for those who'd like to try for Wisconsin.

At the present time K8RXD would like to have a bigger and better antenna than the one now in use (10 elements) but until he does his reliable coverage is confined to the states surrounding Ohio. Dean would be interested in keeping skeds with anyone. His frequency is 144.068. Because of illness WA9BAR missed the Feb. opening on 144 Mc. but local operators told him that Missouri and the Dakotas were available during that month. On Bainbridge Island, Washington K7HEF reports that tropo conditions have been fair on two meters and W7EMX sez that there is much local activity (Bellevue, Wash.) on two with some of the gang going on s.s.b. and n.f.m. In Baltimore, Maryland K3PRN is waiting for decent weather to put up a new 13-element yagi for 432 Mc. Don is still working on his s.s.b. transmitter. Another worked on 432 Mc., W4ZGS, sez his converter for 432 is now tied into a 10-inch television. Til hasn't heard any signals yet on A1, A3, or A5 but no skeds set up as yet either. Til tells us that WA4HMB in Alabama is setting up video equipment for 432 and W4PLK, Florida, will shortly set up his 432 Mc. equipment.

Interested in moonbounce on 220 Mc? Glen Birbeck, WØGMT, (wonder what time he keeps his log in) out in Colorado Springs sez he thinks 220 is being overlooked for moonbounce. Glen sez: "high-gain arrays are easier to build on this band than on 144 Mc. and high-gain, low-no se receivers are easier to build for this band." He would like to hear from anyone interested in moonbounce on either 220 or 144 Mc. Glen has two new 4X150G's and would like info on a tuned-line amp for either of the above mentioned bands. Come on, fellas, flood him with information.

Reports from North Carolina say that the fellows have been hearing W4RMU in Florida but to date no one from the Turpentine State has been able to push through to A1. K4YYJ sez that he worked W8BKI in West Virginia during January but other than that no particularly good conditions recently on 144 Mc. Jim also mentions that he is gathering parts for A5 equipment and that several others in the area plan TV equipment on 432 Mc. since power restrictions have been lifted. Another 4-land report, this one from Virginia and K4EUS tells of working W4MKT, K4MHS and W4BUZ in North Carolina on February 27. Sam sez that W4BUZ had a good s.s.b. signal when the QSB didn't wash him out but the rest of the fellows were on c.w. 500-watt final for 432 is progressing slowly at K4EUS, and word has it that K4UMI and K4IMF will soon be ready for 432 Mc. W4FJ also of Virginia is completing his 432 converter using two 8058 nuvistors in the r.f., 6DS4 mixer. Ted is continuing his nightly skeds with K4IXC at 2100-2130 EST. Frequency 144.085.

In the Hartford and Canton, Connecticut area there is nightly activity on 432 Mc. sez Ed, W1HDQ. Hartford area has W1YDS and W1HDQ. Ed W1HDQ aims toward the Boston area from 2100 to 2125 and toward New York after 2125 when he keeps Wednesday and Friday skeds with W2MDE. Looks for others in that direction after the sked. All of his operation is presently between 432 and 432.1 Mc., and he makes his calls on c.w. Output is about 75 watts. In the Springfield, Mass. area, W1QWJ, W1RVW and W1-VNH are on most nights after 1930 EST, with other

RECORDS

Two-Way Work

50 Mc.: LU3EX — JA6FR
12,000 Miles — March 24, 1956
144 Mc.: W6NLZ — KH6UK
2540 Miles — July 8, 1957
220 Mc.: W6NLZ — KH6UK
2540 Miles — June 22, 1959
420 Mc.: SM6ANR — G3JHM
686 Miles — August 31, 1961
1215 Mc.: W1BU — KH6UK
5092 miles, — August 9, 1962
2300 Mc.: W6IFE/6 — W6ET/6
150 Miles — October 5, 1947
3300 Mc.: W6IFE/6 — W6VIX/6
190 Miles — June 9, 1956
5650 Mc.: W6VIX/6 — K6MBL
34 Miles — October 12, 1957
10,000 Mc.: W7JIP/7 — W7LHL/7
265 Miles — July 31, 1960
21,000 Mc.: W2UKL/2 — W2RDL/2
14 Miles — Oct. 18, 1959
Above 30,000 Mc.: W6NSV/6 — K6YYF/6
500 Feet — July 17, 1957

stations on less often. W1QWJ has highest power with 200 watts on c.w.

Last June (1962) Roy Gilbert, WB2BQJ, got two meters and started collecting a few states. After calling a few CQ's a station in New Hampshire came back to him and after signing with the New Hampshire station Roy had contacts with Rhode Island, Massachusetts, Connecticut, Pennsylvania and Vermont. To date he has worked ten states on 144 Mc. running about 3½ watts input with only ¾ of a watt out. This goes to a simple dipole (through about 50 feet of RG-59-U) about 10 feet above ground. In comparison Roy runs 75 watts into a 5-element beam on 50 Mc. and has worked seven states to date. (Just wait for the spring "openings" on six, Roy.)

Another builder is John, K3AKR. John has recently built a 100-watt rig for 220 Mc., is now collecting parts for a 500-watt two-meter rig and is converting another rig for 50 watts on 432 Mc. (Can't do it all at once, John, take it easy. Another Pennanite, K3MIW, who missed the aurora of February 9 tells us that W3RUE and W1BU had a contact and were working the aurora; that W3RUE has just completed a new 220-Mc. transmitter; that K3MIW and K3SHP have completed their 432-Mc. rigs and should soon be heard on the air with the new rigs; and that K3MIW has a new two-meter antenna, 7 elements up 30 feet and is working with different antennas on 432 Mc.

Seems that Pennsylvania was busy with the pen during the past month. K3STG of State College reports that he is active on two meters with a Heathkit twoer and a ten-element beam about 35 feet high. His best DX is W3RUE about 110 miles and he has heard K2RRM in New York, K3BOB in Maryland and W8KAY in Ohio. Al sez that a number of the boys in his area are looking for schedules and DX contacts, and that a Sunday night two-meter net is held on 145.25 at 2130 EST. Anyone interested is invited to call in.

K3OBU, active in Delaware, sez that conditions on February 5 were good when he heard K4WOB in Fairfax, Virginia, and again on the 10th when he heard W1QAK but couldn't raise him. Joe also reports that he missed the auroral session on February 7 (was attending a net meeting), but that the local stations reported working into Ohio, Michigan, Western New York and Canada.

From 5 land we hear that K5AKB, K5ERB and K5VRW are all working on RTTY for the v.h.f. bands; and out in 6 land WA6ROJ is building a 432-Mc. p.a. and rebuilding his 432-Mc. converter using 8058 nuvistors. In Columbus, Ohio K8HRT and W8BAX are working on 3600 Mc. Polaplexers using 726A Klystrons; and in Burr Oak, Michigan WN8GJS would like to start experiments in amateur microwave work. Anyone interested get in touch with Dick. W1KSZ, Dick is now operational on 1215 Mc. with an APX-6 and made his first contact on that band with W1FTK on March 19. W1BNZ is almost ready to go on 1215 and these boys would all like to know if anyone else in the area "is ready". W6IEY has completed his 4 foot dish for 1215 and should be ready to go by the time you read this.

Final report on the February 9 auroral session from W8PT in Benton Harbor, Michigan, Jack sez that during this period 1, 2, 3, 4, 8, 9, Ø lands were all heard, but other than that on night conditions were very poor during the month of February.

On February 7 K6IBY and K7ICW finally made it on 221.5 Mc. "We had been trying since early December on regular skeds but equipment troubles on the Nevada end prevented a QSO. Because of the lack of local activity, it was difficult to determine that the receiver was working, and it wasn't!" Congratulations fellows, it's a mighty good thing that v.h.f.ers are persistent (stubborn?).

Clubs and Nets

The South Bend Amateur Radio Club Two Meter Net meet on Mondays, Wednesdays and Fridays at 2000 EST on 145.280 kc. It has very good coverage of South Western Michigan and Northern Indiana. WA9AXT is net manager.

The South-Western Michigan Two Meter Net meets Mondays at 2000 EST on 145260 kc. Has good coverage from Flint west, but handles very little traffic. W8CVQ is Net Manager and NCS.

A 432-Mc. net has been established in Southern California and is known as the R and D Network. All members of the net are members of the Sixth Army MARS and have Sixth Army MARs calls, but inasmuch as they operate in the 432-Mc. band, they use their amateur calls. They also operate on 1296 Mc. during the same hours. Net is open to new members and information can be obtained from WA6HIT or W6BLK.

Members of the Albuquerque VHF Club will take to the mountain tops for the VHF QSO Contest. James Harrell, W5FAG, would like to make schedules for 50 through 420 Mc. He may be contacted at 10821 Cordova, N.E., Albuquerque, New Mexico.

2-METER STANDINGS

W1REZ	32	8	1300	W5UNH	6	3	1200
W1AKZ	28	8	1205	W6QSQ	15	5	1390
W1KCS	24	7	1150	W6NLZ	12	5	2540
W1RFU	24	7	1120	W6DNG	9	5	1040
W1AJR	23	7	1130	W6AJF	6	3	800
W1MMN	22	7	1200	W6ZL	5	3	1400
W1HDQ	22	6	1020	K6HMS	4	3	850
W1IZY	20	7	1080	K6GTG	4	2	800
K1CRQ	19	6	800	W6MMU	3	2	950
W1AFO	18	6	920				
W1MEH	17	6	700	W7JRG	17	6	1280
K1AFR	17	5	450	K7HKD	15	5	1150
				W7LHL	7	3	1050
W2NLY	37	8	1300	W7CJM	5	2	670
W2CXY	37	8	1360	W7JIP	4	2	900
W2ORI	37	8	1320	W7JU	4	2	235
W2BLY	36	8	1020				
K2GQI	35	8	1365	W8PT	39	9	1260
K2LMG	30	8	1290	W8KAY	38	8	1245
W2AZL	29	8	1050	W8SDJ	37	8	1220
K2IEJ	27	8	1060	W8IFX	35	8	980
K2CEH	25	8	1200	W8SFG	34	8	1040
W2AMJ	25	6	960	W8LOF	33	8	1060
W2ALR	24	8	1100	W8GGH	32	8	1180
W2RXG	28	8	1200	W8BAX	3	8	960
W2SMX	23	7	1090	W8RMH	32	6	910
K2HOD	22	6	950	W8NOH	31	8	1090
W2DWJ	22	6	860	W8SVI	30	8	1080
W2PAU	23	6	753	K8AXU	30	8	1050
W2LWI	23	6	753	W8EHW	30	8	860
K2KIB	21	5	700	W8LPD	29	8	850
W2ESX	21	6	750	W8WRN	28	8	680
W2UTH	20		880	W8DX	26	8	720
W2WZR	19	7	1040	W8LLC	25	8	800
W2RGV	19	8	720	W8JWV	25	8	940
WA2EMA	19	6	1010	W8WNM	25	8	900
W2RLG	17	6	980	K1CRQ/8	25	8	690
K2JWT	16	6	550	W8GFN	23	8	540
				W8LCY	22	7	680
W3RUE	33	8	1100	W8BLN	21	7	610
W3EPH	33	8	1000	W8GTR	17	7	550
W3SGA	31	8	1070	W8NRM	17	7	550
W3TDF	30	8	1125				
W3GKP	30	7	1180				
W3KCA	28	8	1110	W9KLR	41	9	1160
W3BYF	28	8	1070	W9WOK	40	9	1170
W3LNA	21	7	720	W9GAB	34	9	1075
W3LST	21	6	800	W9AAG	34	9	1050
W3NKM	20	7	730	K9AAJ	33	8	1070
W3LZD	20	7	650	W9REM	31	8	850
K3HDW	12	6	1015	K9UIF	30	9	970
				W9ZIH	30	8	830
W4HJQ	39	8	1150	W9PBP	28	8	820
W4HHK	37	9	1280	W9LVC	27	8	950
W4LTU	34	8	1160	W9OJI	27	8	910
W4ZXI	34	8	954	K9SGD	26	8	1100
W4WNH	33	9	1050	W9ZHL	25	8	700
W4MJL	33	8	1149	W9BPV	25	7	1030
W4AO	30	8	1120	W9CUX	24	7	
W4LVA	26	8	1000	K9AQF	24	7	900
K4EUS	26	7	1130	W9LF	22	7	825
W4EQM	25	8	1040	W9KPS	22	7	690
W4AIB	25	8	900	W9ALU	18	5	800
W4TLV	23	7	1000	W9WDD	16	5	600
W4JC	23	6	725				
W4VVE	23	6	724	WØBFB	37	9	1350
W4RMU	21	7	1080	WØHD	31	8	1030
W4IKZ	20	6	720	WØLFE	30	7	970
W4OLK	20	6	720	W0SMJ	29	9	1075
W4LNG	19	7	1080	WØQDH	27	9	1300
W4RFR	18	9	820	WØRUF	23	7	900
K4YUX	08	8	830	WØMOX	23	6	1150
W4CPZ	18	6	650	WØIC	22	7	1360
K4VWH	18	6	590	WØENC	22	6	1100
W4MDA	17	6	757	KØITF	21	6	940
				WØINI	21	6	830
W5RCI	38	9	1280	WØTGC	21	7	870
W5FYZ	33	9	1275	WØRYG	20	8	925
W5AJG	32	9	1360	WØDQY	20	7	700
W5JWL	29	7	1150	WØJAS	19	7	1130
W5DFU	29	9	1300	WØAZT	18	7	1100
W5PZ	27	8	1300	KØAQJ	16	6	1120
W5LPG	25	7	1000	WØIFS	16	6	1100
W5KTD	23	8	1200				
W5SWV	20		960	VE1CL	8	4	800
W5ML	16	6	700	VE3DIR	36	9	1330
W5KFU	13	4	1300	VE3AIB	29	8	1340
W5FSC	12	5	1390	VE3BPR	24	7	950
W5HEZ	12	5	1250	VE3BQN	20	7	790
W5CVW	11	5	1180	VE3AQG	18	8	1300
W5NDE	11	5	620	VE3DER	17	8	1340
W5WAX	10	5	735	VE3HW	17	7	1350
W5VY	10	3	1200	VE6HO	1	1	915
W5BEP	9	3	1000	VE7FJ	2	1	365
W5EDZ	8	5					
W5YYO	7	4	1330	KH6UK	2	2	2540

The figures after each call refer to states, call areas and mileage of best DX.

220- and 420-Mc STANDINUS

220 Mc.

W1AJR	10	4	480
W1AZK	9	3	412
W1HDQ	11	5	450
K1JIX	10	3	450
W1OOP	1	4	400
W1RFU	15	5	480
W2AOC	13	5	450
K2AXQ	9	3	240
WA2BAH	4	2	167
K2CBA	13	6	650
K2DIG	4	3	140
W2DWJ	15	5	740
W2DZA	12	5	410
K2DZM	12	5	400
K2ITP	10	5	265
K2ITQ	11	5	265
K2JWT	6	3	244
K2KIB	12	4	300
W2LRJ	10	4	250
W2LWI	12	4	400
W2NTY	12	5	300
K2PPZ	11	4	490
K2QJQ	13	5	540
W2SEU	9	3	225
K2UUR	4	3	105
W3AHQ	4	3	180
W3FEY	11	5	350
K3IUV	8	3	310
W3JYY	8	4	295
W3JZI	4	3	250
W3KKN	10	4	255
W3LCC	10	5	300
W3LZD	15	5	425
W3RUE	10	5	480
W3UJG	13	5	400
W3ZRF	5	4	112
K4TFU	8	4	400
W4TLC	5	1	315
W4UYB	7	5	320
W5AJG	3	2	1050
W5RCI	8	5	700
K6GTG	2	1	240
W6MMU	2	2	225
W6NLZ	3	2	2540
K7ICW	1	1	250
K8AXU	10	5	1050
W8IJG	9	5	475
W8LPD	6	4	480
W8RNM	8	4	390
V8PT	10	5	660
W8SVI	6	4	520
W9AAG	9	4	660
W9EQC	11	5	740
W9JCS	6	2	340
W9JEP	9	4	540
W9OVL	6	3	475
W9UED	4	4	605
W9ZIH	10	5	500
KØDGU	5	3	425
KØITF	6	3	515
KH6UK	1	1	2540
VE3AIB	7	4	450
VE3BPR	3	3	300

420 Mc.

W1AJR	11	4	410
W1HDQ	8	3	210
W1MFT	8	3	170
W1OOP	11	3	390
W1QWJ	10	3	
W1RFU	7	4	410
W1UHE	6	4	430
W2AOD	6	4	290
W2BLV	12	5	360
K2CBA	7	4	225
WA2DTZ	6	3	200
W2DWJ	10	4	196
W2DZA	5	3	130
K2DZM	10	4	390
WA2HQE	8	4	280
K2KIB	4	2	100
W2NTY	3	2	100
W2OTA	10	4	300
K2UUR	9	3	280
W2VCG	9	4	280
K3CLK	9	1	
K3EOF	6	3	250
W3FEY	8	4	296
K3IUV	7	3	310
W3LCC	3	2	
W3RUE	3	2	270
W3UJG	2	4	350
W4HHK	8	4	550
W4VVE	7	4	430
W4TLV	3	2	225
W5AJG	5	1	425
W5HTZ	5	3	440
W5RCI	12	3	660
W5SWV	7	3	525
K6GTG	1	1	180
W7LHL	2	1	180
W8HCC	3	2	355
W8HRC	3	2	250
W8JLQ	4		275
W8NRM	3	2	390
W8PT	6	3	310
W8RQI	4	2	270
W8TYY	9	5	580
K8AXU	3	3	660
W8UST	3		25
W9AAG	8	4	525
K9AAJ	7	3	425
W9GAB	9	4	608
W9OJI	6	3	330
K9UIF	6	3	240
KØITF	3	2	158

The figures after each call refer to states, call areas and mileage of best DX.

50 Mc. WAS

1 WØZJB	21 K6EDX	41 K9DXT	61 W7MAH
2 WØBJV	22 W5SFW*	42 W6BAZ	62 W8ESZ
3 WØCJS	23 WØORE	43 W6ABN*	63 W2BYM
4 W5AJG	24 W3ALU	44 VE3AET	64 W7ACD
5 W9ZHL	25 W8CMS*	45 W9JFP	65 K6PYH*
6 W9OCA	26 WØMVG	46 WØQIN	66 W4JOB
7 W6OB	27 WØCNM	47 WØWWN	67 KØJJA
8 WØINI	28 W1VNH	48 K9ETD	68 K6RNQ**
9 W1HDQ	29 WØOLY	49 WØFKY	69 W9QWT*
10 W5MJD	30 W7HEA	50 W8LPD	70 W6EDC**
11 W2IDZ	31 KØGQG	51 WØZTW	71 K6VLM**
12 W1LLL	32 W7FFE	52 W6GCG	72 K6GOX**
13 WØDZM	33 WØPFP	53 W2RGV	73 WØEDM
14 WØHVW	34 W6BJI**	54 W1DEI	74 W9JCI*
15 WØWKB	35 W2MEU	55 W1HOY	75 WØLLU*
16 WØSMJ	36 W1CLS	56 W6ANN	76 W7RT**
17 WØOGW	37 W6PUZ	57 W1SUZ	77 W7RDY**
18 W7ERA	38 W7ILL	58 W1AEP*	78 W6KIN**
19 W3OJU	39 WØDDX	59 W5LFH	79 W6OKR**
20 W6TMI**	40 WØDO	60 W6NLZ**	80 K6GMX

* 49 states ** 50 states

VE7CN	45	EI2W	37	LU3DCA	27	SM5CHH	20
KL7AUV	44	CO2SZ	36	LU3EX	27	LA7Y	20
VE1EF	42	ZS3G	32	ZE2JV	26	VQ2PL	18
VE4HS	41	SM6ANR	30	LU9MA	26	JA8AO	18
XE1GE	39	CO2ZX	30	CO2DL	25	JA8BU	17
VE2AOM	38	SM7ZN	29	CT1CO	24	JA1AAT	17
KH6UK	37	PZ1AE	28	CO6WW	21	JA1AUH	16
		SM6BTT	28	LA9T	21	VP5FP	7

50 Mc.

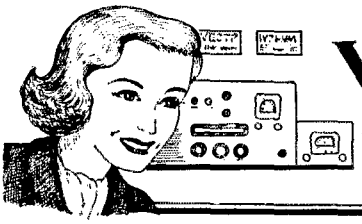
According to Bob Henry, VE6DB, activity is slowly picking up in his area with about six stations active at the present time and another six capable of getting on the v.h.f. bands. Bob sez there have been several slight auroral openings heard on 50 Mc. and indications of an opening to the south. WØPFP in Iowa sez that on February 10 he had a "sort of QSO" with K8TOL via scatter and on the 17th he heard WA4JYN on 50,193 but no QSO. Otherwise February was pretty dead for Jim. He reports a new s.s.b. station now active in Fort Dodge is KØZQT.

In Newton, Iowa, WØDRE agrees with Jim saying that there was very little or no activity heard on 50 Mc., no skip or good ground wave was heard, although K9HBT was heard working WØZBL, 4-3-9, during one of their nightly skeds. Jerry, K9HBT, mentions this sked with WØZBL, sez it has been going for about three weeks and is about 80% readable at all times. During the aurora of February 9 Jerry heard or worked 2, 3, 8, 9, and Ø lands. He comments that interest in c.w. on six meters is up again with several stations on nightly. In Lansing, Michigan K8BGZ adds 1 land to areas heard during the February aurora. Dave sez that at the present time the following stations are on s.s.b. in his area: K8VKX, K8UBD, K8ATM and K8TUL.

Word has it that K7HFN and K7HEF on Bainbridge Island, Washington are really pulling in the stations on six-meter s.s.b. They completely "home-brewed" their rig and since last summer have been working stations all over the West Coast on six-s.s.b. John, K7HEF mentions none of this. He sez only that some sporadic E has been noted, generally into California or Arizona; and that there are now a dozen stations active from Bainbridge Island. K7PIG in Burlington, Washington sez that 50 Mc. activity is low until the band opens up, which it did several times during February with California, Texas, Colorado, Nevada, Arizona and VE7's coming through.

Out in Las Vegas, Nevada, K7ICW reports good E_s on February 1 when Texas, Oklahoma, Arkansas, and New Mexico were coming through with signals being heard up to 51.5 Mc. On February 12 there was a spotty opening into Texas and South Dakota. February 16 "E cloud moved slowly for stations located in Tulsa, Oklahoma practically in a straight line to the Texas Panhandle — good signals." February 24 and 26 weak signals were heard from Texas and California by George. From 6 land K6VXI reports the 50-Mc. opening of February 1 when Arizona and Texas were coming through; and WA6YIT says that February was a very good month with openings on February 1, 12, 24 and 26. W6YKS in Los Gatos comments that there has not been too much DX, just a few E openings to Texas, Arizona, Utah and Colorado. (Sounds very good to the gang in 1 land, John.) C.w. activity is picking up in that area with K6QMD, K6HXY, K6QHC, K6APB and W6YKS being heard fairly regularly.

S.s.b. is also growing on 50 Mc. and K6HCP, K6QHC, K6HUM, WA6QEJ, WA6FJX and a few others active on s.s.b. John is using a communicator on six but also has a c.w. rig running 75 watts to a 6146, and hopes soon to be on n.b.f.m. In Louisville, Kentucky, WA4CQG is still interested in working c.w. on six and would be happy to sked anyone interested. Dale reports groundwave poor during February but good on March 1 and 2 when he worked W8GHX, W8PBU and WA4EJR. Down Virginia way K4IMF in Norfolk reports the opening of February 10 but otherwise "band normal". K4FSP is now on s.s.b. on 50 Mc. with a good signal. WA4AYP mentions the aurora of February 9 and opening on the 10th to VP7CX and also heard K2IOR on the 11th. Called K2IOR on c.w. and on s.s.b. but no contact. Emory says that ground wave during February was very good over the Norfolk to Richmond path and he worked W4HO, K4FSP, K4ASI and W4WCP during this period. In Tennessee K4SHY, K4KYL and WA4IRX all were in on the opening to VP7CX on the 10th and WA4IRX also heard Florida, Texas and Mexico (XE1OE). Don, K3PRN in Baltimore reports large numbers of newly licensed amateurs arriving on six meters along with a goodly number of arrivals from the low frequency bands. (Guess they're finally beginning to see the light.) Just about everyone is talking of going s.s.b. in the near future according to Don. QST



YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,* W1QON

YL Clubs

IT WAS interesting to compile the following information on the various YL clubs of the world for you. The last major tabulation of YL clubs occurred back in the December 1957 issue. While there have been only five new clubs organized in the past five years, the membership within many of them has more than tripled. Incidentally, one of the newest, the Buckeye Belles, already has more members than any other club, save for the YLRL — there are some 225 enthusiastic Buckeye Belles who have been organized only since March, 1961.

In reply to the query "What is the special purpose of your club?" the answers were generally similar. To stimulate the interest of YLs in amateur radio, to promote better operating practices, to engender friendship and cooperation among women amateur radio operators — these are the major purposes. To participate in emergency operation as needed and to assist newcomers obtain licenses were also noted as additional objectives of some clubs.

Most of the clubs get together socially during the year at hamfests and conventions. Some conduct nets, sponsor contests, participate in Field Day, run training classes, aid in the Powder Puff Derby, edit newsletters, and so forth. A growing number of clubs issue certificates and awards — some to YLs only, some to YLs and OMs. In this issue we indicate which clubs do issue certificates. Next month we hope to devote space to all of the YL certificates and awards that are presently available. Meanwhile, write to the custodian, whose address is given, for further information regarding the certificates.

The Young Ladies Radio League is, of course, the largest of the YL clubs. International in scope, the YLRL has increased from a membership of 600 in 1957 to over 1000. Many of the clubs are affiliated with the YLRL (at least 50% of the members belong to the YLRL).

If there are any nets listed in the October 1962 column schedule of YL nets that actually consider themselves clubs, we would appreciate hearing from them. (It is possible that this may be so — *i.e.*, the TYLRUN essentially was a net that developed into a club. It is also still a net!) We don't mean to overlook anyone in our growing family of YL clubs.

In the information that follows, unless otherwise noted, dues are charged annually, and a valid amateur license is required for full membership. New members are warmly welcomed, subject to the special requirements for membership within each club.

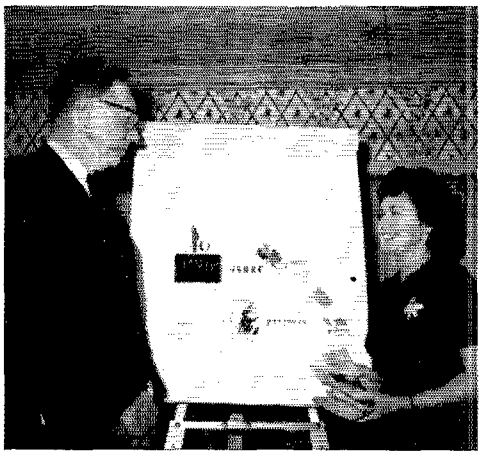
INTERNATIONAL

YOUNG LADIES RADIO LEAGUE — organized 1939; over 1000 members; has a number of affiliated clubs; all licensed women amateurs, including Novices, welcome to membership; dues $2.00. President is Jean Kincheloe, K6OQD, 12007 So. Georgette Ave., La Mirada, Calif. *YL Harmonics* is published bi-monthly. YL-OM contest

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

Louisiana YL K5TXQ, Evalyn Ewing, is 1963 Secretary-Treasurer of the 190-member-strong Texas YL Round Up Net.

Looking très jolie at the Los Angeles YLRC annual YL-OM Valentine Banquet are Recording Secretary Betty Ekstrand, W6JCA (left), and President Anita Gilbert, K6OAI.



At a meeting of the Middlebury, Vt. Mike & Key Club, Pearl La Font, K1AEY, told of experiences encountered while QSOing with hams in 125 countries. K1AEY was invited by Miss Harriet Proctor, W1EIB, club president, to chat about DX for the purpose of creating more interest among Vermont hams in working the DX bands, thus putting the state more in the DX limelight. In the photo Pearl shows Dr. L. S. Walker, W1WOD, some of her many QSLs. *(Information via W1KJG)*

and YLRL Anniversary Party are sponsored annually; phone and c.w. nets are conducted. Awards issued are YL-WAS, YL-WAC, YLCC, DX-YL; continuous membership. Rules and custodians were given in March 1963 column.

EAST

Women Radio Operators of New England — organized 1955; 170 members; meetings in May and Nov. and at annual N.E. ARRL convention; dues $1.00. President is Jean Peacor, K1IJV, 139 Cooley St., Springfield, Mass. Conducts three weekly nets: Yankee Lassie, Wed. 1330 GMT, 3900 kc., K1LCI NCS; Six-Meter Net, Wed. 1900 GMT on 50.65 Mc., W1HOY NCS; C.W. net, Fri. 1330 GMT, 3600 kc., K1IJV NCS. Issues WRONE certificate — custodian is Blanche Randles, K1IZT, 62 Linda Ave., Framingham, Mass.

Rhode Island Young Ladies Radio Club — organized 1955; 20 members; meetings 1st Wed. of the month in homes of members; dues 50¢; President is Norma Walker, W1ZOK, 58 Locust St., Riverside 15, R.I. The Rhode Island YL certificate is offered — custodian is W1ZOK.

New York City Young Ladies Radio League — reorganized 1942; 21 members with 7 associate members; bi-monthly meetings in homes; dues $2.00. Alma Skeete, W2MVV, 1165 Union Ave., N.Y. 59, N.Y. is President.

The Jersey Tomaters Radio Club — organized 1962; 19 members; meetings at home of President Debbie Klarfeld, K2OTW, 69 Mertz Ave., Hillside, N.J.; dues $6.00. A net is conducted the third Monday on 146.502 Mc. at 0230 GMT. A certificate will soon be offered.

Penn-Jersey YL Club — organized 1956; The Penn-Jersey YL certificate is offered — Carolyn Currens, W3GTC, P.O. Box 523, Norristown, Pa. is custodian.

Washington Area Young Ladies Amateur Radio Club — organized 1955; 19 members; meetings bi-monthly at the Natural History Museum, Constitution Ave. & 10th St., N.W., Washington; dues $1.00. President is Viola Davy, K4EAM, 700 Arlington Blvd., Fairfax, Va. The WAYLARC certificate is issued — custodian is Camille Hedges, W3TSC, 2202 Culver St., Washington 21, D.C.

The Georgia Peach YL Club — organized 1957; 22 members; meetings weekly on Thurs. at 1400 GMT on 3860 kc. President is Marita Kells, K4LIU, 1278 Fairhill Lane, N.E., Atlanta 19, Georgia; dues $1.00. The Georgia Peach YL certificate is offered — custodian is Olivia Coogler, K4DNL, 286 Howard St., Atlanta 17, Ga.

Floridora YLs — organized 1955; 104 members; dues $1.00; members congregate on 3850 kc. at 1300 GMT daily. President is Florence Bogardus, W4HRC, 5747 Luella St., Jacksonville 11, Fla. Any YL who resides in Florida for six months or more per year is eligible for membership. Nets are conducted as follows: Mon. 1400 GMT, 7225 kc. (a.m. net) and at 1600 GMT (mixed transmissions); Tues. 1400 GMT 3890 kc. lower s.s.b. net and 6-meter Floridora YL Southern net at 1500 GMT on 50.33 Mc.; Wed. 0200 GMT on 50.3 Mc., the Suncoast YLs net. The Floridora YL certificate is offered — custodian is Marge Campbell, K4RNS, 1700 Nova Rd., Holly Hill, Fla.

St. Petersburg Amateur Radio Club YLs — organized 1954; some 25 members. President is Naomi Spence, W4TDK, 940 Bay St., N.E., St. Petersburg, Fla.

MID-WEST

Ladies Amateur Radio Klub — organized 1952; 45 members; meetings first Tues. at Austin YMCA, Chicago; dues $3.00 resident members, $2.00 non-resident members. President is Connie Kalinowski, W9UON, 1045 Milwaukee Ave., Chicago 22, Ill. Club call is W9FCA. The LARK certificate is awarded — W9UON is custodian.

Chicago Young Ladies Radio League — organized 1952; 7 members; meetings 4th Sat. at Gompers Park Field House at 1:00 P.M.; dues $1.00. President is Peggy Langhoff, K9GUB, 375 Central, Wood Dale, Ill. Club call is W9DEQ. The Dark Eyed Queen's Certificate is issued — Esther Talbott, K9UHD, 15144 Hiawatha Trail, Orland Park, Ill. is custodian.

Hoosier Amateur Women's Klub — organized 1957; 97 members; all day meetings first Sunday in April and Oct.; dues $2.50 resident, $2.00 non-resident. President is Ann Wolford, K9SUT, RFD 5, Tipton, Ind. Two nets are conducted: Wed. 1430 GMT on 50.2 Mc. and Sat. 1430 GMT, 3910 kc. The HAWK Eye-Lash Award is issued — custodian is Fran Yelch, K9ILK, P.O. Box 135, Princeton, Ind. The HAWK certificate is also issued — custodian is K9ILK.

Buckeye Belles — organized 1961; 225 members; meetings at hamfests and conventions with one annual meeting; no dues. President is Marge Farinet, K8ITF, 1608 Rangeley Ave., Dayton 3, Ohio. The following nets are conducted: Mon. 1330 GMT on 3900 kc. (a.m. and s.s.b.) and at 1930 GMT on 3738 kc.; Tuesday 1800 GMT on 7178 kc. (Also on Tues. in Cleveland area at 0230 GMT on 50.3 Mc., and in Toledo area a 2-meter net is conducted at 1500 GMT.); Wed. 1800 GMT on 7260 kc.; Thurs. 0030 GMT on 50.3 Mc. in Columbus area. The Buckeye Belle certificate is issued — custodian is Marie Helmin, W8MBI, 3943 Concord Rd., Toledo, Ohio. The club will hostess the Fourth International Convention of the YLRL, June 19–21, 1964, at Columbus, Ohio.

Upper Peninsula YL Amateur Radio Club — organized 1961; 15 members; meetings twice annually; dues $1.00. Any licensed YL who checks into club net four successive times or who lives in upper peninsula of Michigan is welcome to membership. Muriel Rundells, K8KIT, is net coordinator. A net is conducted Mon. at 1400 GMT on 3920 kc. The Hiawatha Land Certificate is issued — Zelma Neault, W8HAV, Box 483, Marquette, Mich., is custodian.

TEXAS and COLORADO

Texas YL Round-Up Net — organized 1955; 190 members; meets annually first Sat. in Nov. in various cities; dues $1.00. Five consecutive check-ins to net required for membership. President is Mickie Inks, K5IOJ, 1516 East 37th St., Odessa, Texas. Two nets are conducted: Thurs. 1300 GMT, 3800 kc., and 1530 GMT on 7235 kc. The TYLRUN-YL-OM Certificate and the TYLRUN 10CC certificates are issued — custodian is Bernell Johnson, K5GBX, 1822 S.W. Third St., Grand Prairie, Texas.

Women Ham Operators of Texas (Dallas) — organized 1956. (information incomplete)

Alamo Ladies Amateur Microphone Organization — organized 1959; 11 members; meetings Jan., March, May, July, Sept., Nov. — second or third Sunday at homes. Dues are $2.00; licensed YLs in San Antonio are invited to membership. President is Katherine Pirrie, K5TSZ, P.O. Box 181, La Vernia, Texas. A net is conducted at 2100 GMT on 7248 kc. The Alamo YLs certificate is offered — Inez Cole, W5WXT, 320 Meadowbrook Drive, San Antonio 32, Texas, is custodian.

Gulf Area Young Ladies Radio Club — organized 1958. The GAYLARK certificate is offered — custodian is Betty Sutton, W5ERH, P.O. Box 588, Almeda, Texas.

Women Ham Operators (Ft. Worth) — organized 1957. The Women Ham Operators of Terrant County certificate is issued — custodian is Margie Klar, K5PIO, 3525 Bellaire Drive, N., Ft. Worth, Texas.

Colorado YLs — organized 1961; 31 members; meetings second Sat. at 1:00 P.M. in homes; dues $1.00 — 50c for non-Colorado members. President is Opal Meck, KØWZN, P.O. Box 16, Palmer Lake, Colorado. All Colorado licensed YLs invited to membership. The sYLver DOLLar Award is issued — custodian is Tillie Curington, KØRGU, 2067 Brentwood St., Denver 15, Colo. A Colorado County certificate is planned.

WEST

Portland Roses — organized 1955; 14 regular members with 5 associates; meetings monthly at homes; dues $2.50. President is Phyllis Bowers, W7ZMN, 3430 S.E. Martins St., Portland 2, Oregon. Club call is K7UER. The Portland Roses certificate is issued — custodian is Helen Wise, W7RVM, 4311 S.E. Salmon St., Portland 15, Oregon.

Camellia Capital Chirps — organized 1957; 23 members, meetings 4th Friday in homes; dues $2 50. President is Jan O'Brien, K6HHD, 6606 5th St., Rio Linda, Calif. The Chirp tificate is offered — custodian is Velma Lohner, WA6DGH, 5400 Rockwell Rd., North Highlands, Calif.

Bay Area Young Ladies Amateur Radio Club — organized 1954; 65 members; meetings 4th Friday in homes; dues $4.00. President is Dorothy Dimitre, WA6LIZ, 632 Santa Barbara Ave., Millbrae, Calif. Club call is WA6MAO. Two nets are conducted: BAYLARC — Monday 0400 GMT on 50.56 Mc.; Mermaid — Sat. 1800 GMT on 3845 kc. The BAYLARC Mermaid Certificate is offered — Elaine Carter, K6SZT, 1011 85th Ave., Oakland 21, Calif. is custodian. SWOOP (Suffering Wives of Operators' Protectorate) was initiated by the BAYLARCs to bring more fun into the lives of XYLs attending hamfests. A SWOOP certificate is awarded.

Los Angeles Young Ladies Radio Club — organized 1946; 90 members; meetings monthly at Schaber's Cafeteria, 720 S. Hill St., Los Angeles at noon; dues $2.00. President is Anita Gilbert, K6OAI, 2912 N. Buena Vista, Burbank, Calif. A net is conducted Wed. at 0300 GMT on 146.1 Mc. The Lad 'N Lassies certificate is issued — custodian is Irma Weber, K6KCI, 762 Juanita Ave., Santa Barbara.

San Diego Young Ladies Radio Club — organized 1946; 26 members; dues $1.00; meetings third Sat. at noon at various places. President is Kathy Kreysler, K6AWP, 4562 Adair St., San Diego 7. The Missions to Missiles Certificate is offered — custodian is Pat Muelheim, W6GGX, 4275 Del Mar Ave., San Diego 7, California.

OTHERS

Polar Amateur Radio Klub of Alaska — organized 1955; meets monthly at homes; dues $1.00; 30 members. The PARKA Lucky Seven Award is issued — custodian is Geraldine Nichols, KL7ALZ, Star Route A, Box 4017, Spenard, Alaska.

KH6 YL Club of Hawaii — A certificate is offered — Louise Bostwick, KH6AFL, 1825-B Kahala Ave., Honolulu 15, Oahu, is custodian. Our information is incomplete on this club.

South African Women's Radio Club — organized 1952; approximately 130 members; dues 75¢. President is Diana Green, ZS6GH, P.O. Box 7028, Johannesburg, Transvaal, S.A. Two awards are issued: the Worked All YL certificate and the KKK award. Address correspondence to Dot Faber, ZS6BDB, 16 Chester Rd., Bedfordview, Transvaal, S.A.

1st Lt. Claire Balian, USAF Nurse

Are there other YL clubs outside of the U.S.? We certainly would like to hear from them, if there are!

K6ZCR — Air Force Nurse

First Lt. Claire Balian, K6ZCR/5/AFA6ZCR/5, is believed to be the only Air Force Nurse ever to hold a Military Amateur Radio Service license. Presently pursuing nursing duties at Lackland Air Force Base Hospital in San Antonio, Texas, Claire has been a licensed ham since 1957. During her six years of hamming, despite a heavy nursing schedule, Claire has managed to handle over 11,000 messages for service personnel and hospital patients. Operating at Lackland with her own amateur equipment (not MARS property) Lt. Balian is primarily a c.w. operator with an ability to copy code up to 40–42 w.p.m. Claire has been a member of the Los Angeles YLRC and BAYLARC and in 1961 served as 6th district chairman for the YLRL. Our teen age YLs especially, who are considering vocations and avocations ahead, could well look to Lt. Balian, USAF nurse and ham operator, for an inspiring example of service to country and mankind.

Apologies

To Grace Crory, W1EYK, of Harwich, Mass. and to Shirley, K7IVK, and Ardon, K7CSW, Marrill of Casper, Wyoming for switching picture captions on them in the March column. There are very few YLs in Wyoming and on Olde Cape Cod and the least we can do is identify them properly.

Coming Events

WRONE — Annual Spring luncheon May 11 at Svea Gille Restaurant, 190 South Quinsigamond Ave., Shrewsbury, Mass. Smorgasbord at noon. Send $2.50 for reservation before May 4 to Carol Rice, K1VME, 14 Oakview St., Worcester, Mass.

13th Midwest YL Convention — June 22 and 23 at Falls Hotel, Newberry, Michigan. W8HAV, Zelma, and W8JXJ, Vi, co-chairmen. Many interesting events planned.

AWTAR — 17th annual "Powder Puff Derby," sponsored by the Ninety-Nines, Inc. The race will start at Bakerstield, California July 13 and terminate July 17 at Atlantic City, N.J. Carolyn Currens, W3GTC, will again supervise AWTAR amateur radio net. See list of race stopover cities in last month's column. Amateur assistance welcomed — contact W3GTC. QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

W-o-w . . .

The Rarest Country in the World! Perhaps it was the severity of the winter just past, together with the onset of gorgeous spring. Or did *Rhyme of the Restless Rover* cast a mass hypnotic spell? Too, it could have been the sheer inevitability of fate, a classic example of an improbability in Probability mathematics.

Anyway, a curious frenzy gripped all members of the DX Hoggery & Poetry Depreciation Society assembled for their annual assault on endemic liddism. As the entire constituency, clutching steaming steins of Old Haywire, lurched to its feet for the traditional rendering of our DXHPDS anthem, the Wouff Hong Song, we could discern among the mob all sorts of camping equipment, boating gear, collapsible antenna apparatus, portable and not-so-portable transmitters and receivers, etc. Indeed, the floor of Long Hall fairly groaned with the weight of all this paraphernalia as chairman Hugh C. Workin banged a battered gavel for order. The bedlam finally subsided a few dozen db., barely enough to permit Dewey Sendabuck to open the business session with

Leadheaded Malcolm McCracked
Is still getting caught in the act
Of sending for cards
With loving regards
To rare ones he never has snagged.

Dewey fled the scene under a barrage of radioactive Confederate playmoney. Dale Ender next braved the stage to contribute

Fatfist O'Click has a flair
For getting in everyone's hair;
He clutters the freq
When DX is weak
Till you can't tell if anyone's there.

Dale got the Rettysnitches award for that one, many arriving posthumously. Now a strange whirring noise grew noticeable above the tumult, much like the sound of spinning helicopter rotors. After removal of his predecessor's remains, Collin Igor-Lee eagerly delivered

Plugged-up-eared lid Mike Romoze
Likes fifty-per-cent QSOs.
He calls with the pack,
But when one comes back
Someone else tips him off so he knows.

Collin, prepared for travel like everybody else, was attired in a natty space suit. His astronautical ensemble was much better ventilated after a disorderly retreat from the podium. Suddenly the septic auditorium atmosphere was filled with flapping road maps, sextants, compasses, atlases and up-dated *Baedekers*, while the roar of warming-up airplanes, Land Rovers and dog teams shook the very foundations of Long Hall. Russ T. Offswitch had to scream his unpolished gem above the din:

When chasing that intrepid rover,
Our Gus on remote Juan de Nova,
VanKlunk called so long
With timing so wrong
That Gus heard him sign near Europa.

The riotous throng could restrain itself no longer. There was an insane stampede to the exits and windows by clawing creatures garbed in all varieties of casual vacationwear. Tons of ill-assorted radio equipment clattered down stairs or whizzed through the air to vehicles waiting above and below. Groups of DXpeditioners raced for the highways, the docks and the airports, dragging their wounded after them. Jeeves & Co. scrambled for passage along with the rest, leaving only dying echoes amid the rubble in Long Hall.

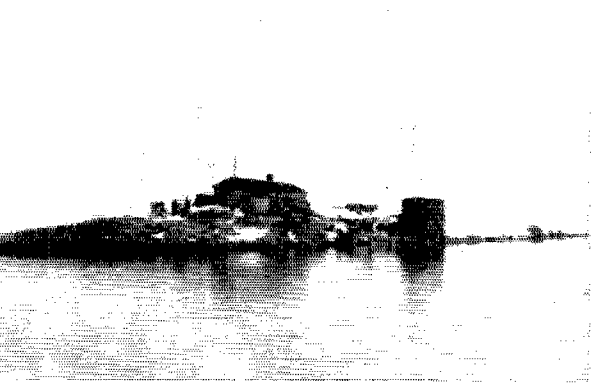
We didn't discover till later that this same fantastic DXodus was occurring simultaneously throughout the land. Hams in groups or by ones and twos were heading for the tropics, the arctic, the antarctic — even outer space — in every form of transportation known, like a host of lemmings in suicidal rush to the sea.

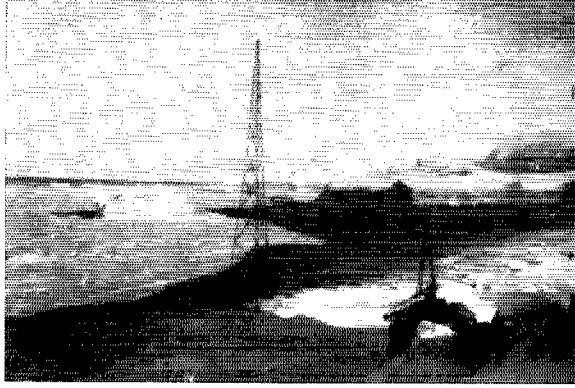
The result was hard to believe. Not only were there no DX hounds left back home to foot DXpeditionary expenses; there was nobody, but *nobody*, left in the States to work. And that is how, for one weird, wild week end, the U.S.A. became the rarest country in the world.

What:

May usually signals the fading of springtime's DX prosperity, at least so far as North American amateurs are con-

*7862-B West Lawrence Ave., Chicago 31, Ill.





LU1ZN's location on the Palmer peninsula, Antarctica, is much too reminiscent of the severe Stateside winter just past. Perhaps we should have saved it till the steam of August. Anyway, LU1ZN's 100 watts of 20-meter c.w. is widely worked by the DX gang. (Photos via W8KX)

cerned. The m.u.f. subsides to leave 10 and 15 meters on the DX ropes, while rising atmospheric noises clobber clients of 160, 80 and 40 meters. This leaves old reliable 20 to strut its summertime stuff, and it always comes through admirably. We spot-checked 14-Mc. DX doings pretty closely last month, however, so let's sneak a peek at the rest of the ranges via our "How's" Bandwagon. . . .

10 phone's north-south path is still opening for **Ks** 3BEQ 4TEA 5FSU and **WA5EEM** who report QSOs with **FG7XL**, **HC1DC**, **HKs** 1GA 4VP, **KZ5JD**, **LUs** 1DAB (s.s.b.), 4DM 7FAG, **TG9s** MP SC, XE1CV (s.s.b.) and YV4GD . . . . . K4TEA and **WA6HRS** find **CE1AD**, **HC1DC**, **XE1VT** and **YV5AGD** hanging onto **10 c.w.** by their fingernails.

15 phone is more like it, with **W8KML**, **Ks** 4TEA 4ZNJ 5FSU 5MHG 7TMJ 9CZV 9DQO 9GVA 9JPL, **WAs** 2RJZ 2RUB 2UEV 2ZVJ 4AYX 6UZA 9AUM, **WB2ALB** and tuner **WN2GLN** coming up with **CEs** 2AW 3XM 4BL, **COs** 2IL (21,265 kc.) 2200 GMT, 6JC 8HJ 8RA (250), **CRs** 6EG 6FN 7CR, **CXs** 3SB 5AS, **ELs** 2K 8C 9J/mm, **FG7XL**, **HCs** 1BA 1DC 2LA 2RM, **HH2s** CE M RS, **HI8s** JOV NEA NOG WEF, **HKs** 3LX 0AI of San Andres, **HL9KE**, **HP1DG**, **I1TDJ**, **JAs** 1ADO 1CIB 1CYV 1DIO 1EHA 1ERB 1FSL 1HMW 2BGW 3ANC 3DPY 3EVN 3EVQ 6AZQ 6CGN 6CMN 7NZ 8ADQ 8MA 8VP 8ZO 91K 0APJ 0ATU 0SU, **Ks** 4ZGB/**KV4** 0VID/**VP9**, **KA2SK**, **KGs** 4BH 6ALD, **KZ5s** RL SN SS 21, **OAs** 3M 4AR 4MB 4OG, **OX3KM**, **PJs** 2AP 2CR 3AO, **TGs** 6PB 9SC, **TIs** 2AMC 2RAG 3RB 8HMD, **VKs** 2ADE 2AMD 2APK 2HO 4KO, **VPs** 2AM 2GAQ 2GW 5BB (210), 7CT 7CX 8EM of the Falklands, **9WB**, **VQ2s** JC WR (420), W6UXP/-**KH6**, WA4s GBH/**KV4** KIZ/**KH6**, **XEs** 1BBA 1MY 2AX, **YNs** 1ST 1TP 3UH 4CF (220), 4WD 9BJM, **YS1RA**, **YVs** 1BJ 1RA 2CJ 3BU 6AV/2, **ZE2KA**, **ZLs** 1AMO 1CA 1RI 2ABP 2MZ 3QK, **ZP9AY**, **ZSs** 1A 1AB 3LE 3VP 5KJ 5OA 6IN 6WS 9G, **5H3IW** and **9G1ED**.

15 c.w. coughs up **CEs** 1AD (50), 20F (45) 22, 3AG (21) 17, **CRs** 6DX 7IZ (80) 17, **DM3FH**, **EI4A**, **FB8ZZ**, **FO8AA** (34) 23, **GC2CNC** (54) 14, **HC1DC** (80) 23, **HH2PB**, **HKs** 1QQ 7BE (19) 23, **HP1IE** (36) 21, **JAs** 1CIB 1DFN 1ERB 1HJE 1IRS 1JCQ 1JQG 1KFN 3ANH 8ADQ 8AMA 0HC 0XD, **KG4AM** (40) 17, **KM6CE**, **KV4s** AA CF, **KZ5EM** 19, **OA4AO** (88), **OE3UP**, **OX3DL**, **PI1VKL** of Holland, **ST2AR** (50) 18, **TT8AL**, **VPs** 2KR (50), **5XG** 9DC, **VQ2W** (55) 18, **VR3O**, **VS4RS**, W6ZDF/-**KM6** (3) 22, **WP4BJI**, XE1VT (72) 23, **ZB1BX**, **ZD6OL**, **ZP9AY** (10) 18, **3V8CA**, **5As** 1TW (10) 17, 2TS (40) 15, **5B4RF**, **9Q5s** AB (64), BZ and DY for patient 21-Mc. fishermen **Ws** 7POU 8KML 8YGR, **Ks** 1RHZ 1RNL 2UYG 4TEA 5MHG 6TZX 9CZV 9MDK 0JPL, **WAs** 2HLH 2RJZ 2RUB 2UEV 2ZVU 4AYX 5EEM 6HRS 6KCM 6UZA and 6VAT.

15 Novice DX-hunters **KN1VWL**, **WNs** 2DDA 9EYY and 9FMQ demonstrate keen persistence in ferreting out **CO7AI**, **DJs** 3KR 8IF, **G3s** JVC RLP, **KP4s** AOO BBN, **KV4AA**, **KZ5s** RZN TG, **OA4CG**, **PA0GRH**, **PJ3AP**, **WP4s** BJG BJJ BJU BLS and **ZP5CN**. Don't give up the ship, lads!

40 c.w.'s spring renaissance encouraged **Ws** 1GDQ 6KHS 6RCV 7DJU 7POU, **Ks** 1JFF 1KSH/4 1RHZ 1RNL 4TEA 4ZNJ 6TZX 0GVA 0JPL 0VSH, **WAs** 2HLH 2RJZ 2RUB 2UEV 2ZVU 5EEM 6HRS 6IVM 6PIB 6VAT 6WSN 9AUM 9EED, **DL9LI** and **ZS2U** to swap salutations with **CEs** 4JU 0AD (5) 0, **CM2BB**, **CRs** 7LU 8AC, **DUIs** AC DR, **EA5BA**, **EI9J** 22, **F2SY** (16) 23, **FB8s** XX ZZ (12) 17, **FO8AA**, HA1KSA 23, HH2FL, **HI8s** NSI XAG (8) 4, **HKs** 1QQ 7BE, **HL9s** KW TH (5) 16, **HRs** 1BS 3HH, **IT1s** AGA ZGY (22) 21, **JAs** 1ACG 1ANP 1BZS 1CO 1EZK 1EZP 1FHS 1FHX 1FNR 1IBX 1ILC 1ISB 1ITX 1IWM 1JCQ 1JEI 1JEJ 1JFC 1JPJ 1JRZ 1KFN 1KSJ 1VX 1XS 1YL 2BGH 2BLG 2CKI 2DN 3BQH 3CAF 3CHO 3DAZ 3DDG 3ECC 3WU 5AJQ 5AKC/mm 5PL 7ACM/mm 7AKC 7AKQ 7BDW 7XF 7YD/1 8AQX 8UQ 9XC 0AC 0OP 0SU (where are the JA4s?), **KA2KS** (21) 10, **KC4USN**, **KG4s** AM BT (60) 6, KH6s galore, **KL7s** likewise, **KM6CE** 6, many KP4s, **KR6s** ED (1), 16 EJ, **KV4s** AA (4) 0, CI, **KX6AJ** (12) 9, **KZ5s** AF GW MQ OX (12) 5, **MP4QAA**, a host of OKs, **OX3AI** (37) 17, **PJ2AE**, some PYs, **SPs** 3ART 8AMI, **TI2FP**, **UA0s** FF KDA (15) 17, KFG (21) 16, **UB5s** KBK QT, **UG2AR**, **UR2KAN**, **VKs** 6RU 7ZZ, **VPs** 2KR 2MV 9DC 9L, **VRs** 2EM (30) 9, 3E 3O 3W, **VSs** 1LJ (23) 15, 1LP (1) 12, 9AAA, W6ZDF/**KM6** (31) 5, **WH6EXR** (150) 8, **XEs** 1FFU 1RM 1UE 2OK (28) 8, **YN1CA**, seads of YVs, ZLs in quantity, **ZSs** 2HI 4AC and 6KD . . . . . W1APA, **Ks** 4TEA 4ZNJ 6TZX 0AXU 0GVA 0JPL, **WAs** 2UEV and 9AUM hit stubborn **40 phone** for **HR3HH**, **KZ5s** AF and MA on straight a.m., **KH6DBY**, **YV5AGD** and **ZS6IF** on single-sideband.

80 c.w.'s season is finishing strong after a slow take-off. **Ws** 1SWX/1 3GQF 3WZL 7DJU 7POU, **Ks** 4TEA 0JPL 0VSH, **WAs** 2HLH 2RUB and 6IVM give us the lowdown on such 3.5-Mc. availables as **CT1HX**, **DM2ABL**, **EI9J**, **F8VJ**, **G4CP**, **GI3OQF**, **GW3JI**, **HAs** 1KSA 5KBP, **HB4IP**, **HC1DC** (27) 10, **HI3PC**, **HK3AH**, **IT1AGA**, **JAs** 1CGM 1CO 1ON 2WB 6AK, **KG4CY** (23) 2, **KH6EYP**, **KP4s** CC TIN, **KV4s** AQ CF (12) 5, CI, **KZ5s** CU OX, LA7RF/mm, **OE1RZ**, plenty of OK-ON-OZs, **OX3DL**, **PA0s** PN QU VG, **SPs** 1HU 6ALD, **ST2AR**, **UAs** 3KAR 0KDA, **UB5WF**, VE1MW/VO2 (3685) 6, **VK5KO**, **VPs** 2LS 5XG 7NT 8GQ 9L, **VQ4IN**, **VS1LP**, Ws 4WQQ/**VP9** (22) 10, 5HCZ/VO2 5JDX/**VP9** 6ZDF/-**KM6**, **XEs** 1AX 1OK 2OK 9, **YV5s** AGD (1) 9, ANT BOE BRD DE, **ZLs** 1AMO 1AXB 4MF, **ZS1A**, **4X4WF**, 5A3CJ and **5N2ACB** (5) . . . . . K4TEA tries **75 phone** for folk like **G2PU**, **HC1DC**, **HI8XAG**, **ON4UN**, **VPs** 2LS and **3HAG** on sideband, **CO8RA** on old a.m.

160 c.w., suddenly usable in areas heretofore closed to the band, wound up the 1962-'63 DX season in a blaze of glory. W1BB's *160-Meter DX Bulletin No. 4*, the season's finale, lists the following DX worked or workable on top band: **GT1CO**, **DL1FF**, **EI9J**, dozens of Gs, **GI6TK**, **GM3KLA**, **GWs** 3JI 8PG, **HB9CM**, **HC1DC**, **HK7ZT**, KH6EGL/**KM6**, **KL7s** AKC AUV, **KP4s** AQY ASK AXU, **LU3EX**, OHs and PA0s, **OKs** 1AFC 1CJ 1KUR 2KOJ, **OY7ML** (a first for W1BB), **SP3RH**, VO1DX, **VPs** 5CZ 5XG 7NY 8GQ, **VR3O**, XE2OK, YV5s AGD ANT, **ZB1BX**, **ZLs** 2DK 3OX 3RB and 4LZ. As we rather repetitiously point out every year about this time, the static barrage eases south of the equator just as it increases up our way. Watch out for some surprising DX when those unusually quiet summer evenings come along. Last July, for example, several W/Ks found themselves in QSO with VP8GQ on 1.8 Mc., and VK contacts came along a few months later. Lots of elbow room for most of us on 160 now with those new frequency allocations. It's not too early to start planning for the fireworks upcoming this autumn!

Where:

Hereabouts — Gee whiz, lots of "QSLers of the Month" this month. Let's dip our beam booms toward CR6CY, CT3AB, DL9KP, DM3ZCO, EA4GZ, F8VP, FG7XT, FO8AA, G6CJ, GI3JIM, HC1DC, HL9KH, HP1IE, KG1FR, KM6CE, KZ5JD, LA5KE, MP4BBW, OA4s HS MB, OE8BQ, PY2CHM, TI3RB, UA6KOD, UD6AAI, UP2NN, VE3FFW/SU, VPs 3RW 5BB, VQs 2AB 8AI 9A, WG6ALS, YN9BJM, YVs 1DP 1CP, ZDs 6JJ 8DW, ZL1ABZ, ZS6s AOW and IF/9, plus QSL managers Ws 2CTN 4ECI 6BAF 8EWS 9RKP 9VZP, Ks 3HQJ 3NKV 5AWR 5SWX 0BLT and ZL2GX, all nominated for prompt QSL performance through "How's" correspondents Ws 4PC 7QB 8GMK 8YGR, Ks 3MNJ 3SPQ 4TEA 5FSU 9CZV, WAs 2RJZ 2RUB 4AYX and 6VAT. Any deserving candi-

dates for such recognition in *your* log lately? .-.-.- Ks 9CZV and ØGVA offer their talents as QSL aides to needful overseas DX operators .-.-.- Help! K2UYG is anxious for a push toward confirmation of a W6YCW/KJ6 QSO, K6TZX needs a clew on AP5AH, K9CZV wants the word on 4X4HK, all worked last year, and WA6VAT wonders what's with the apparent lack of QSLing by TI2 DXers .-.-.- Jeeves jammed his foot into W8KX's mouth in March *QST*, so now we'd better get W3AYD back home to P.O. Box 731, Rockville, Md., where he belongs. W3KVQ is the fellow who was quoted on p. 68, not Mike, and Ed is the future WB2 at 2308 Branch Pike, Riverton, N.J., not W3AYD. [Boss, you wouldn't even make a decent WB9. — *Jeeves*] (Well, we've always wanted to be Zeroes, Jeeves, and we finally made it!) W3AYD chides, "I've never felt that QSL managerships are 'thankless jobs'. Hundreds of thankful letters received from friends all over the world, and occasional listings of W3AYD in your 'QSLers of the Month', are rewarding." .-.-.- K6TZX and WA8AVH confirm that W2ZMT knows naught about QSLs for last Christmastime's VP2MZ tomfoolery .-.-.- Help! W6KHS seeks tracers on KG4AO '54, KX6BU '62, VE0MC '61, VP9IVM '58, VSs 2DW '55, 6CR '54, XE2BC '55 and YN4CB '56, while KØARS hunts hints on K6BAZ/FO8, VP5BL, VQ3s SS TL and W2EPS/KJ6 .-.-.- W1ECH and VE2BK indicate there ain't no legit VO3s no more. If you do catch one, throw him back quick .-.-.- "Finally received the first batch of QSLs my good friend HI8JSM has been holding for me," reports ex-HI8DGC, now VE3FKC. "I have several hundred cards to answer and I'll get at them as soon as possible. The majority cover last year's ARRL DX Test. I had hoped to be able to send answers direct but, because of the quantity involved, this will not be possible. Those who enclosed IRCs or equivalent will get theirs direct but others must go via bureaus. All logs are on hand and all QSLs received will be answered." .-.-.- TG6PB promised to come through with logs to enable WA4AYX to perform as his QSL agent. Pete emphasizes the need for self-addressed stamped envelopes or International Reply Coupons if direct reply is desired .-.-.- "KZ5s cannot ship mail from the Zone bearing U. S. postage," points out KZ5AF operator K2GAO/WA4KTG. "The stamp value required is the same, however, so I believe the quickest way to obtain a C.Z. card is to send your QSL with self-addressed envelope plus *loose* U. S. postage or International Reply Coupon, either of which is exchangeable here. If this is always done I'm sure KZ5 QSLs will leave here more regularly and quickly."

Asia — Ex-KA5AS writes from Memphis, "Tried my best to keep up with requests for QSLs. Some may have been overlooked among the hundreds received. I have complete logs and a supply of KA5AS QSLs." Drop a line with s.a.s.e. to Ben's K4ULT/4 address in the listings to follow.

Africa — VQ4ERR and 5X5AU apprise W1ECH of ARRL Hq. that VQ4 bound QSLs can go via Box 30077, Nairobi, Kenya; 5X5 (VQ5) via Box 3433, Kampala, Uganda; VQ1 and 5H3 (VQ3) via Box 2387, Dar-es-Salaam, Tanganyika. Here's a good spot to remind DXers that the QSL bureaus of quite a few overseas radio societies handle incoming QSLs on a members-only basis. QSLs bound for nonmember stations in their countries may be pigeonholed for coercive purposes, returned or destroyed. So, unless you don't mind a poor return percentage on your QSLs, ship via overseas bureaus only when instructed to do so by the stations worked. On the other hand, your ARRL QSL Bureau serves any U. S./Canadian amateur, member or not .-.-.- "Please announce that I now act as QSL manager for EL3A," writes W3NNC requesting self-addressed stamped envelopes .-.-.- "I've worked hundreds of W/Ks and have QSLd them all, including QSOs in the 1962 ARRL DX Contest," testifies VQ2AT. "My returns for this have been very, very poor — about 17 per cent. Is this playing the game? Apart from those sent out by my QSL manager, WA6HOH, and the few I have sent direct, all VQ2AT cards go out via bureaus. If anyone who has worked me has not yet received my QSL I should very much like to hear from him." Art is told repeatedly during s.s.b. QSOs how difficult it is to get a VQ2 confirmation. It's going to be even tougher in the future if W/Ks don't do more QSLing with their complaining .-.-.- VE4OX, still smarting from terminated EL6E QSL-managerial experiences, is game enough to try a similar arrangement with 9G1EO. "Logs already are coming in. Self-addressed envelopes with postage get immediate reply; other answers go via the bureaus every six months, me paying the post."

.-.-.- "ZD3P logs are at last posted to me and I hope to get the QSLs out in the very near future," declares RSGB's G2BVN in VERON's *DXpress* .-.-.- A juicy prefix may help get QSOs, but VQ8AI echoes a difficulty voiced by VQ2AT. Raoul tells W8KX of his not-quite-DXCC 135/88 countries worked/confirmed over a 20-year stretch .-.-.- W2HMJ says he can assist in the confirmation of all 9Q5AAA QSOs, also 9Q5AB contacts dating from February of this year .-.-.- K9QIZ wants to close the books for 5N2NFS QSL matters on activity ending last December. S.a.s.e., to be sure.

Oceania — "VR2DI is carrying on ex-VR2AS's good work with our QSL bureau," commends VR2BC. "The address is the same as before, P.O. Box 184, Suva." .-.-.- VR2EH explains that he and W8WFB are in disagreement on the handling of VR2EH QSLs. Denis wants to do the job himself henceforth and urges all stations QSOd to reapply for cards to him via the aforementioned Fiji bureau. "I visit the bureau weekly and, if International Reply Coupons are enclosed, I will reply by direct air mail, otherwise via direct surface mail. I hope to have QSLd all contacts 100 per cent before I leave Fiji in October." .-.-.- WA2IZV and others witness that W9UCL has no FO8 QSL affiliations, recent radiational indications notwithstanding .-.-.- FO8AA responds promptly on receipt of three IRCs, finds W7QB .-.-.- HL9KH assures that financial aid to help defray DXpeditionary expenses for W9WNV/KG6R Rota operation and any of Don's future DXcursions, while much appreciated, will not become involved with QSL considerations .-.-.- Got a few cards to answer? Long Island DX Association hears that VK9LA's backlog weighs in at 3000 or so.

Europe — S.w.l. J. Hart tells W1WPO of ARRL's DXCC Desk that UA2AO desires s.a.s.e., or s.a.e. with IRCs, to expedite his QSL labors in behalf of UA1CK, UA1CK/Ø and UA1CK/UH8. Anatoly promises prompt response .-.-.- "Please let the gang know that I have no QSL responsibilities for HV QSOs," requests I1FO. "Sorry — the HV2 who advised 'QSL via I1FO' must be a pirate." .-.-.- Contrary to previous information, OE1FF hasn't yet succeeded in obtaining authorization to operate from Albania. "Only a relatively few amateurs possess genuine ZA QSLs. If I ever should get a permit to work from there I'll surely let you know. I'd expect pile-ups much worse than when I operated from Liechtenstein and Luxembourg!" .-.-.- Collectors of ham literature may be interested in a copy of the first *Polish Amateur Radio Call Book*, a neat new 72-pager edited by SP5PA of Poland's PZK. Eight IRCs or equivalent will bring one from Warsaw Shortwave Amateur Radio Club, P.O. Box 298, Warsaw 1, Poland.

South America — Ex-PJ3AI writes from the address in the roster to follow, "Anyone still needing a QSL for my Aruba activity is invited to contact me. I still have some cards on hand and all QSO records." .-.-.- VP8HK, trekking with the British Antarctic Survey crew, will QSL next year, according to the LIDXA newsletter. Well, better then than never .-.-.- Here's our monthly QTH catalog, suggested addresses that are necessarily neither "official," complete or accurate. Help yourself:

AP2AR, 36 Purana Paltan, Dacca 2, E. Pakistan
CE0AD (via CE1AD)
CM2BB, Calle de Omoa 363 altos, Havana, Cuba
CN8FE (via K3NKV)
CO6AH, C. Rodriquez, 56 Av. 4720, Cienfuegos, Cuba
CO6FB, Box 14, Cienfuegos, Cuba
CR7IZ (via K3HQJ)
CR8AA (to W9JJF)
EA9AZ, R. de Castro, Box 213, Melilla, Sp. Ceuta y Melilla
EL3A (via W3NNC)
EL7A, Box 565, Monrovia, Liberia
EP2RC (to K1KOM)
ex-ET2US/ET2 (to EP2RC)
ET3FW (via K3HQJ)
ET3USN, J. Pringle (K4JRW), APO 843, New York, N. Y.
F9KL (via VE2BCT)
FH8CE (via W4ECI)
FR7ZC, P. Ferrand, Marancourt, Ste. Suzanne, Reunion Is.

LA1LG/p of Jan Mayen found ten pounds of QSLs awaiting his return from a Key West vacation. Erik draws this mail with a 150-watter, HRO and ground-plane.
(Photo via W8KX)

GB3RAF (via G2BVN)
GC3IFB (via G8KS)
HC1WW, J. Watson, c/o U. S. Embassy, Quito, Ecuador
HI8XAA, D. Packard, c/o U. S. Embassy, Santo Domingo, D. R.
HK7AME, A. Rodriquez, Box 222, Bucaramanga, Colombia
HL9TH (via KARL)
IIBAZ, via Franchi 39, Prato, Firenze, Italy
IISR, R. Sellani, P.O. Box 68, Pesaro, Italy
JA1EEB/KG6 (to JA1EEB or via JARL)
K8KHX/VE8, L. Smith, c/o Fed. Elec. Corp., Hangar 9, Winnipeg Natl. Airport, Winnipeg, Man., Canada
ex-KA5AS, A. Singletary, K4ULT/4, 1847 The Oaks Av., Memphis 27, Tenn.
KC4s AAC USN, c/o Dept. of External Affairs, Antarctic Div., 187 Collins St., Melbourne, Vic., Australia
KC4USH, c/o 1922 W. 8th St., Muncie, Ind.
KC4s USV USR USX, Navy 20, Box 16, FPO, San Francisco, Calif.
LA9RG/p (via LA8LF)
LU5ADU/mm (via RCA)
MP4BBR (via MP4BBW)
OA3L, R. Letourneau, Box 91, Lima, Peru
OD5AX (via RSGB)
OX3BT (via OZ7UU)
OX3KW, K. Thomsen, Fredrikshaab, Greenland (or via EDR)
PJ2AF (via K4OGT)
ex-PJ3AI, R. Holly, Rte. 1, Box 280, Newton, N. J.
PY7OS, Box 285, Paraiba, Brazil
PZ1AX (via W2CTN)
SP5AFL (via K4EF)
TF2WHB, AFU, Box 6, H2, Navy 569, FPO, New York, N. Y.
TF2WHY, Box 6, Navy 568, New York, N. Y.
TG6PB (via WA4AYX)
TI2WD (via W2CTN)
UA1CK-UA1CK/UH8-UA1CK/Ø (via UA2AO)
UA2AO, A. Moskalenko, P.O. Box 77, Kaliningrad obl., U.S.S.R.
UT5BH, Box 322, Kiev 6, Ukrainian S.S.R., U.S.S.R.
VE8TU, RCAF Namao, Edmonton, Alta., Canada
VP2AB, J. Brown, P.O. Box 340, Antigua, W. I.
VP7NS (via W2CTN)
VP8GQ (to G3PAG)
VP8HK, British Antarctic Survey, Port Stanley, Falklands
VP9L/VP2 (to VP9L)
ex-VQ1-3-4-5GF (to ZL1AYO)
VQ2AT (via WA6IOH)
VQ2JM (via W2CTN)
VR2EH (via VR2FRC)
VR2EO (via W8EWS)

W4BPD, left, attended by G. Mazery (brother of VQ4GT) and VQ8AI, gets a customs check before embarking on another leg of the supercolossal DXpedition that has activated a batch of exquisitely rare DXCC countries. Gus enthusiastically begins his second year of DX wanderings with all sorts of juicy operational possibilities in mind. Where will W4BPD turn up next? Hard telling, but it's bound to be a choice catch. You'd better keep a close watch on 14,035 kc. like everybody else!
(Photo via VQ8AI, Ws 8KX and 9GFF)

VR3E, G. Lewis, Tank Gp. 8.5, APO 86, San Francisco, Calif.
VR3O (via WA6MAZ)
ex-VS1HY (to VQ4HY)
VS5CW (to VS1CW)
VS9ADV/4W1 (via VS9AAA)
W8UPV/VO2, V. Lewis, jr., c/o Svc. Club, APO 677, New York, N. Y.
W9WNV/KG6R (via W9VZP)
YA1AW (to K5YYP)
YA1BW (via DL8AX)
YK2MN, P.O. Box 251, Damascus, Syria
YV1ES, J. Naranjo, Box 154, Maracaibo, Venezuela
YV1LA, J. Grzesiowski, P.O. Box 3, Punto Fijo, Falcon, Venezuela
YV2CU, I. Osuna, Box 32, Barinas, Venezuela
YV3AV, F. Mattera, Box 348, Barquisimeto, Venezuela
YV4DU/5, B. de Gonzalez, P.O. Box 143, Maracay, Venezuela
YV5BOE (via RCV)
ZB1CR (via W2CTN)
ex-ZC4RP (to G3MRP)
ZE4JN (via W9JEM)
ZL1AYO, H. Seaman, 86 Taylor St., Blockhouse Bay, Auckland SW3, N. Z.
3A2CL (to IIRIF)
ex-5N2AMS, c/o Barclay's Bank Ltd., High St., Littlehampton, Sussex, England
ex-5N2NFS (via K9QIZ)
9G1EO (via VE4OX)
9G1GT (via W4HUE)
9Q5s AAA AB, c/o A. Nickel, W2HMJ, 65 Cromer Rd., Elmont, N. Y. (see preceding text)
9Q5RCS (via VE3BCL)

You can thank donors **Ws** 1 ECH 1GDQ 1SWX 1WPO 1YYM 6KHS 7QB 8YGR, **Ks** 1RHZ 2TDI 2UYG 3KMA 3MNJ 3SPQ 6TZX 9CZV ØGVA, **WA2s** HLH IPC IZV RUB, **WN2GLN**, **ZS2U**, **DJØHZ**, **DL9LI**, J. Hart, American SWL Club *SWL* (6204 E. 109th Ter., Kansas City, Mo.), DARC *DX-MB* (DLs 3RK 9PF), DX Club of Puerto Rico *DXer* (KP4RK), Florida DX Club *DX Report* (W4CKB), International Short Wave League *Monitor* (12 Gladwell Rd., London N. 8, England), Long Island DX Association *DX Bulletin* (W2MES), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), Northern California DX Club *DXer* (WA6TGY), VERON *DXpress* (PAØs FX LOU VDV WWP), and West Gulf DX Club *DX Bulletin* (K5ADQ) for the preceding directory. Any interesting QTHs among *your* recent loggings?

By the way, the RSGB QSL Bureau will be closed down from May 23 to June 10. G2MI asks that you do not send any QSLs to arrive during that period.

Another slip-up somewhere along the way, or someone with a perverted sense of humor. Cards for 6O1ND should *not* go via W4TUA. Cards for all 6OIs may be sent to Box 397, Mogadiscio, Somali Republic.

Whence:

Europe — Russia's annual c.w.-only U.S.S.R. DX Contest takes the DX stage this month from 2100 GMT on the 4th to 2100, the 5th, 3.5 through 28 Mc. You may use the entire 24-hour contest period but each log entry must cover no more than your best selected 12-hour stretch. Everybody works everybody else in this one, but QSOs between amateurs in one "populated place" (cross-town QSOs?) are not considered cricket. "CQM" is the contest call, the usual RST001, RST002, etc., serials will be exchanged, and a given station can be worked but once per band. Each completed contact counts one point, this total to be multiplied for final score by the number of different ARRL DXCC countries accumulated during the grind. Log entries go to the Chief Judging Board, P.O. Box 88, Moscow, and must be mailed by May 15, 1963. Certificates of merit will be available to certain high-scoring participants and there's a single-band (3.5 Mc.) supremacy category to shoot for. Your submitted logs may help you qualify for such U.S.S.R.-issued sheepskins as W-100-U (100 different soviet stations) and R-150-S (150 different countries). The sample log shown on p. 25, April 1962 *QST*, may be informative. K3CUI assisted in the preparation of this condensation of participation particulars. . . . . W1NTH understands that LA8SE/p of Jan Mayen gets on daily around 1200, 1630 and 2200 GMT, transmitting on 14,080-kc. c.w. and 14,150-kc single-sideband. Bjorn usually listens on 14,090 kc. for c.w. answers, on 14,270 kc. for phone comebacks. LA8SE/p may have a 500-watt linear perking by this time and he's considering more 7-Mc. work. . . . . SVØWZ writes finis to his long Crete DX career and sets out for San Antonio this month. W1YYM of ARRL has it that Sarge will be digging for DX pals as W7FTU/5. . . . . DJØHZ, changing local QTH to Nuernberg this month, got a large charge in working W/K/VE/VOs on 80 c.w. in the recent ARRL Test. "Eighty is my favorite band but I have a heck of a time raising a decent piece of wire over here." . . . . G3PIT lined up G3s MZM NUH PKB PWT RSE and a few others to help man Cambridge U.'s GD6UW venture in March and April on 10 through 160 meters. . . . . WB2BOM forwards info on Czech ham licensing from

HA5BU, QSL manager for HSRL, has a familiar call on 20 c.w. with 80 watts. Pista now has a new HRO-50 to supplement this comfortable Budapest layout. (Photo via W5UXE)

OK1KCI: Class C is their novice type, 10 watts of c.w. on 1750-1950 and 3599-3650 kc. with a stiff 16-w.p.m. code requirement. Class B entitles one to 50 watts (still 10 on p. 160) on all bands and modes after a tougher tech exam and demonstrated 20-w.m. c.w. ability. Class A is the top notch, up to 200 watts input on all bands except 160 where the 10-watt restriction prevails, after gaining extensive technical knowledge, a code speed of 24 w.p.m., and three years of Class B experience. At recommendation of the country's Central Radio Club, a Class A ham can be authorized a kilowatt input. The minimum age for all licensees except "club novice" is 18 years . . . . Tip from WGDXC: If you run into PX7OAC later this month, 'twill be F7OAC staffers on a delicious DX lark . . . . LIDXA, aided by RCA Communicators, put a merciful end to the 20-meter buzz-saw parasitic of Madrid's EAM42, a gargle that plagued DXers for a spell last winter. . . . The phone section of the PACC Contest will be held from 1200 GMT May 4 until 1800 GMT May 5, 1963. Rules the same as last year (see page 74, May, 1962 *QST*), with logs to be postmarked no later than June 15 and sent to VERON Contest Manager PA0VB.

Asia — W4BPD, the orbiting Orangeburger, has been overheard on 14 Mc. by ZS2U and others in huddles with HL9KH (W9WNV) about the possibility of joining DXpeditionary forces for assaults on E. Pakistan, Bhutan, Sikkim, Nepal, and so forth later in the year . . . . K2UYG regrets, "Currently active YAs on 14-Mc. c.w. and sideband seem to choose uniformly poor locations for working the U. S. east coast." YA1AW, prominent on 14,110-through-14,350-kc. sideband between 1300 and 1600 GMT, expects to remain workable till September . . . . 5B4WR calls attention to the Cyprus Award, a diploma inaugurated in December, available to DXers who collect a certain quantity of 5B4/ZC4s on various bands since July 1, 1962. For details check with Cyprus Amateur Radio Society, P.O. Box 216, Famagusta . . . . K1EBY departs Turkey for McChord AFB, Washington, where he hopes to try his DX luck as a Seven. For sixteen months Frank ran into a stone wall in efforts to obtain hamming authorization at Izmir. "I wish the best of luck to anyone who wants to operate an amateur station in Turkey. He surely will need it." . . . . EP2AM (W4EXM) has a Collins outfit in Tehran on watch for his many on-the-air buddies . . . . "The JARL (Japan) certification situation is much improved," thinks WA6HRS. "After two years I finally got my AJD wallpaper and QSLs back."

Africa — "FB8ZZ, with ex-TT8AG operating, shows up almost daily at 1500-1700 GMT near 7015 kc.," observes K6TZX. "His 100 watts and ground-plane put a beautiful signal into the west coast. He can even be heard through the QRM he generates on brief CQs. Louis usually tunes about five kilocycles above his transmitting frequency." . . . . Former VQ1-3-4-5CF is back in action as ZL1AYO. "I extend an invitation for visits from any ARRL members who happen to pass through Auckland," writes Sailor. "Telephone 885-825 or try my new address [see 'Where']." . . . . W4GCB may visit Ascension isle for a lengthy assignment with hopes of ZD8 DXing. "The thought of just s.w.l.ing from there for 18 months is giving me a pain." . . . . EL4A (W7VCB) and XYL EL4YL pass along very 73 to their host of DX friends while they vacation in Europe and the U.S.A. "We hope to be back on the air by September from a new rare QTH. Wherever we go we'll be in there pitching with as many QSOs and QSLs as possible." . . . . W3AFM, via 5R8CM, relays W4BPD's remarks concerning his recent Comoros effort: "The whole FH8C'E deal was very disappointing to me because they turned the power off every night at 2000 GMT until 0300 GMT. I could stay only two nights and a day." Gus hopes to get back there with his own power plant for a more thorough ten-day operation after taking care of Tromelin demand. By the way, the cost of W4BPD's peregrinations is running high. If you are among the thousands of DXers who have been well entertained by this amazing odyssey you might check with W4ECI, Stateside liaison, to see if you can help extend the jaunt . . . . 5R8BC, who claims a phone QSO with FB8WW last December, tells W9RB1 and VERON that the Crozet station will become more active next year . . . . DL1VR/EA9 had LIDXA and other lads scanning madly for 14,280-kc. Ifni s.s.b. in March.

Oceania — VR2BC brings us up to date on DX doings out Fiji way: "We lost VR2AS to New Zealand. Stan was the real stalwart of amateur radio here and for years did sterling work as manager of our QSL bureau. We all miss him but hope to hear his Ranger with a ZL call soon. . . . VR2AK goes back to VK2-land. Des was just getting set up and really active when he got his marching orders. . . . VR2DK is due back from vacation to resume his very effective brass-pounding. . . . Also active are VR2s AB AW BZ CC DC DI DS EB EH and EK. . . . *Vasme III* brought VP2VB to Suva. Danny is VR2EO while the boat gets overhauled. . . . VR2BC awaits an HT-37 for s.s.b. action to feed a 3-element plumber's delight on 20, and a ground-plane on 40." . . . . It took a heap of teamwork to activate W9WNV/KG6R in February for 5242 QSOs on 10 through 80 meters, c.w. and sideband. In addition to the operational help and equipment contributed by K2QGC/KG6, KR6BH and WA6ROP/KG6, Don (HL9KH) acknowledges key assistance by HL5X (W2AYN) who supplied gear, KG6AOJ who provided air transport aided by K2FLM, W9VZP for QSL representation on the home front, and many high-ranking nonhams whose cooperation was vital to the venture. Some of Don's DXpeditionary comments: "We started out with dipoles on 20 and 40 meters, replaced them with an old tribband beam next day which was quickly demolished by high winds, and then erected a TH-3 and dipoles for 40 and 80. . . . Phone operations were headed by K2QGC/KG6 although all four of us put in time at the mike. I eagerly grabbed most of the c.w. time with Ray and Eddie also sneaking in a few hours at the key. . . . WA6ROP/KG6, a chief machinists mate, engineered our antenna installations and kept them aloft. Ernie also was the only member brave enough to chew on the island's delicacy, freshly cooked octopus meat. . . . Fifteen meters was a pleasant surprise but 40 and 80 featured overpowering JA VK and ZL QRM plus horrendous QRN. . . . I single-operated the ARRL Test for about 1100 QSOs although the U.S.A. was workable only 28 of the 48 hours. W9HUZ was worked on 80 through 10 meters. . . . Wind and corrosion are amateur radio's No. 1 public enemies in this area. My trusty keyer quickly suffered corroded relay contacts which gave me an exhausting workout on the bug until it was cleaned and repaired. . . . There is excellent fishing and shelling around Rota but one must learn to cope with the slippery and jagged coral. Seeing sharks playfully chasing their dinner is an awesome reminder not to venture beyond the reefs for better swimming." . . . . K6TZX notes, "KR6EK (W7QDJ) is suffering from DX effects of a local power 'brownout' from 0845 to 1230 GMT. Vic participates in propagational experiments for Stanford University."

PJ3AI leaves all this to become an ordinary WB2 soon. Reed won't get as many answers to CQs from New Jersey but he looks forward to receiving his *QST*s more promptly, anyway. (Photo via W1ECH)

HL9KH occasionally leaves this Osan hamshack for such DXcursions as W9WNV/KG6R where he, K2QGC/KG6, WA6ROP/KG6 and KR6BH (K5LXZ) collected some 5200 QSOs from Rota island in mid-February.

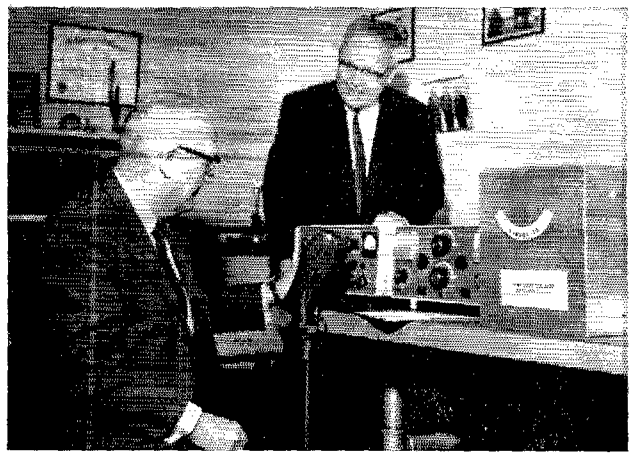
. _ . _ . _ KC6BD (W7FNK) expects to close his Truk log this month. W8KX relays some of Jack's Eastern Carolines DX observations: "I recall working W8KX from KP6AL on 10 c.w. in 1958. Poor conditions here since December have lessened my DX activity. I'm mostly on 7 Mc. these days though not frequently. My gear includes a hurricane-tested NC-300 which works well though badly rusted. I recently replaced my 750-watt 813s rig with a more compact 4-400A at 600 watts, a unit that will fit into my boat more conveniently when I leave here as W7FNK/mm. My antennas have dwindled to a single short vertical. I've managed about 150 countries as KC6BD and I always tune alternately higher and lower than my own frequency in pile-ups. Most good operators learn this quickly. KC6BC is operating at Xavier High School where quite a lot of electronics gear has become available thanks to donations by manufacturers. See you from W7FNK/mm, a 48-footer of quarter-inch steel!" . _ . _ . _ W7QB wants to know where all the VK-ZL c.w. men are hiding . _ . _ . _ Club sources supply further Pacific-type patter: 9M2GV's tour of VS4-VS5-ZC5 regions with a Swan s.s.b. transceiver may conclude this month. . . . VK3AHO itches to sign VK9BH on Nauru, meanwhile skedding Macquarie's VK0DM on 14,130 kc. at 1030 GMT. . . . JA1EEB/KG6 continues to put Marcus isle on phone and c.w. for 40-meter fellows, also sampling 14.040 kc. on occasion. Yuu is with a government meteorological team. . . . VS1FJ's RAF friends menace the DX rarity of Christmas (VK9) isle. So do flyboy ZS6LM & Co. . . . VK9GP's departure from Norfolk island makes a scarce spot even scarcer. . . . VP2VB/mm and *Yasme III* head for the U.S.A. from Fiji for a hiatus in a DXpeditionary career that spans eight years and thousands of QSOs from dozens of difficult DXCC countries. . . . VK0NL's Heard isle 14-Mc. c.w. status in February was elusive to say the least. . . . VR6AC now is determined to go out after his own phone-type DXCC diploma. . . . VK7s LZ SM and ZZ make Tasmania a c.w. cinch on 40's low edge. VK7AG likes to surprise the 3.5-Mc. bottom-end boys nightly around 0800 GMT. . . . ZL1ABZ, who should be KermaDXing till November, now is all set for c.w. on 15 through 80 meters. . . . ZL2GX fired off a new c.w./s.s.b. exciter to ZL4JF of the Campbells, so John will be adding sideband to his delectable 20-40-80 c.w. attack.

South America — K7KBN reports a pleasant visit to K7RWN by OA4s BI and OK, OM and XYL. Sooner or later, it seems, everybody takes in Las Vegas . _ . _ . _ W9NN wonders where all the new Venezuelan amateurs are coming from. There's a big ham boom down there, all right. WA2IPC comments on the outstanding 20-meter a.m. signal of YV1LA's homespun kilowatt and TA-36 sprayer . _ . _ . _ Long Island DX Association's WA2WUV had hoped to keep a KWM-2 and TA-33 hot on the Galapagos till this word gets around . _ . _ . _ VERON hears from CE3AG that a fresh CE0AD operator can be expected to exhibit more DX interest from Easter isle . _ . _ . _ Florida DX Club assisted in securing an SX-111 to replace the venerable S-40B at HK0AI. The club's last HK0ZU invasion left Victor with a supply of other components that should enhance his San Andres catchability. By the way, FDXC's San Felix plans didn't quite jell but they've got other tempting DXpeditionary ideas on tap.

Hereabouts — OX3AI is well air-conditioned for the summer ahead with a QTH some 600 miles from the pole. DL9LI finds Jorgie's KWM-2 and long-wire amply audible on 7037 kc. around 1600-1700 GMT . _ . _ . _ W3AYD commends the warm hospitality of KP4s CK and CL during his recent P.R. visit . _ . _ . _ "Having tasted the fruits of being DX, I fear it will be rough going from the QRM end," muses ex-HI8DGC, now VE3FKC. "But I'll pull some odds and ends together and make some VE3 smoke before long." Doug managed a 129/111 DX tally as HI8DGC . _ . _ . _ Ws 4PC and 9PAO enjoyed a winter visit by DJ6QH . _ . _ . _ Fifteen-year-old WA2HLH would like to hear from other teen-aged 3.5-Mc. DX diggers . _ . _ . _ W8ECO/6, at 671 E. Julian St., San Jose 12, Calif., wants information on amateur radio doings on the Mexican island of Cozumel. Can our XE readers enlighten Sparky? . _ . _ . _ K1KSH/4 left his 160-meter antenna farm up north for an Air Force tour in Albany, Ga., where his portable 25-watter and quarter-wave wire are getting interesting 1.8-Mc. results. Gary and the rest of the gang down that way are elated at finally being able to join the Yankee boys in pursuit of 160-meter DX . _ . _ . _ Bill Schultz, 214 Rutherford Pl., No. Arlington, N. J., takes the helm of Newark News Radio Club at the passing of NNRC's beloved President Potts. This well-knit organization of ace s.w.l.s, many of them licensed amateurs, has been a stanch friend of ham radio for a quarter of a century . _ . _ . _ Consult Guadalajara Radio Club, Aptdo. 726, Guadalajara, Jal., Mexico, for information on the Diploma Guadalajara, a certification available to DXers who work a certain number of the club's twenty members (W/K/KL7/VEs need five) since August 18, 1962 . _ . _ . _ K1RNL and others would appreciate an upward QSY by rag-chewers on 40's low edge when the long skip is favorable to DX. Overseas stations usually don't hug the bottom of 7 Mc. by choice. It's the only chunk of the band many of them are authorized to use . _ . _ . _ W8YGR, evidently mellowed by spring fever, says his only gripe this month is directed at the local power company's dirty insulators. April's showers may have washed 'em off a little. Wonder if Jack likes eggs with his hash . _ . _ . _ The DX Club of Puerto Rico is a new outfit on the long-haul front. KP4RK edits DXCPR's peppy *DXer* in behalf of members KP4s AKS ANJ AQQ ATY BBN BJD CC CO GN HH QA and TL. Some of those birds are tough competitors in the pile-ups. To see what we mainland DXers are up against, take a peek at KP4TL's antenna shennanigans on pp. 72-73, February '63 *QST* . _ . _ . _ VERON learns that W0MLY has his KC4LY Navassa credentials but the place still is off-limits due to the restive Caribbean situation . _ . _ . _ The squeeze is on all over, men. We hear that even W1AW's trusty rhombic is running out of room . _ . _ . _ After kicking Jeeves smartly in the shins, W9VES good-naturedly points out that he (as W1ZDP), not W1JMY, generated the deathly prose quoted in the March "How's" lead with reference to ARRL's 1953 DX Contest. All right, guys — you're *both* great . _ . _ . _ WA6TGY'S popular NCDXC *D Xer* reveals that famed *QST* author W6ISQ, laid up with a heart problem, endured the added indignation of gazing out his hospital window to see a near-by rotary beam twirling about in obvious pursuit of juicy DX. Jack vainly anticipated a little TVI for identification purposes.

Ten Years Ago in "How's DX?" — DX hogs Jim, Hans and Tail-ender McBoom get their lumps at the second annual meeting of the DX Hoggery & Poetry Depreciation Society in May, 1953 . _ . _ . _ DX headlines are grabbed by old 160. QSOs with EI9J, many Gs, GI5UR, GW3FSP, KG4AF, KP4s DV KD, KV4s AA BB, VP9BDA, ZC4XP and ZL1AH are reported . _ . _ . _ Stay-up-lates on 80 c.w. score with CN8MI, CTs 2BO 3AB, EA9AP, FAs 8IH 9RZ, FF8s AF AG, FK8BD, FM7WD, TA3AA, VK1RG, VQs 4HJP 5GLX, VR4AA, YJ1AB, ZB1BJ, ZD4AB, ZK1AA ZS8 3K 9I and 5A3TU . _ . _ . _ Mikers on 75 do right well, claiming contacts with CN8GZ, CT1s CL QF, DL4OV, EAs 2CA 2CQ 4DB, G2PU, HB9MX, HR1BG, KH6PM, OZ9R, VP7NX, ZLs 1WW and 2BE . _ . _ . _ Newcomer 40 phone features some Cubans, CT1BS, HP3FL, KJ6BX, VP6s NA SD WR, VQ3DT, ZS6BW and a half dozen ZLs . _ . _ . _ Forty's c.w. contingent goes heavy for CR4AG, FO8AI, KC6QY, KM6BG, KT1UX, KW6BI, LUs 3ZO 4ZI, SV5UN, VK9GM, VP8AP and ZC5VS . _ . _ . _ Phone fans on 20 pass the word on KA3AC, KT1LU, MF2AA, OQs 5CJ 5EB 5FO 0CZ 0DZ, ST2NW, SU5EB, ZD4BK and 3V8BB . _ . _ . _ Twenty c.w.'s cream: C3BF, FK8BC, HE9LAA, KA0IJ, MB9BJ, MF2AE, NE1NMC, OE13s HP RN, OQ5LL, ST2s AR GL, SU1FX, VK1EM, 9S4s AX and BS . _ . _ . _ Fifteen c.w. offers 11BLF/Trieste, KB6AY, OQ5BQ and ZK2AA . _ . _ . _ Spring feverishness on 28 Mc. turns up a logful of Central and South American phones . _ . _ . _ W7ITN's Idaho entry finally makes "WAS" for DXCC . _ . _ . _ A bee is about to raise Jeeves on the first call, and pictures of VK3HW's mammoth beam, Gary Cooper at ZM6AX, JA1AH, VP8AE and VS9AW decorate the column.

QST



The Eyeball Network was organized by these two. At the left is Ted Hunter, WØNTI, research assistant professor of psychology, and at the right Dr. A. E. Braley, WØGET, head of ophthalmology at the State University of Iowa, Iowa City.

The Midwest Eyeball Network

EYEBALL QSOs are fun, taking place as they do at hamfests, conventions, and other personal visits. But the "eyeball QSOs" held by the Midwest Eyeball Network are providing a public service of the highest order by the participating hams.

The Eye Bank Association of America is composed of opthalmologists and laymen who represent the forty-odd eye banks throughout the country. These eye banks serve as clearing houses between people donating their eyes for use after death and the people needing corneal transplants. The great need is for speed, and this is where hams can play a part. Eyes must be removed as soon as possible, generally within four hours of death, and for corneal transplants are usually used within 36 hours after they have been removed. There are no charges for the Eye Bank service — it is not possible to buy or sell eyes.

Some months ago the Midwest Region of the Eye Bank Association of America began to try out the use of radio amateurs to relay emergency information concerning the procurement and transportation of eyes for corneal transplant operations. Sparkplugged by Ted Hunter, WØNTI, and Dr. Alson Braley, WØGET, the net began operations during December, 1962. Net members report in each morning at 0700 CST on 3970 sideband, following procedures set up in a communications plan promulgated by WØNTI and WØGET.

Whenever a Class A emergency message is received (a Class A emergency is a request for an eye by one of the member eye banks for an emergency operation, an emergency operation being one in which the patient's eye sight is in jeopardy if a corneal transplant operation is not forthcoming in a short time), each member bank is notified by the appropriate member of the net. As soon as an available eye is located, the telephone is used to arrange shipping between the eye bank having the eye and the eye bank needing the eye.

Since the net has been established nearly a dozen people have been aided by the speedy operation of the eyeball network in emergencies. At the present time the network covers nine midwestern and western states, and among those taking part are: K4WUS/9, K5DZV (himself blind), K6ZBB, K9AGH, K9AQF, K9EUQ, K9UQX, W9DOG, KØGHK, KØHNT, KØHZF, KØJAD, KØVEM, KØZLY, WØGET, WØNTI, WØOMM, WØRMF, WØUYG, WØWVK and WAØCHT (a disabled veteran).

If this net continues to demonstrate its worth to the Eye Bank Association of America, other regions may be asked to establish similar nets — and *you* may have the opportunity of being a sight saver. — *R. L. B.*

Strays

W7VDG and K7NTV made a "first" on March 15, 1963, when they had a QSO (monitored by K7IFP) using a transmitter powered by a biological fuel cell. This fuel cell actually consisted of 13 fuel cells, each containing of bacteria that live on rice husks. The transistorized transmitter had an input of 5 milliwatts. The fuel cells are constructed simply by stuffing the combination of bacterial-infested rice husks into plastic pill bottles and by using copper tubing for the anodes and aluminum plates for the cathodes of each cell. (W7VDG, K7NTV, and K7IFP carried on this project as part of their self-study program. They get together one night a week to study theory, use test gear, and exchange ideas. They obviously are not the sort of fellows who are scared by the thought of something new.)

Armed Forces Day Communication Tests

THE Departments of the Army, Navy, and Air Force are appreciative of the technical skills and operating proficiencies of the amateur radio fraternity. The amateurs' contributions to communications training, international goodwill, military morale and recreation, and emergency services are recognized by every echelon of the military services.

In appreciation of the United States amateur radio operator's loyalty and patriotism the Army, Navy and Air Force annually sponsor a military-amateur radio communication program on Armed Forces Day. Planned and implemented by the Director, Naval Communications and the Chiefs of the Army and Air Force Military Affiliate Radio System (MARS) for their respective services, the Armed Forces Day program will be held this year on Saturday, May 18, 1963. On this fourteenth observance of Armed Forces Day all amateurs are invited to participate and demonstrate to the world the close partnership and mutual respect that the U.S. amateurs and U.S. Military enjoy.

The program this year will include a west coast station of each of the participating services in addition to the Washington, D.C. headquarters stations of previous years. This addition during the military-to-amateur contact phase will improve the receive capability of the military, and thereby provide the low-power stations in the western states an opportunity to obtain the special awards which they have been unable to receive in prior years.

Each of the six military stations will offer a special one-time only QSL Card for each confirmed contact with an amateur whose call letters appear in the *Callbook Magazine*.

Other awards will be special certificates signed by the Secretary of Defense for perfect copy of the International Morse Code and Radioteletype receiving contests. The receiving contests are open to any amateur, short wave listener, or other individual who possesses the necessary skills to obtain a perfect copy.

Elements of the Program

(1) A military-to-amateur transmitting and receiving test for licensed amateur radio operators. The military stations will transmit crossband on spot frequencies outside the amateur bands and establish radio contacts with amateurs in the appropriate sections of the amateur bands. This is a test of crossband operations, and contacts will consist of a brief exchange of locations and signal reports. No traffic handling will be permitted.

(2) A c.w. receiving contest for any person capable of copying International Morse Code at 25 w.p.m. The c.w. broadcast will consist of a special Armed Forces Day message from the Secretary of Defense addressed to all radio amateurs and other participants.

(3) A radioteletypewriter receiving contest for any licensed amateur, individual or station that possesses the required equipment. This is a test of the operator's technical skill in aligning and adjusting his equipment, and serves to demonstrate the growing number of amateurs that are becoming skilled in this method of rapid communications. The RTTY broadcast will be transmitted at 60 w.p.m. and will consist of a special Armed Forces Day message from the Secretary of Defense to all Radioteletypewriter enthusiasts.

Operating Schedules and Competition Procedures

Each transmission for the c.w. and RTTY receiving contests will commence at the indicated times with a ten-minute CQ and identification call to permit the participants to select their station and frequency and to adjust their equipment.

The ten-minute CQ call will be followed immediately by the appropriate competition instructions and the SECDEF message. The message will be transmitted by all stations simultaneously and one time only. It is not necessary to copy more than one station and no extra credit will be given for so doing.

Transcriptions should be submitted "as received". No attempt should be made to correct possible transmission errors.

Time, frequency and call sign of the station copied as well as the name call sign (if any), *and address of the individual submitting the entry should be indicated on the page containing the text.* Each year there are a large number of perfect copies that do not receive the certificates

These are the fellows who have been planning this Armed Forces Day test for you. Left to right are RMC H. C. Davis, USN, W5OFH; Capt. A. N. Cole, USAF, W4IYR; Major H. C. Becker, USA; Mr. H. Philbeck, W4LWG; LCDR C. R. Winnette, USNR; and S/Sgt T. A. Bridges, USA. The three officers are chiefs of their respective services MARS programs.

because the above information was not submitted. The name and/or call sign of the individual are mandatory if the certificate is to be awarded.

Competition entries should be submitted to the Armed Forces Day Contest, Room 5B960, the Pentagon, Washington, D.C., and postmarked not later than 31 May 1963.

C.W. Receiving Contest

Time 18 May 1963	*Transmitting Station*	*Frequencies* (kc.)
190300 (2300 EDST)	WAR/AIR (Army & Air Force radio Wash, D. C.)	3347, 6992.5, 14,405
190300 GMT	NSS (Navy Radio Wash, D. C.)	3385, 4015, 6970, 7301, 13,992
190330 GMT (1900 PST)	A6USA (Army Radio San Francisco, Calif.)	6997.5
	NPG (Navy Radio San Francisco, Calif.)	4005, 7301.5, 13,975.5
	AG6AA (Hamilton AFB Calif.)	7832.5

RTTY Receiving Contest

Time 18 May 1963	*Transmitting Station*	*Frequencies* (kc.)
190335 GMT (2335 EDST)	WAR (Army Radio Wash, D. C.)	3347, 6992.5, 14,405
	NSS (Navy Radio Wash, D. C.)	4012.5, 7380, 14,480
	AIR (Air Force Radio Wash, D. C.)	7305
190335 GMT (2135 CST)	A5USA (Ft. Sam Houston, Texas)	4025
	AG4AA (Randolph AFB, Texas)	4455
190335 GMT (1935 PST)	A6USA (Army Radio San Francisco, Calif.)	6997.5
190335 GMT (1935 PST)	AG6AA (Hamilton AFB, Calif.)	7832.5
	NPG (Navy Radio San Francisco, Calif.)	4001.5, 7455

Military-to-Amateur Test

Military stations WAR, A6USA, NSS, NPG, AIR, and AG6AA will be on the air from 181500 GMT (1100 EDST, 0700 PST) to 190500 GMT (0100 EDST, 2100 PST) on 18 May 1963 to contact and test with amateur radio stations. Amateur contacts will be discontinued from 190245 GMT to 190400 GMT to allow the Armed Forces Day c.w. and RTTY broadcast competition as scheduled above.

Station	*Military Frequencies*	*Appropriate Amateur Bands (Mc)*
WAR (Army Radio Wash, D.C.)	4001.5 (c.w.)	3.5 to 3.8
	*4020 (a.m.)	3.8 to 4.0
	6992.5 (c.w.)	7.0 to 7.2
	*7325 (c.w.)	7.2 to 7.3
	*14,405 (u.s.b.)	14.2 to 14.35
A6USA (Army Radio San Francisco, Calif.)	3347 (c.w.)	3.5 to 3.8
	*4025 (a.m.)	3.8 to 4.0

* Operators transmitting on these frequencies will listen for a.m. and s.s.b. signals within the appropriate bands.

NSS (Navy Radio Wash, D.C.)	3385 (c.w.)	3.5 to 3.65
	4015 (c.w.)	3.65 to 3.8
	6970 (c.w.)	7.0 to 7.1
	7301 (c.w.)	7.1 to 7.2
	13,992 (c.w.)	14.0 to 14.2
	*4040 (a.m.)	3.8 to 4.0
		7.2 to 7.3
	14385 (s.s.b.)	14.2 to 14.35
	4012.5 (RTTY)	3.5 to 3.8
	7380 (RTTY)	7.0 to 7.2
	14,480 (RTTY)	14.0 to 14.2
NPG (Navy Radio San Francisco, Calif.)	4005 (c.w.)	3.5 to 3.8
	7301.5 (c.w.)	7.0 to 7.2
	13,975 5 (c.w.)	14.0 to 14.2
	*4045 (a.m.)	3.8 to 4.0
		7.2 to 7.3
	7385 (s.s.b.)	14.2 to 14.35
	4001.5 (RTTY)	3.5 to 3.8
	** 7375 (RTTY until 0200Z)	7.0 to 7.2
	** 7455 (RTTY after 0200Z)	7.0 to 7.2

* Operators transmitting on these frequencies will listen for a.m. and s.s.b. signals within the appropriate bands.

** NPG will conduct Military-to-amateur RTTY contacts on 7375 k.c. until 0200Z (1800 PST). At 0200Z NPG will shift this circuit to 7455 k.c. for RTTY contacts after this time and for the RTTY broadcast.

AIR (Air Force Radio, Wash, D.C.)	3397.5 (c.w.)	3.5 to 3.8
	6997.5 (c.w.)	7.0 to 7.2
	13995 (c.w.)	14.0 to 14.2
	20994 (c.w.)	21.0 to 21.25
	7305 (l.s.b.)	7.2 to 7.3
	14397 (u.s.b.)	14.2 to 14.35
	7315 (RTTY)	7.0 to 7.2
AG6AA (Hamilton AFB, Calif.)	3365 (c.w.)	3.5 to 3.8
	7308 (l.s.b.)	7.2 to 7.3
	14353.5 (u.s.b.)	14.2 to 14.35
	7832.5 (RTTY)	7.0 to 7.2

Strays

At the North Wildwood (Cape May County, N. J.) Recreation Center there has been a class for aspiring hams on Monday and Friday nights at 7 P.M. Check at the Recreation Center, between Ninth and Tenth Streets on Central Avenue.

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The Town of North Hempstead, office of Nassau County Civil Defense, is conducting a basic wireless communications course to train volunteers who desire to qualify for Novice or Technician licenses. Classes are held Tuesday and Thursday evenings at 7:30 at Civil Defense Headquarters, Town Hall, 220 Plandome Rd., Manhasset, L. I., N. Y. No charge, no age limits. Contact the Town Hall for info on registering.

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In January the Yellowstone Radio Club of Billings, Montana, named R. Rex Roberts, W7CPY, as winner of the club's annual Ham Award in recognition of his devotion and service to amateur radio for over thirty years. W7CPY served as SCM of Montana between 1940 and 1946. In 1947 he was elected ARRL's Northwestern Division Director, an office he still holds.

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9N1ME, communicator with the American Mount Everest Expedition, was unable to contact Katmandu, capital city of Nepal, with information about an injured member of the expedition, because of band conditions. But his distress call got through to VK2ON and VK2AQJ, who notified the duty officer at the American Embassy. The duty officer turned out to be VK1TM/K4RRJ, and he sent a telegram to the American Embassy in Katmandu, from whence a helicopter was dispatched to pick up the injured person. A fine bit of international cooperation.

Building Fund—A New Challenge

The ARRL Building Fund drive has now had response from more than 8000 League members, and in less than a year nearly one-half of the goal has been reached. At its present pace, therefore, the objective would be accomplished in mid-1964.

A group of prominent amateurs, who prefer to remain anonymous, has issued a challenge to our League membership to complete the Building Fund drive ahead of schedule. They are men who feel a personal obligation to amateur radio because it was the first thing that kindled their interest in engineering, science or communications, as the case may be, and started them on careers in which they have achieved considerable success. A total of approximately $75,000 is being pledged by these outstanding amateurs! — but on one condition: their offer is made on a basis of matching future membership contributions dollar for dollar. Thus, henceforth, each individual amateur or club contribution of $5 actually brings $10 into the fund; each contribution of $25 brings $50 into the fund; and so on. See the editorial this issue for additional information.

This is a real challenge! Daily we receive contributions with the comment, "Been meaning to do this for a long time." If a Building Fund contribution is on your list of things to do sometime, make that sometime *now*. Let's get the fund as close to completion as possible by mid-year!

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The breakdown of division quotas, and percentage of accomplishment, is as follows as of March 29:

Hudson	63.4%	Roanoke	43.8%
Southwestern	54.6	Delta	33.7
Dakota	52.8	Canadian	33.4
Northwestern	49.8	Atlantic	33.4
Midwest	47.1	West Gulf	32.3
Pacific	46.0	Rocky Mt.	31.5
Central	45.4	Great Lakes	28.8
New England	44.2	Southeastern	25.2

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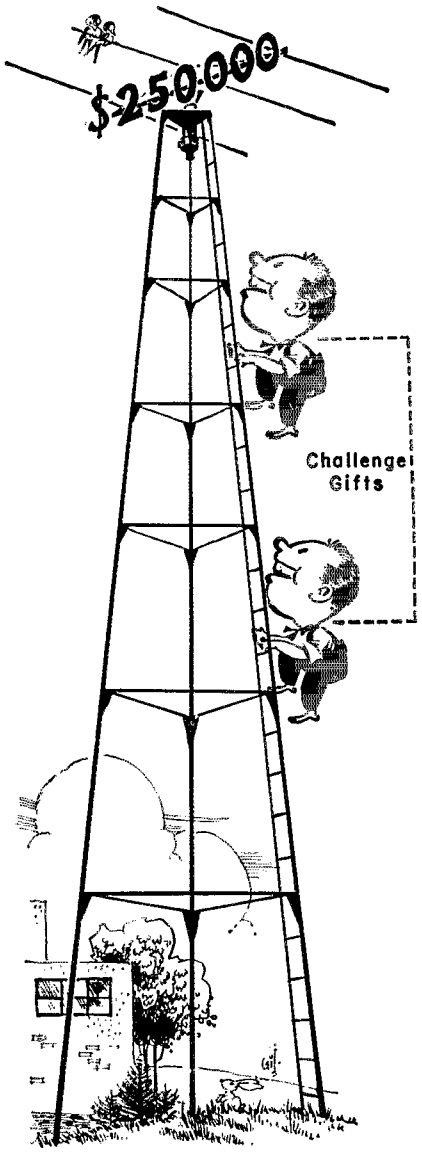
Construction of the building is proceeding on schedule, and it is expected to be ready for occupancy in mid-June. Nearing completion at this writing are the utilities, lighting fixtures, acoustical ceiling panels, and final plaster coats. Next will follow the task of painting, installation of interior office partitions, and the vinyl floor. When weather permits, driveway and parking lot paving will get underway, with landscaping and planting to follow shortly. It is expected that the building will be sufficiently complete by the time of the Board meeting to permit full inspection by the directors, and probably a preliminary dedication ceremony.

Amateurs planning vacations in the New England area after July 1 are invited to include Newington, Connecticut, on their schedule and stop by at 225 Main Street for a visit. We'd be mighty happy to have you see, in person, the building *you* helped create! QST



The Mt. Airy VHF Club has been going great guns in raising money for the building fund. A scale model of the building was constructed and bricks were sold, and the club is well on its way to raising a thousand dollars for the Building Fund. Here, left to right, are K2HHS, W2QCR, W3CL, and K3HWZ.

Members Are Saying

A new building always holds promise of better things to come for any organization, but when it is supported by the membership as is *our* new building, the promise is even more secure — *K2HCH.*

It represents the hams "Mecca" and as such should have a deeper meaning to ARRL members than just an address on a letterhead — *W8MTI/A8QZT.*

I feel that I should do something rather than stand on the sidelines and watch. But surely the Canadians aren't giving enough as evidenced by the amount of letters which appear in *QST* giving opinions, or is it that you just don't print letters sent in by VEs? My cheque is enclosed, and let everybody's voice be heard, as UNITY IS STRENGTH! — *VE7ATD.*

I have been tutoring some students for the Novice license and one offered to pay me a tuition fee. I told him that I would accept it but would turn it over to the Building Fund — *WØPXH.*

I quit smoking for twenty days, putting a quarter a day in a jar. Then I knew it belonged to you, so enclosed is my donation. I wish I could have quit the cigarettes longer, but my will power (supply) blew out and all my resistance burned out! — *K8QYA.*

I am thirteen years old and an active short-wave listener studying for my "ticket" and I realize how much the League has done for radio amateurs already! Enclosed is my small check to help our man up his tower to the top — "*WPE1EBN.*"

Enclosed please find a check tendered in recognition of the League's continuing help to the amateur fraternity: for making available at little or no cost training aids and educational materials not otherwise obtainable; for preserving amateur radio and its frequency assignments through the years; and for its continuing mature decisions and leadership in amateur radio — *1200 Radio Club (Mass.).*

Here is my contribution. I am an old timer, having loaned *QST* money to start up again after World War I. Later it was paid back, but the benefits received from *QST* in my youth were more than could be measured in dollars. Now I hope it is doing the same for others — *W. R. Cottrell, Hinsdale, Ill.*

When K9IUR, one of our employees, informed me that a building fund was accepting contributions, I readily agreed that, as a representative of the Bank of Chicago, everyone should do his part in supporting an organization that has given more to the public than they realize. Please accept this small contribution as "Another Country Heard From" — *H. J. Blomgren, Assistant Cashier.*

Were it not for your code practice and bulletins, I probably would still be studying for my General. Enclosed please find a contribution saved from my allowance. The check is in my mother's name as I am not old enough for my own checking account — *KA1UN.*

I have always been keenly interested in furtherance of the precepts of ARRL when Hiram P. Maxim was president of the organization. I feel the new, and current president, Herbert Hoover, Jr., is of the same opinion and will continue the same efforts as the first president of the organization to foster interest and progress for hams — *Thomas L. Wyatt, ex-W6WT.*

Apparently many hams feel that they can't actively support the Building Fund. I don't think that any of us can afford *not* supporting this project. I, for one, haven't an honest excuse. It's an awfully good feeling to mail this money order — *WB2DST.*

If each paid his share the fund would easily be exceeded. Obviously not everyone is paying his share. I guess some hams don't know which side of the bread the butter is on! — *WB2GIX.*

Over the years Wireless Association of Ontario members have had so many benefits from the ARRL and *QST*, that we want to do a bit towards your new headquarters. The late A. H. Keith Russell, one of our founders, was the first Canadian general manager of the ARRL, prior to Alex Reid's tenure. So this is another reason for our desire to make a small contribution — *Wireless Association of Ontario.*

It's been many moons since the glow of the old receiver's tube and the pungent aroma of hot wire and resin permeated my hideaway here in the frozen wilds of Wisconsin, but, with all the commotion and noise emanating from West Hartford, a little r.f. spark of enthusiasm has been re-kindled deep in the sub-basement of my memory. I've even begun to inventory the moldy treasures in my junk box in preparation for that transmitter I've always wanted to build. Who knows — in another few months the air waves may vibrate and throb with the first booming thunder from this all-pervading puissance, the most overpowering compact twenty-watt (input) transmitter ever built. And what caused this project — what is the real reason for such an undertaking? Someday, in looking back, I will have to give credit where it is due — yes — it all started with my decision to make this contribution to the fund — *W9YOS.*

I visited the old office building when I returned from Japan in 1952. I wondered then how an organization like ours could operate in such crowded quarters — *K6HQK.*

The enclosed check is our contribution. We are constantly reminded of the work of the League and are proud to take this part in improving its facilities — *Amateur Radio Society, University of Pennsylvania.*

During the years 1941 to 1945, which were my high school years, amateur radio existed nowhere in the world except between the covers of a magazine called *QST*. For four years I never saw a ham station, never heard a CQ, and although I lived in the largest city in the world I had never met a licensed ham who had actually been on the air. Yet through the wonderful stories and articles of those war years issues of *QST* I was introduced to a hobby and also to a profession. My first amateur license, KL7OO, did come a few years later, but not before I already had obtained my First Class Radiotelephone ticket, and was well on my way toward a successful career in electronics. I owe a large measure of gratitude to *QST* and the ARRL for keeping alive the spirit of amateur radio during those difficult times — *W2ALJ.*

Our club held an auction and we voted the proceeds to your building fund — *Lower Columbia Amateur Radio Assn. (Wash.).*

VE/W——1962 Results

Last September 29-30, the Montreal Amateur Radio Club put another fine contest into action. The annual VE/W contest took place at that time, and VE2OC reports a successful time had by all with 289 valid logs received. This represents better than 10% more activity than the previous year in 9 Canadian and 57 U. S. sections. Top honors and the trophy go to W4CKD with a total of 125,411 points.

The high Canadian scores were as follows: VE7AAF 105,138; VE3DUS 91,080; VE6BR 82,128; VE4AK 80,640; VE2NI 78,400, VE1ON 52,800; VE5KY 37,506; VE8PC 20,458 and VO1DZ 1408.

The following tabulations, prepared by contest chairman VE2OC, shows the final score with the amateur heading each ARRL section listing earning a certificate.

Maritime

VE1ON	52,800
VE1DB	10,815
VO1DZ*	1408

Quebec

VE2NI	78,400
VE2ALH	31,200
VE2AYU	28,714
VE2BV	14,448
VE2HN	13,530
VE2BLK	11,020
VE2BHV	9000
VE2AMB	7000
VE2YX	5508
VE2AJD	1318

Ontario

VE3DUS	91,080
VE3BOG	67,024
VE3BCF	62,752
VE3EBS	57,240
VE3EZI	47,064
VE3DDU	45,552
VE3EMA	44,676
VE3MI	38,592
VE3DXD	37,485
VE3AMU	36,088
VE3ELQ	32,706
VE3BWY	25,056
VE3SZ	12,978
VE3DDR	12,060
VE3CQH	10,791
VE3EPY	8280
VE3DH	7420
VE3DQK	6624
VE3GI	5325
VE3EFX	4988
VE3DJ	3552
VE3BUU	2754
VE3FHQ	504

Manitoba

VE4AK	80,640
VE4IM	53,100
VE4ZX	11,245
VE4KZ	6336

Saskatchewan

VE5KY	37,506
VE5BK	28,152
VE5JI	21,624
VE5GH	14,652
VE5JU	9064

Alberta

VE6BR	82,128
VE6UP	42,224
VE6AGK	28,485
VE6AGW	27,144
VE6AHJ	18,573
VE6GN	15,360
VE6AJC	11,100

British Columbia

VE7AAF	105,138
VE7EH	100,080
VE7PU	77,775
VE7AQF	41,724
VE7ASI	26,400
VE7ARQ	25,800
VE7BDP	22,878
VE7BBL	17,280
VE7BBB	15,960
VE7BAQ	4736
VE7AJ	4554
VE7BJV	2772

Yukon/N.W.T.

VE8PC	20,458
VE8RG	16,848
VE8JS	5208

Eastern Pennsylvania

K3JCT	74,510
W3AIZ	63,845
W3AHX	57,182
K3MNJ	45,487
K3MNT	19,331
W3KDF	18,519
K3LSC	17,689
W3FHR	9314
W3ADE	8123
K3QNC	1733
K3TYL	1083

Md.-Del.-D. C.

K3KHK	60,070
K3PEP	30,323
K3OKC	4062
K3KAJ	1786
K3GVE	812

Southern New Jersey

W2EXB	67,254
W2QDY	33,789
W2BEI	1786

Western New York

WA2BEX	34,494
WA2THY	8664
WA2PCW	7581
WA2QMJ	2436

Western Pennsylvania

W3LOS	8375
K3ASW	4332
K3RGV	4116

Illinois

W9LNQ	74,944
W9CLH	63,355
W9NIL	62,164
W9YYG	57,994
K9BJM	41,425
K9ZSE	38,988
W9ANN	29,818
K9MBW	28,302
WA9DOC	19,169
W9OUH	11,878
W9SFM	7040
W9BMG	4332
W9WR	3898
WA9ATA	2978
W9FCU	1333
K9DVK	726

Indiana

K9LIO	73,102
K9VRU	51,364
K9LVK	43,811
K9DHN	40,288
WA9AUM	11,913
W9LKI	10,108

Wisconsin

W9ESP	109,744
W9WEN	33,627
K9UWY	23,754
WA9AIB	19,142
K9YBC	18,772
W9CHD	10,722
K9GDF	7310
K9AXB	2599

* Newfoundland/Labrador Winner.

North Dakota

WAØAAD	12,509

South Dakota

WØWUU	1227
KØJHU	54

Minnesota

KØBPO	46,786
KØZXE	23,826

Arkansas

WA5CBL	34,115

Louisiana

W5KC	42,237
W5ERR	28,158
W5BUK	27,147
WA5ALI	9097

Mississippi

W5AMZ	40,937
K2MXA/5	32,345
K5MCV	12,021

Tennessee

K4GXK	18,844
K4QZV	3249
WA4CGI	2165

Michigan

W8CQN	42,453
W8NAN	26,642
K8YEK	9855
W8RTU	217

Ohio

W8RQ	80,413
W8CJN	67,742
W8VIT	20,469
K8VSL	11,877
K8EUC	9855
W8YGR	4910
WA8AWV	217

Eastern New York

WA2OJD	45,323
WA2HLH	35,089
W2TER	26,281
WA2PDU	6444
WA2KHV/2	4333
WA2GFZ	28

N. Y. C.-L. I.

WA2GLU	10,234
W2DUN	9927
WA2VQV	9476
WA2ITR	7580
WA2IUQ	4904
K2ZYR	4622
WA2YHK	2274

Northern New Jersey

K2KFP	46,135
W2TSL	45,919
W2LQP	31,190
K2UUT	13,862
WA2ZKO	1949
W2IBZ	650
WA2APX	433

Iowa

KØVEJ	11,913
WØBQJ	3249
WØJTC	1083

Kansas

KØBHM	37,255
KØPFV	16,895
KØJJR	16,678
WAØBOP	7800
KØGZP	2438

Missouri

KØVSH	62,380
WØKCG	44,186
KØJPL	42,743
KØGSV	15,595
WØMCX	9530

Nebraska

WAØBHL	19,928
KØPTL	2430
WØDSU	1458

Connecticut

W1WY	70,666
K1SDX	59,945
W1TS	37,688

Maine

W1GKJ	13,321

Eastern Massachusetts

W1TQS	30,703
W1EJJ	26,912
W4YCQ/1	12,671
K1UCA	12,130
W1PLJ	10,397

Western Massachusetts

W1JYH	27,616
W1UUK	25,126
K1IJU	5415
K1LSW	4773

New Hampshire

W1SWX/1	54,583
K1RTR	51,406
W1FZ	43,320
K1AEG	21,660
K1PMY	10,613
K1UHE	3754
K1IIK	1624
K1RKH	108

Rhode Island

K1LPL	52,562

Alaska

KL7MF	145

Montana

K7CTI	47,652
K7NHV	41,587
K7GMM/7	15,306
W7EWR	7303

Oregon

W7JLU	31,840
K7MLO	8845

Washington

W7IEU	23,500
K7OFW	11,371
K7OUW	7852

Hawaii

KH6EVT	8122
KH6DKA	1805

Nevada

K7KHA	23,880
K7JMN	22,237
W7CRT	12,562
W7VIU	7933

Santa Clara Valley

W6ISQ	43,320
W6ETR	23,880
W6CLZ	21,480

East Bay

WA6BBJ	50,901
WA6MJP	28,880
K6AHV	19,710
W7QOH/6	2382

San Francisco

W6MSM	33,789

San Joaquin Valley

K6RTK	12,563
K7GTK/6	6227

North Carolina

W4PLL	61,731
W4BDU	17,690
W4OMW/4	11,046

South Carolina

W4BWZ	27,670
WA4EMY	22,364

Virginia

W4CKD	125,411
W4HTV	66,280
K4UEO	9855
W4DLA	5956

West Virginia

W8HZA	9314

Colorado

KØSLD	69,853
WØEFT	23,681

Utah

W7POU	14,729
K7RAJ	10,234
K7QDM	7574

Alabama

K4HPR	77,974
WA4AQV	12,888

Eastern Florida

W4MLE	45,486
K4VFY	20,847
K4NVD	16,462
WA4CDN	14,945
W4LVV	14,440
W4ZOK	13,266
K6SXX/4	10,830
K4RQE	1949

Georgia

K4BAI.....97,957
K4FRM.....5182
K4BWK.....1949
WA4GAY.....1462

West Indies

KP4BEA.....37,526
KP4USA.....6281

Los Angeles

K6JIC.....84,312
WA6IPY.....42,296
WA6NHC.....37,905
W6OEO.....37,400
K6GQX.....28,266
WA6DZV.....8014
WA6USQ.....3465

Arizona

W7ENA.....22,959

San Diego

K6SDR.....44,186

WA6CEZ.....35,739
WA6FYW.....23,122
W6CHV.....15,883

Santa Barbara

WA6PHZ.....12,455
K6LBV.....6848

Northern Texas

W5FTD.....77,488
K5IJU.....31,190
K5MBB.....25,017
WA5DFR.....21,443
K5HGF.....12,382
WA5AZP.....867

Oklahoma

K5OCX.....61,406

Southern Texas

K5HDU.....23,393
WA5AXS.....3249
K5HFC.....1895

May 1938

. . . The highest c.w. score reported in the third annual DX Contest was that of XE1A — 1419 contacts for a score of 236,322. W3EMM came through on phone with a total of 97,092 points with 371 QSOs.

. . . W2KJL wrote, in his sixth and final article in a series, on the construction and adjustment of experimental television receivers.

. . . Several telephone systems for use between the shack and family were described, some of them including switches for opening the circuit in case the operator didn't want to be disturbed!

. . . There were 1013 operators who submitted logs in the 8th ARRL Sweepstakes. W6MVK came out on top with a score of 96,180 points with 469 contacts.

. . . Other technical articles described simple directional arrays using half-wave elements, and gave new ideas in the construction of rotatable antennas. There was an article on a simplified exciter circuit, a mobile crystal-controlled u.h.f. transmitter, a converter for 5, 10, and 20 meters, and an intra-band quick frequency change for transmitters.

. . . Hints and Kinks included a crystal oscillator requiring no tuning adjustment, calibration graphs for panels, a shield for microphone plugs, a switched 6LG6 oscillator for grid-plate crystal and e.c.o. operation, and a method for preventing arcing troubles in 6L6 tubes. QST

Strays

Recently we have begun to use "picofarads" to replace the clumsier "micromicrofarads," and there have been a couple of complaints from those who dislike any change. W9GDA, however, points out that the National Bureau of Standards has adopted quite a number of such terms descriptive of the various powers of ten. Here they are, for future reference:

Quantity	*Prefix*	*Symbol*
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{2}	hecto	h
10	deka	da
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

Silent Keys

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

K1BTA, Paul W. Belcher, Braintree, Mass.
ex-W1GL, Ovide L. Paquette, Newtonville, Mass.
W1GOU, Ernest B. Adshade, Quincy, Mass.
W1HDF, Carl W. Pierce, Elmwood, Conn.
W1QCX, Orlof N. Eddey, Waltham, Mass.
W2ANS, Allan Sinclair, Palmyra, N. J.
W2DD, Dudley J. Connolly, Jackson Heights, N. Y.
W2EEG, Bernard Stark, Laurelton, N. Y.
W2FD, John A. Cioé, Brooklyn, N. Y.
K2FD, Frank K. Johnson, Ramsey, N. J.
W2IDW, Lester Rodman, Babylon, N. Y.
K2IYG, Robert Henschel, Middletown, N. J.
K2KDJ, Benjamin A. Narod, Newark, N. J.
W2PYX, Louis Rattiner, Neponsit, N. Y.
W3ASD, Karl G. Vincent, Smyrna, Del.
K3LUM, Jack G. Bollinger, Altoona, Pa.
WA4HXQ, Stephen D. Jernigan, Pensacola, Fla.
K4KYC, Bernice Browne, St. Petersburg, Fla.
W4LSC, LeRoy Hauser, Alexandria, Va.
K4LVR, Robert G. Stevens, jr., Nashville, Tenn.
W4TKZ, Stanley L. Potter, Alexandria, Va.
W4WSB, Robert A. Powers, St. Augustine, Fla.
K4ZPV, Maurice W. Van Arsdale, Fort Lauderdale, Fla.
K5EVU, Bluford W. Young, Brownfield, Tex.
W5GMU, Richard P. Henderson, Naples, Tex.
W5JP, Harvey R. Pretty, Ardmore, Okla.
K5JTW, William E. McConkay, Enid, Okla.
W5LJ, Louis S. Torrans, sr., Tyler, Tex.
K5PAP, Tito M. Zamora, Baytown, Tex.
W5RUX/ANC, Adrian L. Nutt, San Angelo, Tex.
W6BES, George H. Nibbe, Encino, Calif.
K6IQH, LeRoy A. Lankford, Pacific Grove, Calif
WA6LZO, DeWitt Wise, Alhambra, Calif.
ex-W6OAE, Erwin G. O'Meara, Vista, Calif.
W6PPH, John E. Springer, Taft, Calif.
K6UWI, Louis W. Fowler, Palmdale, Calif.
W7DGR, Arthur S. Frederickson, Centerville, Utah
W7RTE, Raymond E. Olsen, Prescott, Ariz.
W7YQZ, Walter L. Goodbar, Chinook, Mont.
W7ZUK, Benjamin J. Ferguson, Roundup, Mont.
K8AKE, Walter M. Hunt, Lake Odessa, Mich.
W8EYV, Frank A. Swisher, Keyser, W. Va.
W8GLW, Paul E. Snyder, Boyne Falls, Mich.
W8MZI, Lloyd N. Kollar, Berkeley, Mich.
W8UXL, Clarence W. Bloss, Chillicothe, Ohio
W9BIL, Ernest W. Crist, Arcola, Ill.
W9ECA, Frank J. Hajek, Riverside, Ill.
W9EIL, Elton R. Davis, Adams, Wis.
K9HBW, Cloyd A. Bacon, Harrisburg, Ill.
K9JVO, ex-OH2PQ, Harald Lindholm, Chicago, Ill.
W9OGA/K9DIO, William L. Runzel, jr., Chicago, Ill.
WØCS, Don I. Bailey, Clinton, Iowa
WØLSP, Adalbert H. Godron, Sappington, Mo.
KØRUL, George W. Purtle, Ord, Nebr.
WØYSK, William C. Gettman, Norfolk, Nebr.
VE3DBS, Harry R. Anderson, Welland, Ont., Canada
VE3DDN, George M. Chaytor, Sarnia, Ont., Canada
VE3QV, Leo A. Smallwood, Ottawa, Ont., Canada
VE5ON, Clark O. Noyes, Saskatoon, Sask., Canada
VE7MQ, A. C. Mason, North Vancouver, B. C., Canada

The Totah Amateur Radio Club of Farmington, New Mexico, will make its annual 4-corners pilgrimage on the week end of May 25/26. They will operate at the monument marking the common boundary of four states and three call areas — the only such spot in the U. S. A. The call used will be K5WXI. Work 'em, send 50¢ with your QSL, and you'll get a certificate award.

"ZZZZZZZZZZZZZZZZ"

BY JOHN G. TROSTER,* W6ISQ

THANK YOU, thank you. Distinguished guests, fellow amateurs, guests, friends of the Atherton Amateur Radio Transmitting Society — and, of course, our main speaker . . . our own beloved Pacific Division Director, Harry Enwite . . . ahhh . . . Enright . . . err . . . Enwick??? . . . ahhh, Harry, W6HC. Ahem.

"What a wonderful turnout for this evening's conclave to greet our old . . . ahh . . . genial Director. But before I introduce Harry, I just want to say one thing.

"Friends of the Society, you know that a wonderful organization like ours just doesn't run all by itself! It takes lots of initiative and planning. Lots of hard, sweating, back-breaking work and drive. So before we hear from our beloved Director Engwi . . . ahhh . . . Harry, I just want to introduce a few of the distinguished people here at the head table.

"Now first of all, I want to introduce our distinguished friend and President. Really, friends, what can I say about our lovable President? Here is a man who, through all the QRM and sunspots . . . he's made the club . . . why, we wouldn't be here tonight if it weren't for our own lovable old Charlie. Stand up, Charlie . . . everybody up . . . let's really hear it . . ."

"Hoooorrrraaaayyyy — Huzzahhhh."

"OK, OK that's enough, Charlie. Sit down. No time for speeches. Now friends, our distinguished Vice President, who, down through the years . . . your friend and mine . . . our own Eddie.

"That's enough, Eddie, sit down. Please, Eddie . . . down . . . down, Eddie. And now friends, our distinguished Secretary, who, through the years . . . take a bow . . . sit down.

"And now friends, our distinguished Treasurer — 'money bags' . . . don't forget your dues . . . haw. Up . . . bow . . . down.

"And our beloved Public Relations representative — up — down. And then there is our distinguished . . . hurray . . .

"And now, friends of the Atherton Amateur Radio Transmitting Society, I'd like to have our distinguished speaker of the evening stand up for just a second so you can all see what he looks like — haw. Harry, W6HC, ladies and gentlemen, our beloved Director of our beloved . . . err . . . great Pacific Division . . . everybody up . . ."

"Hooorayyy — whooopieee."

"Thank you, Mr. Chairman. Fellow hams, it's a pleasure . . ."

"Not yet, Harry, not yet. Please be seated. I have a few announcements and a few thank-you's yet."

"Now, friends, I want to introduce our wonderful Arrangements Committee. How do you think we got this magnificent banquet hall? Just didn't show up, ya know. I tell you, friends, if you knew what these boys have put into this! Well, friends, all I can say is . . . all seven of the committee . . . on your feet . . . up . . . up."

"Hooorayy — Hooorayyy."

"And now, friends, the Dinner Committee. I'm here tonight to tell you with all the conviction at my command that in all my travels from the rock-bound coast of Maine to the sunny shores of our own beloved California that this is the greatest banquet. . . . Those weren't TV dinners, ya know. I never tasted better chicken and peas . . . ooops, sorry . . . swiss steak and beans. In fact friends, I'd like to say here and now that I don't think you could buy a better dinner in the whole U.S.A. — wouldn't you say so too, Harry?"

"Thank you, Mr. Chairman. My fellow hams . . ."

"Not yet, Harry, not yet. We have to finish the introductions, ya know."

"And now, friends of the Atherton Amateur Radio Transmitting Society, what would our radio club be like without distinguished executives to run our Awards and Certificates and Contest Committees, and things like that, eh? Well now, friends, I just want to introduce a few of our distinguished chairmen because I know you will want to show your unswerving support and devotion . . . err, appreciation.

"Now first I want to introduce old Bill, chairman of our Planning and Research Committee . . . hooorrraaayyyy . . . that's enough, Bill. Sit down.

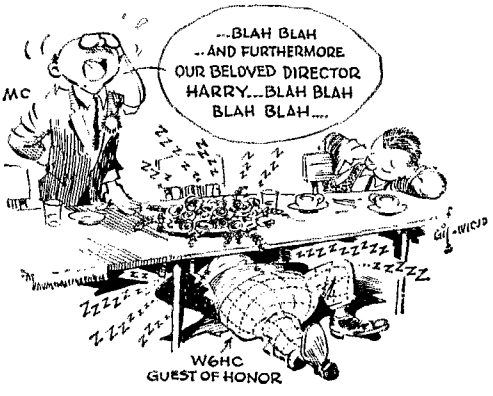
"And now old Tom, chairman of our Rules and Regulations Committee . . . huzzzzaaahhhh . . . down Tom.

"And our lovable Jim and his Committee . . . and then there's Fred . . . and now . . . hooorrraayyy.

"And, of course, the Ladies Auxiliary . . . hoorraayy . . . look at all those lovely ladies! Aren't they wonderful, Harry?"

"Thank you, Mr. Chairman. My fellow . . ."

"Oh no, not yet, Harry. Got to have our draw-



* 45 Laurel St., Atherton, Calif.

ing, ya know. And so friends we come to the drawing for our wonderful prizes. Everybody got their stubs in the hat? OK, I'll wait.

"Now, friends, I don't know if you realize it or not, but prizes just don't walk through the door all by themselves. So just let me say a word about our Prize Committee . . .

"And now a very charming little lady has graciously consented to pick the numbers. First we'll draw for Eighth Prize . . . but before we do friends, a word about the product.

"Now friends, Fifth Prize . . . ahh, I'll just read a word about the specifications . . ."

"And now the Grand Prize! It's number 17 . . . who has number 17? Who's our winner? *Two* people? You mean both of you have number 17? Impossible! Who is Chairman of the First Prize Committee? Get that man's call . . . it's unbelievable. Oh well, cut it in half. We're lucky it's a big cake!

"And so friends, we come to the end of another perfect evening . . . wonderful people, food, prizes . . . yeah! So, until our regular meeting next month, I bid you a warm and . . ."

"Hey, Mr. Chairman, what about Harry, W6HC?"

"Harry? Harry . . . oh my, yes. Harry, W6HC."

"Thank you, Mr. Chairman. Fellow hams, it's been . . ."

"No, no, not yet, Harry. Couldn't let you stand up without proper introduction.

"And now, friends, we come to the highlight of the evening, our own beloved Director. Now first just let me say a word about Harry. Here's a man who . . . log cabin . . . plow . . . horseback . . . country school . . . study . . . Marconi . . . I'm here to tell you tonight . . . radio . . . and if you were to travel from the rock-bound coast of Maine to the sunny shores . . . you couldn't find . . . I just want to say as I stand before you tonight . . . tremendous pleasure . . . here and now . . . our own beloved Director of our own glorious and beloved . . . ahhh . . . great Pacific Division . . . Harry, W6HC! Up . . . up . . . everybody up . . ."

"Yiiippeeee . . . Huuurrraaaayy."

"Harry. Harry! Where's Harry? You here, Harry? Gone home? Where's Harry? Anyone seen our beloved Director? Harry . . . whoa Harry . . . HARRY!

"Where? Stretched out where? Under the table? You think maybe that swiss steak?? He's OK? Good. Well . . . what does he say?"

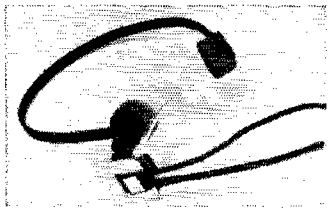
"ZZZZZZZZZZZZZZZZ"

QST

• *New Apparatus*

Mobile Boom-Microphone Headset

Boom microphones and headsets have found application in mobile work out of necessity and safety, but usually aren't even considered for fixed-station use. However, the Pacific Plantronics miniature boom-microphone headset combination, model MS-30, shown in the photograph, is light and comfortable enough for long hours of wear during any type of operating. The total weight of the unit is only ⅔ of an ounce, hardly enough to notice at all.



Placement of the headband on the head is such that the headband pads (the sponge rubber disks in the photograph) are above and slightly in front of the ears. The acoustic tube (the long tube at the bottom of the photograph) can be worn on either side of the headband and is positioned so that its end is adjacent to the side of the mouth. The tube transmits sound to the transducer contained in the small capsule.

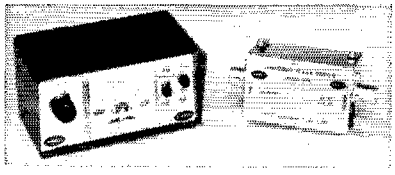
The earpiece, at the end of the transparent acoustic tube, is placed in the ear like a hearing aid. The tip is heat sensitive and molds itself to the shape of the ear canal through body heat. It is available in six different sizes.

A model is available with a microphone only (model MS-20). Microphone specifications include an impedance of 3000 ohms (at 1 kc.), output level of −59 dbm., and a plus-or-minus 6-db. frequency response of 280 to 3000 cycles. The receiver impedance is 600 ohms at 1 kc., with a signal-handling capability of −2 dbm. and a frequency response of 300 to 3000 cycles.

The boom-microphone headset combination is manufactured by Pacific Plantronics, Inc., 111 Josephine St., Santa Cruz, California. — *E. L. C.*

New S.W.R. Bridge and Indicator

A new item from AMECO is their standing wave ratio bridge, Model SWB, and indicating unit, Model BIU. The bridge is designed for use in 50-ohm coaxial lines and has a frequency range from 1.8 Mc. to 225 Mc. Maximum power handling capability is 1000 watts. The bridge is similar in design to the Monimatch[1].



Of particular interest is the indicating unit. It is equipped for inputs from two separate bridges and has a switch that can be used to transfer the indicator from one bridge to the other. This means that the user need only have one indicator to monitor two separate lines.

The meter on the indicator has a 0–100 microampere movement and is calibrated in both s.w.r. and percentage of power. However, the manufacturer states that the power calibration is only accurate for one band, the 27-Mc. Citizens Band. Details are given in the instructions for power calibration for other frequencies. The instructions are clear and detailed. — *L. G. M.*

[1] Monimatch, Mark II, *QST*, February 1957.

Correspondence From Members-

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

May I take this opportunity to acknowledge the many letters which have been sent to me on the subject of incentive licensing. Obviously most of the writers have given the proposal a great deal of thought and I appreciate the many viewpoints that were expressed.

I have forwarded the correspondence to the respective division directors in each instance, for their information in any decision which may be made. — *Herbert Hoover, jr., W6ZH, President, ARRL.*

MORE ON INCENTIVES

¶ I trust the February Editorial represents a serious determination to lead the membership "out of the woods," and restore some measure of pride in the possession of an amateur license . . . — *W4FX.*

¶ The time has come for a Crusade to clean up our bands, our equipment and our practices before the fraternity as a whole sinks into complete mediocrity and eradicates itself! This is not impossible, especially at the present rate of decay of standards. Let us all dedicate ourselves to one thing — restoration of the element of quality which is typified the American amateur in those years B.C. (Before Catastrophe, as a result of the downgrading of our license system.) — *W4EJN.*

¶ It appears to me you are really proposing that use of certain of the present amateur voice bands be restricted to a group who really are not amateurs at all — they are professionals. Many are professional engineers and scientists, in the electronics business, who use company laboratories, testing equipment, shop machinery, etc., to carry on their so-called amateur work. — *WNØDHT.*

¶ Bully for *QST* for shaking up the troops! . . . My earnest hope is that the ARRL will continue to stir us up — we need it badly. We've snuggled down into a comfortable rut where we and our ham buddy are right, and the rest of the lids are wrong. — *W7RGL.*

¶ In my opinion, only the one that is already in possession of an Advanced Class license, could be in favor of it. All the others, which form the big majority, would suffer under such a new ruling. I doubt very much that it would improve our signals, but it certainly would take tens of thousands of operators off the two bands. — *K8QKN.*

¶ . . . This may not be the answer to all of our problems but it certainly is a good start. I will gladly give up some of my operating privileges until I become better qualified. — *K5VQF.*

¶ . . . I'm going to start studying for the advanced license now. — *WA2TWS.*

¶ . . . You have certainly stirred up discussion on the subject, which is good. Most of the objections to an incentive type license that have come to my attention stem from ignorance of the Class A license and exam that was current when Class A privileges were discontinued. Most of the newcomers think in terms of the present Extra Class license, with its 20 w.p.m. code test, which they feel is not necessary for operation in a restricted phone band. — *W8FOV.*

¶ . . . Fundamentally, opportunity, advancement, reward, and recognition are at the very foundation of everything we Americans treasure. Implicit to advancement must be opportunity, just as some form of compensation must reward the effort required to advance. The alternative is stagnation, as repulsive and unhealthy in amateur radio as in any other form of human endeavor. — *K3QAX/W2QEX.*

¶ Your editorial indicates at long last the League's recognition of one of the pressing needs and problems confronting American amateur radio and is worthy of support by every serious amateur licensee in America. I am only sorry that it has taken the League so long to come to its present realization. — *W3VNF/W4BUX.*

¶ Your idea to give tangible recognition to amateurs who qualify as being proficient and able in the art certainly seems to me to be in the true spirit of Americanism. — *K8BYP.*

¶ . . . When you restrict bands as you propose, you are playing favorites. You are saying to the person who is electronically inclined or to the person who is knowledgeable in electronics, "You are privileged." This is unAmerican. — *K2CLI.*

¶ I am looking forward to seeing the League work for this obvious improvement. — *W3CYI/2.*

¶ There are at least two distinct groups of people within amateur radio which contribute greatly to the influence made upon our society by this tremendous field. One such group is made up of those whose contributions in the field of technology have been absolutely astounding. . . . More important to me, however, is a second group of people whose contribution comes mainly in the field of public service, who show superior operating ability, but who simply do not have the physical or mental aptitude to master additional technical training. In their own way, these people make a significant contribution which we could ill afford to be without. Their contribution to RACES, AREC, MARS and other regular traffic and weather nets is invaluable, and to lose them would mean the near or complete breakdown of this vital part of our hobby. — *W5AJM.*

¶ . . . I feel that adequate technical proficiency should be required before an amateur is allowed to operate on any band using any type of modulation. — *W5HYI.*

¶ . . . We feel the over-all benefits will overshadow the temporary loss of privilege to some. Our club is mainly composed of General Class amateurs who would be among those who might be temporarily inconvenienced. — *W7GJL.*

¶ . . . Amateur radio is much more than buying a piece of commercial equipment, hanging up an antenna and talking on the air. Amateur radio is the advancement of an art! Remove the incentive, remove the extra privileges of advancement, and there will be no advancement! — *W4IEN.*

¶ . . . Your March editorial is a rather feeble attempt to camouflage your original proposal. It still appears that you would like to have a QRM-free band or bands at the expense of General Class licensees — this you propose to do under the disguise of "technical proficiency." — *WA2VXF.*

¶ . . . All of the FCC examinations are too simple and I believe that these also should be upgraded. — *K7OGF.*

¶ Our hobby involves the use of a considerable investment in equipment, whether home-brew or store-bought. Why

should those hams who are good operators be penalized in terms of operating restrictions for the errors of a few? Amateur radio to me, and most of my associates, is a pleasant and rewarding hobby — an avocation, not a vocation. If one has to be driven by the incentives of others, then it loses its value as a hobby, a part of a well-rounded individual, not an all-consuming drive. — *W9MLT*.

¶ . . . Many of today's hams aren't as technically oriented as they should be. Some even send their equipment to factories to be fixed. If an amateur can't even trouble-shoot his own equipment, he needs help! — *WA2IPC*.

¶ . . . The plug-in ham you mentioned isn't a bad thing. Everybody who wants top quality isn't going to go homebrew. But the plug-in ham should know as much about what he's plugging in as the ham who builds it. — *WA6ZQF*.

¶ If ham radio is ever to survive we must survive on the basis of *technical* merit. . . . Having spent the past four years in Canada, and noting the Canadian requirement for amateur operation, I strongly feel the U. S. A. did the hobby a great disservice with the 1952 decision. — *W0AIH*.

¶ . . . Technical proficiency includes many facets, most of which can be designated either theoretical or practical. Experience has indicated that prior examinations for licenses higher than General have leaned heavily on theoretical knowledge. The great emphasis thus placed on this one aspect of amateur radio may not be fair to the majority of amateurs when other desirable attributes are considered. — *WA4KEH*.

¶ This is the most important stand you have taken since this matter simmered down ten years ago. It is a matter of appeasing a large number of "plug-in appliance" operators or restoring some measure of technical ability to amateur radio. . . . We feel that this is an excellent opportunity for the League to demonstrate whether it is more interested in the quantity of *QST* subscriptions or in the well being of amateur radio. — *W4PER* and *W4BXG*.

¶ . . . Any General Class licensee who wants to use phone can get his experience on 160 and 10 meters, until he can qualify for an Advanced and/or Extra Class. — *W8FX*.

¶ . . . Inefficiency is exemplified by outmoded methods of operation and improper adjustment of s.s.b. and c.w. equipment. And leave us not recline smugly on our big fat Class A certificates and think that only the lower echelon generates distorted and wide signals, complete with splatter and key-clicks. Brother! You should give a listen to some of these Class A (by certificate only) boys with complete "plug-in" stations. — *W1CHX*.

¶ . . . The editorials in October and November 1962 *CQ*, and November 1962 *QST*, and Wayne Green's remarks in *73* of late have indicated a growing concern for our level of competency, our traditions, and our "PICON." The February 1963 *QST* editorial shows that those who are truly concerned with our welfare want to preserve our tradition, and keep amateur radio as "amateur radio," not a party-line citizens-band-type operation. — *W2CVW*.

¶ . . . The only incentive that would accomplish the purpose that you have in mind would be a reduction in the input power to amateur transmitters with the right to use higher power upon obtaining a higher class license. . . . I believe the right to run a transmitter with an input of over 300 watts should be restricted to amateurs who have demonstrated that they are technically qualified to do so. — *WA2MKG*.

¶ . . . Many nets will be seriously affected and their power and effectiveness lessened through loss of many, many Generals who for one reason or another, perhaps lack of time, cannot find time to adequately study for an Amateur Extra or Advanced license. — *K5DNM*.

¶ . . . No one should be reissued a Class A license on the basis of what he knew 10 years ago. New exams would place all applicants at an equal starting point, and would weed out many who knew the required information at one time but never remembered it. — *WA2SEU*.

¶ . . . Eliminate the multiple choice type of examination and return to the essay type. Ask such questions as, "Draw the schematic for a Hartley oscillator and explain its operation." Fifty questions of this type would not be required to know if the applicant understood basic electronic communication and the operation of equipment. Present practices allow the applicant to memorize the visual image of certain basic circuits and the correct response to a number of questions. He is then able to elicit the correct response when the visual pattern is given, regardless of whether it is a circuit or a question of understanding. Chimps and rats are trained to respond to visual patterns with no understanding of the meaning of the symbol. — *WB2EEL*.

¶ . . . Most anyone, with some effort, can pass the Extra Class exam, and after so doing — so what?? What has been gained? Does this make him a Communication Engineer overnight, from whose laboratory great things will immediately issue forth? Does it make him a better operator, and more courteous? You know damn well that it does not! — *W1LWV*.

¶ . . . I quite strenuously resent the tag of "mediocrity" both for myself and amateurs as a whole, and I resent the implication that my difference with your opinion represents "weeping and wailing." The thoughts and opinions could have been presented in a much more accurate perspective with a far better choice of language. These articles do *not* make me proud of my membership in the ARRL. — *WA2HBS*.

¶ . . . If more preparation is desirable, then I suggest that making the requirements of the General and Conditional licenses more difficult and exacting; but I think any procedure that is retroactive is basically unfair. — *W8AIW*.

¶ . . . Without the initiative to advance, ham radio does not stand still: it actually retrogresses. Ninety nine percent of the hams I've met are intelligent and would be much happier in their wonderful hobby with an incentive to progress with the art. I don't think the griping would be serious. — *W5LGW*.

¶ . . . It is disconcerting to me that your august body has fallen into the so-often-disproved theory that additional federal regulations will solve the problem of the bands. Individual ingenuity and competition for space are part of this hobby and should be maintained. Additional exams will not change the "mediocrity" you claim exists. — *WA6YDG*.

¶ There are, of course, many issues which can and ought to be decided by active amateurs, but *this* question should be solved by League officials who are more completely informed and probably better able to make a sensible judgment. That is not to say there is no chance of error, but I'd say the problem would be in the best possible hands. . . . — *W7KCN*.

PULSE

¶ I have just finished rereading the articles on pulse technique for microwave. My congratulations to Robert Ciuba and John Zimmer for their excellent articles. I am greatly looking forward to the next article on Pulse.

I just joined the League and am very glad I did! — *Rick Brown, WA9FCG, Peoria, Illinois*.

DO IT YOURSELF?

¶ It pleases me no end to see the fine technical level of articles that are offered in *QST*. From time to time some letters appear from fellows complaining about the "high" technical level of the articles but it might be pointed out that the articles submitted to your group and accepted represent the state of the art. Indeed, the "beginners" articles are almost all written by the technical staff of *QST*. I assume that this is because there are no acceptable articles of this level submitted. I believe that this is due to the ever widening gap between the "ham operator" and the "ham operator-experimenter." The "ham operator" who complains about the technical level of the articles should just jump right in and get his feet wet by writing a short paper of his own and submitting it to your group. — *Bill McKay, W7QBR, Cedar Rapids, Iowa*.

Hints and Kinks For the Experimenter

ANOTHER DIPOLE CONNECTOR

A SIMPLE dipole connector, shown in Fig. 1, has excellent mechanical and electrical stability. The heart of the connector is a "U"-shaped piece of Plexiglas or metal. If plastic is used, it probably can be obtained from a hobby shop or a plastic-supply store. A piece of ¼-inch stock about 2 inches wide and 6 inches long is needed. Heat the plastic by rotating it over a stove burner — either gas or electric. When it is soft enough to bend, grasp it with flat-jawed pliers and bend it into the U shape as shown in Fig. 1. Each side should be about two inches long.

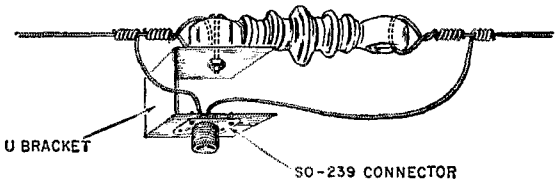


Fig. 1—WA2VOL's dipole connector.

One of the sides should be drilled to accommodate a coax receptacle. A small hole is drilled in the opposite side to take a machine screw and nut, which is used to attach the assembly to the insulator. After the proper electrical connections, the unit is ready for hoisting.

— *Kent Williams, WA2VOL*

VERTICAL ANTENNA FREQUENCY EXTENSION

I HAVE been using a 40- through 10-meter trap vertical antenna (Hygain 14AVS) for some time with success but have missed being able to operate on the 75-meter band. I was limited to coax feed line and the base of the antenna was not easily accessible for exchange of connections on a base loading coil.

My solution was to run out a 180-foot horizontal wire. It wasn't a straight run; it had to make a right angle turn in the process. I connected the other end of the wire to the base of the vertical just above the insulator. The base of the antenna is mounted at the house roof line about 12 feet above the ground.

The antenna system now shows a 1.2 to 1 s.w.r. at 3975 kc., and to top it off, I now find that the s.w.r. has improved on 20 meters! This idea should work with almost any trap vertical.

— *K. M. Aitken, W2OUY*

PERMAKAY FILTER FOR IMPROVED RECEIVER SENSITIVITY

THE selectivity of many receivers having an i.f. of 455 kc. can be improved by adding a remodeled Motorola Permakay filter unit. These units were removed from Motorola f.m. communication equipment in large numbers when conversion to split-channel or narrow-band f.m. was made. Discarded filter units are often obtainable from mobile communication service organizations.

The Permakay unit contains 12 copper cups potted in a 4 × 2 × 1 ½-inch metal box. Potted in each copper cup is a capacitor and slug-tuned coil which has a *Q* of about 150 at 455 kc. Figure 2 shows the original circuit with the exception of the coupling capacitors, which are added in this modification and are shown outside the dotted

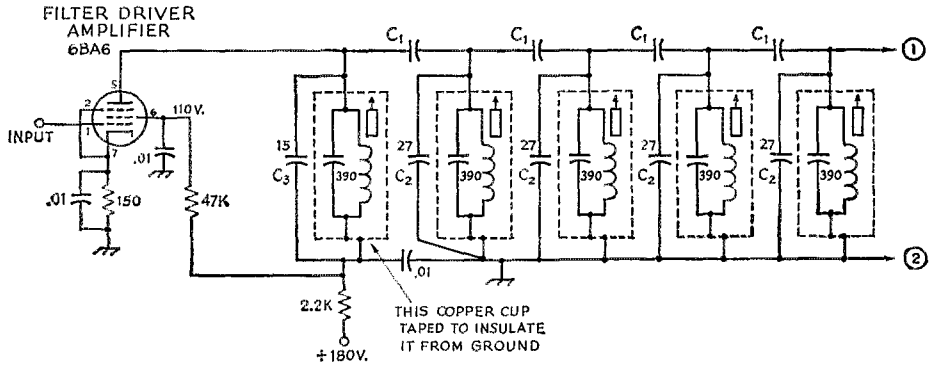


Fig. 2—Schematic diagram of the Permakay filter. In the original circuit, C_1 was 19 pf.

	3-Kc. Bandwidth	6-Kc. Bandwidth
C_1	3 pf.	5 pf.
C_2	27 pf.	27 pf.
C_3	15 pf.	15 pf.

lines. The bandpass curves, after modification, are shown in Fig. 3 for two different coupling capacitor values.

To remodel the unit, pry the lid off along with the brittle potting compound, with a sharp screwdriver and hammer. This job must be done with care to avoid damage to components, and may take an hour or two. This exposes the coupling capacitors, slug-tuning screws, and wire connections to one side of each resonant circuit. Each resonant circuit remains potted in its copper cup, but the tuning-slug screw protrudes and is now adjustable. Remove the original coupling capacitors, C_1, and replace them with the values shown in Fig. 2. With 5-pf. coupling capacitors, the filter has a 6-db. bandwidth of 6 kc., and with 3-pf capacitors, a bandwidth of 3 kc. Since the original coupling capacitors formed part of each resonant circuit, small shunting capacitors, C_2 and C_3 are added to the circuit to maintain the center frequency at 455 kc.

To compensate for filter insertion loss, an additional stage of i.f. amplification is added as shown in Fig. 2. Since the resonant circuits are internally grounded to the copper cups, the input cup is insulated with tape and bypassed to ground to allow B-plus to be fed through the coil and to the driver plate. After modification, the slug-tuning screws are adjusted for maximum gain.

The filters by themselves exhibit rather high insertion loss. The 3-kc. filter loss measured 62 db., and that for 6-kc. 31 db. However, the filters have a high input impedance of about 60,000 ohms, and this allows the pentode amplifier to achieve enough gain to compensate approximately for the insertion loss. The gain from the 6BA6 grid to the filter output is five for the 6-kc. filter and one sixth for the 3-kc. model.

Since the loss of the 3-kc. filter is high, caution must be used in inserting this unit into an existing receiver which has little a.g.c. ahead of the filter. Dynamic range is limited by the fact that weak signals must be kept above the noise at the grid of the tube following the filter, and strong signals must not overdrive and distort in the tube which drives the filter. An additional amplifier inserted in the center of the filter might be helpful.

The filters described here are marked TU-145 and were obtained when kit SK-9443A was installed, but similar modifications should be possible with other Permakay models.

— G. L. Roberts and J. D. Gooch, W9YRV

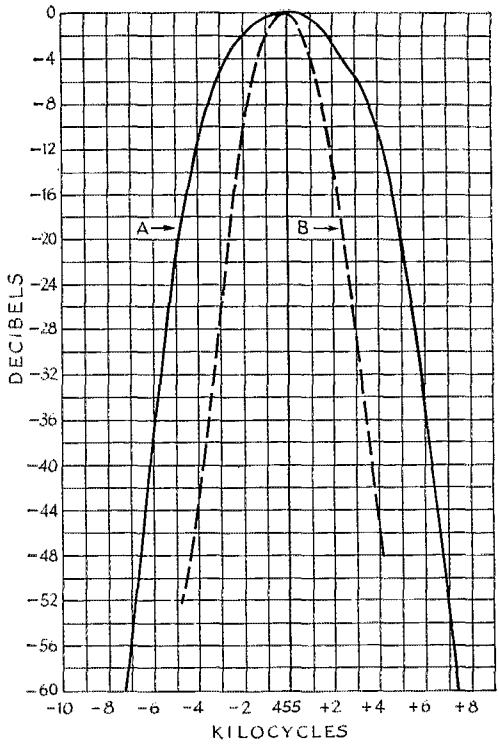
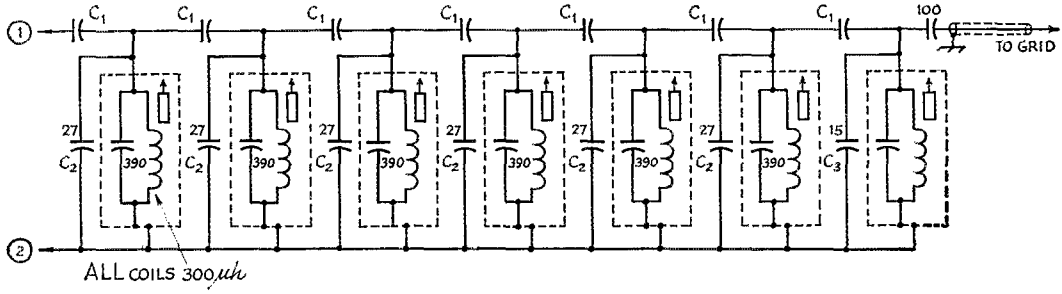


Fig. 3—Selectivity curve for the Permakay filter. Curve A is the 6-kc. bandwidth (at 6 db.), curve B is the 3-kc. bandwidth (at 6 db.).

COAX CONNECTOR REMOVAL

To remove coaxial connectors such as the PL-259 from their cables, first take a knife and cut away any lumps of solder around the holes in the body of the connector. Next, drill out the solder in each of the holes with a No. 31 drill. Heat the center conductor pin with a soldering iron, give the cable a twist and a pull, and the connector will come off easily. The important thing to remember is not to use any heat on the body of the connector. If there is a reducer bushing in the connector — the kind used to modify the connector for small-diameter coax — use two pairs of pliers; one holds the connector and the other the bushing. Screw this out before starting the above process.

— M. J. Silvers, W4HUW



Reciprocal Operating Bill
Senator Goldwater Licensed
Mobile Logging
License Fees

RECIPROCAL OPERATING BILL S. 920

As we reported briefly last month, Senator Barry Goldwater, K7UGA and ex-6BPI (see separate article) has introduced a new bill, S. 920, to provide for reciprocal operating agreements with other countries, along the lines of the agreement of many years' standing between the U. S. and Canada. The bill was drafted with the help of the League staff and General Counsel Booth to meet some of the objections expressed by Government departments to S. 2361 last year; it drops the idea of *licensing* aliens and rather proposes that alien amateurs from countries with which we would sign agreements would be permitted to operate their amateur stations here, using the home call sign followed by a portable or mobile designator indicating operation in a particular part of the U. S.

At its meeting in March, the Executive Committee expressed its support for S. 920 in preference to other reciprocal licensing bills which have been or may be filed.

An impressive list of Senators have cosponsored S. 920: Messrs. Allott, Bartlett, Bennett, Boggs, Curtis, Hayden, Hruska, Lausche, Metcalf, Moss, Mrs. Neuberger, Messrs. Randolph, Scott, Sparkman, Tower, Yarborough, McIntyre, Dominick, Clark, Humphrey, Fong, Bayh, Gruening, Ervin and Javitts (the latter three joining the list after the bill was printed).

League members interested in supporting the bill may write to the Senators from their respective states, especially those on the Senate Commerce Committee. The text of the bill follows:

88th CONGRESS
1st Session

S. 920

IN THE SENATE OF
THE UNITED STATES

FEBRUARY 28, 1963

MR. GOLDWATER (for himself, Mr. ALLOTT, Mr. BARTLETT, Mr. BENNETT, Mr. BOGGS, Mr. CURTIS, Mr. HAYDEN, Mr. HRUSKA, Mr. LAUSCHE, Mr. METCALF, Mr. MOSS, Mrs. NEUBERGER, Mr RANDOLPH, Mr. SCOTT, Mr. SPARKMAN, Mr. TOWER, Mr. YARBOROUGH, Mr. MCINTYRE, Mr. DOMINICK, Mr. CLARK, Mr. HUMPHREY, Mr. FONG, and Mr. BAYH) introduced the following bill; which was read twice and referred to the Committee on Commerce.

A BILL

To amend sections 303 and 310 of the Communications Act of 1934, as amended, to provide that the Federal Communications Commission may, if it finds that the public interest, convenience, or necessity may be served, issue authorizations, but not licenses, for alien amateur radio operators to operate their amateur radio stations in the United States, its possessions, and the Commonwealth of Puerto Rico provided there is in effect a bilateral agreement between the United States and the alien's government for such operation by United States amateurs on a reciprocal basis.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That clause (1) of section 303 of the Communications Act of 1934 (47 U.S.C. 303) is amended —

(1) by inserting "(1)" immediately after "(1)"; and

(2) by adding at the end of such clause the following: "(2) Notwithstanding section 301 of this Act and part (1) of this clause, the Commission may issue authorizations, under such conditions and terms as it may prescribe, to permit an alien licensed by his government as an amateur radio operator to operate his amateur radio station licensed by his government in the United States, its possessions, and the Commonwealth of Puerto Rico provided there is in effect a bilateral agreement between the United States and the alien's government for such operation on a reciprocal basis by United States amateur radio operators. Other provisions of this Act and of the Administrative Procedure Act shall not be applicable to any request or application for or modification, suspension, or cancellation of any such authorization."

SEC. 2. Subsection (a) of section 310 of the Communications Act of 1934 is amended by adding at the end thereof the following: "Notwithstanding section 301 of this Act and clauses (1) and (2) of this subsection, the Commission may issue authoriza-

FLASH — At press time, we learn that the Commission has removed the restriction against single sideband on 160 meters, which was to have gone into effect on April 15. Also, an expanded Loran program requires reactivation of the 1900-kc. channel in the Gulf area, and it is accordingly expected that about June 1 additional restrictions will have to be placed on amateur operation in Gulf states in the 1875-1900 and 1900-1925 kc. segments.

tions, under such conditions and terms as it may prescribe, to permit an alien licensed by his government as an amateur radio operator to operate his amateur radio station licensed by his government in the United States, its possessions, and the Com-Commonwealth of Puerto Rico provided there is in effect a bilateral agreement between the United States and the alien's government for such operation on a reciprocal basis by United States amateur radio operators. Other provisions of this Act and of the Administrative Procedure Act shall not be applicable to any request or application for or modification suspension, or cancellation of any such authorization."

SENATOR GETS AMATEUR LICENSE

All of us know several people who are going to get their amateur licenses just as soon as they can find time to study. Somehow, one of the busiest men in the country has found the time; Senator Barry Goldwater of Arizona has recently received the call K7UGA, renewing an interest which started in 1922, when he was only thirteen. Under the call 6BPI, Mr. Goldwater started out with a five-watt c.w. rig, later going to high power — 20 watts! The Senator recalls that his best DX was Hawaii. He should have little difficulty topping this record today, however, with new s.s.b. gear running a "full gallon."

K7UGA

The Senator holds the rating of a Command Pilot and the rank of Major General in the Air Force Reserve. He's active in Indian affairs, and has a side hobby connected with this interest, the collection of more than 400 Kachina dolls, displayed in the Goldwater Department Store, of which he is Board Chairman. A family man with four children, the Senator is a Shriner, and belongs to both the American Legion and the Veterans of Foreign Wars. Senator Goldwater and his wife both enjoy fishing for marlin. And a current anecdote has it that President Kennedy autographed a recent photograph: "To my friend Barry, with the hope that he follows the career for which he has shown so much talent — photography"!

We welcome the Senator back to the ranks of amateurs and League members.

COMMISSION EASES MOBILE LOGGING

The Federal Communications Commission, in Docket 14853, has granted the League's request for relaxation of mobile logging requirements. Effective March 21, 1963, mobile stations no longer have to note the time of establishing contact and the time of signing off with *each* station. Instead, the mobile amateur, at the first convenient time after a period of mobile operation, may enter the time he started to operate, the ending time, and the calls of the stations worked during the interval. The text of the Report and Order appears below.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington 25, D. C.

In the Matter of Amendment of Part 12 of the Rules governing the Amateur Radio Service to simplify log-keeping requirements during mobile operation	DOCKET NO. 14853 RM-281

REPORT AND ORDER

By the Commission; Commissioners Minow, Chairman; and Hyde absent.

1. On November 23, 1962, the Commission released a Notice of Proposed Rule Making to amend Section 12.136(a) of its Rules governing the Amateur Radio Service to provide that during a period of continuous mobile operation the time of each transmission may be omitted from the station log provided that the date and times of commencing and terminating such mobile operation are entered. This Notice was duly published in the *Federal Register*, November 28, 1962 (27 FR 11708), and all comments filed in response thereto have been considered by the Commission.

2. The comments received either wholeheartedly or qualifiedly supported the proposal. The American Radio Relay League, the original petitioner in this Docket, submitted a supporting comment but, additionally, suggested that this Report and Order clarify when the required log entries for mobile operation should be made. In this regard, the Commission contemplates that a licensee operating mobile will maintain his log at his first practicable opportunity, such as a stop for service, food or lodging, or upon completion of a day's journey. Of course, memory limitations may require some licensees to make an occasional stop to record data necessary for the accuracy and completeness of their logs.

3. Qualified support was received from those licensees who felt that greater relaxation of log entry requirements should be made. As to these comments, the Commission notes that meeting the present logging requirements, excepting the one being changed in this Docket, does not appear to impose an undue burden upon licensees and is considered necessary to administration and enforcement in the Amateur Radio Service.

4. As indicated, there is no objection to the proposed rule amendment. Therefore, for the reasons set forth herein and in the Notice of Proposed Rule Making, the Commission concludes that the proposed rule making should be adopted.

5. Authority for the amendment set forth in the attached Appendix is contained in Sections 4(i) and 303 of the Communications Act of 1934, as amended.

Therefore, IT IS ORDERED, this 13th day of March, 1963, that Section 12.136(a) of the Commission's Rules is amended as set forth in the Appendix attached hereto, effective March 21, 1963.

FEDERAL COMMUNICATIONS COMMISSION
BEN F. WAPLE
Acting Secretary

APPENDIX

Amendment of Part 12, Amateur Radio Service.

Section 12.136 is amended by addition of the following clause at the end of the first sentence in paragraph (a): ". . . except that for a period of continuous mobile operation, the time of each transmission may be omitted,

JA1FG, president of the Japan Amateur Radio League poses in front of Tokyo's Toyomura Electronic Co., where he is caught by the camera of KR6DL/W4AWT.

provided that the dates and times of commencing and terminating such mobile operation are entered in the log."

As amended, Section 12.136(a) reads as follows:

§12.136 Logs

* * *

(a) The date and time of each transmission, except that for a period of continuous mobile operation, the time of each transmission may be omitted, provided that the dates and times of commencing and terminating such mobile operation are entered in the log. (The date need only be entered once for each day's operation. The expression "time of each transmission" means the time of making a call and need not be repeated during the sequence of communication which immediately follows; however, an entry shall be made in the log when signing off so as to show the period during which communication was carried on.)

LICENSE FEES

In a public notice dated March 27, the FCC announced that it had instructed its staff to prepare a final Report and Order in Docket 14507 establishing a schedule of fees in connection with the filing of applications for licenses and the like. The Commission's action is based on provisions of Title V of the Independent Offices Appropriation Act of 1952, which expressed the view that the many Federal agencies should be self-sustaining insofar as possible. The fees — to become effective January 1, 1964 — range from $2 to $100, the latter for major applications related to TV stations. As we write this, no announcement has been made of the revised schedule of fees. There are indications that many items of the schedule will be lower than was originally proposed when the docket was opened in February 1962, but no indication whether amateurs will be exempted as the League requested in its filing (See page 57 of *QST* for July, 1962).

It is expected that the fees to be raised by this measure might total $5,000,000 per year. The revenues would go into the general fund of the U. S. Treasury; the Commission would continue to obtain all its operating funds through an annual Congressional appropriation.

SMALL FINES

In the April editorial, we reported on the new small forfeitures rules established by the Commission for its non-broadcast services. The new procedures are already being used: a "Notice of Apparent Liability" has been sent to a licensee in the Citizens Radio Service for repeated violations of sections 19.61 (a) (unauthorized communications) 19.62 (improper identification) and 19.83 (false call sign). The forfeiture is to be in the amount of $300; the licensee has 30 days to respond to the notice. The FCC action is under the authority of section 510 of the Communications Act as amended by Congress last year, and section 1.80 of the Commission's rules.

MINUTES OF EXECUTIVE COMMITTEE MEETING

No. 292

March 26, 1963

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Statler Hotel, New York, N. Y., at 10:22 A.M. March 26, 1963. Present: President Herbert Hoover, Jr., in the chair; First Vice President W. M. Groves; Directors Robert W. Denniston, Noel B. Eaton and Morton B. Kahn; General Manager John Huntoon; Vice President F. E. Handy. General Counsel Robert M. Booth, Jr., was also present.

On motion of Mr. Kahn, affiliation was unanimously GRANTED to the following societies:

Carlisle Amateur Radio League, Carlisle, Pa.
Carolina Radio Monitors League, Asheville, N. Car.
The Central New Jersey V.H.F. Society, New Brunswick, N. J.
Chillicothe Amateur Radio Club, Chillicothe, Mo.
Cleveland Police & Fire Amateur Radio Club, Cleveland, Ohio.
Fulton Amateur Radio Club, Fulton, New York
Lawrence High School Amateur Radio Club, Cedarhurst, L. I., N. Y.
Montgomery Shop Amateur Radio Club, Aurora, Illinois
Needham High School Amateur Radio Club, Needham, Mass.
North Shore Amateur Radio Club, Northbrook, Ill.
South Bay Wireless Society, Torrance, Calif.
Tri-State V.H.F. Association, Whippany, N. J.
Wave Riders, Branson, Mo.

On motion of Mr. Denniston, unanimously VOTED to grant approval for the holding of an Oregon State Convention in Eugene on June 1–2, 1963; a Rocky Mountain Division Convention in Pueblo, Colorado, on June 15–16, 1963; a Kentucky State Convention in Lexington on September 14, 1963; an Ontario Province Convention in Hamilton on September 28, 1963; a Delta Division Convention in Lafayette, La., on November 29–31, 1963; a Florida State Convention in Miami on January 18–19, 1964; and a Great Lakes Division Convention in Detroit, Michigan, on April 3–5, 1964. The Committee accepted the request of the Racine Megacycle Club for withdrawal of its application to hold a Wisconsin State Convention in Racine on May 25, 1963.

On motion of Mr. Groves, unanimously VOTED that the Committee affirms its earlier informal authorization to the General Manager, in accordance with recommendations of the Finance Committee, for the temporary use of League operating funds as may be necessary for payment of construction bills for the new Headquarters building pending completion of the Building Fund drive.

The Committee was in recess from 11:45 A.M. until 5:00 P.M., at which time Hudson Division Vice Director Harry J. Dannals joined the meeting.

On motion of Mr. Denniston, unanimously VOTED that the officers and General Counsel are requested to take action as may be appropriate to effect League support of Senate Bill 920, in the matter of reciprocal amateur operating agreements with other countries, in lieu of bills which provide for reciprocal licensing privileges.

During the course of the meeting the Committee discussed, without formal action, the building fund drive, negotiations for sale of the present Headquarters property, incentive licensing, and amateur self-policing.

There being no further business, the meeting adjourned at 6:00 P.M.

JOHN HUNTOON
Secretary

Operating News

F. E. HANDY, WIBDI, Communications Mgr.
GEORGE HART, WINJM, Natl. Emerg. Coordinator
ROBERT L. WHITE, WIWPO, DXCC Awards
LILLIAN M. SALTER, WIZJE, Administrative Aide
ELLEN WHITE, WIYYM, Ass't. Comm. Mgr.

Preparing for Field Day. Some clubs work all year to put forth a maximum effort in the ARRL Field Day operations. The week end of June 22–23 is the one designated for the over-the-air field test of individual or club setups this year. Some clubs have "teams" under a chairman for each band or with all the planning going forward under one general chairman for the Field Day. In other cases there are club committees (to recommend in connection with site, commissary, equipment, antennas, and operating shifts.) The FD rules were distributed to 1300 affiliated clubs in February and will be re-printed in June *QST*.

Advance planning is the way to get *most* from your FD. We *hope* that many individuals will build and test 30-watt rigs; it might be a good idea to have a hand-carried battery powered category to supplement the emergency things that can be done from cars or home stations. *The Anne Arundel Radio Club (Maryland)* has accomplished notable Public Service work with its 25 mobiles and 18 hand-carried six-meter equipments and base station support.

W9MSG, Ninth district QSL manager, congratulates the new President of the Rockford Amateur Radio Assn., K9DJG, during the January club meeting. Other officers, (left to right) are: K9AHH Treasurer, K9KGV Secretary and K9RXS Vice-President.

A club's *aggregate mobile score* makes an excellent report showing when supported by the consistent work throughout the FD with such truly-emergency equipments and the summation of the scores of the club-connected individuals!

Each club customarily makes its own decisions as to what transmitter class to enter, whether Novices will help log or if enough can volunteer to make it worthwhile to have a separate setup manned by Novices or Techs to work exclusively in the bands they are assigned. This might be a good thing to do for certain hours, if not for the full FD.

Operator Briefings. When it comes to scoring, operator-proficiency and coverage of c.w. as well as phone bands becomes important. We suggest that *now is the time* for the more experienced in procedure techniques and operating to be invited to put on a combined lecture and demonstration at the club. Message form, timing of calls to make them get results, length of call, accurate logging and other matters should be demonstrated by those with the know-how. In some clubs a panel treatment by the experts and subsequent free-for-all question and answer session, after a demonstration will work wonders. After the groups assigned building and planning responsibilities have completed their efforts (at the last minute when FD setup is completed in June, too) more briefing may be called for. Operators all need to be familiarized with the controls and tune-up techniques on any equipment with which they are not altogether familiar. A good indoctrination for the operator who wants to step up his ability to exchange intelligence accurately and quickly is membership in the c.w. and phone nets (each Section) that constitutes the basis for the National Traffic System.

ARRL Emergency Coordinators should be brought in on the Field Day planning. Each club will send a FD message reporting on the number of AREC members. There should be some AREC-recruiting and getting groups up to strength before Field Day. The FD message rates 25 points credit. From the very start the FD has

been dedicated to individual and club improvement of its facilities to work *emergency-powered*. ECs should recruit AREC members, fit them into local disaster plans dedicated to definite agencies and functions served in disaster. All amateurs who have equipment that rates may receive the Official Mobile Unit cards and Emergency Radio Unit placards and AREC decals available only from Emergency Coordinators. This Field Day is some one and one half months away. In that time let us each add a new emergency-operative item to our equipment or test-improve same or develop our personal ability to operate and handle formal communications.

Since *club and group entries* (Class A for three or more operators) often take intricate planning, we have talked most about club preparations. But don't forget. You can also go afield where one or two operators try out portable gear in the *unit or individual class* (Class B) or enter your *mobile* (Class C). Then you compare score only with other mobiles. You'll have some grand experiences, however you get in the FD.

FD Log Forms Now Available. We suggest you ask for our Field Day log-report forms by radio or mail at once, if there's a good chance you'll be out there, or with your club, so we have a chance to place these in your hands. The forms are *now ready*. — *F. E. H.*

TIME CONVERSION TO GMT

EST	GMT	CST	MST	GMT	PST
1900	**0000***	1800	1700	**0000***	1600
2000	**0100**	1900	1800	**0100**	1700
2100	**0200**	2000	1900	**0200**	1800
2200	**0300**	2100	2000	**0300**	1900
2300	**0400**	2200	2100	**0400**	2000
0000*	**0500**	2300	2200	**0500**	2100
0100	**0600**	0000*	2300	**0600**	2200
0200	**0700**	0100	0000*	**0700**	2300
0300	**0800**	0200	0100	**0800**	0000*
0400	**0900**	0300	0200	**0900**	0100
0500	**1000**	0400	0300	**1000**	0200
0600	**1100**	0500	0400	**1100**	0300
0700	**1200**	0600	0500	**1200**	0400
0800	**1300**	0700	0600	**1300**	0500
0900	**1400**	0800	0700	**1400**	0600
1000	**1500**	0900	0800	**1500**	0700
1100	**1600**	1000	0900	**1600**	0800
1200	**1700**	1100	1000	**1700**	0900
1300	**1800**	1200	1100	**1800**	1000
1400	**1900**	1300	1200	**1900**	1100
1500	**2000**	1400	1300	**2000**	1200
1600	**2100**	1500	1400	**2100**	1300
1700	**2200**	1600	1500	**2200**	1400
1800	**2300**	1700	1600	**2300**	1500

Greenwich Mean Time (GMT) is time at the zero or reference meridian. Time changes one hour with each change of 15° in longitude. EST, CST, MST and PST are 5, 6, 7 and 8 hours "earlier" than the time at the Greenwich (0°) meridian. They correspond to 75th, 90th, 105th and 120th meridians.

*** or 2400. (2400 is associated with the date of the day ending; 0000 with the day just starting.)**

ARRL Communications Department Operating Aid No. 10.

It's hard to beat GMT for accurate log keeping, whatever the season. Get your handy GMT card from the Comm. Dept.

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are per GMT)

May 3: CP Qualifying Run — W6OWP
May 21: CP Qualifying Run — W1AW
June 6: CP Qualifying Run — W6OWP
June 8–9: V.H.F. QSO Party
June 19: CP Qualifying Run — W1AW
June 22–23: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

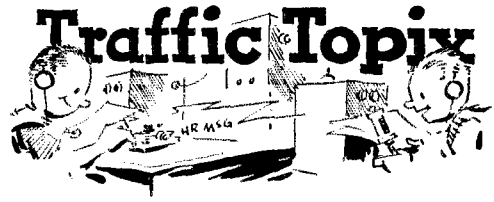
May 3–5: West Virginia QSO Party, Mountaineer ARA (p. 146, this issue).

May 4–5: SJRA QSO Party, South Jersey Radio Assn. (p. 102, this issue).

May 4–5: PACC Contest (phone), V.E.R.O.N. (p. 77, this month).

May 4–5: International Telegraphic Contest, USSR Federation of Radio Sports (p. 76, this issue).

May 11–13: Georgia QSO Party, Columbus Amateur Radio Club (p. 152, this issue).



Should the BPL be abolished? We recently received a letter from a good traffic man who seriously proposed just this. Another letter suggested that a separate honor roll be set up for phone traffic handlers. And quite frequently we receive suggestions to change the counting system, to give points for net controlling, for "informals," for direct communications between third parties, with multipliers for doing it on v.h.f., or with low power, or from a poor location, or for being over (or under) a certain age, and so forth *ad infinitum*.

Still, the BPL remains a much-sought-after honor roll and adds immeasurably to our traffic-handling stature. Perhaps another form of honor roll, with shifted emphasis, *could* be more beneficial, but there is no doubt that the traditional list, with its traditional name (although it is open to *all* traffic-handlers) results in more traffic being handled than would otherwise be the case.

At the end of World War II, we started giving "BPL points" to all individual amateurs operating their own stations who made this list. These points were assigned on the basis of four points for making the BPL plus an additional point for every full hundred in the monthly traffic total. These points then became cumulative from month to month and year to year. This system gave credit for consistent top performance in traffic handling, rather than on a simple month-to-month basis, and very soon started to identify our traffic "giants." At first we had a "BPL Honor Roll" every month, but soon the competition to achieve a place on this list turned into bitter rivalry, then into strife, and amidst accusations of cheating among the aspirants we discontinued the monthly list. Since then, we have restricted ourselves to a semi-annual or annual summary, proclaiming (but not very loudly) an annual traffic "champ" and listing the top few traffic men in the "all-time" (since 1946) BPL list. The first "champ," in 1946, was W7FST, and in 1947 W4PL topped the list. Subsequently we had W6REB in '48, W6CE in '49 and '50, W3CUL in '51, '52, '53 and '54, WØBDR in '55, W2KEB (now K7NOA) in '56, '57 and '58, and W3CUL again every year since then. Thus, you see, out of the 17 years

we have kept these records, W3CUL has won 8 times and the "weaker" sex has supplied the champion eleven times.

Yes, in 1962 W3CUL was again the traffic champ, by the usual wide margin: 614 BPL points to 424 for her nearest rival, K6BPI. (See July '61 *QST*, p. 82, for the low down on how she does it.) Here is the rest of the top 25 for 1962: WØLGG (246), WØSCA (221), W9JOZ (191), K4AKP (167), W7BA (165), W1PEX (152), W3EML (151), W7DZX (139), W3VR (129), W3IVS (127), W8UPH (127), KØONK (125), W8DAE (125), W9DYG (124), WA2GPT (120), W1TXL (119), K6EPT (117), K7KBN (112), K4SJH (110), K7JHA (104), WA4BMC (101), W6WPF (91), W6GYH (88), W9IDA (88).

The "all-time" BPL list has at its head (who else?) W3CUL, with 6723 points. Second is W7BA with 2408 and third was W4PL with 2297. The remaining "top 25" in the post-war list (some of whom you have probably never heard) are as follows: WØSCA (2279), WØBDR (2106), K7NOA (1873), WØLGG (1474) W6GYH (1370), W9NZZ (1347), W3WIQ (1184), W9DO (1121), WØCPI (1099), W9JUJ (982), K6BPI (960), W7PGY (940), W8UPH (931), W7CZY (885), WØLCX (882), K2UTV (880), W6CE (815), WØTQD (809), WØPZO (725), W9TT (674), W9JOZ (663), W2RUF (641). You don't get on this list in one year, unless you suddenly become a W3CUL.

—•••—

February Net Reports. Someone asked us to explain the headings on this summary. "Sessions" is the number of times the net meets during the month. "Check-ins" is the number of times stations check into the net during the month (the same station is counted each time it checks into a session). "Traffic," of course, is the number of traffic handlings completed during the month.

Net	*Sessions*	*Check-ins*	*Traffic*
Eastern Region Traffic	20	63	30
75 Meter Interstate S.S.B.	28	1148	606
Northeast Area Barnyard	—	859	19
Early Bird Transcontinental	28	...	82
7290	40	1594	942
Mike Farad E & T	49	420	1052
All Service	4	37	31
20 Meter Interstate S.S.B.	16	402	1578

—•••—

National Traffic System. The harbingers of spring have been exceedingly welcome this year, after the session of long skip we had during the winter — and NTS is still holding together. A little shaken and wan, 'tis true, but nevertheless possessed of a good, rugged constitution that will soon snap back now that signals within 25 and 100 miles can again be copied without fishing through 89 QRM from a thousand miles away.

Last fall we exhorted all NTSers to consider using 160 meters as an alternative or QNY frequency when their 80-meter frequency showed signs of becoming useless. Few did so. Now that we have somewhat expanded privileges on 160, let us renew this thought. During the summer, the band is usually pretty noisy, but come this fall we can predict that 80 will again start doing a fadeout for practical purposes, starting in October or November and lasting into March, from dark to dawn. There have been some good *QST* articles on the subject of rigs for 160 meters in recent months, so dig out your back issues, unlimber the old soldering iron, and be ready to shift to 160 this fall when conditions go sour on us again.

This is the base station for the March of Dimes Telethon at Panama City, Fla., on Jan. 25, operated by members of the Panama City Amateur Radio Club. Left to right, seated, are WN4IMC, a telethon official, WA4KKB, W5GWA; standing, W4AFJF, WA4GJO.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for February Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	412	3112	2861	226	6611
K6BPI	49	1586	1448	138	3221
W9JOZ	21	1581	1579	2	3183
W9IDA	14	1430	1400	8	2852
W6YDK	1567	158	152	36	1913
K4AKP	16	949	838	97	1900
WA4BMC	77	856	814	65	1812
WØSCA	26	795	792	5	1618
W9MM	25	740	739	2	1506
W3IVS	14	708	673	57	1452
WA2GPT	30	671	613	42	1356
W3EML	26	701	576	19	1322
W1PEX	19	642	617	19	1297
WØLGG	128	518	478	26	1150
W4ZJY	19	553	548	5	1125
K9KZB	18	526	483	43	1070
K6EPT	28	520	390	130	1068
K4PXY	121	268	389	247	1025
WA4IJH	14	490	482	8	994
WA6ZOW	74	421	407	88	990
K8FDV	7	462	457	5	931
K4EHY	504	206	174	22	906
W4TUB	11	449	416	19	895
K8YUZ	6	438	415	23	882
W3VR	40	397	374	17	828
W2EW	125	362	233	103	823
K4MCL	7	410	344	57	818
W7BA	5	406	368	37	816
WA2VAT	70	380	304	61	815
W1TXL	70	373	337	17	797
WA9AJF	72	345	251	94	762
K5IBZ	19	369	360	9	757
W8LDU/4	3	377	354	19	753
K2UAT	79	348	317	3	747
K4HSB	204	255	278	6	743
W3IVC	29	356	343	9	737
W6RSY	40	355	242	94	731
W8DAE	66	338	247	75	726
K1BCS	60	327	295	27	709
WØZWL	6	431	2	191	630
K8LGA	12	303	295	6	616
K4WJI	44	281	276	8	609
W9DYG	36	304	249	20	609
K5ANS	47	301	237	17	602
K2UBG	6	304	262	14	586
K6MDD	4	289	193	96	582
W7DZX	7	297	254	13	571
W2MTA	17	275	255	15	562
K5TEY	8	280	268	4	560
W2WFL	5	281	254	10	550
W6EOT	4	274	262	4	544
K1ONW	8	276	184	75	543
WA2EXP	10	260	224	41	535
K7KBN	123	203	200	3	529
W9NZZ	134	199	0	196	529
WA2TQT	106	211	200	11	528
WA2WLN	10	260	240	15	525
W2RUF	20	264	176	60	520
K8OBW	24	244	226	20	514
K3OOU	55	241	136	73	505
WA4ELB	11	249	235	10	505
W9PHR/5	40	205	70	190	505
K8JJC	152	175	90	85	502
Late Report:					
WA2TQT (Jan.)	92	401	376	25	894

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K9NBH	3146	90	0	5	3241
W4PFC	28	1298	1326	84	2736
W6IAB	185	1108	1050	56	2399

BPL for 100 or more *originators-plus-deliveries*

K6GZ 230	K6GMU 120	WA2CCF 103			
K9GMZ 207	WA2GAB 117	K8DIU 103			
WA4FYV 195	K3QOO 117	W9BUQ 102			
W4NTR 157	WA2RUE 111	W3TN 101			
W7APS 153	K8GOU 108	Late Reports:			
WAØBYO 142	WA6YLZ 107	W4MLE (Jan.)	165		
K9IMR 141	WA2VKK 105	WØPZO (Dec.)	110		
	WA2KQG (Dec.) 103				

More-Than-One-Operator Stations

KR6GF 360	KR6MD 116	Late Report:
KR6MB 120		W5AC (Jan.) 165

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs since last month's listing: K1TSD, W2MTA, WA2QJU, W3MFB, K4COO, K4VFY, K5QXV, W7GUH, W7OCX, WA9AJF.

The BPL is open to all amateurs in the United States, Canada, and U. S. Possessions who report to their SCM a message total of 500 or more or 100 or more originations plus deliveries for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

February reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
EAN	28	2264	1.348	80.9	99.4
CAN	28	1772	.954	63.2	100.0
PAN	28	997	.721	35.6	93.4
1RN	53	751	.394	14.2	66.8
2RN	56	915	.704	23.2	99.6
3RN	56	544	.349	9.7	95.8
4RN	55	938	.500	17.1	96.6
RN5	56	1018	.465	18.2	85.2
RN7	54	399	.253	7.3	71.5
8RN	56	627	.366	11.2	85.8
9RN	28	680	.612	31.4	98.11
TEN	65	626	.308	9.6	65.7
ECN	26	103	.204	4.0	67.91
TWN	28	101	.165	3.6	45.01
Sections[2]	1065	7441	...	7.0	....
TCC Eastern	67[3]	643			
TCC Central	84[3]	1040			
TCC Pacific	111[3]	818			
Summary	1682	21677	EAN	11.4	CAN
Record	1802	28659	1.183	19.1	100.0

[1] Region net representation based on one session per day or less. Others are based on two sessions per day or more.

[2] Section nets reporting: GSPN (N.H.); BEN & WSB (Wis.); SCN (Calif.); NCN & NCSN (N.C.); BN (Ohio); KYN (Ky.); BUN (Utah); EPA (Pa.); NEB (Nebr.); MDDS & MDD (Md.-Del.-D.C.); GEM (Idaho); MSPM Noon & MSN (Minn.); Wolverine (Mich.); TEX (Texas); AENB, AEND, AENH, AENM, AENO, AENP Morn, AENP, AENS, AENT, AENV & AENR (Ala.); ILN (Ill.); QFN & WFPN (Fla.); SGN (Me.); Tenn. Phone, ETPN, Tenn. SSB & TN (Tenn.); OQN (Ont.-Que.); VN & VSN (Va.); WSN (Wash.); RISPN (R. I.).

[3] TCC functions reported, not counted as net sessions.

The headings of the above chart have been explained before, but here we go again: "Sessions" means the number of times during the month the net met in directed session. "Traffic" is the number of traffic handlings that were completed by the net in directed session during the month. "Rate" is the "messages per minute," obtained by dividing the traffic total by the monthly total of minutes in directed session. "Average" is the average number of traffic handlings per session, obtained by dividing the traffic total by the number of sessions. "Representation" is a percentage indicating how well the sections (in region nets) and regions (in area nets) were represented in their higher nets during the month. These data require (1) careful record-keeping on the part of each net control station, and on the part of the net manager and (2) regularity in reporting by NCS to manager and by manager to headquarters. Our reporting record on NTS is really something to be proud of and has resulted in a better statistical history than any other ARRL activity.

No long skip problems plagued EAN in February, W2EZB notes; W4DLA is a new NCS. EAN certificates have been awarded to K1BCS, W1RZG, K2KYS, *W2s* GKZ MTA WFL. W9DYG comments on the same uptrend in CAN. WA6ROF says "book" messages are holding down PAN's "rate." WA2GQZ has issued 2RN certificates to *WA2s* BLV and LKW; Joe puts out a fine net bulletin called "Traffic Lines." W3UE notes that sections in 3RN missed sessions for the first time in years; W3EML's preoccupation with TCC has cut down their traffic total. K4AKP is concerned over the showing of Arkansas but reports all other RN5 sections are regular; here's another region net with an excellent bulletin. The early (0145Z) net session is by far the most popular on RN7, sez K7JHA; K7IWD again captured the monthly BRAT (Brotherhood of Radio Amateur Traffickers) award. W8CHT says 8RN "showed rumblings of its potential" in February, but he suspects a lot of traffic is bypassing the net. W9ZYK reports skip still entirely too long for an effective late session, which will be resumed when conditions permit. TEN representation has suffered, probably because of sickness, says WØBYV. WØFEO is resigning as TWN manager; February report was submitted by W7OCX.

Transcontinental Corps. Because of family illness and prospective transfer, K4AKP has resigned as TCC-Eastern manager. W9JOZ will take over. TCC certificates have been issued to W9VAY and K9DHN. There is talk of creating a new TCC function (L) to serve as relay between J (west coast) and D (east coast), but directors W7DZX and W3EML want to have another go at the direct hop first.

February reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	67	59.8	1260	613
Central	84	91.7	2288	1040
Pacific	111	91.1	1629	818
Summary	262	79.9	5177	2501

Now let's explain *these* headings. The "functions" are the number of times a station performs a TCC duty; such a duty includes two steps — getting the traffic from the net and relaying it to a counterpart station, or vice versa. Eastern Area and Pacific Area TCC each has four functions per day, Central Area TCC has three. The figures are the number of such functions *reported* during the month. However, "% Successful" is the percentage of *all* functions (whether reported or not) that were performed with 100% success. "Traffic" is the total of traffic handlings performed by all TCC stations both in nets and by out-of-net schedule, but includes only handlings performed as a part of the TCC function. Then "Out-of-Net Traffic" is that portion of the handlings that were completed outside of directed NTS net sessions — that is, by separate schedule between two TCC stations. This latter is what we add to the NTS overall traffic total.

The TCC roster: Central Area (K4AKP, Dir.) — W4JZY, K4AKP, *W9s* ZYK JOZ DYG CXY VAY, K9DHN, WØSCA. Pacific Area (W7DZX, Dir.) — *K6s* KCB LKD GID, *W6s* EOT HC, *WA6s* ROF RGD, K7NWP, W7DZX, KØEDK, *WØs* WME WHE KQD, VE7AGF.

Stuck away in the back pages in small print, an announcement of the creation of a new entity will make no big splash, and we may be criticized for not making a bigger thing of it. It would be much more dramatic, far more attention-arresting, to accompany the announcement with the figurative blare of trumpets and flourishes, a prominent full-page up-front announcement, a bulletin over W1AW, then an extensive and exhaustive campaign to sell the idea to all amateurs. This would be in accord with the methods of the times.

But it isn't that kind of program. It's a go-slow, take-it-easy, spontaneous progression which one falls into in the natural course, like love and marriage. In fact, it *is* a kind of love and marriage — love of the same over-all objective (public service in the name of amateur radio) and marriage of the two principal implements of that objective: the Amateur Radio Emergency Corps and the National Traffic System.

Some time ago, in an Emergency and Traffic Bulletin, we put out feelers on a proposed merger of these two facilities. There wasn't a great deal of reaction, but what there was seemed to be overwhelmingly favorable. We called the whole concept the Amateur Radio Public Service Corps, ARPSC. Perhaps when it becomes more commonplace an abbreviation we shall shorten it just to PSC; or perhaps someone will suggest a better name and we'll change it altogether. There is still time.

Otherwise, in the near future you will start to see this name appear on certificates and forms and posters and maybe even at the heads of columns. No, we don't intend throwing out all our present forms; we'll use them up first, and make any necessary changes when we reprint. Also, we're not going to cram this name, or even this concept, down your throats, and this is another reason for the gradual approach. Let us know what you think, whether you buy the idea or don't like it, or whether you want more details regarding its implementation before you buy it or reject it. We proceed under the assumption that silence gives consent. But those who are not silent are usually the objectors, and if we get too many objections and not enough support we might "chicken out," so you proponents had better let us hear from you too. More details later. — *WINJM.*

It's just possible that when you read this there will still be time to send in your EC annual report, although probably not time enough to get the forms from us first. If you have not yet done so, please fill out your report card (all ECs as of the end of 1962 received them, others need not report) and mail it in to us. At this writing we have received slightly over 500 reports, and we'd like to top our 1960 record of 573. The annual Emergency and Traffic Bulletin will contain the detailed analysis.

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When KØUTC was suddenly stricken ill alone in his home on Feb. 14, he managed to turn on his rig and call for help. The call was heard by WØPZO and WØSLC, and the latter immediately summoned assistance, which arrived in jig time to administer oxygen and remove the victim to the hospital, where at last report he was doing fine.

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On Feb. 17, Anoka County (Minn.) EC WØHEN was asked to assist in locating a missing hunter by providing emergency communication. WØHEN and KØCKT made themselves and their facilities available and rendered assistance for one hour to local authorities until the emergency was over. — *KØKKQ, SEC Minnesota.*

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Heavy rains in the vicinity of Chillicothe, Ohio, on March 4 caused flash floods from the runoff and officials declared a state of emergency. AREC RACES was alerted on stand-by at 2330 local and nets were quickly established on 6 and 2 meters. At 0100 the immediate emergency was declared over but the nets remained on alert.

On Mar. 6 a derailment on the Baltimore & Ohio Railroad caused by wash-out of tracks disrupted service and communication and the amateurs were again called upon. Assistant EC K8JMN made the necessary arrangements. Operators included four members of one family: *WA8s* FGW FGX FGY and FKL, operating base station, mobile and portable at the trainmaster's office. Not until 1900 did the railroad establish direct contact with the wreck and relieve the amateurs. At 1630 the Ross County C.D. director requested emergency communications as a result of flooding of the Scioto River. Mobile and portable units were dispatched to various points for communications to the emergency center. At 0130 EST on March 7, all units were recalled to base and the emergency declared over. The following additional amateurs took part: *K8s* WKJ DOK DIQ ZWZ SUB, W8NTL, *WA8s* AFI EFX. — *K8SUB, EC Chillicothe, Ohio.*

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During the midwestern blizzard conditions which existed on Mar. 12, amateurs handled communications for the Rural Electrification Assn.; Southwestern Bell Telephone Company; Northwestern Bell Telephone Company; Chicago, Burlington and Quincy Railroad, and a number of towns in Kansas and Nebraska which has part or total failure of communications on regular channels. Three NCS divided the day and kept communications running smoothly on 3885 kc. from 0930 to 1717 local time. Several of the towns served were also without electrical service, which was the more quickly restored because of the activity of amateurs in handling communications to and from generating plants and R.E.A. junction points. It was an outstanding rendition of amateur radio public service. Mentioned as having participated: *K0s* QPD ZMK OMM UVH DGB, *WØs* HL EKL HLN SZF EMY HGJ LOW QHE DBJ PDJ VGE, *WAØs* DAV FBD CBJ BOO BOP. — *WØHGJ.*

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The Calhoun County, Mich., AREC held a surprise test on Jan. 13, with five mobiles and five fixed stations reporting in. The test started at 1630 EST with the mobile rigs taking positions along Interstate 94 to assist stranded motorists in the simulated heavy snow. All mobiles successfully established contact with the NCS and the test was terminated at 1705 EST. — *K8AEM, EC Calhoun County, Mich.*

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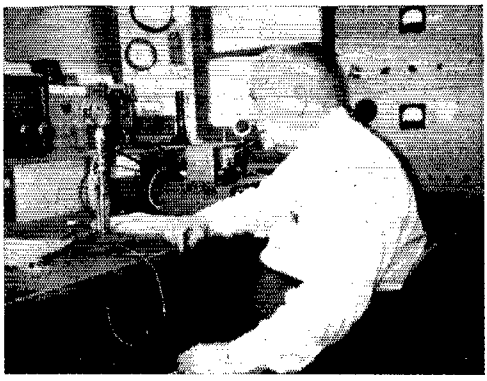
We start off 1963 with a resounding bang in the matter of SEC reporting. *Forty-four* reports were received for January activities, representing 18,334 AREC members. This beats any previous January by *13 reports* and 4500 AREC members. Furthermore, it is tied with last month for the greatest number of SEC reports ever received in a single month and is a *new all-time record* in number of AREC members represented by these reports. Gentlemen, we salute you! Sections reporting: Del., Mich., E. Mass., NYC-LI, S. Texas, Alberta, Ohio, E. Pa., W. Pa., Ind., No, Dak., So. Dak., Miss., Tenn., Kans., Mo., Maine, W. Mass., Mont., Ore., Wash., Nevada, E. Bay, S.J.V., No. Car., Colo., Utah, N. Mex., Ala., E. Fla., W. Fla., Ga., Los A., Ariz., No. Texas, Minn., N.N.J., Iowa, Ont., S.C.V., R.I., Okla., Md.-D.C., B.C.



Meet K8IGQ, EC for Wexford County, Mich. Bill ramrods a small but select AREC group in Cadillac, Mich.

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We continue with the "Diary of the AREC" (see Nov. 1962 *QST* for last installment):

Sept. 11: The South Texas Emergency Net held a special "Hurricane Twist" Drill, covering all sections of STEN, handling traffic to city officials in all major cities. Drill started at 1800 CST and ended at 2145. Over 60 STEN stations took part.

Oct. 21: The Huntingdon County (Pa.) Amateur Radio Club and RACES organizations handled communications for the Sabin oral vaccine mass immunication program in an excellent activity by fifteen amateurs.

Oct. 26–3: A number of AREC and RACES groups were out on patrol aimed at suppression of vandalism during Halloween. In Vincennes and Bicknell, Ind., eleven amateurs were active from Oct. 26 to 31st every night to provide supplemental communications for the harrassed police department.

In Engelwood, N. J., nine amateurs patrolled the city using three mobile units, each accompanied by an auxiliary policeman, on Oct. 29.

The Union Beach e.d. amateur group gave mobile support to their police department for three nights up to Halloween night; as a result, vandalism was nil, greatly contrasting with previous years. Seven amateurs took part in this one.

The Skokie (Ill.) Six Meter Indians assisted the Skokie police on Halloween with 7 mobiles manned by as many amateurs between 1900 and 2300 local time.

On Oct. 30 and 31 the "Ghost Patrol" was on the job in Michigan City, Ind. with K9VUI's station set up in the police station and fifteen amateurs in the area taking part.

In Massapequa, N. Y., nine amateurs guarded many public and private buildings on Oct. 30 and 31, using mobiles to send reports to auxiliary police at headquarters.

Nov. 2: Many public figures witnessed a simulated disaster rehearsal demonstration in Elmhurst, Ill. in which about fifteen amateurs took part by relaying messages using various kinds of equipment and modes.

Nov. 6–7: Ten members of the Wisconsin Valley Radio Assn. assisted in collecting election returns from a 16-county Wisconsin area. Bands used were 75, 10 and 2 meters. The complete election net, coordinated by Marathon County EC W9VHA, consisted of about 40 amateurs.

Nov. 11: East Bay SEC WA6MIE reports that about 55 amateurs provided communication for a "KO Polio" drive in Contra Costa County, Calif. This was the second such activity and showed a marked improvement over the first one in Sept.

Nov. 17: The Adams County (Colo.) RACES group assisted the Northglenn Jaycees in their ambulance fund drive, using mobiles on six and two meters.

RACES News

On the evening of Jan. 31, RACES groups were activated in Central and Eastern Contra Costa County, Calif., because of heavy rainfall and danger of flooding. Mobile and fixed stations were utilized covering areas of immediate danger and at various other points to provide best over-all coverage. All operations were on 75, 6 and 2 meters. All units were secured late in the evening after it had been determined that there was no further danger. A total of 28 amateurs took part. — *WA6MIE, SEC East Bay.*

Radio Officer W2OZY for Clinton County, N.Y., reports that from Nov. 28, 1961 to Oct. 16, 1962, 31 net operations were held, both scheduled and unscheduled, with an average attendance of 71%. Thirty additional stations are signed up on a limited basis, but are always on hand in the event of an emergency. Restricted operator permits have been issued to many XYLs and school students. The NCS of the weekly net is rotated to qualify all possible personnel for NCS duty if called upon by the c.d. director. The net expands its coverage as additional equipment and personnel become available.

DX CENTURY CLUB AWARDS

Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date of receipt. *All totals shown represent submissions received from February 1, thru February 28, 1963.*

W1FH....312/327	G3AAM....309/322	W5ADZ....307/319	W3JNN....306/319	W1BIH....304/317
W6CUQ....311/325	W3KT....308/321	W6EBG....307/321	W1CLX....306/318	K2GFQ....304/317
W2AGW....311/324	W8JIN....308/322	W8BF....307/319	W7PHO....306/317	W9HUZ....304/316
W1GKK....311/325	W8BKP....308/320	W8UAS....307/319	W2HMJ....305/317	CX2CO....304/317
PY2CK....311/324	W6AM....308/322	W9YFV....307/320	W5MMK....305/317	WØA1W....304/316
W4DOH....310/323	LU6DJX....308/321	W8DMD....307/319	W6GPB....305/317	W9LNM....303/317
W3GHD....310/323	W5ASG....308/321	CE3AG....307/320	VE7ZM....305/318	W3LMA....303/315
W8KIA....310/323	4X4DK....308/319	HB9J....306/320	WØDU....305/317	W2LPE....303/316
W9RB1....309/323	G4CP....308/321	WØQVZ....306/317	W6YY....305/318	W4TM....303/316
KV4AA....309/323	G2PL....308/320	W7GUV....306/319	W1ME....304/317	W8DAW....303/316
W8BRA....309/322	W2HUQ....307/320	W2BXA....306/319	W8KML....304/316	W1JYH....333/316
W9NDA....309/322				W4GD....303/316

Radiotelephone

W3RIS....312/326	W1FH....307/319	W8PQO....304/315	CX2CO....304/317	W6AM....301/314
PY2CK....311/324	W8BF....306/318	W4DQH....304/315	W6YY....304/317	W2ZX....300/312
W9RBI....309/321	4X4DK....306/317	W7PHO....304/315	W8KML....302/314	W3JNN....300/312
W8GZ....308/320	VQ4ERR....306/319			

New Members

W6VNJ....216	UA1DI....122	OZ8EA....106	K1ANV....102	WA6KMF..101	W3DYP....100
HB9UE....151	K8ZBY....116	DJ2JX....105	K3ICA....102	K8RDE....101	K4RDU....100
W4AQT....141	K9BGM....113	ZE4JS....105	W4CHK....102	K8ZPK....101	WA5CBL...100
W1PNR....140	G3EIX....113	CP5EZ....104	K9WRX....102	W9BJM....101	W6CLZ....100
UA9BZ....128	G3BZU....112	K4GRD....103	VE1VN....102	WØCXY....101	W6FZD....100
I1SF....126	OK1US....108	ZS6QK....103	W5DRW....101	K2BMI....100	DJ5LA....100
W3AVQ....124	JA4AO....107	5A3CJ....103	W6HS....101	K2KYS....100	VK2AXK...100
LA1M....122					

Radiotelephone

K4TWF....134	W6VNJ....114	K1AMO....111	KR6HL....104	YO2BN....102	K4ACJ....100
W2MZB....125	I1SF....114	ZS1TZ....106	K2DQI....102	W1NLU....100	YV1EL....100
K1OOJ....115	ZC4FR....112	W5WLD....105			

Endorsements

W8HGW....316	W2ZKQ....261	SM5DW....229	DJ2MN....182	W1NTH....150	F2PO....130
W3ECR....311	W4UKA....260	SP7HX....221	ZS5KU....181	W5CME....150	F2MB....129
WØBFB....307	W9PQA....260	DL9RK....220	W1WHQ....180	W8LUZ....150	K8IPS....122
ON4DM....303	K2QHL....252	W3YZI....210	W8BIE....180	K1OOJ....149	W4KJL....121
W1FKX....302	KØLFY....252	K6CTV....210	SM5BFE....174	W2ADQ....149	K9FLT....121
W5UX....301	W1OOA....250	W6ERS....210	W4BXG....172	K8JJR....149	VP7NQ....121
W2CNT....300	K2ZKU....250	KP4RK....210	W1IKE....170	K4MWB....146	W2ELW....120
W4OPM....300	W6KYG....250	HB9DX....206	W1JDE....170	W1IP....145	WA4CXR....120
W6WWQ....300	K4TWF....245	W3AFU....203	W5PMK....170	W7BSP....143	W4VWW....120
W2CR....294	W2BHM....243	W3AFM....202	OK1GT....170	F8DF....142	K8GJD....120
W5PM....291	W9EHW....243	DL8CM....202	SP9TA....170	W1UUK....140	KØTYO....120
G3DO....291	W2AZS....240	W2JVZ....200	W5DVV....164	K6TQO....140	DJ5AI....120
HB9MQ....291	W3SOH....240	W4NJF....200	VE1DB....162	K9OYD....140	G8GG....120
K9EAB....290	VE5JV....240	K4QBP....200	W8ETU....160	VQ2IE....140	UT5CC....120
W9HCR....290	W8ILG....234	WA6TGY....200	DJ5GG....160	W1MKX....136	K1NHR....117
W4GRP....283	G6LX....234	W9FKH....200	W1LMT....159	K6SDR....136	K4YFQ....117
W2MUM....280	OK1KTI....233	G3JLB....200	W7DIS....156	UA6KOD....136	W1BQL....116
VE3RE....280	WØSNL....232	W9EGQ....197	W4JDM....153	W7DQM....133	W4BZ....115
W1ELR....272	WØOAQ....231	WA6DUG....191	UA3FT....152	K1IMD....130	UA7JF....112
DJ3KR....272	K2YXY....230	W8AYS....191	W2ASF....151	W1MX....130	K5QHZ....110
W4CKB....270	W4AVY....230	W3FSF....190	K9VRU....151	K2OXN....130	W9KQB....110
K4JVE....263	K4WIS....230	OK1ZL....187	K1HTV....150	W5NXF....130	

Radiotelephone

W8HGW....306	YV5AB....250	WØBFB....215	W4ZRZ....186	W1GOX....165	W5NXF....130
ON4DM....301	W1WDD....241	K2JFV....211	W4NJF....183	XE1HHT....161	W8QNW....129
W3KT....300	W8YBZ....240	W4SSU....202	W3HCO....182	W5DVV....156	K9JJR....123
G2PL....290	K9ECE....239	W8ONA....201	SM5DW....181	W9GAI....151	VE3CBY....123
K4AIM....283	I1RIF....239	W3YZI....200	W9EGQ....180	K2UTC....150	TG9US....123
W3ECR....282	W1HX....236	K8LSG....200	W4BXG....170	VE3PV....145	K4WIS....120
W5AFX....280	YV5ALP....230	W3ICQ....197	WØPMU....170	W7BTH....143	WA6LDV....120
G3DO....280	PY1NC....229	YV5ANQ....197	TI2PI....170	W5CME....142	WA6TGY....113
W2HTI....274	W4GRP....226	DL3EA....188	W8WC....167	W1JSK....130	KØLFY....110

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.w.* — 3535, 7050, 14,060; *phone* — 3765, 14,160, 28,250 kc

SUGGESTED RTTY OPERATING FREQUENCIES

3620, 7040, 14,090, 21,090 kc.

GMT CONVERSION

To convert to local times subtract the following hours:

ADST −3, AST −4, EDST −4, EST −5, CDST −5, CST −6, MDST −6, MST −7, PDST −7, PST −8, Hawaiian −10, Central Alaska −10.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made May 21 at 0130 GMT. Identical tests will be sent simultaneously by automatic transmitters on 3555, 7080, 14,100, 21,075, 28,080, 50,700, and 145,800 kc. The next qualifying run from W6OWP only will be transmitted May 3 at 0400 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION:* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0130 GMT May 21 becomes 2130 EDST May 20.

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.

W1AW conducts code practice daily at 0130 GMT on all frequencies listed above with speeds of 15, 20, 30, and 35 w.p.m. on Tuesday, Thursday, and Saturday, and at 5, 7½, 10, and 13 w.p.m. on other days. Approximately 10 minutes' practice is given at each speed. To check your copy, the texts used on several transmissions are listed below. The order of words in each line of *QST* text is sometimes reversed. To improve your fist, try to send in step with W1AW.

Date Subject of Practice Text from March *QST*.

May 1: *"It Seems to Us . . .",* p. 9
May 7: *The HBR-8 Communications Receiver,* p. 11
May 10: *A. C. in Radio Circuits,* p. 20
May 13: *Grinding Surplus . . . Crystals,* p. 30
May 16: *Checking Signal Quality . . . ,* p. 34
May 20: *The Chartreuse Panels,* p. 37
May 29: *Typhoon Karen,* p. 56

W1AW SCHEDULES

(Effective April 28)

Operating-Visting Hours

Monday through Friday: 1 P.M.-1 A.M. EDST.
Saturday: 7 P.M.-2.30 A.M. EDST.
Sunday: 3 P.M.-10:30 P.M. EDST.

The ARRL Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 4 miles south of West Hartford. A map showing local street detail will be sent on request. The station will be closed May 30, Memorial Day.

Operating Frequencies

C.w.: 1820, 3555, 7080, 14,100, 21,075, 28,080, 50,700, 145,800 kc.

Voice: 1820, 3945, 7255, 14,280 (s.s.b.), 21,330, 29,000, 50,700,145,800 kc.

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in Greenwich Mean Time.

C.w: Monday through Saturday, 0000; Tuesday through Sunday, 0400.
Voice: Monday through Saturday, 0100; Tuesday through Sunday, 0330.

Caution. Note that in the U. S. and Canada, because times are GMT, bulletin hours actually fall on the evening of the previous day.

W1AW CONTACT SCHEDULE

Would you like to work W1AW? W1AW welcomes calls from *any* amateur station in accordance with the following schedule:

Time (GMT)	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000-0030[1]	.....	14,280	3555[3]	14,100	14,100	7080[3]	14,100
0030-0100	.....	14,280	3555	14,100	14,100	7080	.....
0100-0130[1]	.....	145.8 Mc.	21,330	145.8 Mc.	50.7 Mc.	21,330	.....
0230-0300	.....	.....	.....	1820	.....	1820	.....
0300-0330	.....	.....	.....	3555	.....	3945	.....
0330-0400[1]	.....	.....	3945	7255*	3945	7255*	3945
0400-0500[1]	.....	.....	3555[3]	.....	3945	7080[3]	.....
1700-1800[2]	.....	21/28 Mc.	21/28 Mc.	21/28 Mc.	21/28 Mc.	21/28 Mc.	.....
1900-2000	.....	7080	14,100	7255	14,100	7080	.....
2000-2100	.....	14,280	7080	14,100	14,280	14,100	.....
2200-2300	.....	14,280	14,280	14,280	14,100	7255	.....
2300-2330	.....	7255*	.....	21,075[3]	.....	14,280	.....
2330-2400	.....	14,100	.....	3555	.....	14,280	.....

[1] Starting time is approximate. General-contact period on stated frequency begins immediately following transmission of Official Bulletin, on c.w. at 0000 and 0400, on phone at 0100 and 0330.
[2] Operation will be on 21,075, 21,330, 28,080 or 29,000, depending on band and other conditions.
[3] W1AW will listen for Novice Class licensees on the Novice portion of this band before looking for other contacts.
* Operation may be on s.s.b. as announced at the beginning of the period.

Station Activities

• 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: W3DUI. RM: W3EML. PAM: K3BHU. V.H.F. PAM: W3SAO. Amateurs in the Philadelphia area note: W3ELI has been appointed EC for that county. Address all AREC applications and question to 4607 Convent Lane, Philadelphia. W3QDW is in the debugging business for new Technicians. A heavier a.c. line was installed to handle the shack load at W3AHZ. We welcome K6GMU to our section and traffic nets. The EPA Net had 328 QNI with a load of 513 QTC. K3KTH's new 300-watter has given him a fuse blowing problem. K3MEH and K3HNP were good samaritans to numerous motorists during a recent snow storm, via 6-meter assistance calls. Our sympathy to K3UOW on the loss of his XYL. K3RJX has antenna problems getting into the PFN. After 42 years with the Pennsylvania Power and Light Co. W3OY has retired. Scratch one trafficker, W3HNK has given over to the DX bug. K3TYE is active on 50.64-Mc. c.w. and welcomes skeds and contacts. Anyone need Lackawana County, here's your chance. W3EU is reading the seed catalogs and planning spring planting. K3OWE is now Navy MARS. Although our traffic groups have no jurisdiction over MARS nets, it would be appreciated if MARS members would *not* hold their traffic until the date has become obsolete. Our section netters have been taking the brunt too often upon delivery. Thanks. (SCM note) Did you know W3RV was formerly KL7AK? New Gear Dept.: K3SEH a new v.f.o.; K3HTZ and K3HNP a keyer; K3RZM an HQ-110 and HT-40. K3MVO has an EAN Net certificate. New club officers of the Carbon ARC are K3JLW, pres.; K3GLL, vice-pres.; K3AHR, secy. Milton ARC officers are W3LXN, pres.; K3LTI, vice pres.; K3RCM, secy. The newly-organized WCAUARA elected W3JSA pres.; W3HKZ vice-pres.; W3HGZ secy. Overbrook High ARC's officers are K3SME, pres.; K3QBQ, vice-pres.; K3JGO, secy. If two or three weeks pass without a reply to your letter, perhaps it's because you did not place your call or return address on the letter. Do we owe you a reply? Traffic: W3CUL 6611, W3IVS 1452, W3EML 1322, W3VR 828, K3MVO 340, K3MQE 247, K6GMU 180, K3JSX 144, W3ZRQ 112, K3CAH 109, W3RV 106, K3KTH 91, K3BHU 53, W3AXA 48, W3LC 37, K3HNP 34, K3ARR 30, K3NLW 23, K3TLX 21, K3MDG 16, K3RJX 15, K3ANU 14, K3JKX 14, K3JHF 12, W3QDW 11, W3ADE 10, W3OY 10, W3FAF 8, W3BKF 6, W3BNR 6, W3BUR 6, K3QBQ 6, W3BFF 5, W3HNK 4, K3SEH 4, K3SJA 4, W3DUI 2, W3ID 2.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Andrew H. Abraham, W3JZY—SEC: W3CVE. RM: K3JYZ and W3TN for the MDD Traffic Net which meets on 3649 kc. daily at 0000Z. RM: W3ZNW for the MDDS (slow) net on 28.1 Mc. daily at 0130Z. PAM: W3EQK. MEPN meets on 3820 kc. M-W-F at 2300Z and on Sat. and Sun. at 1800Z. MDD and MEPN traffic has about doubled for each of the past 2 months and the check-ins on both nets have increased. There is excellent state-wide coverage via liaison stations to the MDD and MEPN nets. The following stations made the BPL in February: W3IVC, W3TN and K3QOO. K3APM is on the air handling traffic. W3ATQ provides an outlet for traffic to W. Va. and the western part of Md. W3BKE was on for the opening of the new 1875-1900-kc. segment of the 160-meter band Feb. 21. W3CDQ has been on jury duty. W3CVE, our SEC, is planning an SET drill for the section. You may copy the AREC bulletins from W3CVE every M-W-Sun. at 0100 GMT on 3521 7042 50.400 and 145.660. K3DNO has acquired a 10A-SSB exciter and will be on 6 and 2 meters soon. W3EQK is active on 20 meters. W3EOV is looking for his 1963 auto tag number 73-88 again this year. W4EXM/3 worked over 100 countries the first month of operation with his new call, EP2AM. K3IMG is back in the U.S. after a tour of duty in KP4-Land. W3IVC has been filling in a spot on the TCC this month. K3LLR has worked his first DX on 20 meters. W3MGG had a good time in both the phone and c.w. portions of the DX Contest. W3OHI reports his grandson is now KN3WPN. K3OXL is NCM for the MEPN and reports that an average of 28 members check into the net each session. K3PRN has a new thirteen-element Yagi beam on 432 Mc. K3QDD is looking for some summer schedules. K3QFG has a new Drake 2-B. K3QOO has an 813 on 80 meters so that he can put a little stronger signal into the midwest nets. W3QYL has not been on the air since Oct., 1960, and received a QSL card for a QSO on Feb. 27, 1963. Don will not be on the air until about the middle of the summer, 1963. K3SVA is busy with home work. W3TN is busy making up reports of the MDD Net. K3UTD and W3WVV are building amateur TV equipment for 432-Mc. W3YKQ. Howard County EC, is busy getting the AREC group lined up. W3ZAQ had very little activity. W3ZNW is getting the Calvert County AREC Net organized. Traffic: W3IVC 737, K3QFG 358, W3TN 276, K3QOO 189, K3WBJ 124, K3QDD 90, W3HQE 75, W3BKE 69, K3APM 57, W3CVE 24, K3OSX 24, W3EOV 20, W3MCG 20, K3OXL 19, W3ATQ 18, K3GZK 17, W3PQ 15, K3LLR 5.

DELAWARE—SCM, M. F. Nelson, K3GKF—PAM: K3LEC. RM: W3EEB. The DEPN meets on 3905 kc. Sat. at 1830 local time; the DSMN on 50.4 Mc. Tue. at 2100 local time. New appointees: W3CMR as OBS on 10 meters, K3OWS as OPS. K3AZH had fun on 40 and 80 meters in his first CD Contest. K3BYJ is busy converting Navy gear. K3CNI has his TVI licked. W3EEB joined the ranks of politicians and is now Newport Water Commissioner. K3EWK had son, K3DZG, install a Sixer in the family car. W3HC now has a 6N2 on the air. K3JUH and K3JUR, in Kent County, are now on 40 and 80 meters. K3KAJ has a new Drake 2B and has been NCS for MDD. K3OBU has a new 80-meter dipole in action. K3OWS has joined the Delaware Hamfest Committee. K3PZL is sporting a new Vibroplex bug with no time to use it. Traffic: W3EEB 53, W3JFR 42, K3KAJ 23, K3PZL 14, K3GKF 5, K3EWK 3, K3AZH2, K3OWS 2.

4th SJRA QSO PARTY

May 4-5

The South Jersey Radio Association announces its 4th QSO Party to aid all amateurs in pursuit of their SJRA Achievement Certificate.

Rules: (1) *Contest Period:* Participants may operate any or all of the 29 hour period from 1700 GMT May 4 to 2200 GMT May 5 on any amateur bands. (2) *Contacts:* Stations outside the continental limits of the U. S. must QSO 25 SJRA members; stations within the country (including Alaska and Hawaii) must make contact with 35 SJRA members. Contacts do not have to be limited to any one band. General call "CQ SJRA." The exchange must consist of the QSO number, report, QTH and name of the operator. (3) *Logs:* Logs must be postmarked not later than June 5, 1963 and sent to: SJRA, c/o Awards Chairman, Art Lingo, WA2EIY, 1005 Emerald Avenue, Collingswood, N.J. (4) *Awards:* An achievement certificate will be awarded to those who meet the scoring requirements in Rule 2. Endorsements will be made to indicate single band operation.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RM: WA2VAT. WA2WLN, Linwood, and WA2VAT, Woodbury, made BPL with outstanding traffic totals. W2RG also does FB as a traffic-handler but the new postal rates really hurt with 75 mailed. W2ZVW, Burlington Co. EC, is building a new rig for 160 meters. K2JJC, Pitman, has been on the sick list. W2ZQ, the DVRA station, has a new look with new furnishings, including the s.s.b. rig, new 6-meter rig and receiver, also new 6- and 20-meter beams. WA2NXV has been on the sick list but is back in business again. Charlie is NCS of the NJP&T Net Wed. at 2300 GMT. W2EBI, Audubon, added a ZD8DW card for 110 on the DXCC list. W2IU, Absecon, worked WAC on 160, the 3rd one in the U.S. NJN held 28 sessions with QNI 472 and traffic 490. WB2EBW, 13 years

(*Continued on page 114*)

THE ASSOCIATION OF COLLEGIATE AMATEUR RADIO CLUBS

ONE of the most enjoyable things about amateur radio is the spirit of fellowship that exists among "hams". We all enjoy sitting back and comparing notes with one another especially when there is another interest besides amateur radio itself that brings us together. Remember the good times had by all at your last net picnic or at the SSB dinner?

A GROUP of us feel that this special spirit of fellowship could be fostered among college-student-hams, giving us all a better appreciation of our hobby. For this reason, we have formed the ACARC (Association of Collegiate Amateur Radio Clubs).

THE ACARC was formed in the spring of 1962 by the gang at WØYC, the Gopher Amateur Radio Club of the University of Minnesota. At the present time we have thirty-one member clubs in eighteen states and two Canadian provinces.

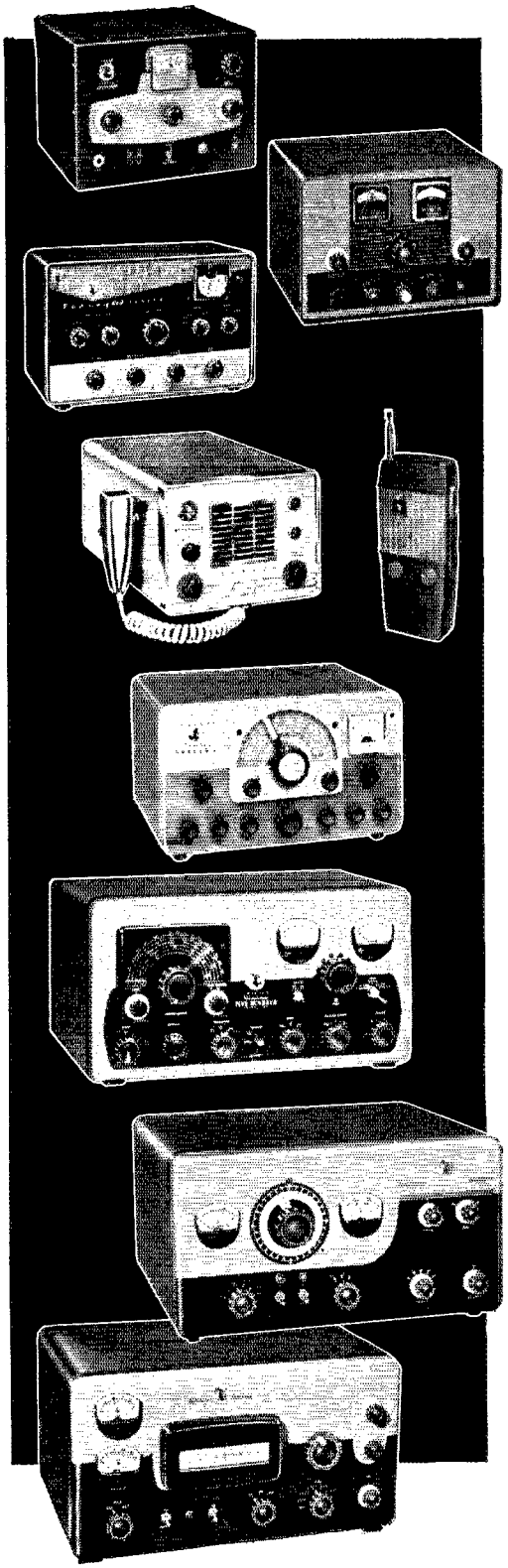
WØYC, the headquarters station, publishes the ACARC Bulletin which contains articles of interest to college hams, organizational tips, general information, and an exchange of club news. For example, the December issue of the ACARC Bulletin contained a list of members, an article about VE4UM, at the University of Manitoba, some tips on recruiting from W9YT, at the University of Wisconsin, and the ACARC Constitution.

FUTURE plans include issuing certificates, compiling an information file, and forming a net or chain of nets.

IF YOU are a member of a college club, why don't you discuss the ACARC at your next meeting? We think that this organization can make your club more interesting through the opportunity for an exchange of ideas. If you are interested, contact either the Gopher ARC at the University of Minnesota, or K8WBL, the Xavier University ROTC Radio Club. We'll see that you get all the info available and a sample copy of the ACARC Bulletin.

— FREDERICK TROMANS, K8PVU
Activities Manager, K8WBL
Xavier University ROTC Radio Club

W. J. Halligan W9AC Lewis Marshall K9EBE hallicrafters



Viking®

ADVENTURER—Self-contained . . . 50 watts CW input . . . rugged 807 transmitting tube . . . instant bandswitching 80 through 10 meters. Crystal or external VFO control—wide range pi-network output—timed sequence keying. With tubes, less crystals.
Cat. No. 240-181-1 Kit ..... **Net $69.95**

CHALLENGER—70 watts phone input 80 through 6; 120 watts CW input 80 through 10 . . . 85 watts CW on 6 meters. Two 6DQ6A final amplifier tubes. Crystal or external VFO control—TVI suppressed—wide range pi-network output. With tubes, less crystals.
Cat. No. 240-182-1 Kit ..... **Net $124.75**
Cat. No. 240-182-2 Wired, tested ..... **Net $169.75**

6N2—Rated 150 watts CW and 100 watts phone—instant bandswitching coverage 6 and 2 meters. Fully TVI suppressed—use with "Viking I, II", "Ranger I, II", "Valiant" or similar power supply/modulators. Operates by crystal control or external VFO with 8-9 mc. output. With tubes, less crystals.
Cat No. 240-201-1 Kit ..... **Net $149.50**
Cat. No. 240-201-2 Wired, tested ..... **Net $194.50**

10 METER "MESSENGER"—A compact, superbly-engineered transceiver, ideal for fixed location or mobile operation. Completely crystal controlled, the 10-Meter "Messenger" contains 10 tubes (including rectifier). Instant selection of five frequencies in the range of 29.4 to 29.7 mcs., within a 300 kc. segment of the 10-meter band. Superheterodyne receiver has excellent sensitivity and selectivity. ANL, AVC—positive action "squelch" . . . wide range pi-L network output . . . push-to-talk ceramic microphone! Transmitter section uses a 7054 crystal oscillator coupled to a high gain 7061 final amplifier—delivers a clean, crisp, well modulated signal! Unit is light weight, easy to install. With power cords, tubes, microphone and 29,640 kc. crystals for National Calling and Emergency Frequency.
Cat. No. 242-201 115V AC only ..... **Net $129.75**
Cat. No. 242-202 115V AC/6V DC ..... **Net $139.75**
Cat. No. 242-203 115V AC/12V DC ..... **Net $139.75**

10 METER "PERSONAL MESSENGER"—Two models: 100 milliwatts for short range; 1 watt for extended range—11 transistors and 4 diodes—super-heterodyne receiver with tuned RF amplifier gives excellent sensitivity, two stage transmitter punches signal home. "Quiet" control silences receiver on standby. With battery compartment for penlight cells (less cells). Rechargeable cadmium battery and other accessories available.
Cat. No. 242-103 10 Meter "Personal Messenger", 100 milliwatt, with 29.640 crystal, 8 penlight cell battery case . . . Net $109.50
Cat. No. 242-104 10 Meter "Personal Messenger", 1 watt, with 29.640 crystal, 8 penlight cell battery case ..... **Net $129.50**
Cat. No. 251-806 Leather carrying case and strap . . . . Net $8.50
Cat. No. 250-804 Rechargeable nickel cadmium battery. Plugs into 115 V AC outlet to recharge . . . . . Net $19.95

RANGER II—Now—a new version of the popular 75 watt CW or 65 watt AM "Ranger". The "Ranger II" transmitter also serves as an RF/audio exciter for high power equipment. Completely self-contained instant bandswitching 160 through 6 meters! Operates by built-in VFO or crystal control. High gain audio-timed sequence keying, TVI suppressed. Pi-network antenna load matching from 50 to 500 ohms. With tubes, less crystals.
Cat. No. 240-162-1 Kit ..... **Net $249.50**
Cat. No. 240-162-2 Wired, tested ..... **Net $359.50**

FIVE HUNDRED—Full 600 watts CW—500 watts phone and SSB (P.E.P. with auxiliary SSB exciter). Compact RF unit designed for desk-top operation. All exciter stages ganged to VFO tuning—may also be operated by crystal control. Instant bandswitching 80 through 10 meters—TVI suppressed—high gain push-to-talk audio system. Wide range pi-network output. With tubes, less crystals.
Cat. No. 240-500-2 Wired, tested ..... **Net $1050.00**

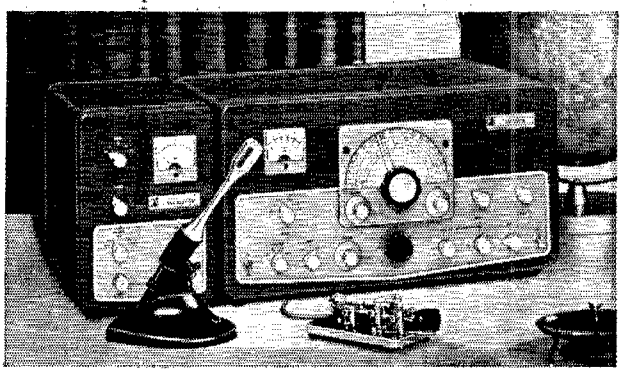
"6N2 THUNDERBOLT"—1200 watts (twice average DC) input SSB and DSB, Class AB1; 1000 watts CW, Class C; and 700 watts input AM linear. Continuous bandswitched coverage on 6 and 2 meters. TVI suppressed. Drive requirements: approx. 5 watts Class AB1 linear, 6 watts Class C CW. With tubes and built-in power supply.
Cat. No. 240-362-2 Wired ..... **Net $549.50**

"THUNDERBOLT"—The hottest linear amplifier on the market—2000 watts P.E.P. (twice average DC) input SSB; 1000 watts CW; 800 watts AM linear. Continuous coverage 3.5 to 30 mcs—instant bandswitching. Drive requirements: approx. 10 watts Class AB2 linear, 20 watts Class C continuous wave. With tubes and built-in power supply.
Cat. No. 240-353-2 Wired, tested ..... **Net $659.00**

New Catalog

The E. F. Johnson Co. also manufactures other transmitters and accessories . . . all described in our newest amateur catalog Write for your copy today!

1st Choice Among Nation's Amateurs!



Matched Pair

Outstanding performance on SSB, AM and CW with absolutely no compromise on any mode!

"SSB ADAPTER"—The new filter-type SSB generator—with bandswitching 80 through 10 meters . . . more than 50 db sideband suppression . . . more than 45 db carrier suppression! When used with the Viking "Valiant" or "Valiant II" it places 275 watts P.E.P. at your command. Two compact units and interconnecting cables . . . RF unit is only 8" wide—may be placed on your operating desk. Power supply unit may be placed in any convenient location. Features built-in multiplier requiring VFO input only—band-pass interstage couplers require no tuning—design and front panel make operating practically foolproof. Superb audio fidelity and balanced audio response; excellent sideband, spurious and carrier suppression. Other features: positive VOX and anti-trip circuits with built-in anti-trip matching transformer and adjustable VOX time delay. With remote power supply, tubes and crystal filter, less microphone.

Cat. No. 240-305-2—Wired, tested.....Net $369.50

INVADER—More exclusive features than any other Transmitter/Exciter on the market today! Specially developed high frequency, symmetrical, multi-section band-pass crystal filter for more than 60 db sideband suppression—more than 55 db carrier suppression! Instant bandswitching 80 through 10 meters—no extra crystals to buy—no realigning necessary. Delivers a solid 200 watts CW input: 200 watts P.E.P. SSB input; 90 watts input on AM! (25-30 watts output—upper sideband and carrier). Built-in VFO—exclusive RF controlled audio AGC and ALC (limiter type) provide greater average speech VOX and anti-trip circuits. Fully TVI suppressed. Self-contained heavy-duty power supply. With tubes and crystals.

Cat. No. 240-302-2 Wired, tested.....Net $619.50

INVADER 2000—Here are all of the fine features of the "Invader", plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Rated at a solid 2000 watts P.E.P. (twice average DC) SSB, 1000 watts CW, and 800 watts AM! (250 to 300 watts output—upper sideband and carrier.) Wide range output circuit (40 to 600 ohms adjustable). Final amplifier provides exceptionally uniform "Q". Exclusive "push-pull" cooling system. Heavy-duty multi-section power supply. With power supply, tubes and crystals.

Cat. No. 240-304-2 Wired, tested.....Net $1229.00

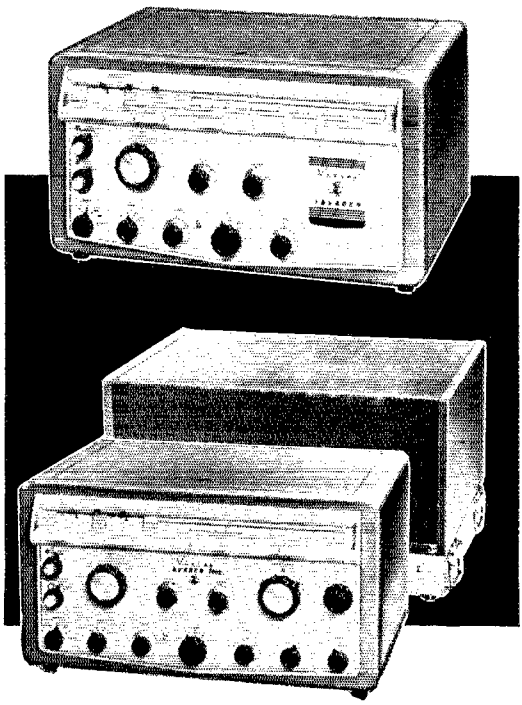
HIGH POWER CONVERSION—Take the features and performance of your "Invader" . . . add the power and flexibility of this unique Viking "Hi-Power Conversion" system . . . and you're "on the air" with the "Invader 2000". Wired, tested, includes everything you need—no soldering necessary—complete conversion in one evening.

Cat. No. 240-303-2.....Net $619.50

"VALIANT II"—Outstanding flexibility and performance—bandswitching 160 through 10 meters—delivers 275 watts input CW or SSB (with auxiliary SSB exciter or Viking SSB adapter) and 200 watts AM! Low level audio clipping—differentially temperature compensated VFO provides stability necessary for SSB operation! High efficiency pi-network tank circuit—final tank coil silver-plated. Other features: TVI suppression; time sequence (grid block) keying; high gain push-to-talk audio built-in low pass audio filter; self-contained power supply; and single control mode switching. As an exciter drives any popular kilowatt level tubes and provides quality speech driver system for high power modulators. Provision for plug-in SSB operation with no internal modification. With tubes, less crystals.

Cat. No. 240-105-1—Kit.....Net $375.00

Cat. No. 240-105-2—Wired, tested.....Net $495.00



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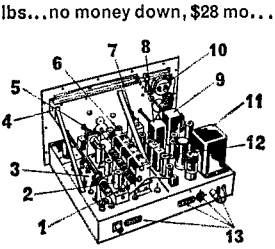
all modes...

HEATHKIT "MOHAWK" DELUXE AMATEUR RECEIVER

1. Amateur band coverage only for maximum accuracy and stability. **2.** 1 uv sensitivity for 10 db S/N ratio—160 through 10 meters. **3.** Prebuilt, prealigned coil/bandswitch assembly. **4.** Rotating slide-rule dial. **5.** 15 tube double conversion superheterodyne receiver. **6.** Upper and lower sideband selection (crystal controlled). **7.** 5 selectivity positions (5 kc to 0.5 kc). **8.** Bridged T-notch filter. **9.** Stable, variable BFO. **10.** Panel "S" meter. **11.** Rugged well-rated components used throughout. **12.** Built-in 100 kc crystal calibrator. **13.** Terminals for antenna (50 or 300Ω), speaker (8 or 500Ω), accessories (B+, fil. muting), 117 V AC.

Kit RX-1..69 lbs...no money down, $28 mo.....**$299.95**



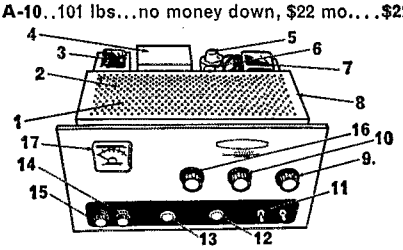
ACCESSORY SPEAKER KIT: Styled to match the "Mohawk". Heavy-duty 8" PM speaker. 8 ohms impedance. 4.7 oz. magnet. 7 lbs.

Kit AK-5.....**$10.95**

HEATHKIT "WARRIOR" DESK-TOP KILOWATT LINEAR AMPLIFIER...OPERATES SSB, AM & CW—80 THROUGH 10

1. Four 811A's **2.** Fan cooling **3.** 5-50 hy. swinging choke **4.** 8 ufd, 2 KV, oil-filled filter capacitor **5.** Two 866A's **6.** Monitor scope output with level control **7.** 1500 v. Power transformer **8.** Internal RF shielding **9.** Loading control **10.** Band switch, 80 through 10 meters **11.** Power and High Voltage interlocked switches **12.** High Voltage pilot light **13.** Power pilot light **14.** Relative Power sensitivity control **15.** Meter switch with Grid, Plate, Relative Power, and High Voltage positions **16.** Tuning control with band markings **17.** Meter

Kit HA-10..101 lbs...no money down, $22 mo....**$229.95**



COMMUNICATIONS MICROPHONE: Specially designed for SSB communications. Response limited from 300 to 3000 cps voice frequencies. Stand has grip-to-talk switch with lock position. Hi-Z output. 3 lbs.

HDP-21....no money down, $5 mo.....**$29.40**

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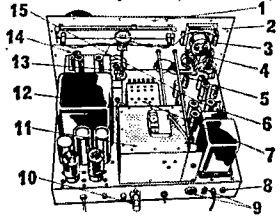
HEATHKIT "MARAUDER" SSB TRANSMITTER.. UNMATCHED AT LESS THAN TWICE ITS PRICE!

1. Operates SSB (upper or lower sideband), CW, AM and FSK. **2.** 180 watts P. E. P. on SSB and CW—80 through 10. **3.** Panel meter (grid, plate, HV, ALC, Rel. Pwr). **4.** VOX controlled break-in CW operation. **5.** Automatic level control for higher talk power. **6.** Multi-section, hermetically sealed crystal band-pass filter. **7.** Dual conversion, crystal controlled heterodyne oscillator. **8.** FSK input. **9.** Accessory sockets. **10.** Monitor scope output. **11.** Air-cooled, shielded final amplifier. **12.** Heavy-duty power supply. **13.** 165 to 1 gear drive tuning assembly. **14.** Preheated, temperature compensated VFO—100 cps stability. **15.** Carrier suppression, 50 db; unwanted sideband suppression, 55 db.

Kit HX-10 92 lbs. no money down, as low as $22 mo. **$334.95**



HEATHKIT MONITOR SCOPE KIT: Specially designed for Amateur Radio use! Shows SSB/AM envelope, RF trapezoid and RTTY patterns. Handles 5 watts to 1 KW, 160 through 6 meters. 11 lbs.

Kit HO-10....no money down, $6 mo.....**$59.95**

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THE FATE OF A NATION

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GOTHAM VERTICALS DELIVER THE CONTACTS

THE ULTIMATE PROOF OF THE FINE PERFORMANCE OF THE GOTHAM VERTICAL ANTENNAS IS IN THE ACTUAL FIELD RESULTS, BY HAMS ALL OVER THE WORLD.

PROVEN! PROVEN! BY THESE EXCERPTS FROM UNSOLICITED TESTIMONIALS:

CASE HISTORY #71

"I am very delighted with the first V80 and want another for a different location." A. C., California.

CASE HISTORY #159

"I ordered a Gotham V40 Vertical Antenna and found it so successful that several others are wanting them, too. Will you please send me four more." W. A., Alaska.

CASE HISTORY #248

"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/43, a WAC of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

CASE HISTORY #111

"The V160 did a beautiful job on a VE1 for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when bought it." D. S., New Jersey.

CASE HISTORY #613

"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success — i.e., DL4s, ZS3, etc., all solid copy." R. D. S., Penna.

CASE HISTORY #483

"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

CASE HISTORY #146

"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. I., Nebraska.

CASE HISTORY #555

"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

CASE HISTORY #84

"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

CASE HISTORY #407

"I recently purchased a Gotham V80 vertical antenna and I am very pleased with the results. Up until now my home brew antenna has had a very high SWR, but with the V80 the SWR is 1:1." J. D. R., Virginia.

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Catalog of all Gotham antennas, including 47 different beams covering 2 meters through 20 meters, free on postcard request.

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THE GOTHAM VERTICAL ANTENNA IS THE BEST ALL-BAND ANTENNA

- 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.
- Non-corrosive aluminum used exclusively.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price.

73.
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2. LOADING COIL NOT REQUIRED ON 6, 10, 15 AND 20 METERS. FOR 40, 80, AND 160 METERS, LOADING COIL TAPS ARE CHANGED MANUALLY EXCEPT IF A WIDE-RANGE PI-NETWORK OUTPUT OR AN ANTENNA TUNER IS USED; IN THIS CASE BAND CHANGING CAN BE DONE FROM THE SHACK.

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FILL IN AND SEND TODAY!

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Enclosed find check or money-order for:

☐ V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS..... $14.95

THE V40 IS ALSO MADE FOR CITIZENS BAND OPERATION, WITH SPECIAL INSTRUCTIONS. DESIGNATE CB-11 ANTENNA. PRICE SAME AS THE V40

☐ 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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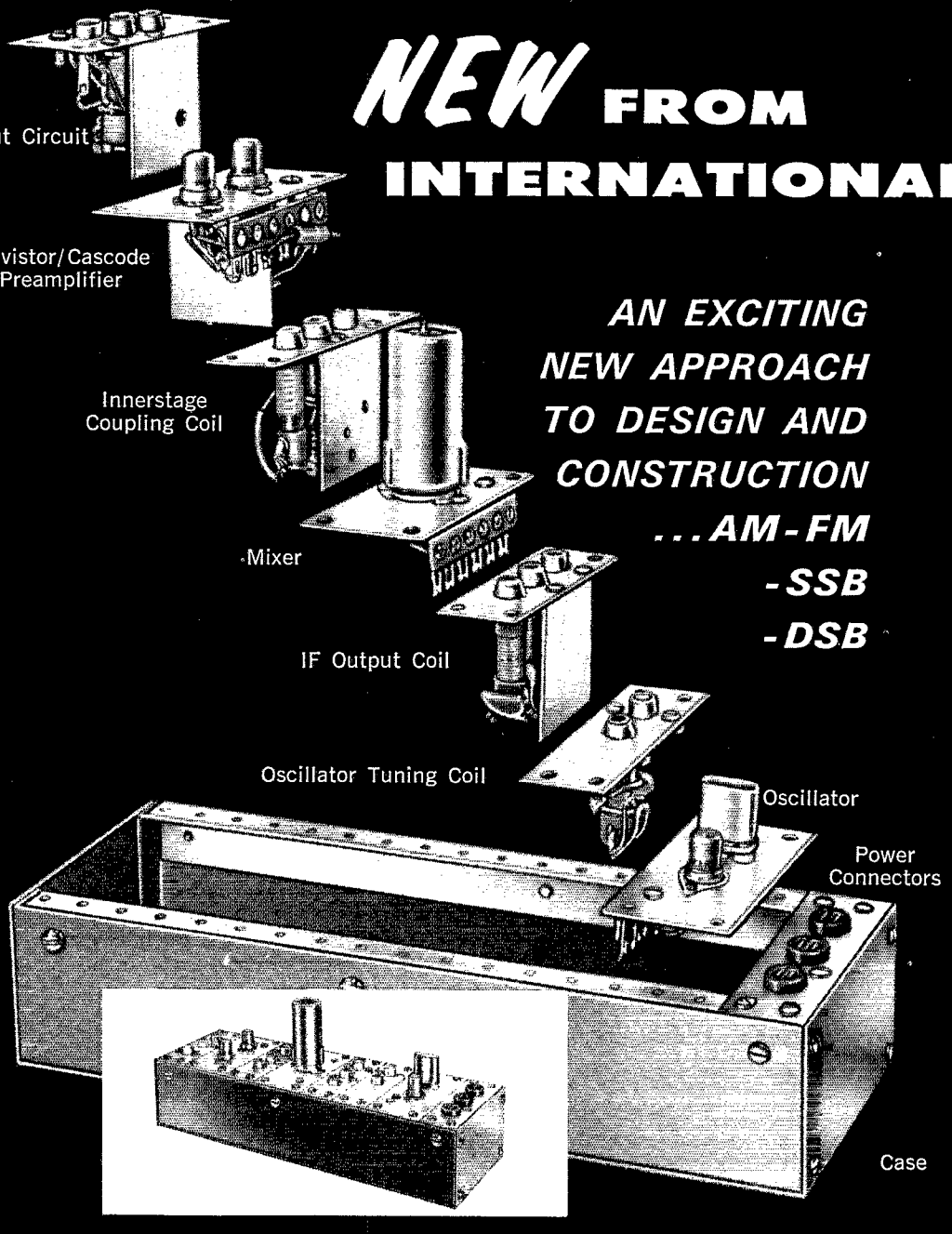
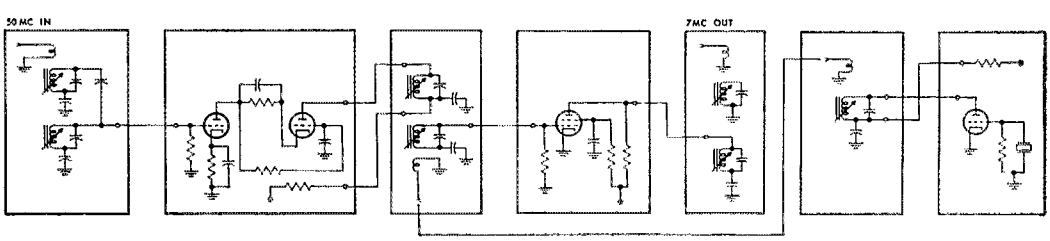


AN EXCITING NEW APPROACH TO DESIGN AND CONSTRUCTION ...AM-FM -SSB -DSB



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Amateurs and experimenters will discover a new and easier way to build a wide variety of communication and electronic gear with International **AOC** units . . . individually wired oscillators, preamplifiers, detectors, etc., each tested and mounted on miniature metal chassis.

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AOC units permit custom building for a wide range of frequencies, modes, and power. RF coils are available from 200 kc to 450 mc. IF transformers are available from 262 kc to 10.7 mc. Transmitter power to 100 watts. Matching cases, complete with hardware, available in a variety of lengths.

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AOC units are moderately priced from.....**$2.00** up.

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BASE STATION VERTICAL

This antenna offers exceptional improvement of signal to noise ratio. Shunt fed, grounded radiator. Rigid aluminum and cadmium plated steel construction. Vertical length adjustable. Cat. No. 160-129 . . . . . **$27.95**

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Base loaded whip antenna for installation on roof of auto. May be mounted on trunk lid or door facing with International blind mounting bracket (Cat. No. 160-126) Sealed loading coil-adjustable whip. Cat No. 160-130 **$19.95**

For complete details, mail coupon today.

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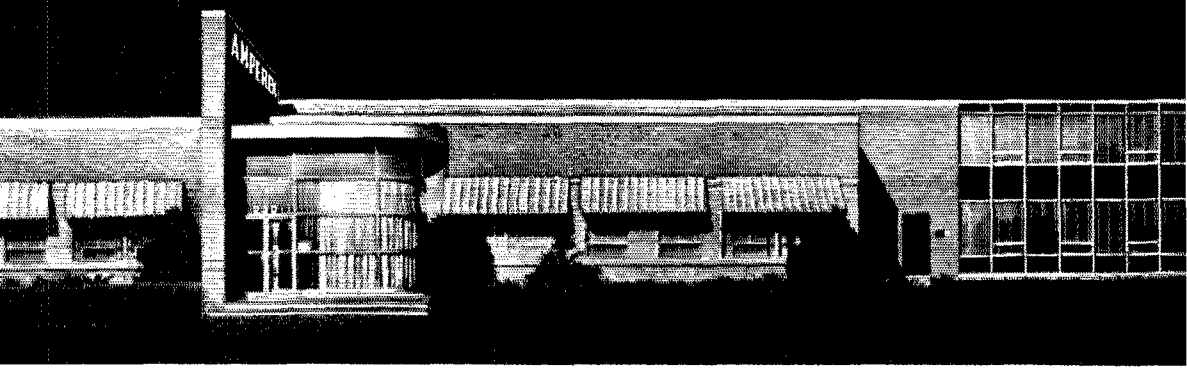
SSB problems solved here



Amperex status as the source of more tube types for Single Sideband Suppressed Carrier Service than any other producer didn't just happen. Leadership has been achieved as the result of a deliberate and continuing program of engineering research and intensive laboratory testing from which has emerged a distinctive and clearly superior comprehension of SSB technology and SSB applications for any power level from 5 watts to 5 kilowatts PEP.

From internal tube geometry to overall envelope design, AMPEREX SSB Tubes are *Performance Tested, Performance Rated* and *Performance Guaranteed* for optimum linearity and minimum intermodulation distortion *at full Single Sideband power ratings.*

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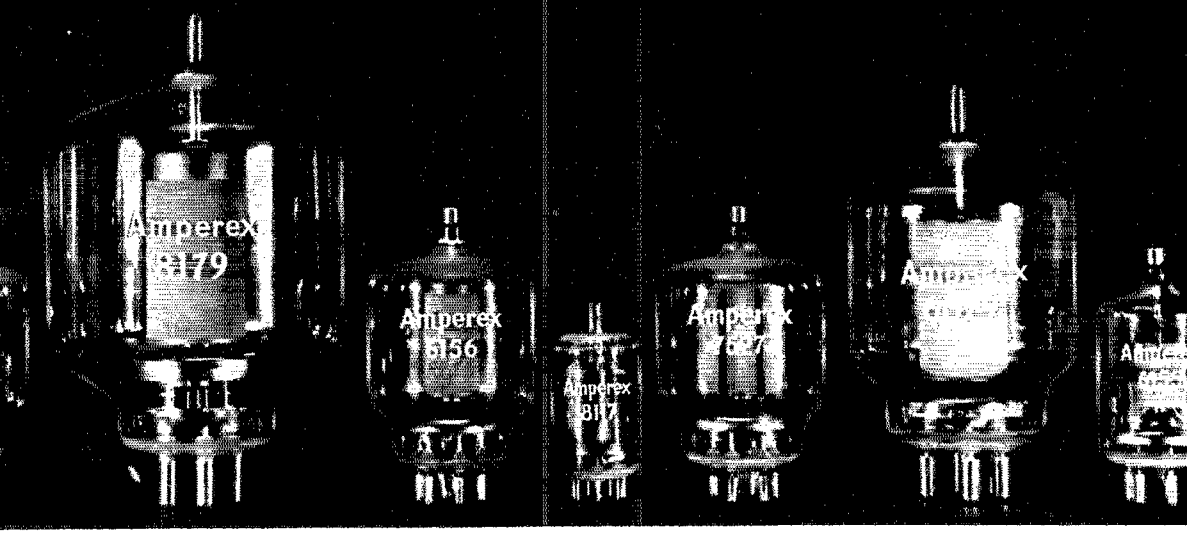


SSB TYPE NO.	8179	6156	8117	7527	6079	6155
Peak Envelope Plate Power Output *(watts)*	1410	421	158	723	1032	206
3rd Order Intermodulation Distortion *(db)* (without feedback)	34	35	30	35	35	30
5th Order Intermodulation Distortion *(db)* (without feedback)	40	40	40	40	40	38

Illustrated are six radiation air-cooled tetrodes of a line of more than 20 AMPEREX "Performance-Rated" SSB tubes with power ratings from 5 W. to 5 Kw. PEP. Watch for releases of new SSB tubes now in prototype stage. Write for technical data sheets. Applications engineering assistance available. AMPEREX Electronic Corporation, Tube Division, Hicksville, L.I., N.Y.

IN CANADA: PHILIPS ELECTRON DEVICES, LTD., TORONTO 17, ONTARIO

Station Activities

(Continued from page 102)

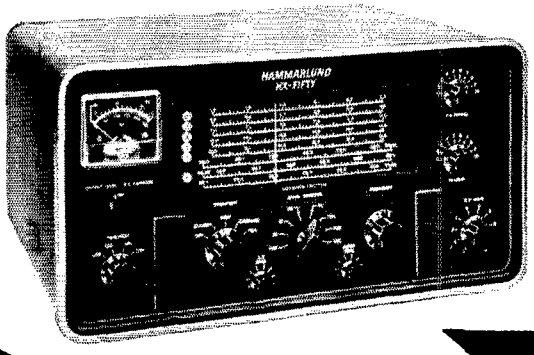
old, received his General Class license, WA2BCB is a new member of the SCARA. W2BLV was top scorer in the SJRA in the recent V.H.F. Contest. WA2EMB and WA2KOK were runners-up. K2HBY is SJRA's DX Contest Chairman. N.J. Phone Net totals for Feb.: 28 sessions, QNI 268, traffic 171. The Levittown (N.J.) Radio Club meets the 1st Tue. WA2FGS, Rose, recently became Mrs. W2CDZ. Their QTH is Pennsville and they are members of the Salem County Radio Club. K2KBL's QTH is Palmyra; it formerly was Tucson, Ariz. The SJRA's training class is progressing very well under the direction of K2BZK. All appointees are urged to report their activities and also check the expiration date of their appointments. WA2TOW, Williamstown, is a newcomer on the NJN. The NJN is in need of traffic outlets in Cape May and Atlantic Counties. Contact WA2VAT for information. Traffic: (Feb.) WA2VAT 815, WA2WLN 525, W2RG 204, W2ZVW 99, K2RXB 61, K2JJC 37, WA2KAP 36, W2ZI 27, WA2NXV 12, W2BEI 4. (Jan.) W2ZI 21.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ICZ. RMs: W2RUF, W2EZB and W2FEB. PAM: W2PVT. NYS C.W. meets on 3670 kc. at 1900; ESS on 3590 kc. at 1800; NYSPTEN on 3925 kc. at 1800; NYS C.D. on 3610.5 and 3993 kc. at 0900 Sun. and 7102.5 at 1930 Wed.; TCPN 2nd call area on 3970 kc. at 1900; IPN on 3980 kc. at 1600; 2RN on 3690 kc. at 0045 and 2345 GMT. WA2KQG made the BPL in December. Congratulations. K2VOX had been appointed OBS. Don't forget the WNY Hamfest to be held at Doud Post, Rochester, May 11. The RARA is sponsor and W2ICE chairman. W2FEB was voted the most valuable member of the NYS C.W. Net for '62-'63. NYS C.W. held 365 sessions in '62 and handled 4669 messages. Certificates were awarded to WA2KQG and WA2LKW for their help in keeping liaison with 2RN 100 per cent; BPL in February was made by Net Mgr. W2RUF, who deserves much credit for keeping this net on the ball. W2SB has a new SBE-33. W2TMI mobiled on 75 meters for six week in SW U.S. WA2VZA reports that hams in the Newfane area are trying to organize a club in conjunction with civil defense. K2ZFV reports that the Squaw Island ARC will affiliate with ARRL. WA2VZF has a pair of 813s to follow the HT-37. K1BVT/2 is now on high power with a pair of 4X150As on 2 meters. WA2IYB is now s.s.b. with a valiant and an SB-10. K2DNN and XYL WA2TCZ, WA2YQQ and XYL WA2-ZOE and WA2URX and XYL WA2FKW all report new rigs for 6 meters. New Techs, include WB2FXH, FXJ, FXK, FXL, FXM, WA2JRN and WA2REU. New Generals include WB2BEG, WB2DCQ, WB2FWR, WA2ZBD and WA2ZOB. All are from the Elmira area where W2GOR, W2ZYB and W2HQY instruct regular code and theory classes in local schools. Chemung County AREC will supply communications for the National Glider meet in Elmira July 2 through 11. The Monroe County RACES organization headed by W2CTA received a civil defense commendation from the state of New York. Attention all clubs: Let's make Field Day the biggest event of the year—Get monthly activity organized now. Reports must be in the hands of the SCM by the 5th of each month. Traffic: (Feb.) W2RUF 524, W2EZB 408, WA2IYB 339, WA2LKW 259, W2FEB 245, WA2QKG 237, W2QHH 156, W2RKU 113, W2FCG 88, WA2WEE 54, K2OFV 53, K2JBX 33, K1BVT/2 29, W2RQF 26, K2IMI 9, WA2FRR 3. (Dec.) WA2KQG 309.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC: W3LIV. RMs: W3KUN and W3NUG. The WPA Traffic Net meets Mon. through Fri. at 2400 GMT on 3585 kc. The Keystone Slow Speed Net (KSSN) meets at 2330 GMT on 3585 kc. Mon. through Fri. It is with deep regret we record the death of W3UQ, of Monessen. Congratulations to K3OOU on making BPL the hard way. W3LMM has a new 40,80 trap antenna. The Bucktail ARC elected W6LAC, pres.; W3RMX, vice-pres.; K3CUE, secy.-treas.; W3KCJ, pub. W3PWN, trustee; K3OLF and W3NMJ, program committee. New YLs in the Pittsburgh district: K3WLQ, K3WHR and K3WPW. The Etna RC reports via *Oscillator*: W3KSI has a new Drake 2-A; W3EAF is recuperating from a broken ankle; W3MTY now has a complete Hallicrafters station; W3JT now is s.s.b. K3-BWI has a Drake 2-B. W3SYY is an Asst. EC now. Butler County ARC meets the 1st Sun. of the month at Butler VA Hospital at 1930 EST. The Bedford County ARS reports via *Shorts*: The club received its call, W3ZWJ, in memory of a deceased member; K3PPQ is in the Coast Guard; K3SAK is working the South Pole Deep Freeze Operation; a new Novice is KN3WMP. The Horseshoe RC reports via *Hamateur News*: W3ISZ and K3AYU are working with TV on 430 Mc.; K3NHZ has joined the service; K3SIQ has a new SR-150; K3QFK recently was hospitalized; K3LLF has a new antenna up.

(Continued on page 116)

measure
the
performance...



VOX & Push-To-Talk Circuitry.

Output Power—Two-tone SSB and CW—50 watts at 10 meters to 65 watts at 80 meters for conservatively rated input of 90 watts DC, 130 watts P.E.P. AM is 25% of SSB/CW values.

3 element Pi network variable output circuit (40 to 80 ohms).

5 position switch for internal or external VFO plus three crystal control frequencies suitable for Novice, MARS, C.A.P., etc.

Built-in antenna changeover, VOX and break-in keying.

Amateur Bands Covered—80, 40, 20, 15 and 10 meters. 160 meter band position provided for use with optional kit.

Complete passband coupler design used throughout low-level stages provides minimum 1 MC bandwidth at the following frequency ranges: 3.2 to 4.2 MC; 6.9 to 7.9 MC; 13.8 to 14.8 MC; 20.8 to 21.8 MC; 27.0 to 31.0 MC.

Stack up the features!

HAMMARLUND'S HX-50

...and we are sure that you will agree that despite the new price tag we have had to put on the FABULOUS HX-50, it still gives you more dollar-for-dollar value than any other transmitter in the market today! The '50 is crammed full of outstanding features to deliver the performance you have always wanted—but have never been able to get in this price range.

ONLY $449.50 AMATEUR NET

Now Available! 160 Meter Band Kit for only $11.00. Or, if you prefer, this plus feature can be wired right into the unit on special order for an additional charge. NOTE: The Hammarlund HX-50 is the only commercially manufactured SSB Amateur transmitter that presently provides 160 meter band capability.

Don't wait. See the FABULOUS '50 at your authorized Hammarlund Distributor—or send for complete technical data on the transmitter that is still "THE BEST BUY IN ITS CLASS."

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AMATEUR RADIO EQUIPMENT • COMMERCIAL COMMUNICATIONS EQUIPMENT • THE OUTERCOM 2-WAY RADIO
VARIABLE AIR CAPACITORS • SUPERVISORY REMOTE CONTROL SYSTEMS

The Cumberland Valley ARC reports through *Valley QRM*: New officers are W3CUK, pres.; W3ZUX, vice-pres.; W3ESV, secy.-treas.; K3MUF and K3QCS act. mgr. W3HUF recently was hospitalized; the club mobiles took an active part again in the Annual March of Dimes Drive. In regards to the WPARCC Worked All Penna. Counties Award, the Nittany Amateur Radio Club (K3HKK) at State College, Pa., is taking it over. For further details contact the NARC. The Uniontown ARC reports via *Magpie*: The club recently purchased a 2-meter converter; K3RTG passed his 2nd-class commercial; KN3UNE has 39 worked for WAS; W3AKZ is recuperating from surgery. Up Erie way: K3KJN lost his tower in a recent storm; K3PDA will be ordained a priest this spring; K3HFL is building a kw. for 6 meters; W3AU is the new C.D. Radio Officer for Erie County. The Coke Center RC recently was incorporated. K3VIQ got his General Class license. K3PPW has an HT-32. KN3XSL is a new Novice in Dawson. The Steel City ARC reports via *Kilowatt Harmonics*: W3LOR has a new 170-A receiver; K3KPI has a new Hy-Gain 52-ft. vertical tower; W3SDV is participating in sports car activities; W3ZDW has a Heath KW linear. The Bureau of Mines ARC put in 30 hours on the recent Tenth Anniversary RTTY SS. Traffic: K3OOU 505, W3-KUN 184, W3LMM 72, K3DKE 48, W3UHN 48, K3EDO 39, W3JHG 39, W3KNQ 28, W3IYI 21, K3PYS 19, W3SMV 18, W3OEO 8, W3YA 8, K3COT 4, K3JCZ 2.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9GME. SEC: W9RYU. RM: W9USR. PAM: W9VWJ. EC of Cook County: W9HPG. Section net: ILN; 3515 kc. Mon. through Sat. at 1900 CST. All ECs are asked to report into the EC Net every Sun. at 1600 GMT on 3840 kc. Harold Vance, K2FF, Lewis G. McCoy, W1ICP, and Phil Haller, W9HPG, were among the many notables attending the dedication of amateur radio station W9DVJ at the Veterans Administration Research Hospital on Mar. 10. WA9AJF, after 50 years of c.w, finally has been persuaded to go s.s.b, and finds it FB for moving traffic. KC4USH, a joint New Zealand/U.S. ham station at Cape Halley, Antarctica, wants contacts in the Midwest and all contacts will get a special pictorial QSL. W9LDU is the new manager and W9ECF is secy. of the IEN which meets Sun. at 0800 on Tue. and Thurs. at 1800 on 3940 kc. WA2UWR is now living in Rockford. K9KWV, W9BUB, W9UWX, K9BOC, W9EJ and K9SSF are the newly-elected officers of the Society of Radio Officers Radio Club. W9KCR received his A-1 Operators Club certificate. WA9CHG has a new 6-meter three-element to help bring in v.h.f. DX. WA9BYR is sporting a new Heath Twoer and a new Tribander. WA9BFD is a new General Class licensee. The Chicago Area Emergency Net's frequency is 1995 kc. effective Apr. 1 because of power restriction on the lower section of 160 meters. The Hamfesters Radio Club Inc. (Chicago) celebrated the 25th Anniversary of its State Charter as a radio club, with W9ZHR as the speaker. The League's executive Committee approved the application for League affiliation of the Ninth Area Radio Club, Inc. (Chicago). K9QPJ has taken a position with W9HPJ at E-Lectronics The RAMS new meeting place is Shabonna Park Field House (Chicago) the last Fri. of the month. The North Central Phone Net handled 593 pieces of traffic for February while the ILN's count was 232 messages and the Interstate Single Sideband traffic was 606. The CAEN was 54. WA9BIT is now General Class. WA9DQW received his WAS certificate. W9BIL and K9JVO are Silent Keys. We send our sympathy to their families and friends. VE8MD spoke at the March meeting of the North Shore Amateur Radio Club. K9EWJ has a new four-element Telrex beam on 6 meters and WA9CWZ is using a ten-element on 2 meters. WA9EQE is on 420 Mc. amateur TV. K9PLH is transmitting on 1215 Mc. New appointments are: K9GSD as ORS, W9FPZ as OBS and K9TYH as OES. K9NBH, W9IDA, K9KZB, WA9AJF and K9GMZ are recipients of the BPL award. Traffic: K9NBH 3241, W9IDA 2852, K9KZB 1070, WA9-AJF 762, K9GMZ 421, W9AKV 205, W9USR 180, W9EET 156, K9JXV 89, K9SAM 70, K9ZQT 47, K9BTE 38, WA9-DEW 29, K9RAS 24, K9DRS 16, K9CRT 13, W9PRN 13, K9QMJ/W9CSC 7, W9SKR 6, K9UCG 6, W9OKI 5, W9LNQ 4, K9FNB 1, W9YYG 1.

INDIANA—SCM, Donald L. Holt, W9FWH—Asst. SCM: Clifford M. Singer, W9SWD. SEC: W9SNQ. PAMs: K9KTL, K9CRS, K9GLL. RMs: W9TT, K9-DHN. Net skeds (all times in GMT): IFN, 1300 daily except Sun. at 1330 and 2300 M-F on 3910 kc. ISN (s.s.b.), 0030 daily on 3920 kc. IN (training), 0000 M-W-F on 3745 kc.; QIN, daily at 0030 and RFN, at 1300 Sun. on 3656 kc. New appointments: WA9ELY as ORS, K9INF as ORS, W9FYC as OBS, K9BNL as EC of Fayette County, K9UKM as EC of Union County, K9VEC, EC of Fulton County, was listed as Asst. EC in Jan. *QST*.

(*Continued on page 118*)

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Now! A low-cost microphone that offers the enormous advantage of true cardioid directional pickup, plus a virtually indestructible ceramic element! This design, by rejecting surrounding noises from the sides and rear, provides substantially improved voice pickup at greater working distance and with less room-noise pickup.

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K9FNR is the Asst. EC. The new secy.-treas. of the Milliwatt Mobilers ARC is K9INF. New officers of the Purdue ARC, W9YB are W9PJK, pres.; WA9AMZ, vice-pres.; K9LHC, secy.; W2LIS, treas.; WA9BVS, member-at-large. A new all-amateur family in the Winslow area: WN9EYL, XYL; WN9FGT, jr. operator and WN9FXE, OM. WA9BGI is a new General in Leavenworth. QIN Honor Roll: K9DHN, WA9ELY, WA9BFB, K9SGZ, WA9AVT, K9KTL, W9TT and K9WWJ. Those making BPL: W9JOZ, W9MM, W9NZZ, W9BUQ. *Amateur radio exists as a hobby because of the service it renders.* Feb. net reports: IFN 273, ISB 4220, QIN 327, QIN (training) 35, RFN 49, Hoosier V.H.F. 140. Traffic: (Feb.) W9JOZ 3183, W9MM 1506, W9NZZ 529, K9DHN 378, K9INF 349, K9IVG 276, W9TT 273, W9BUQ 268, K9KTL 240, W9QLW 211, W9VAY 160, K9ZLB 121, K9SGZ 77, K9CRS 75, K9RWQ 62, WA9BFB 60, W9SNQ 53, W9FWH 51, K9ZLA 45, W9CC 41, K9AMWC 37, WA9ELY 36, W9CLY 35, K9ILK 34, K9WWJ 30, W9BDG 28, K9MAN 28, K9OXA 28, W9QYQ 28, W9DGA 27, WA9AXT 26, W9EJW 23, W9BTZ 22, W9DOK 21, K9CIF 19, K9QJR 18, W9CHO 16, W9RTH 16, K9BSL 15, K9AUI 14, K9VEC 13, K9WET 13, W9DZC 11, W9EJV 11,W9JBQ11, W9YYX 11, W9BZI 10, W9CHO 10, W9ENU 10, W9ETJ 9, W9BZI 8, W9OG 8, W9HUF 6, W9RE 6, W9BDP 5, W9AB 4, W9AQW 4, W9JSV 2. (Jan.) W9SYL 177, K9KOW 4.

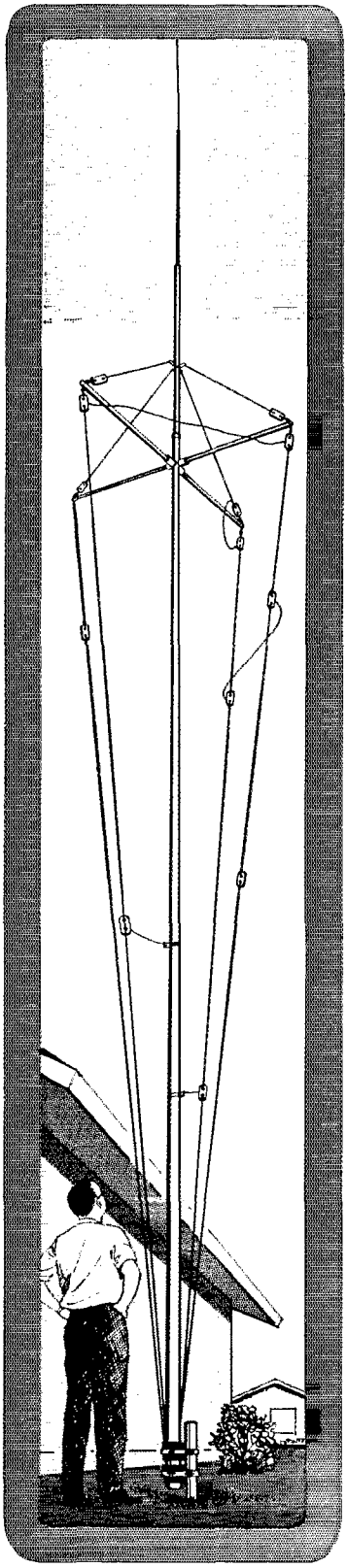
WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9BCC. RM: W9VHP. PAMs: W9SAA, W9NRP and W9NGT. Nets: WIN on 3535 kc. daily at 0045Z., BEN on 3950 kc. daily at 2300Z, WSBN on 3985 kc. daily at 2245Z. Renewed appointees: W9YT, W9CBE and K9UJJ as ORSs. W8JRK/9 has taken over the classes in amateur radio at the Oshkosh Vocational School. K9GDF has received the "College Wireless" and "Japan Twins" awards. W9SOA lectured on antenna and feedline operation at the Neenah-Menasha ARC. K9KPQ is on 75-meter mobile with a 10-watt rig. WN9FLF and WN9CWU were active during the Novice Roundup. W9YT had a new Vee beam 550 feet per leg for the DX Contest. K9WIE has his DX confirmations up to 98. W9CCO reports that 5 from his code classes have taken the Novice class exam. The Milwaukee AREC held a drill with the Red Cross at a 5-alarm fire. K9UUT and K9GSC have been awarded the "W99W" awards No. 6 and 7 by the Racine Club. Don't forget the QSO Party and Hamfest sponsored by the Racine Megacycle Club at Racine, May 25. For details contact Phil Neumiller, W9HAG, 1110 Summerset Dr., Racine, Wis. The MRAC Valentines Dance was a huge success through the efforts of K9PSU, W9VQD, W9FDX and the XYL of W9DYG. W9DYG, and K9IMR made the BPL in February. Net reports: BEN, 238 messages; WSBN 874 messages cleared. Traffic: (Feb.) W9DYG 609, W9CXY 356, K9IMR 322, W9SAA 172, WA9CDY 167, K9BLN 151, K9GSC 150, W9NRP 39, K9CJP 26, K9UUT 22, K9GDF 19, W9HPC 16, W9CBE 15, W9UEB 15, W9OTL 13, W9SZR 13, K9RQQ 10, W9WJH 7, W9CCO 4, W9SOA 4, W9YT 4, K9WIE 2, (Jan.) WA9CDY 19, K9BQQ 16, W9SZR 11, K9HFR 10, (Dec.) K9RQQ 24.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Harold A. Wengel, WØHVA—SEC: WØCAQ. PAM: KØTYY. EC appointments were renewed for KØATK and WØHBR, also ORS appointment for KØQWY and OPS for KØRSA. The North Dakota 75-Meter phone Net reports for February: 23 sessions with 646 check-ins, a maximum of 37 check-ins and a minimum of 20, handled 45 pieces of formal traffic and 82 informals with 22 relays. New officers elected by the Minot Amateur Radio Association for 1963 are Bob Johnson, pres.; Charles Burgess, vice-pres.; Dick Reimer, secy-treas.; Roger Marquardt, Act. mgr. and Gerhand Pietsch, sgt.-at-arms. The funds derived from the series of IGY films, shown in January and February will be used to provide technical literature to the Minot Public Library. Traffic: KØITP 128, WØYCL 37, WAØAYL 23, KØFRT 20, KØGGI 19, WØDNJ 12, KØRSA 11, WØYCM 4, KØMHB 3, KØFOP 2, WØMQA 2, KØTYY 2, WØBFN 1, WØBHT 1.

SOUTH DAKOTA—SCM, J. W. Sikorski, WØRRN—SEC: WØSCT. KØWEN, Sioux Falls, received DXCC S.S.B. WØRWE has his Tri-bander working. KØFKJ, Dell Rapids is operating with a new Comanche and Cheyenne. WØSMV, Sioux Falls, reports 235 countries worked, with 219 confirmed. The Mitchell ARC elected WAØAOY, pres.; KØJGM, vice-pres.; WAØCFC, secy.; KØJMW, treas.; WØGWW, act. mgr. A new General Call licensee at Tripp, WØGWQ is operating an Invader. KØBSW installed a Swan 240 in his new car. WØGWD operates the following RTTY schedule between 7130 and 7150 kc.: Tue., 0500; Thurs. 0300; Sun., 2100 and Mon. 0300 (all times GMT). He announces he will operate RTTY on Field Day. Traffic: (Feb.) WØZWL 630, WØSCT 211, WAØAOY 109, WØDYB 109, KØBMQ 80, KØAIE 51, WØOFP 26, KØJGM 16, KØCXL 10,

(*Continued on page 120*)



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KØBSW 9, KØTNM 8, KØTVJ 6, KØTXW 6, KØZBJ 6, KØJTD 4, WAØBMG 3, KØKOY 2, WØYVF 2, KØAKT 1, KØZTV 1. (Jan.) KØBMQ 79, WØBSC 32.

MINNESOTA—SCM, Mrs. Helen Mejdrich, WØOPX—Asst. SCM: Emerson Mejdrich, WØRIQ. SEC: KØKKQ. RMs: KØUXQ and KØIZD. PAMs: WØGCR and WØHEN (for MSSB). To Lydia, WØKJZ, our Minnesota SCM for the past four years, we express appreciation for a job well done and a very special "thank you." KØWJF, of Mound, received a letter of commendation from U.S. Navy Commander R. K. McGregor, Antarctic Support Activities, for providing communications between Navy personnel and their families at home. Congrats to KØWYV on receiving an Eagle Scout award. OO WØKLG reports 14 violations, all for 3rd harmonic generations outside of the amateur bands. OES WØHPS reports extensive activity on 145 Mc. using a kw. into a nine-element beam. KØZKK reports activity for Novice classes at the Park Rapids Headwaters Amateur Radio Club. The Red Lake Falls Radio Club has been organized with KØMPK, WØUBL, WØGIL and KØJOA as instructors. KØJOA is on 160 meters with a 50-watt homebrew transmitter. New ham WAØCME, of Crookston, is on the air with a 90-watt Globe De luxe and folded dipole. WAØOLE, of Plummer, warms the antenna with a Knight T-60. WAØBYO made BPL on originations. Congrats! Traffic: (Feb.) WAØBYO 279, KØGCJ 146, WØATO 105, KØIHD 94, WØKJZ 89, WØHEN 71, WØWMA 71, WAØABU 55, WØTHY 49, WØOPX 41, KØZKK 41, WØKLG 37, WØVXO 33, KØLWK 27, WØGCR 26, WØKYG 25, KØIJU 23, WAØARA 22, KØVPJ 19, KØJYJ 18, KØJOA 17, WØRIQ 17, WØBUO 14, KØGNH 13, KØICG 13, KØMGT 12, KØSNC 12, KØGOY 10, KØCNI 8, KØFLT 8, KØZOH 8, WØFGP 3, KØZRD 3, WAØACI 2, KØWYV 2.

DELTA DIVISION

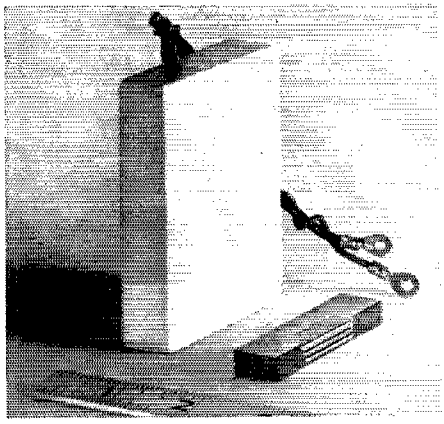
ARKANSAS—SCM, Odia L. Musgrove, K5CIR—SEC: W5KRO. PAM: W5DYL. RM: K5TYW. For the third time in three months W9PHR/5 has handled more than five hundred pieces of traffic. The Washington County Chapter of the American Red Cross held its annual disaster drill at Goshen, Ark., and the University of Ark. Club station handled the communications. Those participating were W5DTR, K5FNK/5, W5YM, WA5ATK, K5GXR, K5KIX, W5NIR, K5SGC, K5JXC, K5JXF, WA5BZY and K5IIX. The frequency was 28.7 Mc. and it was a big success. W5CAM and K5PRL report a new 6-meter net in the Pine Bluff area with twelve members. K5CIX is the NCS. W5RPB has a new 6-meter mobile. K5QYH has a new Hy-Gain 6-meter beam. K5YYA lost his tower and 6-meter beam but had it repaired and back up 60 feet in three days. WA5EOG is editor of the South East Arkansas Club paper, *The Grid Drive*. W5VQD has returned from a week in Florida. Traffic: W9PHR/5 505, W5DTR 82, K5TYW 51, K5SGG 38, K5IPS 22, K5UEK 9, K5GTN 5.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—During a recent visit of TI2EV to New Orleans, K5AGJ, K5SGJ, K5SGK, W5BUF, WA5DUL, W4NZ and W5FMO together with the XYLs had a steak party at a local restaurant ending the evening at the QTH of W5NZ for further refreshments and ragchewing. W5MXQ conveniently caught the flu while his rig was at the factory for reconditioning so didn't lose any operating time. The Westside Club contributed 10 per cent of the club's bank balance to the ARRL Building fund. K5KQG's beam blew down and he is contemplating a 10-15-20 quad now. The Springhill Club Radio Station, WA5EPP, is on the air with an ART-13 and a BC-348. WA5VSU has been transferred to Pine Bluff. WA5FRU and WN5FVO are new hams in Springhill. W5AJY is proud of his 40/80 vertical. The Southwest Louisiana ARC's plans for its hamfest on May 4-5 are completed. K5OKR is active on 75 meters and the Central Gulf Coast Hurricane Net. W5CEW has 280 countries worked and 280 confirmed K5FQN has been doing a fine job as net control for the Delta 75 each Sun. morning on 3905 kc. Activity has been marred by some East Texas and Arkansas amateurs who seem to QRM the net deliberately. Although the Delta 75 has been operating on 3905 kc. for some 30 years and does not lay claim to 3905 as its own, all can take pride in its public service aims. It would seem good amateurs will share in this to the extent of one hour a week (!) to 40-50 to operate in a net that has rendered the public much service in hurricanes and other disasters. Let's work together, not against each other. Traffic: W5CEZ 181, W5MXQ 26, K5FQN 23, K5TJG 18, W5AJY 15, W5EA 14, K5FYI 9, K5SDA 7, K5KQG 2, K5MOJ 2.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: K5SQS. W5LWS has a new receiver. W5GRP and W5IHP now monitor 29.6 Mc. WN5EZG is very active on the

(*Continued on page 122*)

Building better electronic gas tanks...



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The result is a nickel-cadmium battery with 50% more capacity per unit of volume and 30% more capacity per unit of weight than comparable types...and capable of being recharged well over 2000 times. For instance, the 12-volt battery pictured has a nominal capacity of 500 mA hours yet weighs only ½ pound and occupies a space of only 5.5 cubic inches. Other types, up to 28 volts, have capacities from 50 mA hrs. to 4 Amp hrs.

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73, Bob Lynch K2RMN

SYLVANIA

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Novice bands. W5DYJ has a new linear. W5WZ reports the Tombigee Radio Club has 40 students in its c.w. theory classes. The Miss. C.W. Traffic Net has moved to 3647 kc. W5CKY says the Jackson DX Club made a good score in the C.W. DX Contest. On the first weekend of the DX Phone Contest K5MDX made 273 QSOs. K6TYP, Keesler AFB Club station, is very active in Navy MARS. K6DGW/5, K4BSK/5, W2TQW/5 and K3LPH/5 are active operators. The Jackson ARC Hamfest will be held July 28. A new OO is K5DZE. Congratulations to WA5AWR and WA5EMJ on getting their General Class licenses. Traffic: W5JDF 112, K5KSK 76, W4CJD/5 66, K5TYP 47, W5WZ 35, W5CKY 28, K5AFM 25, WA5BNH 18, K5PPI 17, K5YTA 14, K5GVV 13, K5AFO 8, K5IHQ 7, K5GAD 3, K5MDX 2.

TENNESSEE—SCM, David C. Goggio, W4OGG—SEC: W4WBK. RMs: W4OQG and K4AKP. PAMs: W4LLJ and K4WWQ. February nets reports:

Net	*Freq.*	*Time*	*Days*	*Sessions*	*QTC*	*QNI*	*Average*
ETPN	3980	0640E	M-F	18	15	404	22
TSSN	3980	1830C	M-Sat	24	96	825	34
TN	3635	1900C	M-Sat	24	288	288	12

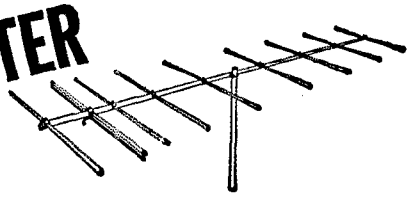
K4AKP, RN5 mgr., reports 1024 messages with 85 per cent attendance from all sections. New officers of the Kingsport ARC are WA4BXZ, pres.; W4KQZ, vice-pres.; K4SHY, secy-treas. The club net meets on 50.7 Mc. Thurs. at 8:30 P.M. 100 Chattanooga Choo Choo certificates have been issued. 25 contacts are needed. Send 50¢ with a list of stations worked P.O. Box 13, Chattanooga. W4MF won the Frye ARC outstanding amateur award. The MARA, Mid-South V.H.F. Assn. and Tri-State DX clubs are sponsoring the Memphis Hamfest June 2. See Hamfest Calendar for details. The Teenage Rebel Net WA4BNF mgr., meets on 3825 kc. at 2100 GMT Mon., Fri. and Sat. at 1500 GMT. Delta Div. Director W5MUG will be in the May I.O Party on 3925 kc. May 4 at 4 P.M. CST and May 5 9 A.M. on 3810 and 3925 at 4 P.M. CST. The Morning Watch and Hit and Bounce Nets on 40-meter c.w. combined to be renamed the W4PL Memorial Net. New officers of the Oak Ridge Club are K4UMC, pres.; K4LTA, vice-pres.; WA4GAX, secy. The club meets the 2nd and 4th Thurs. Shelby County AREC had 17 mobiles operating in the March of Dimes and 7 mobiles on for the Heart Fund Drive. W4WZC reports Drag Net operating on 28.7 Mc. Mon. nights with an average attendance of 25 stations and completion of a successful radio school by the Frye ARC. Your SEC would like to see a West Tennessee v.h.f. net started to foster AREC operations. It is suggested the Jackson and Tri-County Clubs get together to discuss this. K4RIN worked California and other western states in the 160-meter contest. Traffic: K4AKP 1900, W4ZJY 1125, W4KAT 143, W4PQP 131, W4OGG 126, K4WWQ 98, W4MXF 74, W4ODR 65, W4RM J 60, WA4AVX 52, W4OQG 39, W4CVG 32, WA4BNF 25, W4WBK 22, WA4CRH 20, W4TZG 16, W4LLJ 15, K4OUK 15, W4ZAC 14, WA4MCC 13, K4PYH 13, WA4ATS 10, K4NRO 10, WA4DPJ 8, W4JVM 8, W4HPN 7, W4CZE 6, K4FZJ 6, K4HOZ 6, WA4KGX 6, K4PKM 6, W4BQG 4, WA4IRX 4, K4TAX 4, K4UMW 3, K4IOQ 2, K4RQP 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Elmer G. Leachman, W4BEW—SEC: W4TFK. PAMs: W4SZB, and K4ECJ. V.H.F. PAM: K4LOA. RM: W4CDA. Asst. RM: K4NYO. MKPN reports 31 sessions, 496 QNIs, 78 QTC; EMKPN 17 sessions, 127 QNIs, 19 QTC; KPN (s.s.b.) 20 sessions, 356 QNIs, 67 QTC. 20 stations reporting traffic; KYN (Civ) 29 sessions, 135 QTC; MKTN (Maysville) 15 sessions, 469 QTC. A slow c.w. net, KNN, for Novices and others who wish to brush up has been activated. Contact your SCM for details. Several clubs are running code classes, including the Ashland Amateur Radio Club, which has graduated two. KYN held its first dinner meeting, sponsored by W4CDA, the RM, and reports good response. The Louisville Red Cross Emergency Net, on 53.6 Mc. under K4ZQR, provided communications for several large companies involved in a breakthrough of liquid material that overflowed several plant sites. Among those assisting were K4FLP, K4DMU, K4ZQQ, WA4DYL, WA4AGH, W4MFI, W4USE, W4RCC, W4DHB, W4MDY and K4GZS. K4QIO assisted the Mayor in arranging for a visit from guests from Quito, Ecuador, proving the value of amateur radio. K4WJI soon will have a kw. on c.w. using 813s. K4HHG is recovering from an auto accident. K4HSB is our leading award winner with 45 so far. Traffic: K4HSB 743, K4WJI 609, WA4ELB 505, W4CDA 76, K4KWQ 74, W4USE 65, K4NYO 57, W4SZB 56, K4ZQQ 46, WA4APU 43, K4QIO 38, K4NVO 32, WA4JQR 25, W4BEW 24, WA4GCL 24, K4VDO 20, K4LOA 16, W4KJP 12, W4YYI 10, K4SWL7.

(*Continued on page 124*)

NEW SCOTCH! MASTER



2 & 6 Meter Antennas

MOSLEY Model A-92-S

An introduction to the New MOSLEY SCOTCH-MASTER two meter beam. This nine element antenna may be mounted vertically or horizontally, providing excellent front-to-back ratio, handling maximum legal power, amplitude modulated or 2,000 watts P.E.P. SSB. Mounting bracket fits masts up to 1½ inch OD. Antenna is matched for 300 ohm balanced line. Boom is made of sturdy medium weight wall 1¼ inch OD aluminum tubing to achieve maximum strength with minimum weight and wind loading characteristics. Stacked arrays feature 300 or 75 ohm balanced feed.

SPECIFICATIONS AND PERFORMANCE DATA: Forward gain, 14 DB. Front-to-back, 20 DB. SWR, 1.5 to 1 or less at resonant frequencies. Maximum element length, 41 inches. Boom length, 12 feet. Turning radius, 6.5 feet. Assembled weight, 4 pounds. Maximum wind surface area, 1.25 square feet. Wind load, 25 pounds. Antenna is shipped in kit form. Amateur Net $16.40

MOSLEY Model A-76-S

Also introducing for the first time, the MOSLEY SCOTCH-MASTER six meter beam. This seven element array provides maximum forward gain with excellent directivity. SCOTCH-MASTER will handle the full legal power, amplitude modulated. Mounting bracket fits up to 1½ inch OD mast. Antenna is "Gamma" matched for 52 ohm unbalanced line. Boom is of heavy guage 1¼ inch OD aluminum. Easily rotated with TV rotor and can be mounted vertically or horizontally.

SPECIFICATIONS AND PERFORMANCE DATA: Forward gain, 12 DB. Front-to-back, 20 DB. Boom length, 24 feet. Turning radius, 13 feet. Assembled weight, 12.5 pounds. Maximum wind surface area, 2.5 square feet. Wind load, 51 pounds. Antenna is shipped in kit form, complete with detailed instructions. Amateur Net $35.10

MOSLEY Model A-56-S

The New MOSLEY SCOTCH-MASTER six meter beam features five elements, maximum forward gain and excellent directivity. This gamma matched beam will handle the full legal power amplitude modulated. Can be mounted vertically or horizontally. Feed with 52 or 75 ohm line.

SPECIFICATIONS AND PERFORMANCE DATA: Forward gain, 10 DB. Front-to-back, 20 DB or better. SWR, 1.5 to 1 or less at resonant frequencies. Maximum element length, 118 inches. Boom length, 12 feet. Turning radius, 7 feet 8¾ inches. Assembled weight, 6.5 pounds. Wind load, 32 pounds horizontally, 56 pounds vertically. Antenna is shipped in kit form, complete with detailed instructions. Amateur Net $ 28.16

••Mosley SCOTCH-MASTER Stacking Kits••

MOSLEY Model A-92-S-SK1

A kit for stacking two horizontally polarized A-92 SCOTCH-MASTER beams, one above the other. Comes complete with matching transformer, insulator, complete instructions and phasing line. Feed point impedance - 300 ohm balanced line. This stacked array will attain 3 Db additional gain over a single horizontally mounted beam. Amateur Net $3.15

MOSLEY Model A-92-S-SK2H

A kit for stacking four horizontally polarized A-92 SCOTCH-MASTER beams, two over two. Complete with support members, mounting plates, phasing line, insulators, hardware and instructions. Feed point impedance - 75 ohm balanced line. This stacked array will attain 6 Db additional gain over a single horizontally mounted beam. Amateur Net $44.35

MOSLEY Model A-92-S-SK2V

A kit for stacking four A-92 SCOTCH-MASTER beams, two over two, in the vertical plane. Comes complete with support members, mounting plates, insulators, phasing line, hardware and instructions. Feed point impedance - 75 ohm balanced line. This stacked array will attain 6 Db additional gain over a single vertically mounted beam. Amateur Net $44.35

Mosley Electronics, Inc. 4610 North Lindbergh Blvd. Bridgeton, Mo.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: W8LOX. RMs: W8EGI, W8IXJ, W8FWQ, K8KMQ. PAMs: W8CQU, K8LQA, V.H.F. PAM: W8PT. Appointments: W8GOW and K8LJS as ECs. WA8ENO and W8QFO as ORSs, WA8DZP and WN8GJS as OESs. New officers of the Detroit ARA are W8JKD, pres.; W8MOB, vice-pres.; W8LEU, secy.; K8AMH, treas.; W8MGQ, K8UEU and K8MSF board members. BPLers: K8FDV, K8JJC, K8GOU. All Michigan radio clubs should have representatives on the Michigan Council of Clubs or should send their club opinions to the Division Director. Genesee County RC assisted the Red Cross, providing first-aid facilities at the Mt. Holly Ski Meet via WA8BQK, WA8BQR, W8HRL, K8RWB, K8TXL, W8VGG, W8VXB and K8WRB. The "Wouff Hong" originated in Genesee County, also the "ROWH." The SVARA again handled the '63 Mothers' March of Dimes with the following: K8AQA, K8BQJ, W8CAM, W8CTY, K8HIO, W8HZF, K8KWG, W8LNE, K8MEQ, K8MPI, K8NUN, K8OIC, K8PNX, W8QQK, K8SWQ, W8SXY and K8TTP. K8GKX made the Amateur Extra Class. Congrats! 01' W8EGE is on the mend after a QSO with the hospital. W8LIM is now VP7CX in the Bahamas working DX on 50 Mc. W8FTW/3 is heard working 80-meter c.w. Takes us back 30 years! New Generals: WA8DNZ and WA8DSV. The garage ham shack of WA8FET was burned to the ground. W8PT reports the S.W. Michigan 2-Meter Net meets Mon. at 0100 on 145.260 with good coverage from Flint west. The South Bend ARC 2-Meter Net meets Mon., Wed. and Fri. at 0100 on 145.280 and covers S.W. Michigan and North Indiana. The Adrian ARC Net meets on 50.4 Mc. at 2100 Thurs. Hillsdale County RC is on 50.29 Mc. at 2000 Fri. K8SXV is the call of the Lansing Community College RC which has 4 stations in multi-band operation, including the Collins S/Line, Thunderbolt, Seneca, HX-500, HQ-170, Drake 2-A and 2-Meter Communicator, plus RTTY gear. K8ILR is on 50-Mc., s.s.b., RTTY and working in closed circuit TV. W8AXA is on 50-Mc. s.s.b. and K8EXG is on 50-Mc. RTTY. WA8ASD makes General. W8DSW now sends OBS daily on 50 Mc. at 0200. Traffic: (Feb.) K8FDV 931, K8JJC 502, W8ELW 315, K8NJW 242, K8GOU 222, K8KMQ 202, W8QFO 144, K8VDA 118, W8BEZ 96, W8FWQ 94, W8RTN 92, W8IBB 90, W8DSW 86, K8QLL 82, WA8ENO 70, W8FX 58, W8EOI 53, W8IXJ 52, W8HKT 50, K8LNE 34, W8YNY 30, K8PYW 28, K8TJH 27, K8TFE 26, W8IUJ 25, WA8ASV 19, W8EGI 19, K8WQV 18, K8YAY 18, W8TBP 17, K8HLR 16, W8SWF 15, W8UFS 14, W8YAN 13, K8CKD 12, W8DSE 12, W8WVL 11, W8AHV 6, WA8ASK 6, W8ZLK 6, K8MEG 5, K8GJD 4. (Jan.) W8IUJ 139, K8LNE 73, W8SS 12.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE, W8IEP and K8ONQ. PAMs: W8VZ, K8BAP and K8UBK. The Seneca RC saw the Telestar film. Findlay RC's *W8FT News* has a new cover page showing an etching of its club house with antenna tower for the club station and states that WA8COB and WA8GXF are new hams. The Ohio Red Cross Mutual Aid Net meets each Sun. at 1630 EST on 3973 kc. and all a.m. and s.s.b. stations are welcome to join and check in the K8JSQ net megr., and K8MZT, secy. Columbus ARA's *Carascope* tells us that Mr. McDonald, a W5/8, told of ham radio back in 1900 along with its tubes and gear. Inter-City RC's *IRC News Bulletin* informs us the club held an auction. W8TTS recovered from his illness and now has a new KWM-2 and the club has 62 enrolled in its code and theory classes with W8QJF and W8VTP as instructors. K8BXT passes along this news: W8FBE is now married. K8PAU has a new Tri-band Swan. K8ZNB has a new Swan, K8GVY has an HX-10 and there is a new club named Radio Amateurs and Television Experimenters Society. Toledo's *Ham Shack Gossip* named W8ITT as its Ham of the Month and says the Toledo Mobile RA held an auction. W8RZQ won the hidden transmitter hunt. K8LFG was married and the Genoa RC was formed with K8VVH, pres.; W8KDK, vice-pres.; and Tom Drain, secy.-treas. The Ohio S.S.B. Net celebrated its first anniversary with the handling of 815 pieces of traffic. The Ohio Buckeye Net will hold its annual picnic at Mt. Vernon July 27. WA8AJD spent two weeks in Europe. W8AQ worked HC1DC on 160-meter c.w. with 50 watts. Queen City Emergency Net's 1963 officers are W8MXR, pres.; K8-DQU, vice-pres.; K8PMW, secy.; K8CRV, treas.; and W8USM, comm. mgr. Greater Cincinnati ARA's *The Mike and Key* says the club saw a film describing the important role the quartz crystal plays in present-day communications and a 50-ft. tilt-over tower. A 6 and 2 beam and rotor were presented to my old friend W8ALW for his many years of unselfish service. Licking County RC's 1963 officers are K8QOQ, pres.; W8MRN, vice-pres.; and K8EKI, secy. Warren ARA's *Q-Match* tells us that W8CMZ and K8GVY have new Drakes 2Bs, the club toured the Packard Electric plant and heard K8-JWH speak on interference in TV, hi-fi and radio,

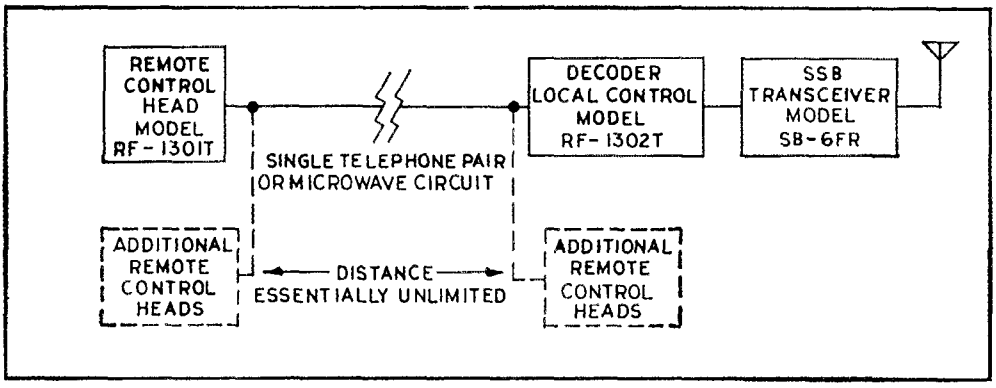
(*Continued on page 126*)

SSB COMMUNICATIONS
with TWO-WIRE REMOTE CONTROL

THE PROBLEM: In many commercial and government point-to-point SSB communications systems, it is necessary to locate HF radio stations in congested downtown areas. Local noise generated by fluorescent lights, elevator controls, etc., frequently results in such a high noise level as to make efficient reception impossible.

PREVIOUS SOLUTIONS: In the past, several approaches have been used to overcome this problem. One is to increase power levels in an attempt to swamp out the noise. This is obviously inefficient. Another, is to eliminate the noise. This is usually impractical, since it may originate from sources beyond control of the communications group. A third, is to use multi-conductor remote control SSB equipment which is very expensive due to the cost of running long lengths of special cable.

A NEW APPROACH: R F Communications now has available an SSB point-to-point transceiver system which can be controlled remotely over any **two-wire** communications link. This includes telephone pairs, microwave links, VHF links, etc. See block diagram below:



The Model RF-1301T Remote Control Head can be placed in any location regardless of noise level. The output can send over any two wire circuit (such as a leased telephone line) to the transceiver/antenna site. At this low-noise antenna site the control signal is decoded by the Model RF-1302T Decoder and used to control a Model SB-6FR SSB transceiver. This is a specially modeled version of the widely used R F Communications SB-6F transceiver.

Functions that can be controlled are Channel Selection, Power, Mode (SSB or AM), Transmitter Keying and Receiver AF Gain. And, the distance over which control can be exercised—**essentially unlimited.**

The SB-6FR Transceiver provides six fixed channels in the frequency range of 1.6 to 16 Mc—both SSB and AM modes. Power output is 125 watts p.e.p. Local control is also provided at the transceiver location.

Write for details on this and other items in the world's most complete line of fixed channel commercial SSB communications equipment.

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Overseas Distributor Inquiries Invited

WN8EEH was in the hospital and has a new Drake 2B. W8GM and W8UXL are Silent Keys. WA8DUX has a new 99er. K8YSQ has a new Shawnee. WA8AUR moved to Florida. W8JZD moved to Michigan. WA8BZF received his General Class license. K8OTM is going to Ohio State U. K8LEA is going to Carnegie Tech. The Ohio Phone Net meets at 2200Z on 3860 kc. and reports for February: 20 sessions, 179 check-ins and 114 messages handled. Canton ARC's *Feedline* has a picture of W8SQW's 1917 station when he was 8AUX and tells us the stork brought K8DGT and K8DGZ a baby boy. W8QAZ joined the QCWA. W8ULY and his wife spent several weeks in the Bahamas. WA8BTE has his General Class license. W8FMW and W8GAB have a new 75S-3 and 32S-3. WN8GMY and WN8GMX are a father-and-son team. Mr. Finneburgh, of Finco Antenna Co., gave a talk on their 6 & 2 beam. K8EJN won a beam. W8DIM is in the hospital. Springfield ARC's *Q-5* informs us that K8UYD spoke on "Lasers" and states W8FV is now W4EK. W8DAE, K8DIU, K8LGA, K8OBW and K8YUZ made BPL in February. Parma RC's *P.R.C. Bulletin* relates that W8FAT discussed the hottest thing ever to hit the ham market and the club held its Old Timers Night which was attended by 80 hams with 12 OTs there. Dayton ARA's *R-F Carrier* says W8HCD told the Story of Box 21 with a live demonstration of rescue breathing. Srepco had 76 register for Novice and Technician code and theory classes and Charles Friend spoke on Stable Oscillators. South East ARC's *Ham Fax* tells us that K8TSI returned from Florida. V.H.F. High Banders RC's bulletin reports that K8ZES spoke on TVI. Traffic: K8YUZ 882, W8DAE 726, K8LGA 616, K8OBW 514, W8BZX 365, K8DIU 364, K8UBK 198, W8MGA 190, K8SQK 169, K8ONQ 131, W8KCN 102, W8ECB 95, K8BNL 75, WA8-BBG 62, K8RXD 60, K8PCL 56, W8AZF 46, K8JSQ 45, W8QCU 33, W8PMJ 32, W8IEP 27, K8BAP 25, K8AGN 24, W8DQD 22, W8LZE 17, K8LGB 16, W8DQX 13, K8-ZFS 13, K8DDB 12, W8OKN 11, W8UID 10, K8KLA 6, WA8AJD 5, W8DIH 4, K8PBE 4, W8AL 3, K8DDG 3, W8EEQ 2, K8ZTX 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RMs: W2PHX and K2QJL. PAM: W2LJG. Section nets: NYS on 3670 kc. nightly at 0000 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; MHT (Novice) on 3716 kc. Sat. at 1800 GMT; Inter-club on 28.690 kc. Mon. at 0130 GMT; Emergency Coordinators on 146.550 kc. Fri. at 0015 GMT. Appointments: WA-2VYS and WA2LJM as ORSs; WB2DQO as OBS. The guest speaker on v.h.f. at the Schenectady Club was W1HDQ, of ARRL. WA2KUL, K2LNG and WA2LVU are newcomers to Albany. Welcome to our section. K2OTQ spoke on converting the ARC-5 in Albany. Among those vacationing in Florida was K2LTW. Schenectady drills three nets for AREC preparedness each Sunday on 75, 6 and 2 meters. ECs, please inform us of the time and frequency of your local AREC nets. The operation of SAGE was the subject discussed by the Telephone Co. representative at the New Rochelle Club. A later meeting was concerned with the latest developments of v.h.f. converters. Schenectady has nearly 30 stations on 146.94-Mc. wide-band f.m. including 15 mobiles. The repeater station gives the mobiles exceptionally long-range v.h.f. communication. All receivers and transmitters are crystal controlled on a single frequency. It's an impressive net. The State Civil Defense Control Center has moved to new and larger quarters in Albany with plenty of room for antennas. Traffic: WA2UZK 238, W2THE 224, WA2VYS 180, K2TXP 145, W2PKY 87, WA2LJM 70, W2URP 58, K2SJN 42, WA2-DRP 16, W2GTC 16, WA2LYP 16, WA2HGB 14, W2EFU 10, WA2LOJ 8, K2HNW 3, W2PHX 2, WA2MID 1.

NEW YORK CITY AND LONG ISLAND—SCM, George V. Cooke, jr., W2OBU—SEC: K2OVN. RM: W2WFL. PAM: K2HCU. V.H.F. PAM: W2EW. Section nets: NLI, 3630 kc. at 0015Z nightly; NYCLIPN, 3908 kc. at 2230Z nightly; V.H.F. Net, Tue.-Wed.-Thurs. on 145.8 Mc. at 0100Z and Fri. through Mon. on 146.25 Mc. at 0000Z; Mike Farad on 7238 kc. at 1700Z; All Service Net at 1800Z Sun. on 7270 kc.; Q5 Net on 3935 kc. at 2100Z daily. February traffic totals are close to 2000 points higher than January, which is an excellent demonstration of a job well accomplished, and for exceptional effort in that direction the following received BPL certificates: WA2GPT, W2EW, K2UAT, K2UBG, W2MTA, W2WFL, WA2EXP and WA2TQT for over 500 points and WA2RUE, WA2GAB and WA2VKK for originations and deliveries. Because of a late report WA2-TQT also made BPL in January. WA2GPT now is sporting a new HT-37 and an HT-41. WA2EXP now is operating a new Valiant. WA2VGK has gone RTTY. WA2QJU became a member of the A-1 Operator Club. K2KYS is very happy that he made DXCC. WA2IUQ

(Continued on page 128)

IT would be reasonably accurate to say that the question most frequently asked of us by mail and at hamfests is whether we recommend purchase of a general coverage or ham-band-only receiver. Our answer, of course, depends on the projected use of the new receiver, and more than one prospective customer primarily interested in the ham bands has been surprised at our recommendation of a less expensive ham-band set instead of a general coverage unit costing many dollars more. At the sacrifice of 88% of the HF spectrum, a ham band receiver usually offers superior calibration and stability as compared to a general coverage/bandspread unit in the same price class. Compare two five-band receivers — one a ham-bander with an average coverage of 500 KC per band, the other a GC receiver covering as much as 10 MC per band. The ham band receiver on 20 meters, for example, has one tuning capacitor tracked to spread 14.0 MC to 14.5 MC over as much as 12″, with resultant excellent calibration — our NC-303 can be read directly to two KC on 20. The GC receiver incorporates 20 meters as part of its 10-20 MC band and because of bandspread ratio changes from band to band, and dial space and mechanical limitations, may spread 20 meters over only 4″ to 5″ with correspondingly less accurate calibration.

ELECTRICAL stability of the general coverage receiver is usually reduced because of its wide frequency range on each band, and the resultant necessity for a wide variation in variable tuning capacity (ΔC). Take temperature compensation — assume X $\mu\mu f$ of temperature compensation is required to stabilize the receiver at the high end of the 10-20 MC band. If the high frequency oscillator is cranked down to the very low end of that band, the increase in tuning C automatically results in a different ratio of tuned circuit C to temperature compensating C — and the oscillator is no longer properly compensated. Therefore, a general coverage receiver enjoys optimum temperature compensation over only one portion of its tuning range on each band. Additionally, the restricted ΔC of the ham-bander allows a higher percentage of fixed close-tolerance temperature compensating capacitance in the oscillator compared with heat sensitive variables such as coil inductance, variable tuning capacitance and tube interelectrode capacitance — thereby minimizing their effect on frequency with variations in temperature.

MECHANICAL stability of the general coverage receiver is made more difficult because space requirements dictate a tuning capacitor with a large number of plates spaced closely together in order to achieve enough ΔC — as a result, capacitance change stemming from vibration of the plates is greatly magnified. The ham band unit requires comparatively few plates which can be double spaced to further reduce the effects of shock and vibration. Since true general coverage receivers directly comparable with good ham-band-only units are quite expensive, our advice is to put your money in the ham-bander if maximum performance for the ham bands is the only criterion — however, for many of us, a reduction in ham band performance is more than offset by the instant ability to copy any WWV frequency — use the receiver as a tunable IF for VHF converters — trouble-shoot homebrew gear — work the MARS frequencies — copy commercial CW — or to just read the mail from foreign broadcast and government services all over the world. You might consider putting the bulk of your budget in the ham band receiver and buying a less expensive general coverage job for a second or standby receiver — we build both general coverage and ham-band-only equipment and have a 12 page catalogue ready for you which describes our entire line.

MIKE FERBER, W1GKX

received WNYCLI Class all, Colonial and QRP-25 awards. W2GKZ expressed pleasure in receiving the EAN certificate. WA2SIV received WWCNY No. 529. WA2GFP and WA2VNK have pulse units in the works for 2300 Mc. as described in *QST* recently. WA2KER is seeking information about putting his 20A on 28.72 and 28.68 Mc. The Tu-Boro Club now meets at 104-19 127th St., Richmond Hill, the 2nd and 4th Wed. each month. WA2WAO is now 6-meter AREC Asst. EC and WA2TAQ is Asst. EC for 2 meters in Queens. W2PF attended the New Orleans Mardi Gras and enjoyed a dinner in a famous restaurant there owned by W5RU. WA2PMW received HTH and CHM No. 831. WA2RJZ got QRP and HTH "G" No. 535. WA2AUZ has been appointed Asst. EC for the Manhattan 6-Meter AREC Net. The Manhattan 2-Meter AREC Net meets at 2300Z Mon. at 146.94 Mc. W2KTG is welcomed into our section from up Plattsburg way. W2TUK's fourth harmonic arrived on Lincoln's Birthday at the same time K2BZY's XYL presented him with a new jr. operator. Both are girls and their names are the same except the order is slightly changed. The godfather of W2TUK's new arrival is W2VKS, who also was born on the same date. The Federation of Long Island Radio Clubs has been activated and W2MNX reports much future planning to assist member clubs. WA2RUE has formed a new net meeting daily on 3575 kc. at 2130Z known as the TEAM (TN) Net covering the east coast and including the 8th district. The Staten Island RA elected K2OEI, pres.; K2EFB, treas.; WA2PJM, rec. secy.; WA2QDJ is now WAØFAK in Denver and looking for contacts from back home on 15 and 40 meters. WB2DSL tells of the formation of the Shorefront RC in Brooklyn. W2OKU has been appointed EC for the Borough of Brooklyn and WA2GAB as EC for 2 meters in the same area. A coordination meeting was held at the call of WA2QAO, Bronx EC, to integrate various community emergency plans in the Hudson AREC nets No. 1, 2 and 3 with successful results. Thanks to all participating amateurs for a wonderful cooperative effort. Traffic: (Feb.) WA2GPT 1356, W2EW 823, K2UAT 747, K2URG 586, W2MTA 562, W2WFL 550, WA2EXP 535, WA2TQT 528, WA2RUE 366, WA2GAB 196, WA2VKK 193, WA2QJU 169, K2KYS 142, WA2LJS 134, WA2LUQ 101, W2JGY 100, WA2ZXR 60, WA2ZDT 55, WA2RZJ 46, WA2RMP 35, WA2PSZ 33, W2GKZ 32, WA2IZV 31, K2UFT 29, WA2EFN 18, WA2WAO 17, K2THY 16, WB2CAV 15, WA2SIV 15, WA2WIH 13, WA2VZN 12, WA2KER 8, K2KHK 8, WA2VNK 8, WA2SAZ 7, W2LGK 6, W2PF 6, WA2PUE 6, WA2RAQ 6, K2AHS 5, WA2YNH 3, WA2PMW 2, WA2RJZ 2. (Jan.) WA2TQT 894, W2GKZ 111, WA2PSL 28, WA2ZDT 4, K2BVN 1.

NORTHERN NEW JERSEY—SCM, Daniel H. Earley, WA2APY—SEC: K2ZFI. RM: W2QNL. PAM: K2SLG. V.H.F. PAM: K2VNL. WA2BRC won first prize in his school's Science Fair; he also has started a club and teaches code in the local c.d. WA2BNF has erected a 50-ft. mast for v.h.f. WA2MNQ has worked 120 countries since November with his homebrew rig. WN2DHT dropped the "N" for a "B." WB2DDA reports that WA2UPP has joined the League. WA2ZKO and WA2MNQ are starting a net on 3550 kc.; the purpose, to help teenage hams to become better acquainted. The first session will be held Apr. 27 and every Sat. from then on at 0000 GMT. Glad to hear that K2RVH has become Mrs. K2KJI. K2UCY received the top award from the East Coast V.H.F. Society for traffic, training and RACES. WA2PWI got his second call from the FCC and says he can now work from the Salt Mine. He also received his WAC award. K2CCF has been made Radio Officer of Newark. His assistant is WA2LUD. WA2OVK is having trouble getting an 80-meter antenna on a 100-ft. lot. W2NKD had a time driving through the snow in upper New York. WA2ZQH says his XYL is going to the hospital. WB2DEP passed the General Class exam and will get with the traffic soon. K2SBS says school and radio don't mix. W2NIY says that W2DJT has retired from the A.T.&T. Company and is now in Florida. WA2OQP has an electronic keyer and wants to get into the NJN. Just bang away, Tom, there are no requirements. W2CVW reported a lot of traffic and with it the fact that the "thank you" letters have been coming in. That always makes trafficking nicer. WA2ZKT has his 80-meter antenna up and says it's FB. WA2UOO has a screen modulator for his low-band rig. W2CFB, down south, wants to know if anyone would like to work pulse transmissions on 2700 to 3500 Mc. Seems to me there is some of that going on in the 3500-kc. range. Hi. K2HGH has been appointed net manager of the Air Force MARS V.H.F. Net. WA2MYB has gotten on 2 meters. The following new appointments were issued in February. WA2LPJ and WA2PWI as OESs, W2SJB as OO and W2NAK as ORS. Renewals: W2ABL and W2OXL as ORSs; K2JTU and W2VMX as OPSs, W2VMX as OO. The Northern New Jersey NTS nets can be found in last month's col-

(Continued on page 130)

C-P COMMUNICATION ANTENNA SYSTEMS

—mean

CERTIFIED PERFORMANCE!

BASE STATION COAXIAL ADVANCED DESIGN ANTENNA (2X-Omnidirectional Gain)

CAT. No. 79-509, FREQUENCY RANGE 108-174 MC*

Cat. No. 79-509 2X-Gain Antenna combines the simplicity of a coaxial antenna with the gain of a more complex structure. Though external appearance is that of a standard coaxial antenna, the union of special element lengths and internal matching devices produces 3 db omni-directional gain.

SPECIFICATIONS

Electrical:

Nominal input impedance	50 ohms
Maximum power input	500 watts
Omnidirectional gain	3 db
Internal feedline	RG-8A/U
Flexible terminal extension	18" of RG-8A/U
Termination	Type N male with Neoprene housing
VSWR	1.5:1
Bandwidth	±1%
Lightning protection	Star gap

Mechanical:

Skirt	2" dia. red brass
Whip rod	6061-T6 aluminum
Support pipe	1-5/16" dia. hot-galvanized steel, 24" minimum length exposed available for mounting
Rated wind velocity	100 MPH at 150 Mc
Lateral thrust at rated wind	19 lbs. at 150 Mc
Bending moment 6" below skirt	55 lbs. at 150 Mc
Weight	30 lbs. at 150 Mc

**Exact frequency must be specified*

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DIVISION OF

PHELPS DODGE ELECTRONIC PRODUCTS

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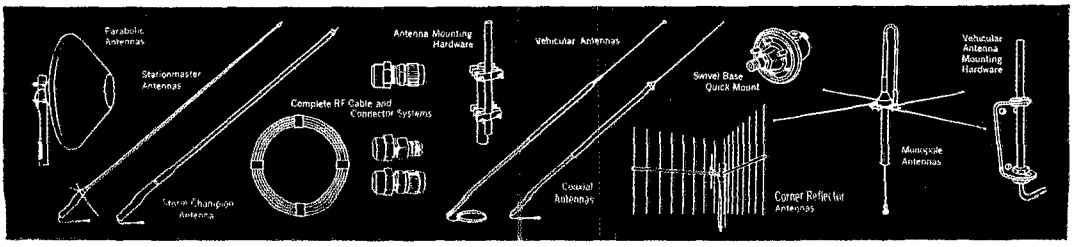


umn. The sessions, attendance and traffic of the NTS nets: NJPN: 28,268,171. The NJ 6&2: 20,115,43. The NJN: 28,472,490. The NNJ section is allotted just so many lines and the reports really are coming in, so don't feel slighted if everything sent in is not put in print. Traffic: K2UCY 378, K2VNL 339, WA2SRK 223, WA2CCF 208, WA2UOO 208, W2CVW 183, WA2TJZ 146, W2QNL 135, WA2GQZ 129, WA2ZRR 114, WA2WSB 76, W2FNX 60, K2SBS 57, K2JTU 50, W2SJB 41, W2DRV 31, K2EQP 23, WA2LUD 22, K2PVH 22, WA2IGQ 20, W2TFM 20, WA2APY 18, W2OXL 15, WA2OQP 14, K2SLG 13, WA2ZQH 13, W2NAK 11, W2BVE 10, K2AGJ 8, W2CFB 7, WA2QPX 7, WA2ZKT 6, W2EWZ 4, W2NIY 3, K2VNK 3, WA2ZKO 3, WA2OVK 1.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WØNTR—SEC: KØEXN. PAMs: WØLSF, WØPZO. RMs: WØSCA, WØLGG. New EC: KØRRU, Page County. OPS: KØCQO. New calls: WNØEYJ Jamaica, WNØDLS and WNØDZM Fort Dodge: WNØFEX Fr. William Devine, spiritual advisor of the Boys Training School, Eldora. A new club is the Spencer Amateur Radio Club (SPARK) with WØUHC, pres.; KØHGH, vice-pres.; KØCVC, secy-treas. The AREC State meeting was held at Ames Feb. 23 but the weather cut down the attendance. Thanks to everybody at ARRL, especially W6ZH, W1LVQ, W1BDI, W1NJM and our own WØNWX; we have elbow room on 160 meters. In this section opinions concerning "Restricted Voice Bands" perhaps as many as there are individuals are being routed to the League Directors and we feel sure good sense will prevail. Whatever the outcome there will be provisions for all stations. For my part, I still enjoy c.w. with my old friends who work it from choice. W4PL, who has been a landmark these many years, has joined the Silent Keys. It was my pleasure to have known *him*. 73, Ben! Feb. activities: 160-Meter Net QNI 1178, QTC 15, 31 sessions. 75-Meter Net—QNI 1080, QTC 145, 24 sessions, average 6. Hamilton County Net—QNI 150. Traffic: (Feb.) WØSCA 1618, WØLGG 1150, KØQKD 80, WØNTB 57, WØDUA 54, WØPZO 38, WØLJW 37, KØGXP 23, KØGID 20, WØQVA 16, WØYDV 16, WØTTT 14, WØUSL 13, WØBLH 8, WØHTP 8, WØJPJ 8, KØKAQ 6, KØVBM 5, WØQVZ 4, KØAFI 3, WØFDM 2, KØHGH 2. (Jan.) WØDUA 57, KØGID 21, KØHGH 7, WØQVZ 4. (Dec.) WØPZO 271.

KANSAS—SCM, C. Leland Cheney, WØALA—Asst. SCM: Richard G. Caspari, WØYZB. SEC: KØBXF. PAMs: KØEFL and WØBOR. RMs: WØQGG and WØPFG. V.H.F. PAMs: WØHAJ and KØVHP. Net reports:

Net	*Freq.*	*Time*	*Days*	*Sessions*	*QTC*	*QNI*	*Average*
KPN	3920	1245Z	M-W-F	27	90	479	17.7
QKS	3610	0030Z	Daily	28	114	158	5.63
HBN	7280	1800Z	M-F	19	88	389	20.5
SCAN	7070	1900C	Mon	4	0	48	12.0
SCAR	7205	1900Z	Tue	4	0	50	12.5

The following hold EC appointments: KØCPD, WØGCJ, WØQJU, KØLHF, WØZGK, KØYQE, KØIZW, WØEQD, KØGLW, KØQKS, KØVQC, KØUNE, KØLPE, KØYBR, WØBBO, WØYZB, WØFHU, KØEWW, WØALD, WØZXN, WØZUX, KØOUS. These are the amateurs who are giving so much of their time and effort to handle emergency communications through the AREC organization. Give them your support. Register with AREC today through your EC. The Wichita-Sedgwick County Civil Defense has started a training program for RACES operators under the leadership of WØYZB. Training will be a requisite to obtaining a RACES license under this plan. We still are waiting to hear from most of the clubs in the section. If you want to be listed here, get your reports in to the SCM before the fourth of each month. Traffic: KØZPN 305, WØBYV 259, WØSAF 185, KØYTA 55, WØYZB 50, KØEFL 43, WØQGG 41, KØBXF 31, KØGII 26, WØIFR 22, WØEXG 14, KØPSD 12, KØLHF 11, WØFDJ 9, KØQKS 9, WØWYK 8, WØFHU 4, KØTGR 4, KØVQC 3, WØERQ 2, WØPFG 1.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: KØWNZ. RMs: WØOUD and KØONK. PAMs: WØBVL and WØLFE (v.h.f.) Thanks to all who voted in the recent election. A big vote of appreciation goes to KØWNZ for acting as temporary SCM until the election. If you want to see news in this column please send in the items with your traffic reports. A new Gen. Cl. licensee in Harrisonville is WAØFBQ. A new Novice in St. James is WNØEZV, operating 7 Mc. KØVNB has a new CM-1 receiver. KØYIP built a TO keyer for the N.W. St. Louis ARC. KØAXU, and 8 operators put the club station in the DX Contest. KØVSH copied European hams on 80-meter c.w. before

(Continued on page 132)

AMECO LEADER in COMPACT, QUALITY HAM GEAR

NUVISTOR PREAMPLIFIER
for 27, 28, 50, 144 or 220 MC.
Lower noise figure
Over 20 db gain.

Model PV—Uses 6CW4 Nuvistor. Improves gain and noise figure of present converter or receiver. Specify frequency.

Model PV Wired & tested **$13.95**

Model PH—Uses 6CB6 tube—for any frequency or ham band, 2 to 27 MC. Wired & tested **$13.95**

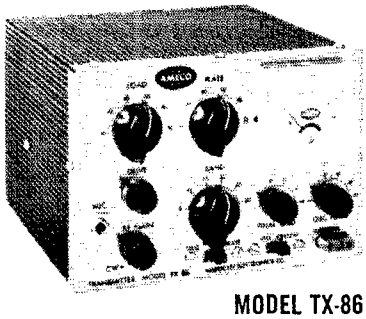
MOBILE CONVERTERS

Require only 12 volts B+. Crystal controlled. For any FM or AM frequency or band from 2 to 54 MC. **Model CLB**—for 6 meters or citizens band. **$24.95**
Add $1 for any other frequency

Model CLB

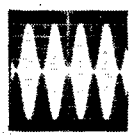
SquelchANLimiter

A combination squelch & noise limiter. Requires only 12V B+. Model . . . SNL-12, for 12V or SNL-6, for 6V, **$17.95.** Noise Limiter alone, Model ANL-6 or ANL-12, **$7.95**



MODEL TX-86

COMPACT 6 thru 80 TRANSMITTER



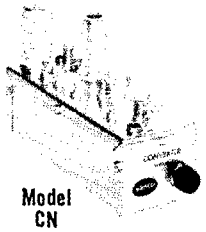
SCOPE PATTERN SHOWING 100% MODULATION OF TX-86

The TX-86 is an attractive, compact (only 5" x 7" x 7") transmitter that can handle 90 watts input on CW and 90 watts peak input on phone on all bands. It is ideal as a fixed or mobile unit. The new modulator circuit produces modulation that cannot be distinguished (with a scope) from push-pull plate modulation (see photo above).

Tube lineup:—12BY7 oscillator, a 6BQ5 buffer, a 6146 final modulated by a 12AX7 and a 6AQ5. Power requirements of 6 V at 3.2A or 12 V at 1.6A and 300 V at 75 ma. plus 600 V at 150 can be supplied by PS-3 for fixed use or W612A for mobile. Smaller power supplies can also be used. Other features include: Final operates STRAIGHT-THRU on all bands, push-to-talk mike jack; Pi-net output ckt., true potentiometer drive control (no detuning of circuits), can take crystal or VFO.

Model TX-86K Kit (specify 6 or 12 V)..... **89.95**
Model TX-86 Wired (specify 6 or 12 V) **119.95**
Model PS-3 Power Supply, Wired **44.95**
Model W612A 12 V Mobile Minn.-Honeywell Power Supply **54.95**

NUVISTOR CONVERTERS
For 50, 144 & 220 MC
High Gain, Low Noise



Model CN

$49.95 wired **$34.95 kit**

Two Nuvistor RF stages, a Nuvistor mixer and a 6J6 osc. give lowest noise figures and high gain. Ameco convertors do NOT become obsolete as their IF output is easily changed to match any receiver. All CN models (CN-50 for 6 meters, CN-144 for 2 meters and CN-220 for 1¼ meters) are available in ANY IF output. (Specify IF output in order.) Specs. Noise figure 2.5 db at 50 MC; 3.0 db at 144 MC; 4.0 db at 220 MC. Gain 45 db average, image and spurious rejection—better than—70 db. IF rejection—better than 100 db. Power required—100 to 150 V at 30 ma, 6.3 V at .84 A. See PS-1 Power supply.

CB-6

Tube-type low noise, high gain converters. IF easily changed. Specify IF.

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. ..only $19.95
CB-6W—6 meter wired & tested $27.50
CB-2K—2 meter kit, 6ES8 1st rf amp., 6U8—2nd rf amp/mix. 6J6 osc. only $23.95
CB-2W—2 meters wired and tested. $33.95
Model PS-1—Matching Power Supply—plugs directly into CB-6, CE-2 and all CN units. **PS-1K—Kit .....only $10.50**
PS-1W—Wired $11.50

EASY TO UNDERSTAND AMECO BOOKS

Amateur Radio Theory Course	$3.95
Amateur License Guide	.50
Radio Operators' Lic. Guide, EL 1-2	.75
Radio Operators' Lic. Guide, EL 3....	1.75
Radio Operators' Lic. Guide, EL 4..	1.25
Amateur Log Book	.50
Radio Electronics Made Simple	1.95

CODE PRACTICE MATERIAL

Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4" speaker and can be converted to a CW monitor.

Code courses on records .....from	$ 4.95
Model CPS-Code oscillator, Kit	13.75
Model CPS-Code oscillator, Wired	14.95
Telegraph Keys .....from	1.00

Write for complete details on code courses and other ham gear.

Ameco equipment is available at all leading ham distributors.

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sunset in Feb. KØJWN reports that 6 meters was open to Arizona Feb. 17. Thanks to WØBUL for the clipping from the K.C. newspaper telling how WØOMM used ham radio to locate an eye for a cornea transplant at the U. of Kans. Medical Center. It has been reported that KØVMZ, KØUWZ, and KØGFA took long walks, 50-mile type, not mobile. WØKCG moved the operating position downstairs. Net reports for Feb: (See Jan. *QST* for frequencies and times.) C.W. nets: MON—QNI 171, QTC 142; NCSs, WØOUD 8, KØFPC 6, KØVPH 5, WØKIK 4, KØVBT 1, KØVMZ 1. SMN—QNI 23, QTC 23; WØOUD 4. MSN—QNI 42, QTC 26; KØGOB 10, KØONK 5, WNØCWV 4. Phone nets: MEN—QNI 233, QTC 99; W5ZEY/Ø 5, WØTPK 4, KØVPH 3. Mo. S.S.B.—QNI 145, QTC 27; WØECA 5, WØOMM 3. PON—QNI 290, QTC 94, WØHVJ 7, KØBWE 7, KØVIQ 4, WAØAQN 1. Traffic: (Feb.) KØVPH 190, WØTPK 169, KØFPC 156, W5ZEY/Ø 138, W5KVZ/Ø 83, KØVNB 73, KØVSH 61, WØOUD 59, KØMMR 48, WØKIK 47, KØVBT 46, KØBLJ 44, KØWNZ 35, WØMKJ 33, KØVIQ 30, WØZLN 27, WØOMM 22, WØBVL 19, WØPXE 15, WNØCWV 11, WØGBJ 8. (Jan.) KØMMR 8.

NEBRASKA—SCM, Charles E. McNeel, WØEXP—SEC: KØTSU. WØBBS is in Mercy Hospital in Denver, Colo. KØDGW, NC for the Morning Phone Net, reports QNI 467, QTC 37. WØNIK, NC for the Western Nebraska Net, reports QNI 572, QTC 448, of which 431 were WX, 100 per cent check-in: WAØAES, WØSHV, WAØAHB, KØAIE, KØBMQ, WAØBYK, WØDVB, WØFZJ, WØNIK, KØITP, WØRIH, WØWUV. WAØBES reports for WØEGQ, NC for the Emergency Phone Net, QNI 844, QTC 90. New members: W1CJP/Ø, WAØERN, WØHQZ, WØMJU, KØVTD, WØOKO, NC for the Nebraska Section C.W. Net, reports 24 sessions, QNI 125, QTC 48. WØFIG, NC for the Storm Net, reports QNI 614, QTC 8. With deepest regret we report the passing to Silent Keys of Roy E. Olmsted, ex-W9POB, from Waunetta. Traffic: WØGGP 385, WØLOD 101, WØOKO 64, WAØBYK 48, KØRRL 46, WØZJF 42, WØFIG 40, KØKJP 34, WAØBES 31, WØNIK 29, KØCYN 28, WAØBID 26, WAØAES 24, WØAHB 24, WØWUV 24, WØZHV 24, WØIAY 23, W1CJP/Ø 22, KØDGW 20, WØRIH 20, WØYFR 18, KØZEO 18, WØNOW/Ø 17, KØSBP Miñ&, KØIAL 10, WØEGQ 9, KØFRU 9, WØBOQ 8, WAØDFS 8, WØCRK 7, WØJFN 6, WØVEA 5, WØVZJ 4, WØWKP 4, KØYZP 3, KØCGM 2, KØDVI 2, KØEZY 2, WØHTA 2, KØJPP 2, WØPQP 2, WØRAM 2, KØCIW 1, WØHOP 1, WØKEK 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Robert J. O'Neil, W1FHP—SEC: W1EKJ. RM: W1KYQ. H.F. PAM: W1YBH. V.H.F. PAM: W1FHP. Traffic nets: CPN, Mon. Sat. 1800, Sun. 1000 on 3880 kc.; CN, daily at 1845 on 3640 kc.; C.V.N., Mon., Wed. and Fri. at 2030 on 145.980 Mc.; CTN, at 0900 on 3640 kc., all local times. Endorsements: W1EQV as OO, K1BEN as EC, W1FPH as OPS, K1PUG as OPS/OES, K1TKJ as OES. W1NGR gave a demonstration on a 3300-Mc. transmitter/receiver at the New Haven College ARC. The Stamford area held a three-phase bunny hunt. Those participating were K1s 1KE, LFX, OAS, VMI, RCK, TOE, PLR, QPP, ZWE, KN1ZDC, WVE and VYQ. Winners were KN1WVE and K1ZWE. Stamford High names K1GHO as new co-editor of its bulletin. Fewer OO reports were received during Feb, while constructions lists seem quite a bit higher around the v.h.f. bands. K1TGX reports for the Waterbury ARC. Meetings are held in the new quarters and new equipment is listed for K1SCN, K1OVF and K1TGX, with loads more now on 144 Mc. with converted gear. A new General Class licensee is K1VQB, who is interested in DX and good QSOs. New AREC cards were issued to K1PKQ, K1WME and W1DME. RM W1KYQ lists high QNI to K1GGG, W1CTI and W1RFJ on CN. The average was 10.7 traffic per station in 28 sessions in the month of February. Attendance is holding at the 11.9 average. W1GNS is working on traffic by RTTY. The CQRC is working on a new arrangement for the 1963 Field Day to be held June 22-23. You are reminded to send your traffic count and operator list to your SEC for point credit during the FD operations. CPN handled 228 messages with an average attendance of 20 stations. High check-ins were K1AQE, K1DGK, K1SRF, W1DAV, W1FPH, K1UQQ, W1LUH, K1PUG and W1VQH. Some difficulty in band conditions was noted by W1YBH and the various net control stations, but it should get better with the longer days in first call area. Traffic: (Feb.) W1KYQ 350, K1WKK 204, W1CTI 195, K1QPN 139, W1YBH 132, K1PQS 120, K1DCK 114, W1AW 103, W1EFW 79, W1BDI 76, K1EIR 58, W1LUH 57, K1YIX 52, W1FPH 51, W1CHR 48, K1GGG 44, K1NTR 42, W1OBR 39, K1SRF 36, K1JAD 31, K1UQQ 22, K1PUG 18, K1AQE 15, K1MBA 11, W1CHR 10, K1OJZ 8. (Jan.) W1AW 166, K1WKK 33.

(*Continued on page 134*)

BRAND NEW FROM CLEGG LABS . . . THE

POWER PACKED THOR 6

TRANSCEIVER FOR 6 METERS.

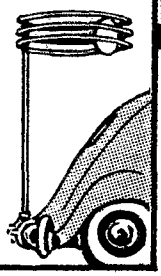
Come on up out of the noise . . . let 'em know you're around! For contests, marginal openings or just overriding the Qrm . . . your new sixty watt, VFO controlled, 100% high level modulated THOR 6 transceiver makes you the "Voice of authority" on six . . . and what's more you'll hear them too! The receiver section with its crystal lattice filter, is selective to the nth degree and so sensitive that even S1 signals are Q5. Sound good? Here's the rest of the story.

TRANSMITTER FEATURES:

- **FULL 60 watts input on phone or CW to 6883 final.**
- **BUILT-IN VFO that automatically tracks the receiver or switches to crystal control for fixed frequency operation.**
- **ALL stages broadbanded for easy QSY.**
- **SPEECH-CLIPPING FOR MAXIMUM talk power.**
- **BUILT-IN PUSH-TO-TALK.**
- **BUILT-IN Keying relay for clean chirpless keying.**

MOBILE OPERATION

Now you can run a mobile "power house" using the new Clegg Model 418 transistorized 12V DC power supply / modulator unit to power your THOR 6 transceiver.



RECEIVER FEATURES:

- **NUVISTORIZED front end for extreme sensitivity at lowest noise level.**
- **CRYSTAL lattice filter for maximum selectivity.**
- **BFO with variable carrier injection for SSB reception.**
- **ULTRA-STABLE tuneable local oscillator that also functions as VFO for transmitter.**
- **EXCELLENT audio characteristics. 2 watts into 3.2 ohm speaker.**
- **Sharp reduction in spurious responses and cross modulation.**
- **Effective noise limiter.**

The THOR 6 is of two unit construction with attractively styled receiver and transmitter rf section mounted in one cabinet for convenient desk top operation. The power supply/modulator section is mounted in a second cabinet for remote location. A ten foot interconnecting cable is provided.

Amateur net price for AC operation $349.95. 12V DC Mod./Pwr. Sup. $100.

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EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP—W1AOG, our SEC, received reports from the following ECs: W1s AAU, STX, FON, K1s MBU, ICJ, PNB. K1ONW is a new ORS. K1BTA is a Silent Key. W1EAE has a grandson, W1MEG is on 6 meters. W1FEY hopes to be on soon. April marks W1NF's 60th year as a ham. W1DMD received the first DXYZ-7 award to W1-Land, also the first Virginia Civil War award to Massachusetts. W1HIL worked some DX on 20. K1IGY is on 10. The Middlesex ARC has new members joining up. K1RHZ added 8-ft. radials to the V80 vertical antenna and worked 7 new countries. W1GDY/W1GE has a 50-year citation from OOTC. The T-9 Club met at W1MNK's. W1TJP is in Miami. The So. Eastern Mass. ARC will be on the air with 1 kw. W1JIT moved back to Boston and is working in R.I. K1MOD is in school in N.H. W1AWA and K1DGI are in Sarasota, Fla. W1IBE is on 40; he lost his 80-meter antenna. W1DBY's wife, K1MGP, is in the hospital. K1UPD's beam on 6 works FB. K1RZO has her Apache back on the air. The Chelmsford ARC meets the last Thurs. at Town Hall. W1AAR is on 2 most of the time. W1BGW is working DX. W1OOP and W1JVG spoke at the QRA. K1BUR has gone 100 per cent s.s.b. K1CBB was in the hospital. K1TCB is going to Florida. KN1WYF has a new receiver. W1s PSG, ZBE, RSW, NCT, BJE and K1VKH assisted police in a RACES drill to apprehend a tire slasher in that town. W1PEX and K1ONW made the BPL. K1ONW is NCS for 1RN on Wed. The Townsend ARC has the Punkin Hollow Traffic Net on 6 each week and joins RACES the 1st Mon. of each month. K1SGZ has a new rig for 6. W1AUQ got 6 new countries in the DX Contest and has a DX-100B. Our new 10-meter net is coming along fine with lots of interest. It is on 28,950 kc. at 8 P.M. Mon. through Fri. W1FON has a new beam for 10. W1BP is on 10. K1OFV has a Viking Valiant. K1VXB has his General Class license. W1ICC is going into the Army. K1VLB built a modulator and t.r. switch. Tewksbury HSRC, K1UFB, produced 3 new Novices. EM2MN had 20 sessions, 205 QNIs, 163 traffic. K1ZBJ and KN1ULG are checking in. K1YVB, ex-WA2WYJ, is General Class. K1DJG is active again. K1AQI and K1RWT have a new baby. The Wellesley ARS held a meeting. North Shore RC had an auction. The Framingham RC had Ed Tilton, 1HDQ, as a speaker. W1RCJ has a new s.s.b. Marauder. W1BVL gets on 20 meter c.w. some. KN1ZZX is new in Winthrop. W1BB is busy with 160-meter DX. W1DIY says he worked KH6EGL/KM6, ex-K1PLP, Midway Island, on 80-meter c.w. W1JSM worked some good DX on 2 during an aurora; also he is on 220 Mc. and building a 432-Mc. converter. New officers of the Norwood ARC are W1-UAI-K1TPW, pres.; K1QLG, vice-pres.; K1WKT, secy.; K1RVH, treas. They are going to help the Explorer Post #105. K1JME is advisor. K1QLG will be trustee. The club meets Mon. at 8 P.M. at the Norwood Fire Station. Appointments endorsed: W1IBE Rockport. W1PST Brookline, 1EIQ Bedford. K1AQI Burlington as ECs; K1DJG as OO; W1AAR as OPS. KN1-ZGI is new in Hyannis. The 6-Meter Net held 20 sessions, 343 QNIs, 54 traffic. EM75PN report 19 sessions, 180 QNIs, 91 traffic. K1RHZ won the science fair project at his high school, "A study of antenna systems." K1TDP also won with a 6-meter transmitter. Traffic: (Feb.) W1PEX 1297, K1ONW 543, W1EMG 379, W1OFK 288, W1ZSS 187, W1LES 153, K1GKA 85, W1DOM 80, W1AOG 50, K1PNB 44, W1AUQ 39, W1FON 37, K1-MYN 37, K1OFV 34, W1DIY 23, K1VXB 23, W1SIV 19, W1ICC 18, W1HGN 16, W1BKT 12, W1GEK 10, K1QNZ 9, W1OJM 8, K1VLB 8, W1ZFQ 7, K1GTX 6, K1TNL 5, K1UAB 3, K1QVU 1. (Jan.) W1EMG 286, K1QNZ 17, K1VLB 12, W1FJJ 11, W1HGN 7.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR. C.W. RM: K1IJV. PAM: K1RYT. Congratulations to our RM K1IJV, who has been named YL Editor of *QST!* She has a big job to fill and we know that she can do it. The Hampden County Radio Association is considering having club decals made up for its members. It is reported that W1RFU has moved to Chicago. RM K1-IJV reports 13 members of the WMN on deck during February. W1YXN has a new Hallicrafters HA-5 v.f.o. K1DVI, W1JTL and W1FVM are on 6-meter RTTY. K1JGW has received a fine thank-you letter from a high source for his skeds with the Antarctic. Members of the Nipmuc Emergency Radio Corps were very active in the V.H.F. Sweepstakes. I realize that this is a very short report, and I also realize whose fault that is, too. It is the fault of all of you who hold ARRL appointments and have not submitted monthly reports to me as you agreed to do at the time of your appointment. Failure to conform to that agreement is grounds for cancellation of appointments. Come on, gang, get on the ball! Reports from any who do not hold ARRL appointments are always welcome, too. Traffic: K1SSH 221, K1LBB 164, K1IJV 158, W1BVR 88, W1ZPB 42, W1DVW 38, K1ZBN 15, K1VPN 2.

(Continued on page 136)

NEW HAMPSHIRE—SCM, Albert F. Haworth, W1YHI—SEC: W1TNO. PAM: K1NXV. RM: K1BCS. The GSPN meets Mon. through Fri. at 2330Z and Sun. at 1430Z on 3842 kc. CNEW meets Mon. through Sat. at 1130Z on 3842 kc. NHN (c.w.) meets Mon. through Sat. at 2330Z on 3685 kc. Note the change of time of the Granite State Phone Net. Appointments: K1BGI as OPS; K1TMD as ORS. Cancelled: K1BGI as OBS. Ken's services will be missed but his full time as OPS will make up for this loss. Congratulations to K1BCS on having qualified for the Brass Pounders League for three months. W1ELH reports that KN1ZDZ and KN1-ZEP are new operators in the Manchester area. The Dartmouth Radio Association, W1ET, meets in Wilder Lab, Hanover, every other Thurs. of the month at 7:30 P.M. Officers are WA6DFF, pres.; K7APJ, vice-pres.; K1KQC, secy.; WA2LCZ, treas. K1AEG made an FB score in the CD Party. The Midstate Amateur Radio Assn. meets at Old RR Station, Lakeport, the second Tue. with W1YHE, pres.; K1OIZ, vice-pres.; K1NXV, secy.; K1NZJ, treas.; W1BST, activities. Let's have more reports of activities. Traffic: K1BCS 719, K1TMD 68, W1CUE 28.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE. RM: W1SMU. PAM: W1TXL. RISPN reports 28 sessions, 685 QNI, 165 traffic. New appointment: W1LSP as West Bay Area EC. The W1DDD Club of Woonsocket announces that it is publishing its club bulletin once more and it is available to other clubs in New England upon request. W1AUT, the club president announced, that New England Director Chaffee would visit the club. The NCRC of Newport issued NCRC certificates to the following stations who worked 5 NCRC members: K1s YBR, JOD, JOA, SXY. The certificates were issued by W1WLG, chairman of the committee. Visiting hams are always welcome at the club. The SEC says that if you want to join the AREC program, contact him at once. AREC drills are being held and W1YNE would like interested hams to join the program. K1TPK has constructed a seven-element Long John antenna for his station. K1LII is back on the air with a new 6-meter antenna. The W1AQ Club of Rumford will run a Ham and Bean Supper in May. Tickets may be obtained from K1LII or any club member. Traffic: W1TXL 797, K1TPK 37, K1NJT 32, K1-DZX 26, K1GRC 18, K1SXY 17, W1YNE 8.

VERMONT—SCM, Mrs. Harriet Proctor, W1EIB—SEC: K1DQB. K1HGY now works in Bridgeport, Conn., and will be moving there from Brandon. W1AD has been in the hospital again and we all hope for a speedy improvement. W1VSA is state director and is working to build up Air Force MARS. W1UED, of ARRL Hq., attended the CVARC Family Supper. K1-VID has been administering amateur tests to Putney students. K1JTM has left for Great Lakes Naval Training Center. W1NDL is handling theory classes, with code being handled by W1OAK and W1FRT. FD comes only once a year and deserves a real effort by amateur groups. The Middlebury M&K Club challenges Vermont groups to really scratch gravel and come up with the top score. How about more traffic reports? Traffic: K1YID 47, W1KJG 39.

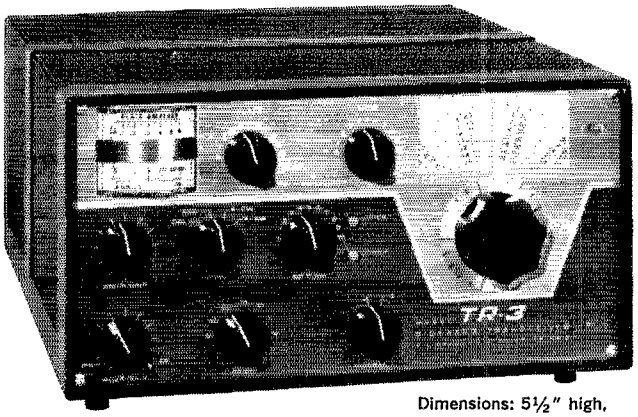
NORTHWESTERN DIVISION

ALASKA—SCM, Kenneth E. Koestler, KL7BZO—OOs: KL7BJW and KL7AQU. EC: KL7CUK. Asst. Ecs: KL7DRW and KL7DGA. Many of the 2-meter net members are now AREC members with new amateurs joining every day. The RACES Net meets Mon., Wed. and Fri. at 7 P.M. AST on 145.3 Mc. RACES and AREC members now have a relay station on a 4800-ft. elevation 40 miles from Anchorage and cover more than 2500 square miles for us. The dog races were a big success with the help of the radio amateurs of Alaska with many point-to-point Relay stations along the 25-mile trail. Code practice is given on 3995 kc. with KL7BJD as m.c. Mon. through Fri. KL7AQU and Dottie were hitched so now Dennis is no longer free and lonesome. Dennis is chief engineer for KFQD. KL7AN has more than 52 years as an amateur. Bill and Rose KL7ZR will be leaving Alaska for Portland, Ore., after 23 years in Alaska with the FAA. WL7EBK has a new rig, a 32S-3 and a 75S-3. KL7ALA has a new home-brew 2-meter 48-element antenna and works KL7IS and is trying to make Fairbanks contacts. KL7DDM also has a 20-element Telrex 2-meter antenna with a three-element 20-meter Telrex at his new home. Gale and Dennis are putting on a couple of 4-1000s with KL7BJW putting up a new 150-ft. tower with home-brew 20-meter four-element and 40 meter three-element antennas atop of it. KL7MF passed the 200 country mark and is reaching for 500 CHC awards. Traffic: KL7BZO 6.

IDAHO—SCM, Mrs. Helen M. Maillet, W7GGV—The FARM Net meets at 1900 MST on 3935 kc. M-F.

(Continued on page 138)

DRAKE MODEL TR-3 SIDEBAND TRANSCEIVER



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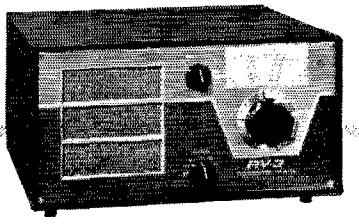

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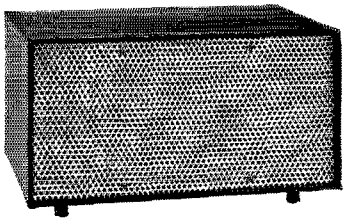

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The Gem State Net meets daily at 2000 MST on 3580 kc. TEN meets Sun. at 0900 MST on 3910 kc. Boise Valley 2-Meter Net meets Sun. at 1930 MST on 145.44 Mc. New OOs are K7SKS and W7ZLO. The U. of I. club station, W7UQ, has been reactivated and new officers are: K7DAS, prexy; KN7QNJ, veep; W7EWM, secy.; K7BUY, act. mgr. Floods in eastern Idaho activated AREC members W7s BDL, DWE, GCO, GGV, IST; K7s CXP, GQE, MMA and KN7VFI. The C.D. exercise "Forward Pass" activated W7s CRE, DHL, DUP, EVP, GGV, NJU, RKI; K7s CLK, DMY, LLS, OVG, PDW, RSZ, SKR. K7PLX won a Navy Cruise at the Science Fair displaying a mutiple-base slide rule. K7-PLU won on the Jr. High School level with an RTTY exhibit. The Magic Valley Club has 10 members on 2 meters. W7EMT is moving to Boise. FARM Net traffic 42. Gem State traffic 46. Traffic: W7EMT 63, K7HLR 38, W7GGV 34, K7KBY 24, W7MJZ 11, W7IY 6, K7SJM 6, K7OAB 1.

MONTANA—SCM, Walter R. Marten, W7KUH—SEC: W7UPR. PAM: W7YHS. RM: K7AEZ. The Mont. Phone Net meets Mon., Wed., Fri. at 3910 kc. at 1800. Code practice is given by K7OGF Mon., Wed., Fri. on 3825 kc. at 1900. Officers of the Electric City Radio Amateurs of Great Falls are K7DGR, pres.; W7FGZ, vice-pres.; K7PQM, 1st vice-pres.; W7NWC, 2nd vice-pres.; K7BYB, secy.-treas.; K7JKZ, asst. secy.-treas.; K7JXL, W7WYG, W7JVN, K7GLS, K7-IOA, dir.; W7WYG, pro. dir.; W7KUH, pub. dir. Officers of the Glacier Radio Club of Columbia Falls are K7MGX, pres.; K7UAZ, vice-pres.; K7DCI, secy.-treas. New calls in Columbia Falls are KN7VPS and K7TAP. K7CTI participated in the 160-Meter C.W. Test and worked 33 countries. Laurel Radio Club's new officers are K7ELW, pres.; K7JAT, vice-pres.; K7MYH, secy.; K7JBH, pro. chmn. A new call in Laurel is KN7VZC. W7ZYQ, W7LBK and W7SMY are working 2 meters between Billings and Laurel. K7JBH and W7LBK are active on MARS RTTY. K7MOW and K7ELW have a new Mauraander. K7KJS has a new 2B and K7PGN has a new HT-40. We are saddened by the passing of W7YQZ. K7BON has a new 10-B. W7TNJ is on with new HT-37. A new call in Bozeman is KN7-VTT. Congratulations to W7ZHA, who has new baby daughter. K7EWZ worked CX6 on 10 meters in the ARRL C.W. DX Test. New hams in Billings, products of K7OGF's code classes are KN7VZC, KN7VSS and KN7VXR. K7OGF is on mobile s.s.b. with a new Heath. The Yellowstone Radio Club has started new code and theory classes. OO notices sent during Feb.: K7OGF 24, W7FIS 11, K7VMJ 1. K7VMJ is building a deluxe frequency standard. New officers of the Capitol City Radio Club (W7TCK) are K7KLF, pres.; K7-ACT, vice-pres.; K7RXO, secy.-treas. The following members of the Capitol City Radio Club had a round table meeting on 75-meter phone: K7KME, K7FRI, W7BIS, K7ACT, K7PFQ, K7RXO, K7PFQ, K7KLF, W7VHA, W7BLD, W7UWY, W7JZW, W7HIZ, KØ-YAB/7, W7CBY, K7PGO. W7IPB has a sideband exiter on order. W7WVL is running an ART-13 from Deer Lodge. W7COH also is on with an ART-13. W7UPR visited K7MUM in Missoula. On 2 meters in Missoula are W7JIZ, W7NEG, K7CVK, K7IMZ, W7PDE. W7FIS and W7NEG purchased two low-frequency transmitters (TMH). K7NEG is operating RTTY. K7ELW is back from the hospital. K7KJS has a new 2B Drake. K7OGF made the OO Honor Roll for 1962. KN7UPH took the Conditional Class exam. KN7VSS and KN7-VYS are piling up QSL cards. WØDGB/7 moved to Hysham from Nebr. W7BMI is sponsoring a 4-H club for prospective radio hams. W7BGX and W7BMI are putting together a tape on radio theory to be used in teaching the blind. K7IOA has AREC meetings at his home. W7KUH attended radar school in Ft. Worth. Director W7CPY returned to Montana in April. Traffic: K7EWZ 118, K7OGF 47, W7SFK 14, W7TYN 7, K7TCI 5, W7OIO 1.

OREGON—SCM, Everett H. France, W7AJN—SEC: W7WKP. RM: W7ZFH. New appointments: W7ZFH as RM, W7YG as OO class III-IV, W7KTG as OPS. Endorsements: W7RVN as EC and OPS, W7ZFH, manager of OSN, reports sessions 19, total attendance 162, traffic 53, BRAT awards to W7AJN, W7ZFH, K7DYY and K7IWD, W7BNS, Columbia County EC, has been appointed CD Director for that county. He reports his two sons are hams with the calls K7KSM and KN7-VWG. W7DEM reports that K7PMB, with a DX-100, is keeping skeds with K7BZP/5 in Tulsa, Okla., on 15 meters; W7SUC is teaching code to the National Guard Group in Grants Pass and also is on 2 meters using c.d. gear but will have a Heath Twoer on soon. K7IWD still is very busy with OO work and RN7 and PAN activities. W7RVN, Multnomah County EC, reports a total of 56 AREC members and with his 6 assistants everything is shaping up very nicely. W7-

(*Continued on page 140*)

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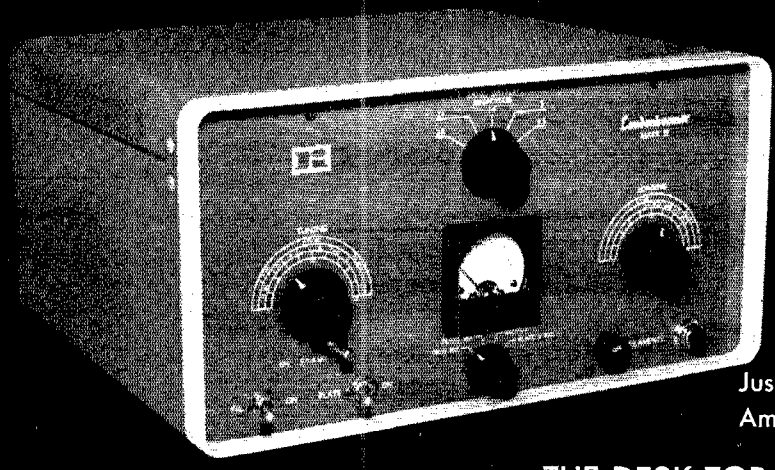

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BNS, Columbia County EC, reports 12 members with 1 assistant in his small area. At the regular monthly meeting of the Portland Area AREC there was a large attendance to hear Major Hoppel of the Air Search and Rescue Squadron. The Major gave a very interesting talk on communications. Well, gang, thanks for your reports. Traffic: K7IWD 247, W7ZFH 77, W7DEM 14, W7AJN 12, W7BVH 10, W7MAO 3, W7KTG 2.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—Asst. SCM/SEC: Everett E. Young, W7HMQ. RM: W7AIB. PAM: W7LFA. V.H.F. PAM: Open. New officers of the Valley Amateur Radio Club are W7RMI, pres.; W7SLB, vice-pres.; K7DQV, treas.; K7CZA, secy. The Radio Club of Tacoma had a very interesting spread in the Feb. 17th *Tacoma News Tribune* regarding its activity in the AREC and c.d. W7EQU, W7UOJ, W7OHI, W7ULL, W7ZIC, K7BEO and K7CTS are operating 2-meter RTTY in the Spokane Area. W7IST has purchased an NC-300. K7CTO, K7ETW, K7BLW and K7JLT were home on vacation from college. The Walla Walla gang is making the 10-meter band QRL in the area. W7NSU is QRL wiring the hamshack. W7GVC reports 113 Pea Picker certificates have been issued as of this date. W7BOE joined the ranks of Silent Keys. The Rodeo City Radio Club of Ellensburg sponsored a get-together of the Northwest Weather Net Mar. 30 and 31 at Ellensburg. The WSN had 19 sessions, 154 QNIs, 47 QTCs in January. W7MCU, W7-JJK, W7SLB and K7PIY are operating RTTY a.f.s.k. on 2 meters in the Puyallup area. W7MII, KN7SUR, KN7SUQ, K7KNZ and W7SAP, all of the Vancouver area on RTTY, are QRL building gear. K7GBW is recovering from an attack of hepatitis. K7GPJ has been granted a scholarship to the Massachusetts Institute of Technology. New officers of the Lewis County Amateur Radio Club are K7KTS, pres.; K7PWH, vice-pres.; K7MQP, secy.-treas. W7PXA and W7ETD are planning on a 60-ft. crank-up tower. K1RFX/7 uses a G-76 as a fixed rig. K7NBU has a new transmitter. K6PPU/7 will be operating soon from the Fort Lewis area. The Northwest Slow Speed Net now meets at 1930 PST on 3700 kc. and had 25 sessions, 172 QNIs and 37 QTCs in February. New appointments include K7DQV and W7ZTG as ECs and K7IEY and K7NHG as ORSs. W7CZY sends Official Bulletins on RTTY on 3637 kc. Mon. through Thurs. at 0500. K7AJT is giving the Saturday Phone Net boys instructions on the art of traffic-handling. K7JRE worked Wisconsin on 40 meters with 5 watts. K7PIN has a new high-gain 6-meter beam and channel master rotor. K7IGN is waiting for a new Mosley TA-36. K7PIG has a new Mosley TA-33. Don't forget the Bremerton Hamfest. K7DCJ and K7PVJ are doing excellent jobs printing *Parasite*, official bulletin of WARTS, the Washington Amateur Radio Traffic System. K7KUG is on with a new Marauder. KN7VSN is a new Novice in the Seattle area. W7UJA reports Asotin County is active on 50.250 Mc. and 80 through 10 meters. The NARCS Six F.M. gang assisted in the search and rescue of a local business man lost in Olympic Forest. Traffic: W7BA 816, W7DZX 571, K7JHA 238, W7APS 200, W7GIP 105, K7CTP 48, W7-AMIC 21, K7JRE 16, W7AIB 12, W7BTB 12, K7PIG 12, W7JC 4, W7RGL 1.

PACIFIC DIVISION

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: W7JU. The Silver Dollar Nets are on 3980 kc. at 1900Z Sun. and 29.6 Mc. at 0300Z Thurs. The Over The Hill Net is on 145.8 Mc. at 1400Z Wed. K7LBQ, Las Vegas High School Electronics instructor, is conducting an electronics course on transmitters two nights a week. W7KMF reports good DX on 40-meter c.w. K7KBH's shore leave has expired but he made the BPL before shipping out. K7GQD has new antennas on 80 and 40 meters. K7QPK is building an RTTY TU for the club station. K7HYP. The Las Vegas Radio Amateur Club's new officers are K7RLX, pres.; W7-VYC, vice-pres.; W7OYQ, secy.; K7PFX, treas.; W7-FJN, act. mgr.; W7OHQ, editor of *News Letter*; W7-ORR, publicity. With seventy-five members the club is getting off to a fine start and should have its station on the air by now. K7TKS has a good signal with the new 80-meter dipole. W7BVZ is looking for a station to work in Esmeralda County, Nev. Traffic: K7KBN 529, K7GQD 24, W7PEV 6, W7QPK 4.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM: Edward T. Turner, W6NVO. SEC: WA6EIC. RM: K6KCB. PAM: WA6HVN. We welcome back W6PLG as ORS. Clem, former PAN mgr., has been away on company business and now is back operating on NCN. A section Sunday morning breakfast meeting was held in Los Gatos with 18 section members present. W6RSY and K6GZ again hit the BPL column and report conditions on 80 are much better. The SCARS C.D. Net is now on 80-meter c.w.

(*Continued on page 142*)

1963 EDITION

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with a net, according to ORS/EC W6DEF. W6ASH reports working VR30 and KH6EGL/KM6 on 160 meters. W6AUC is on 20-meter phone. W6YHM spends much time flying and now copies weather information with a BC-453. The SCCARA enjoyed a talk on lasers by John Terry in March and is busy making plans for FD. W6RFF plans to be back active with NCN now that he has an inverted "V" in operation. WA6HRS is back in full swing with bulletins. W6ZRJ transmits Bulletins on 3635 Mon., Wed. and week ends at 0500Z with tape-keyed transmission. W6VQK is active on MTN and is busy building equipment for 2 meters. W6MMG plans to work the section 2-meter net. SCVSN. K6EQE reports great difficulty copying signals on 75 meters because of long-skip QRM. WA6OLQ is QRL trying to be president of Junior Statesmen. The San Benito County High School Radio Club in Hollister is very active at its station, WB6BYQ. The SCARS held a successful auction in January. Traffic: W6RSY 731, K6GIZ 290, W6AIT 55, W6DEF 48, W6ASH 46, W6AUC 43, W6HIC 40, W6PLG 36, W6YHM 36, W6UW 33, K6YKG 22, W6RFF 21, W6ZRJ 16, W6OH 11, K6VQK 5.

EAST BAY—SCM, B. W. Southwell, W6OJW—KH6ERG is a newcomer to the section. K6GK is still a mainstay on UTL. WA6MJP cornered a couple of new ones in the DX Test. The Miramonte RC, K6KGD, got a Comanche Receiver. WA6WLE got rid of the chirp and is working on the Kw. rig. WA6KJZ got HTH-100, QRP-50, is working on his QCWA certificate and was nominated for the tops C.W. Club. K6GK says 3.5 and 7-Mc traffic frequencies are full of QRM. WA6YES, the XYL of WA6YET, got her General. WA6VAT has a DXCC score of 45/24 and got 5N2ACB for WAC. The Richmond ARC is conducting a code and theory class weekly at the school for the blind on Berkeley. Walnut Creek area has a 10-Meter Net going on 28,690 kc. at 8 P.M., Mon. with W6WFR, WA6MIE, K6ZYZ, WA6JCD, W6LTI, K6OSO, W6CGS, W6LGW, and W6QEN. WA6MIE has a new KWM-2. W6LGW is chairman of the TVI committee of the MDARC. W6NOP is RACES officer for the Napa area and the Napa C.D. area is using his call during exercises. K6RZR is Asst. EC for Napa County. The Silverado Six Shooters Net is on 50.4 Mc. Tue. at 9 P.M. Contra Costa County RACES groups were activated during flood conditions with WA6MIE, W7QOH, WA6FBS, K6ZYZ, WA6JCD, W6IDW, WA6QAZ, K6DEL, K6SAS, K6POR, WA6KUF, WA6LUU, W6LKE, W6LGW, K6MGM, K6IRB, W6IT, WA6NFF, W6FDP, W6NBS K6JPR, W6QEN, K6IMV, WA6DKG, K6DX, K6POU and W6PIR taking part. RTTY bulletins are put out on 3620, 146.475 at 7:15 PST Thurs., K6ESZ; 14090, 4 P.M. PST, W6YJG, 3620 4 P.M. PST, W6YJG, respectively. The NCARTS board of directors held its Feb. meeting at W6ZVV's on Feb. 8. AD6OLF has a model 15 Reperforator. WA6GAW is on 144 Mc. WA6QZA and his XYL, WA6PTU, are on RTTY. W6WOC has a new transistor printed circuit board on RTTY. K6SEX is portable Ø. school. K6OXK gave a talk on test equipment as used with receiver alignment at the ORC meeting. WA6BKM, WA6QZA and WA6PTU are mobile on s.s.b. W6ELW was worked by ye SCM on s.s.b. with his flea power. W6MNK has retired from the Naval Air Station, Alameda. K6KQD is expert on bridge (game). W6FQE had a heart attack. WA6KLL was on TV Feb. 16 as a result of WA6ODP winning a place in the 1962 FD. W6TXY is building a kw. for the next Oscar exercise. The Lark held a pot-luck supper Feb. 2 in Livermore. The Silverado Amateur Radio Society is getting its FD setup lined up. W6NOP bakes a mean cake, so we hear from the Silverado club. WA6YLR is going on 50 Mc. K6LYG is out of the hospital and feeling better. WA6NXC has a new job with Western Electric. WN6CTZ and WV6ZXU worked in the Novice Roundup. WA6VPH and WN6ASV passed the General Class exam. W6RUZ, W6ICU and W6LGW were made lifetime members of the MDARC. WN6FDZ (YL) is a new novice in the MDARC. 23 Mobiles are active in the Diablo Valley area. Traffic: (Feb.) WA6RGD 164. K6GK 130. W7QOH/6 28, WA6MIE 19. WA6WLE 3. (Jan.) K6GK 150.

SAN FRANCISCO—SCM, Wilbur E. Bachman, W6BIP—K6NCG, Naval School Command Amateur Radio Station at Treasure Island, participated in the '63 ARRL Contest and managed to log a few new countries. The station is awaiting erection of a new 100-ft. tower and will then use the present 40-ft. tower to support an eight-element 6-meter beam. The Marin Radio Club was host to the Central Calif. Radio Council in March. WA6VME is looking for a tower. New calls in the club are WN6CIE and WN6CCE. W6GFB has a new 65-ft. crank-up tower and is hoping to improve his 300-plus in DXCC competition. WA6AUD had a complaint at his planning commission when neighbors objected to his 50-ft. tower but when the commission checked they granted him permission to install and suggested that the neighbor who complained

(*Continued on page 144*)

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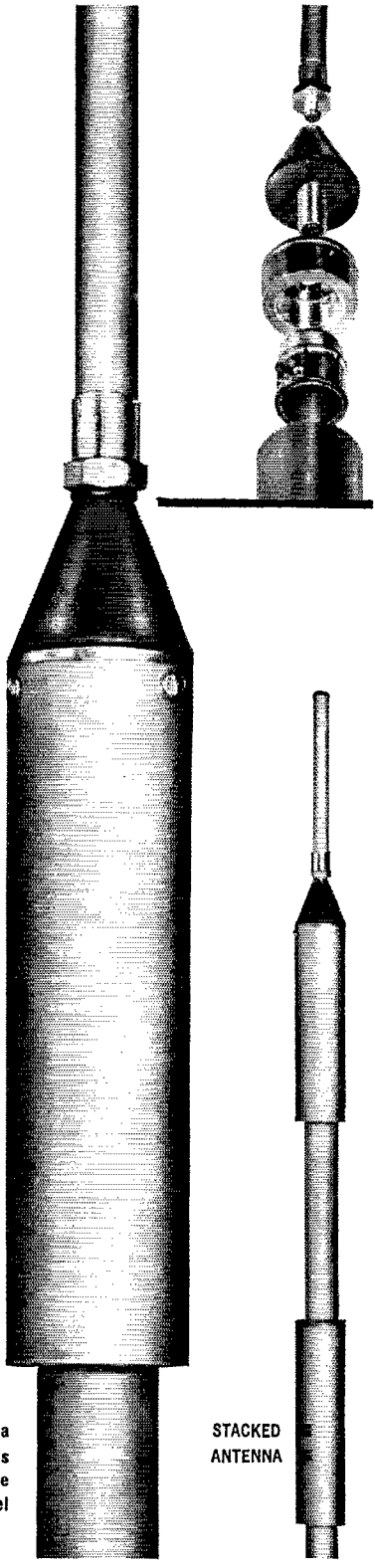

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clean up his own back yard. The S.F. Club held its annual March auction with visitors from the surrounding area clubs attending. The HAMS had a meeting one week earlier than usual and had a big attendance. W6TBV, program director of the Tamalpais club, has lined up several guest speakers for future meetings. Feb. guests were members of the Marin Co. Sheriff's Office. K6ZCR, Claire, is now a USAL nurse and holds a MARS call at Lackland AF Base, San Antonio. The Central Calif. Radio Council, with W6KZF as editor, now issues a monthly news bulletin, *CCRC Circle*. The BAYLARC Club held a Valentine Party in February. At the "Sweetheart Party" many out-of-the-ordinary games were played and enjoyed. Hamshack love lyrics, composed by W6BDE, Esther, were sung by the group. A special "Boylarc Award" was presented to W6UDL for his help to the club during the past year. WA6LIZ showed a scrap book of the latest club activities and LIZ also was the winner of the club's plaque for the year. W6KZF, EC reports the AREC celebrated its 11th anniversary last Feb. Tune in on 3900 kc. Sun. at 10:30 A.M. Keep your local emergency net in liaison with the AREC. W6OPL is using a new 80/40 Telrex inverted "V" for 40/80 contests with excellant results using 100 wt. W6GZA has participated in his 40th consecutive FMT and D and still is active in AF MARS. WA6ABR, W6EQA's son, completed the Navy Electronic School work T.I. is now stationed at New London, Conn. W6BYS says the ship *Hope* will be going to N.Y. soon. W6QMO, Jeri, is in Mary's Help Hospital after surgery. Latest reports show she is now doing nicely. W6KVQ reports the Mendecian County Club meets Fri. nights on phone. W6BIP worked in the first half of the DX Contest. Traffic: W6OPL 230, K6IWJ 61, WA6QXV 31, W6GGC 18, W6BYS 16, W6PZE 5, W6KVQ 3, W6BIP 2, W6FDU 2.

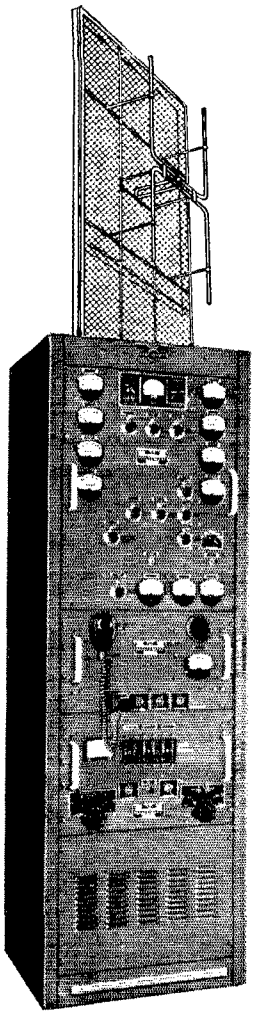
SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—It is not too late to send in your reservations for the Pacific Division ARRL Convention, which will be held May 18-19, 1963, the Town and Country Lodge on Hiway 99 in Fresno. The tariff is $6.50 and the main prize is an SBE-33. Send in your reservations to the Fresno Amateur Radio Club, P.O. Box 783, Fresno, Calif. K6OZL has a 200-V and a Drake 2B on 20-meter s.s.b. W6OBQ is on 20-meter s.s.b. chasing DX. WA6ESH has a new TA-33 Jr. beam and is pleased with it. The Six-Meter MARS Net is now RTTY and meets every Tue. at 8 P.M. K6UDX has a six-element 6-meter beam. W6JPS sends code on 50.5 Mc. every evening for those who want to polish up on c.w. WA6YPF has a Globe King 500 and a 75-A1 receiver. WA6DRH burned out a relay in his 6-meter Seneca. K6LKJ is looking at a triband transceiver. W6ZFN is on 20-meter RTTY. The SJVN Net had 662 check-ins, 20 traffic, 67 contacts, 5 QST, 11 bulletins and one emergency traffic. WA6YZA handled 76 pieces of traffic. W6CUA is net manager of the Sketo Net. K6MHH is back from the service and is on 40-meter c.w. K6MFB is now located in San Jose. W6JPS is building up a mobile 75- and 7-meter rig. W6NKZ is building up a g.g. final using a pair of 6JB6 tubes. Don't forget that the Fresno Amateur Radio Club meets the 2nd Fri. of each month on the 10th floor of the PGE Building. Traffic: (Feb.) WA6ESH 43, W6ARE 20, W6EFB 12. (Jan.) W6EFB 17.

ROANOKE DIVISION

NORTH CAROLINA—SCM, N. J. Boruch, W4CH—SEC: W4MFK. RM: K4CPX. V.H.F. PAM: W4ACY. The v.h.f. meeting held at Lexington was very well attended, as reported by W4MFK, W5ACY and K4YYJ. A program on s.s.b. v.h.f. was well presented by W4OAB, W4BUZ and W4URS. An excellent write-up in the *High Point Enterprise* entitled, "CD Radio Exercise is Success," was sent in by W4COJ, who is coordinator of the High Point RACES Net. W4CPI, former EC, is now secy. of the Forsyth Radio Club in Winston-Salem. The Greensboro Radio Club's new call is W4GG. Congratulations to the newly-organized Lumber River Radio League, whose pres. is W4NHV; training chairman is W4EVN. K4WOD also reported the newly-organized Cape Fear Amateur Radio Club in the Fayetteville area. Official Bulletins were transmitted per sked by W4BAW, W4BUZ, W4COJ, K4QFV and K4SWN. OO reports were received from WA4FJM and W4FUI. There were no outstanding 50-Mc. openings observed by OESs WA4JOS, K4WOD, W4OAB and K4YYJ. New appointees: K4TSW, WA4CJV, W4VGQ and W4WAK as ECs; WA2WBA/4 and W4EJQ as ORSs; WA4IER and W4FDO as OESs. K4TSM, EC, got an excellent press on his plans for emergency communications coverage at Mechlenburg. Traffic: WA2-WBA/4 179, W4PCN 149, WA4FJM 130, K4QFV 109, W4LWZ 65, WA4ANH 51, W4EJP/4 40, K4YCL 35, W4EVN 28, W4COJ 22, W4BAW 20, W4EJQ/4 20, K4-IEX/4 20, WA4EYA 12, WA4GEU 12, K4MPE 12, K4-TPK 2.

(Continued on page 146)

AEROCOM PRESENTS VHF AM TRANSMITTERS and RECEIVERS



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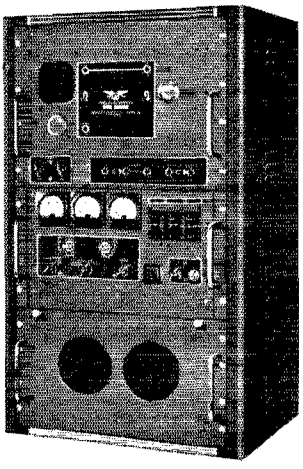

Model VH-200—200 Watts output in range 118-132 mc. Excellent for both point-to-point and ground-to-air communications. Press-to-talk and audio input may be remoted using single pair of telephone lines. Power requirements 105-120V 50/60 cycles. Also available for use above 132 mc; output drops gradually to 150 watts at 165 mc.

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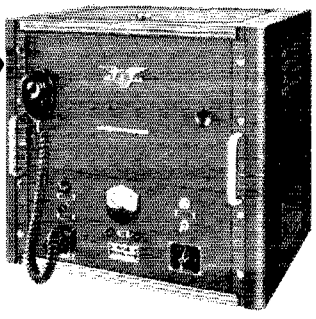

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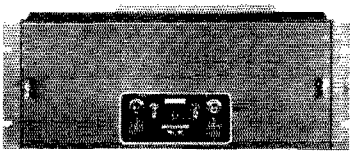

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SOUTH CAROLINA—SCM, Lee F. Worthington, K4HDX—SEC: W4BCZ. A. M. PAM: K4KCO. S.S.B. PAM: K4JOQ. RM: W4PED. Nets: C.W., 1900 and 2200 EST 3795 kc.; S.S.B., 1900 EST 3914 kc.; A.M., 1900 EST 3930 kc.; AREC S.S.B., 1830 EST 3914 kc. Wed. New appointments: WA4BSO, K4VWL, W4SME, K4JMV as ECs. WA4CAW was awarded a Section Net certificate. The c.w. gang wishes a speedy recovery to W4AKC, Roanoke Division Vice-Director, who has had an extended illness. The State Radio Council held a very successful meeting in Columbia on Feb. 17 called by Chairman K4HDX. New officers elected at this meeting were W4PED, vice-chairman; K4LNO secy.; K4FYS, treas.; K4JMV, delegate to the executive committee; K4BMI, editor of the new statewide paper, *SCARAB*. A permanent "S.C. Field Day Award" will be presented by the Council each year. Read *SCARAB* for details. Subscriptions are $1.00 per year from K4BMI, Bill King, Box 488, Bishopville, S.C. Net traffic: C.W. 95, S.S.B. 83. Traffic: K4WJR 132, K4LND 119, K4WOI 49, W4PED 29, K4VWL 22, K4HDX 21, K4OCU 11, K4YFK 11, K4PJW 9.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—W4PFC reports another FB month with a nice traffic total. W4NTR has his KWS-1 operating and submits for his 12th consecutive BPL! K4SGQ is fooling around with various dipoles and broadcast radios. W4RHA reports a temporary slump and K4WVT's activity was hampered by schoolwork. K4BAV gave a well-received talk at the Alexandria Radio Club on VSN, NTS and QN sigs. W4DLA has taken on another new job as NCS of EAN as well as a 2nd TCC assignment! W4CVO still is on the go with world travels visiting Brazil, Trinidad, Surinam and Panama. OO K4PXY sends in a traffic report of 1025! W4BGP and XYL WA4BVE are busy on the air. Contest man W4JUJ still is working 'em as well as new DX and finds time for traffic besides. K4YDL is rebuilding the rig. W4PTR now has antenna tuners for each band. W4ZM is using an HX-50 and trying out 160 meters. K4QIX reports on a very successful Fairfax Co. mobile hunt on 29.1 mc. W4WBC suggests strongly that all Heath Marauder owners read "Stray" on page 11 of Dec. 1962 *QST* and avoid a notice of violation! The PVRC went for a full sweep in wins in the SS, CADX and ARRL DX Contest. W4TE completed a new table-top operating desk, rewiring controls and antenna. K4GZR is enjoying traffic work and WA4GWD, at Cape Charles, is pleased with his OPS appointment. Business and outside commitments keep K4IIP "hawgtied." W4NVX designed and built a new linear amplifier. WA4JFY's rebuilt 811 final is functioning FB. K4AL is off on a vacation. We're very sorry to lose the services of W4FOR as OO, ORS and EC. We wish him the best in his new West Coast assignment. Traffic: (Feb.) W4PFC 2736, K4PXY 1025, W4DLA 435, W4FOR 352, W4NTR 331, W4DVT 222, W4RHA 190, W4LK 112, K4ITV 110, WA4JFY 109, K4FSS 100, W4PTR 69, WA4GWD 64, W4IA 62, K4PQL 60, K4AL 38, K4SDS 33, W4ZM 28, K4GRZ 25, W4BGP 21, W4TE 17, K4BAV 14, K4WVT 13, W4LRN 12, K4MXF 12, K4JYL 11, W4NVX 11, K4QIX 10, W4SHJ 10, W4ZAU 10, K4LTK 8, K4SGQ 8, W4KX 7, W4JUJ 6, WA4BVE 4, K4YZT 4, W4WBC 2. (Jan.) W4WDZ 66, W4ZM 24, K4AL 20, K4IIP 3, K4DCN 2.

WEST VIRGINIA QSO PARTY

May 3-5

The Mountainer Amateur Radio Association will sponsor a W. Va. QSO Party from 2200 GMT May 3 to 2359 GMT May 5. The contest is open to all West Virginia amateurs and all others who have held calls in W. Va. in the past. Only these contacts may be counted for awards. However, stations interested in working W. Va. for county contacts should check 3570 and 3890 and 3903 kc. There are no power or band limitations and the same station may be worked on different bands for credit. C.w.-to-phone QSOs are allowed but cross-band contacts are not permitted. Score 2 points for each completed contact, exchanging the following information and submitting it with your logs: date; call; time; city, county. When contacting stations outside of W. Va., obtain the ex-call of the former W. Va. station. Mobiles operating in more than one county may be worked once in each county by a fixed station. Each contact with stations in Morgan, Hardy, Doddridge counties will count 6 points or a complete exchange. Multiply the final score by the number of countries worked. Awards for first and second place. To be eligible, logs must be postmarked not later than May 25 and mailed to MARA, Box 909, Fairmont, W. Va.

(*Continued on page 148*)

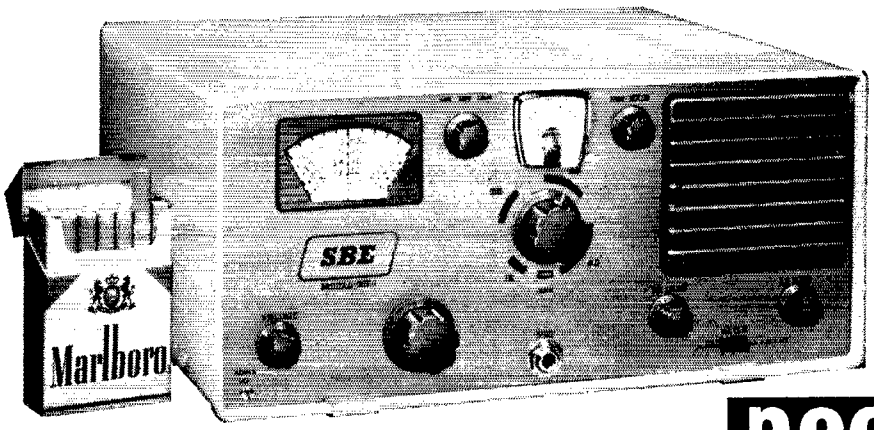
SB 33

"BILATERAL"

Transistorized Circuitry

KEY FEATURE IN THE BIG SB-33 VALUE

Bilateral! Space-age word, key to one of the biggest SSB transceiver values ever! Exclusive SSB Bilateral amplifiers and mixers (pats. appd. for) operate in two directions—avoid needlessly-idle stages in either transmit or receive. This eliminates a boxful of components —simplifies wiring—reduces equipment size—provides savings in cost that reflect in a lower selling price. **There is no compromise!** The compact SB-33 package includes **everything** essential for the brightest state-of-the-art SSB performance—features a **Collins mechanical filter that is used in both transmit and receive!** And add—as further cost-reducing innovations, new SBE overtone techniques for a unit using only three quartz crystals! Advanced solid-state techniques are skillfully applied throughout SB-33 to take full advantage of lower power consumption and superior heat rise properties of transistors and diodes. Equipment is more effective—smaller in size. Stability is inherent, VFO drift extremely low. Both VFO and I-F are gang-tuned on the nose. No critical bandpass circuits.



4-Bands: 80-40-20-15 meters.

Power input: 135 watts P.E.P. maximum (speech waveform).

Receiver sensitivity: Better than 1 uV for 10 db signal/noise ratio.

Sideband selection: Upper or lower sideband selectable by panel switch without change in frequency.

Tube and semiconductor complement:
2—PL-500 beam power tetrodes.
1—12DQ7 driver. 20 transistors.
13 diodes, 1 zener diode.

Power supply: Built in 115VAC supply.

Loudspeaker: Built-in.

Size: 5½"H, 11¾"W, 10¼"D. 15 lbs.

389.50

SB-33 Special inverter, 12V DC/115V AC 59.50

SB-33 Deluxe VOX/Compressor 39.50

SB-33 100 Kc crystal calibrator 27.50

SB-33 Mobile mounting base, locking type 12.50

SB-33 Carrying case, luggage type w/accessory compartment 29.50

SB-33 accessory adaptor for rear of transceiver 1.95

Faust Gonsett, W6VR, Pres.

SBE Sideband Engineers Inc. Rancho Santa Fe, Calif.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. RM: K8HID. PAM: K8CFT. West Virginia nets: C.w. 3570 at 0000; a.m. phone, 3890 kc. at 2330; s.s.b., 3903 kc. at 0100. Centennial Contests are going swell. Watch for the West Va. QSO Party. Worked West Virginia and the V.H.F. QSO Party. Those registering before June 1 for the State Convention at Jackson's Mill, July 6 and 7, will be eligible for an additional grand prize. K8HID, K8CNB and W8HZA operated from rate counties on c.w. during the Centennial QSO Party. K8TPF is quite active on WVN Phone, PON Phone and C.W. Nets. W8KEG holds daily code practice on 50.50 Mc. at 1830. W8DRU reports the v.h.f. hamshack completed on Freezeland Mountain. WA8CPY is a new ORS. The Kanawha Radio Club will operate an ARRL booth at the State Convention. W8HZA and W8DUV were elected vice-pres. and secy. of the W. Va. State Radio Convention. W8WSL, W8RXN and K8RLC are quite active county-chasing on 75-meter phone. W8WHQ has a new SR-150 mobile rig. K8CFT reports 500 stations checked in to 21 sessions of the a.m. phone net. Traffic: K8VFK 105, W8NYH 95, K8ZWM 62, W8CKX 54, K8CFT 47, K8TPF 45, W8HZA 38, K8ELH 21, W8DUV 5, W8ESH 2.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØTTB—SEC: WØSIN. PAMs: WØCXW, WØIJR, WØGNK. RM: WØFEO. OBS: KØDCC. The 1962 PICON Award was presented to WØAJL and WØJRQ jointly for their outstanding public service in providing essential communications with Antarctica stations, with the Good Ship *Hope* and with a Boy Scout expedition to Alaska. Their work has done much to reflect credit on the amateur service. KØBCX reports that 160 meters is getting better and those of you who like to ham from sundown to sunup should try 1.92. Looks like old Pueblo town will be the center of interest this summer with the Rocky Mountain Division Convention being held there June 15-16. WØSIN reports that the only bright spot in the AREC is the Columbine Net. Let's have all of the ECs pitch in and do their part by getting reports to the SEC every month. WØNIT has been appointed Asst. Director to replace KØTTB, the new SCM. News about the state should include the battle between WØCUZ and KØDXF for the title of "Old Man Of The Mountain." Let's have more traffic reports. Traffic: KØWGC 34, KØLCZ 19, WAØEUV 1.

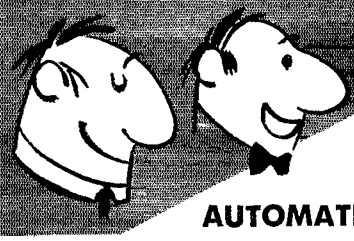
UTAH—SCM, Thomas H. Miller, W7QWH—Asst. SCM: John H. Sampson, W7OCX. SEC: K7BLR. Station activity reports reached an all-time high in February. A total of four stations sent in reports. Thanks are extended to W7OCX, W7BAJ, K7NWP and K7RPA for helping to set this record. Interest in Navy MARS seems to be high in Utah. K7QIE, in Boise, Idaho, has been awarded a net certificate on BUN. K7MPQ, W7OCX, W7QWH, K7QGW and K7QIE earned BRAT awards on BUN. W7BAJ fired up the rig from the new QTH and worked two new countries during the DX Contest. K7TQE, in Brigham City, reports some activities in that area. A group of Thikol Chemical Co. employees have formed the Wasatch Ham Operators Club and is interested in becoming acquainted with other clubs in the state. Traffic: K7NWP 329, W7OCX 58, W7QWH 2.

NEW MEXICO—SCM, Carl W. Franz, W5ZHN—SEC: K5QIN. V.H.F. PAM: W5FPB. 10 Meter PAM: W5WZK. The NMBC Net meets on 3838 kc. at 0700 Mon. through Sat.; the NM Emergency Phone Net on 3838 kc. at 0730 Sun.; the Caravan Club Net on 29.6 Mc. Tue. at 1900; the Totah Club on 3980 kc. Sun. at 1100, all MST. The Alamogordo Radio Club will sponsor a Hamfest at Clouderoft Aug. 18. The Caravan Club will hold a Hamfest in Albuquerque July 7. The Yale ARC for the Visually Handicapped is 100 per cent AREC members and is looking forward to Field Day operations. They will soon apply for ARRL affiliation and also will be 100 per cent league members. A new EC in Santa Fe is K5JJI. Glad to have you with us, Ethel. A new OES in Santa Fe is W5CYZ. The Albuquerque RACES group is planning extensive field tests for early spring. W5ZHN has a new Master Mechanics 1200-watt putt-putt. W5FAG and the Albuquerque and Santa Fe 2-meter boys are running some long-haul propagation tests. They will all play a big part in the upcoming RACES field tests. Santa Fe is looking for some of the 2-meter operators in Roswell or other points south. Traffic: W5UBW 78.

WYOMING—SCM, L. D. Branson, W7AMU—SEC: W7HH. The Pony Express Net meets Sun. at 0830 MST on 3920 kc.; the YO Net is a c.w. net on Mon., Wed. and Fri. at 1830 on 3610 kc.; the Wyoming C.D. Net meets on Wed. at 1900 MST on 3537.5 kc.; the TWN Net is a daily net which meets at 2000 MST on

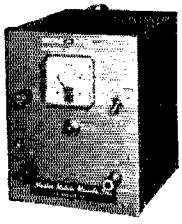
(*Continued on page 150*)

YOU WILL AGREE—
THEY *MUST* BE USING
MASTER MOBILE



DEPENDABLE POWER UNITS

AUTOMATIC TAPER CHARGER



COMPACT. 8" High x 6¼" Wide x 7" Deep.

AUTOMATIC CHARGING — the charging current is automatically reduced as the battery approaches full charge, and drops to a trickle charge when the battery reaches full charge. Overcharging is completely eliminated.

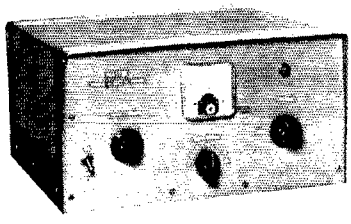
HIGH CURRENT RATINGS. Model TC-15 for 15 amps, Model TC-30 for 30 amps — both types designed for continuous-duty operation.

IDEAL FOR mobile radio systems, or on boats requiring a 12-V ignition source. Unit is not only an excellent heavy-duty charger, but may also be used as a bench supply for repair of car radios...for marine application, electroplating, powering model trains, and wherever else a high current, stable 12-volt source is needed.

MODEL TC-15 $59.50
MODEL TC-30 $79.50

Your 12-V battery fully charged every morning!

K-73 "GO" POWER LINEAR AMPLIFIER



SMALL: 13½" wide x 6½" high and 12½" deep

COMPACT: 15½ pounds.

FEATURES:

2-811A zero bias triodes in grounded grid.
750 Watts PEP.

500 Watt self contained TRANSISTORIZED DC Power Supply employing a bridge of solid state rectifiers for excellent regulation.

Panel meter measures plate current or RF output.

Ideal linear amplifier for any 50-100 Watt SSB exciter, such as KWM-2, SWAN, HALLICRAFTERS, SONAR, etc.

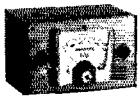
Covers 10, 15, 20, 40 or 80 meter operation with a heavy duty band switch.

Internal antenna relay allows barefoot operation when amplifier is not in use.

Wide range PI-NET output.

Does not require additional batteries in *most* automobiles.

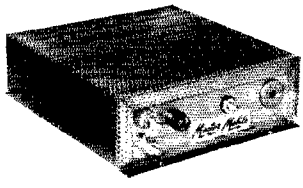
MODEL K-73 $289.50 NET



MODEL RC-73 $17.95

REMOTE CONTROL: INCLUDES

Five wire remote control cable for On-Off switch, Pilot Light, Plate MA or RF Output Meter and Push-to-Talk Antenna Changeover Relay.



POWER SUPPLY

...dc-dc transistorized converter dependably powers transceivers in the 100-watt output class.

SMALL SIZE. 2¾" High x 8" Wide x 9" Deep...

TWO OUTPUT MODELS. Model MPS-800 100-watt SSB exciters: 800V @ 275 ma; 300V @ 150ma, and a zener diode regulated —90VDC bias supply.

Model MPS-1250, 1250VDC @ 400ma, 300VDC @ 150ma, and a zener diode regulated —90VDC bias supply.

MODEL MPS-800 $119.50
MODEL MPS-1250 $139.50

Master Mobile Mounts INC.
4125 W. JEFFERSON BLVD. • LOS ANGELES 16, CALIF.

AVAILABLE AT LEADING RADIO JOBBERS NOW.

3570 kc.; K7IVK, Shirley, has worked a YL in every state and is waiting for her certificate. W7HH has returned from a visit on the West Coast and resumed duties as SEC. W7NNX has a new HT-37; W7HEB has a new HT-37 on the way. Cheyenne has two new Novice stations, KN7VTM and KN7VTN. W7HAW is having plenty of trouble de-bugging a new amplifier. The Cheyenne Radio Club has some activity on 6 meters. W7DXV, at Moose, Wyo., reports lots of snow. Traffic: W7DXV 49, W7BHH 43, W7AMU 33, W7AEC 13, K7QVG 12, W7HH 10, W7LVU 10, W7HLA 9, K7-HAW 4, W7LKQ 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—SEC: W4NML. RM: W4USM. PAMs: K4BTO, K4DJR-v.h.f., K4TNS and K4WHW. The Birminghamfest will be held May 5; the Mobile hamfest May 26. W4NML and K4WHW had a nice visit with the Birmingham Club Feb. 21. WA4EDF and WA4EEC have a new Swan 175. K4FTC has the new S/line. Alabama hams suffered a great loss when W4EBZ joined Silent Keys. Judge Thompson was a big help in getting call letter license plates in Alabama. K4YKA and K4YTR are busy with RTTY. WA4HGN has a new SB-10. WA4-EXB has a new Globe King 500C. WA4FOI is a new ham in Dadeville. We welcome WN4MAP and WN4GPN to the AEND. Several stations are planning to go to 160 meters. K4HKD has a new Meteor. We are getting good reports on most all nets in the state. Traffic: (Feb.) WA4AVM 418, K4WOP 247, K4AOZ 118, W4USM 100, K4BSK 80, K4WHW 73, K4TNS 56, WA4BDW 51, K4KJD 45, W4PEX 44, K4YUD 36, K4NGD 35, K4FZQ 32, K4GXS 28, K4NUW 26, WA4-HCW 23, K4NSU 18, K4JHM 16, W4NML 15, W4OGT 12, K4WND 12, K4BTO 10, WA4EEC 10, K4PHH 10, WA4CWI 9, WA4CPF 8, K4DSO 8, W4OXU 8, K4AVM 7, WA4ENJ 7, WA4GNG 7, K4BRZ 6, K4UMD 6, W4CIU 5, W4DS 5, K4ZBX 5, WA4FWP 4, K4TDJ 4, K4WVD 4, WA4EDF 3, WA4AJT 2, WA4EXA 2, WA4-HFE 2, K4KDE 2, K4PBY 2, K4RIL 2, WA4DFE 1, K4WOQ 1. (Jan.) K4AVM 10, K4NUW 6.

EASTERN FLORIDA—SCM, Albert I. Hammel, K4-SJH—SEC: W4IYT. RM: K4KDN. RM RTTY: W4-EHU. PAMs: 80 K4LCF; 40 W4SDR; S.S.B. W4OGX. The V.H.F. PAM post is now vacant. Any experienced v.h.f.er interested in working toward increased, better organized v.h.f. activity should apply to the new SCM, W4QVJ, of Jacksonville. The future for v.h.f. in this section is bright but good leadership is needed. How many know that besides being a top-notch amateur W4DVR also is president of the Rhodesian Ridgeback Club of the U.S. and chairman of the board. W4BNE, of Tampa, and that fine HARS continue an outstanding active program. And that, fellow hams, constitutes all the news that you have sent in. How about giving Ed a helping hand with something to print every month. Briefly, but wholeheartedly, I would like to thank all the members of this section for the tremendous cooperation extended to me during my past two years as SCM. Without you it would have been a bust. Regards and best wishes to all. Traffic: (Feb.) WA4BMC 1812, WA4IJH 994, K4EHY 906, W4TUB 895, W8LDU/4 753, W4KIS 493, K4BY 376, K4KDN 359, K4SJH 268, W4MIN 223, WA4FYV 201, WA4COR 186, WA4BGW 171, W4EHW 165, W4BNE 150, W4TRS 149, K4LCF 129, K4YSN 117, WA4GBM 113, WA4ACI 111, W4AKB 111, W4KCG 85, WA4DMV 80, K4COO 63, K6SXX/4 63, K4FQP 58, K4NVD 56, WA4FGE 55, WA4CJC 51, W4CWD 51, K4DBT 51, WA4IHH 43, W4BKC 39, WA4LHK 34, WA4CNZ 32, W4NGR 32, K4RNG 31, K4ENW 27, K4MTP 25, K4DAX 21, W4-SVB 19, K4AHU 17, W4GUJ 15, W4LMT 15, W4EAT 13, WN4IXS 13, W1AGM/4 12, W4BBZ 12, WA4EXJ 10, WN4IXI 10, W4ZZZ 10, K4AX 8, WN4ESS 8, K4ZIF 8, WN4KKW 7, W4SMK 7, W4DFZ 6, WA4AZZ 4, WA4AME 2, W4AYD 2. (Jan.) K4FMA 165, W4KCG 103, W4NGE 103, W4DVR 98, WN4KKW 71, W4VWL 62, WA4DMV 53, K4DAX 45, WN4ESS 36, W4LMT 35, K4NVD 35, WA4AME 34, W4GUJ 30, W4IYT 26, WA4CIQ 21, W4DFU 21, K6SXX/4 18, W4SMK 14, W2EII/4 13, WA4DKG 13, K4EHY 13, W1AGM/4 11, W4NOK 8, K4OSQ 5, K4MZR 4, K4PVP 3, K4RHL 3, K4CMK 2, K4NTA 2. (Dec.) K4NTA 10, K4EHY 2. (Nov.) K4EHY 41.

WESTERN FLORIDA—SCM, Frank M. Butler, jr., W4RKH—SEC: W4MLE. PAM: W4WEB. RM: W4-BVE. Tallahassee: K4VNJ was first-place winner in the Science Fair. WA4GFU is on 75 and 40 meters from Newport, and hopes to be on 29.560 soon for tests with Tallahassee. ECs K4RZF and W4GWU were recent guests of Memorial Hospital, Madison: High winds damaged WA4GHE's antenna farm. W4RCO has good luck with early-morning 40-meter phone QSOs. Chattahoochee: WA4IPJ is the new Gadsden County EC. WA4JRT is Asst. EC for the Sneads area of

(*Continued on page 152*)

WORLD-WIDE ENGINEERING ASSIGNMENTS WITH ITT-FEDERAL ELECTRIC CORPORATION

Working in more than 30 countries across the free world, electronics technicians and engineers of ITT-Federal Electric Corporation install, service, maintain and manage an immense variety of electronic equipment and systems. These range from the 4,000 mile DEW Line across the frozen North, to the single instrumentation site on a lonely promontory jutting into the Ocean, down the Pacific Missile Range.

But between these extremes, there's much more—not only in terms of individual challenge and adventure, but in importance to the growth and welfare of other friendly nations. An example here is the microwave communications network linking 8 cities in South Vietnam.

Actually, at any point in time, FEC engineers and technicians are working on more than 100 active projects—installing, testing or operating almost every type of wire or wireless communication system in addition to radar, instrumentation and computer facilities, plus the multitude of ancillary systems and services supporting them.

The great number and diversity of our programs generates these valuable career advantages rarely found together in service engineering today:

FASTER PROGRESS
Your FEC assignment accelerates your progress by giving you a first-hand knowledge of some of today's most advanced electronic systems and equipments. Then, varying responsibilities add flexibility to your experience—you may teach navigational aids, direct emergency maintenance, supervise a radar installation, or become a field service administrator. And to help you forward faster, FEC reimburses you 100% for advanced study at leading universities and colleges or approved technical correspondence courses you complete.

ADVENTURE
An assignment may take you to Nepal—or to Africa, Alaska, Greenland, Europe, Canada or across the U.S. FEC field engineering operates in almost every climate and living condition in the world. Along with adventurous assignments in exotic countries, FEC field work often has a diplomatic side. For instance, teaching native workmen how to operate systems you're helping to install—a first-hand role in strengthening the good impression of our country by making friends abroad.

THE FUTURE
Every Federal Electric career is stabilized by FEC's world-wide operations. And your future career is further enhanced by association with the parent company—International Telephone and Telegraph Corporation—whose current annual sales and revenues now exceed a billion dollars. When a field job is completed, FEC men have priority for openings in other field assignments, as well as at headquarters in Paramus, New Jersey. Then too, you may find a future with one of the many subsidiaries and divisions of ITT who also seek qualified technical talent.

There are always interesting positions at many levels with FEC. However, openings change from day to day. If you would like to receive further information on current opportunities, please write to: Mr. A. Sheridan, ITT—Federal Electric Corp. Room 88-MH, Paramus Industrial Park, Paramus, N. J.

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Jackson County, under WA4DED. Panama City: WA4FIJ/FJF have a new 75S-3 inhaler. A new RTTY converter is on the air and working FB. WA4FJF received YLCC-150 and WAC for all 2-way s.s.b. Panama City now guards 146.42 Mc. for any calls. K4VFY spent some time in the hospital. WN4IMC was appointed OES. Fort Walton: K4HXS is assembling an HX-10 and hopes to adapt it for 6- and 2-meter s.s.b. W4PLK, W4KWX, WA4FRK and WA4FFU are all mobile on 2 meters. W4CXP has joined the 2-meter gang with an ARC-4. W4ZGS is working on ham TV gear. Pensacola: PARC *Parasitics* is back in print again, with K4BZJ doing an FB job as editor. K4SMB is building a new station with a Heath Marauder and Warrior and a Drake 2-B. Traffic: (Feb.) K4VFY 323, W4ZWD 131, W4BVE 124, WA4FIJ 29, W4GAA 25, W4PBO 3. (Jan.) W4MLE 192, W4BVE 191.

GEORGIA—SCM, James A. Giglio, W4LG—SEC: W4YE. PAM: W4KR. RM: W4DDY. Welcome to the Turner AFB MARS Amateur Radio Club, Albany, Ga. and to the Cherokee Radio Club, Cherokee County, Ga. The serious work by K4NQQ on antennas has resulted in some new formulae for v.h.f. using ½" thin wall conduit. K1KSH/4 successfully handled medical traffic from Brazil recently. The Kennehoochee ARC meets the 1st and 4th Mon. at 8 P.M. at Marietta Federal Savings & Loan Assn. Officers for 1963 are W4KTS, pres.; W4YFR, vice-pres.; K4VTG, treas.; and WA4GPA, secy. W4HEG is the new president of the Atlanta Radio Club because of the resignation of K4HJW who moved to Orlando. W4YE has moved up to the vice-pres. spot. WA4AFP puts out a good signal on a.m. in addition to s.s.b. The Sowega ARC "dined out" together then visited a local TV station for an interesting program lately. WN4LQU wants skeds on 7155 with any ham who needs "Gilmer County" for the Georgia County award. He is a newcomer and uses a DX-60 and an S-120. The Columbus ARC announces that six Georgia County awards have been made to date. They were awarded to W4KR, K4CZR, K4BAI, K4BVD, K4TVE and K4FRM. K1KSH/4, using an end-fed dipole, worked 7 countries on 160 meters the first week using a Viking I on reduced power. New appointments: WA4GPA as OPS. Traffic: K4MCL 818, K4WWY 250, K4FRM 107, K1KSH/4 72, K4YRL 10, W4BZ 4, K4FUE 4, K4DKY 3, K4BVD 2, K4NQQ 1, W4OHA 1.

GEORGIA QSO PARTY

May 11-13

All amatures are invited to participate in the 2nd Georgia QSO Party, sponsored by the Columbus Amatuer Radio Club.

Rules: (1) *Time:* 2300 GMT Saturday, May 11 to 0500 GMT Monday May 13. Any or all of the 30 hour period may be utilized. (2) All emissions and bands may be used, but a station may be contacted only once per band. C.w-to-phone is permitted, but crossband contacts are not allowed. (3) *General Call:* "CQ GA" on c.w. and Ga. stations will identify by signing "DE (call) GA K." (4) *Exchange:* QSO number, RS(T), and county, state, province, or country. (5) *Scoring:* Count two points for each completed contact, one for each report received and sent. For final score, Ga. stations multiply QSO/points by the total number of different states, provinces, and countries worked. Ga-to-Ga. contacts count for the purpose of obtaining Ga. multiplier. Outside stations multiply QSO/points by different Ga. counties. (6) *Awards:* Certificates to the highest scoring station in each state, province, country and Ga. county. 2nd and 3rd place awards will be issued if in the opinion of the contest committee the number of entries warrants it. (7) *Suggested frequencies:* 3595, 3995, 7060, 7260, 14060, 14260, 21060, 21310, 28060, and 28560 kc. (8) Logs should show dates, times, stations worked, exchanges, frequency, type emission, and a signed statement that all contest rules have been observed. Contest logs postmarked no later than May 31, 1963 should be sent to CARC, c/o John T. Laney, K4BAI, 3500 14th Avenue, Columbus, Georgia.

WEST INDIES—SCM, William Werner, KP4DJ—C.D. Radio Officer: KP4MC. QSL Bureau Mgr.: KP4YT, Box 1061, San Juan 5, San Juan EC, KP4-BCA reports 15 AREC members as of February,

(*Continued on page 154*)

now get

SSB with optimum performance

over the entire HF spectrum

Continuous tuning with extreme accuracy — that's what you get with Collins' 51S-1 HF receiver.

Most advanced in a famous series of general coverage receivers, this SSB/CW/AM unit delivers: visual dial setting *within* 1 kc throughout the range • *high frequency stability,* nominally 100 cps per week under normal conditions, ideal for pre-assigned frequencies • *sharpest selectivity,* from Collins Mechanical Filters • *highest sensitivity* for difficult monitoring assignments.

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one mobile and five emergency-powered stations. KP4-BCA is building a linear amplifier using two 4-400As and plans RTTY activity. Founding members of the new DX Club of Puerto Rico (DXCPR) are KP4CC, KP4CK, KP4CL, KP4RK, KP4WD, KP4YT and KP4AQQ. Officers are KP4RK, pres.; KP4CL, vice-pres.; KP4AQQ, secy.-treas. and awards custodian. KP4AQQ's address is P.O. Box 476, Roosevelt, P.R. The DXCPR Award certificate will be called "8x8x8" for 8 stations in P.R., 8 countries in zone 8. Good news for KP4s was the return of *segments* in the 160-meter band between 1900-1925 kc. and 1975-2000 kc. KP4AXU was on the opening night of Feb. 21 with 25 watts to a 300-ft. long wire antenna and was heard working all U.S. call areas on 1905 kc. with a beautifully keyed signal. KP4ASK replaced the balanced line with 85 feet of coax to feed the inverted Vee antenna on 80 meters and loads same through the antenna coupler on 160 meters. KP4ASK installed a product-detector in the 75A-1 receiver. Other stations on 160 meters are KP4AQY and KP4AWH with a Globe Scout. KP4DJ replaced the 80-meter dipole with an inverted Vee antenna. KP4TL built a *40-80-meter inverted Vee per Sept. 1962 QST.* KP4AWH now has 51 countries worked on 75 meters. VP2VE and VP2VL installed a 280-ft. antenna fed with a 600-ohm open line on the highest hill on the island of Tortola, B.W.I. KV4CI works DX on 3500 kc. KP4BID and KP4BMM are MARS operators at Fort Allen. KP4AZ is using his Hornet vertical on 80, 40, 20 and 15 meters with good results. KP4RK received his DXCC-210 sticker, and added a 14AVS vertical antenna for the low bands. KP4OW has new S/Line equipment. KP4CC boasts a 100 per cent countries worked and confirmed score. KP4BEA worked 202 countries during 1962. KP4BBN rapidly is approaching DXCC status. KP4ACH contacts brother KP4BHM at Aguada on 50 Mc. KP4BHM runs 150 watts to a 4X150 in the final. KP4AXC worked KP4ES, Ponce, on 144 Mc. using 80 watts to a halo antenna. KP4AFL says there is plenty 6-meter activity in Aguadillasas he worked KP4*BLQ*, KP4AGJ, KP4BHS, KP4AZG, KP4ANG, KP4AAW and KP4BHM. KP4WT reports to the CAP Net on 3116 kc. daily. PRARC WPR-25 Award certificates went to YV1DQ and WA4BMC, and a WPR-N-20 Novice sticker to KP4-BBN. The estate of KP4UA, Box 216, Sabana Grande, is selling Hammarlund and Collins equipment. Known CHC members in P.R. are KP4s CC, CK, CL, RK, WD, YT, AOO, AQQ, BEA and BBN. KP4CL was handing out YL-OM Contest numbers near the thousand mark when last heard on 75-meter s.s.b. LU3-DCA, of 50-Mc. fame, and his XYL were house guests of KP4CK and KP4CL, as was W3AYD. W4HKY, of Miami, is busy installing radio transmitters for Arinc here. The El Morro ARC will participate in Field Day. KP4CH built an antenna coupler to match the long-wire antenna on all bands. Traffic: KP4WT 110, KP4DJ5.

CANAL ZONE—SCM, Thomas B. DeMeis, KZ5TD —The CZARA elected KZ5PR, pres.; KZ5VR, vice-pres.; KZ5CS, secy.; KZ5UR, treas.; KZ5OM, activities. KZ5JD was appointed program dir. KZ5PR's one-man membership drive started last November met with good response. The new administration in February presented plans for the year's activities, including a boat trip through the Canal Locks. Officials of the Panama LPRA attended the March meeting for further development of plans for the boat trip in the Canal. Ex-KZ5AC, now WA4GAH, was down for a visit recently. KZ5KR is in San Antonio for schooling. The Crossroads Club elected KZ5IW, pres.; KZ5RA, vice-pres.; KZ5SS, secy.-treas.; and KZ5BK, act. mgr. KZ5TF and KZ5HF left for the U.S. and will be living in El Paso. The Crossroads club had a farewell dinner party at the Cristobal Yacht Club. KZ5HF was retired on disability. KZ5OB and KZ5OA are off the air awaiting a new tribander. KZ5RN had a baby boy. 15 meters has shown good long-path skip but internationally activity is down.

SOUTHEASTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, Jr., W6JQB—Asst. SCM: Lyle G. Farrell, W6KGC. RM: W6BHG. PAMs: W6ORS and K6PZM. The following stations earned BPL in February: K6EPT, K6MDD and WA6-YLZ. Congrats, fellows! New officers of the *San Fernando Valley Radio Club* are WA6IZO, pres.; K6-RVA, vice-pres.; WA6TVK, secy.; WA6PPY, treas. W6NAA is handling communications for the City of Hope 29 Palms Motorcycle Run this year. WA6RJJ has a new four-element triband beam up. W6VOZ reports 15 meters is starting to open up again for DX. WA6TMY is a new member of the RCC. W6GYH handled press releases for the *LEHI V*, W6MLZ/MM. New officers of the Los Angeles Council of Radio

(Continued on page 156)

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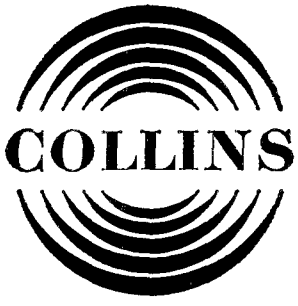

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Clubs are K6HV, chairman; K6HCY, vice-chairman; W6YSK, secy. W6VEB announces a "QSO Field Day" for school club stations on May 17. For further details contact W6VEB, WA6YWR, WA6UMC and WA6NON are putting APN-1 gear on 420 Mc. WA6-YIT reports several good openings on 6 meters to W5- and WØ-Land. K6TVC is working on a transistorized power supply. This is the next to the last report from me as your SCM. It has been a wonderful experience to have worked with you for the past 6 years. I certainly want to wish the new SCM the best of success. I am sure you will support him to the fullest extent. Support your section nets: On phone, the Southern California 6 Net (SoCal 6) meeting daily on 50.4 Mc. at 0300 GMT; on c.w., the Southern California Net (SCN) meeting daily on 3600 kc. at 0300 GMT. Traffic: (Feb.) K6EPT 1068, K6MDD 582, W6GYH 400, W6WPF 397, WA6YLZ 216, W6QAE 208, WA6WTK 152, W6BHG 122, WA6-UHM 72, WA6KAW 50, K6HIT 48, K6ZDL 45, WA6-USU 44, WB6BBO 38, K6SIX 12, W6USY 10, W6CK 7, W6SRE 7, W6VOZ 3, W6ORS 2. (Jan.) WA6TYX 45, K6UMV 23, K6SIX 14, W6NKR 6.

ARIZONA—SCM, Kenneth P. Cole, W7QZH—Asst. SCM/SEC: K7NIY. PAM: W7OIF. RM: W7LND. The Copper State Net meets at 1930 MST Mon. through Fri. on 3880 kc.; the Grand Canyon Net Sun. at 0800 MST on 3880 kc.; the Tucson AREC Net Wed. at 1900 MST on 3880 kc.; the Cochise County AREC Net each Sun. at 1400 MST on 7260 kc.; the Tucson 2-Meter Net at 1000 MST on 145.35 Mc.; the Arizona Interstate Net, C.W., Mon. through Fri. at 1900 MST on 3555 kc. The Maricopa County AREC Net will meet each Thurs. at 0200 GMT (7 P.M. MST) on 28,620 kc. over the weekend of Mar. 16-17 amateurs in the Phoenix Valley of the Sun, sparked by K7LPB, set up four transmitters that transmitted simultaneously on 432, 220, 145 and 50.11 Mc. On the two high frequencies, 40-element beams were used. Transmissions were made from the highest peak in the South Mountain area and were on voice, c.w. and teletype. All amateurs interested in forming the 12th radio teletype organization should contact W7YWF. The Organization will be known as the Arizona Radio Teletype Society. W7MAE and his XYL, W7KOY, returned to their automobile recently to find their mobile receiver and the mobile antenna among those items missing. Whoever stole the equipment was kind enough to unscrew the coax connectors and pull the plugs. All wires were left intact. It appears that the job was done by a professional. New calls: K7VIS, Pine Mountain, Ariz., without commercial power. Traffic: K7VTY 113, W7AMM 88, K7CET 8.

SAN DIEGO—SCM, Don Stansifer, W6LRU—Five stations in the section made BPL in February: K6-BPI, W6IAB, W6YDK, WA6ZOW and W6EOT. K6-LKD is now manager of RN6, and checks into SCN and PAN. W6UFS, recently home from a trip to ZL-Land was the featured speaker for the Newport Amateur Radio Society in March. W6AIW, San Diego FCC Engineer, was guest speaker at the San Diego DX Club meeting in March, held at the home of W6LAG. W6IEY, OES in La Mesa, finally made a two-way contact with WA6HIT in Los Angeles on 432 Mc. W6WRJ, in Tustin, is now an OBS, and puts out Official Bulletins three days a week. If in the area check with Ralph as to times and frequencies. New officers of the Palomar Radio Club include W6HAW, pres.; W6CCE, vice-pres.; WA6RCS, secy.; and W6YZV, treas. The club meets at 8 P.M. the last Tue. of each month at the South Oceanside School. Visitors are welcome. Your SCM enjoyed the hospitality of the Orange County Club at its February meeting, with over 70 attending. The San Diego DX Club is starting a 2-meter "DX Monitoring" net. W6CHV, long time phone man, is experimenting with electronic keyers for c.w. use. The new president of the Astro Club is W6FAY. All clubs in the area report that Field Day plans already are underway with indications of more entries this year than ever before. Convention plans continue to move ahead with committees filled, and clubs and local hams responding well. WA6BUX was home for a short time between quarters at Stanford. Traffic: K6BPI 3221, W6IAB 2399, W6YDK 1913, WA6ZOW 990, W6EOT 544, K6LKD 318, WA6-ROF 230, K6IME 107, K6GJM 8.

SANTA BARBARA—SCM, William C. Shelton, K6AAK—SEC: WA6OKN. We now have a full-fledged Section Emergency Coordinator at last. Now we need applicants for other jobs such as RM, PAM, etc. Your SCM visited the following clubs during February and the large turnout was sure welcome: LEARC at Vandenberg AFB, Ventura County at Ox-

(Continued on page 158)

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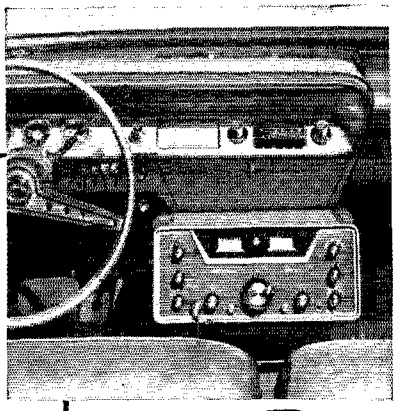

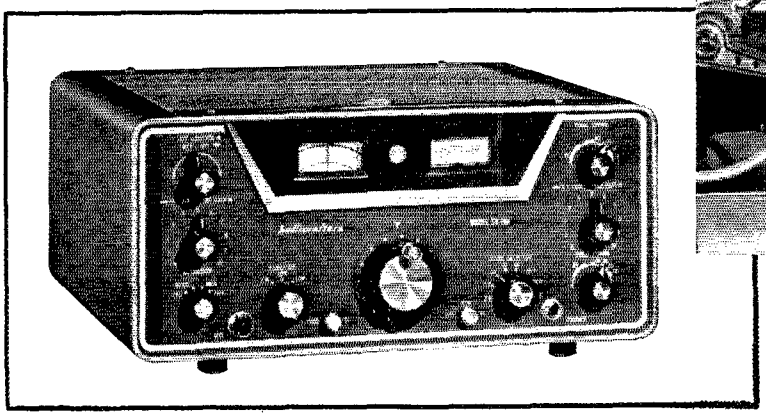

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nard, Poinsettia at Ventura. I tried to visit W6YCF in person but Mel was out presenting the Estero Club's charter on behalf of W6MLZ. This club is quite active. The Santa Barbara Club held "Ole Timters Nite" and it was a big success. The club publishes a very fine and newsy paper. Congrats. The Cal Poly club (W6BHZ) is active on 75, 40 and 2 meters on a.m. and s.s.b. K6GHU is pres. of the Santa Barbara Club and also editor of its paper *Key Klix*. His YL, K6KCI, is Asst. Director and *Key Klix* reporter. Traffic: W6YCF 16, K6AAK 5.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG —Asst. SCM: E. C. Pool, W5NFO. SEC: K5AEX. RM: W5LR. With the opening of the 160-meter band in the various sections hereto before restricted, quite a bit of activity has been heard and also many harmonics on the higher frequency bands. I would advise that you check and double check to be sure you are not causing needless interference on the higher bands. OOs will be busy trying to save you a QSL from the FCC. K5ANS is the new net manager for the TEX C.W. Net and is doing a fine job. The San Angelo ARC elected W5RSV, pres.; also the EC for the county; W5DCR, vice-pres.; W5FZY, secy.; K5MGH, treas.; and W5GWM, activity chairman. W5FZY reports much interest in 2 meters and plans are being made to set up a production line for 2-meter rigs. I am sorry to report the passing of "The Old Sheepherder" Feb. 19. LeRoy operated W5RUX in San Angelo and W5ANC on his ranch in Van Horn. W5CUI reports Navy MARS is growing by leaps and bounds. Preparations were made for 3 to 400 applicants but at last report they were swamped with more than 1600 applications, so have patience. For information contact F. C. Burt, State Navy MARS Director, P.O. Box 20062, Dallas, Tex. The Panhandle ARC visited KFDA TV and found out how the news and weather is collected. Don't forget the West Gulf Division Convention to be held in McAllen, Texas, June 7-8-9, 1963. Traffic: (Feb.) W5BKH 158, K5DOC 41. (Jan.) K5ANS 602.

OKLAHOMA—SCM, Adrian V. Rea, W5DRZ— K5LVA has returned from the hospital. W5RST is back in the hospital. W5NS still is in the hospital. W5DXJ is recuperating from a long illness. K5KUX has been transferred to Midland, Tex. WA5DQV is a new General and W5DQV has acquired a new bride. W5MMD has 301 DX contacts confirmed. K5-BBA has been on the sick list. K5IRO and W5PPE are conducting workshops in mobile construction and homebrew building, respectively. K5VNJ has been doing a yeoman's job on the c.w. nets. W5MJQ is named Oklahoma Operator of the Month. Bill probably makes more phone calls than any other amateur in the state. WA6NNX is back in the state; his friends will know him as W5WAI. If you get hungry for fish, call on W5HIM or W5FEC. W5PPE, our SEC, has started an EC net on Sun. afternoon. We urge all ECs to check into this net. Stations renewing EC appointments are W5MFX, K5BYF, W5CZB, W5VLW, W5AAJ and W5WAX. WA5EXY is putting out signals from Woodward. Congratulations to W5PNG. Dick has not missed sending a station activity report— during the present tenure of office of this SCM, three and one-half years. W5AHD, at Lawton, has been a member of ARRL continuously for forty years. Can anyone beat that? Traffic: (Feb.) K5IBZ 757, K5TEY 560, W5PPE 138, K5VNJ 126, W5JXM 72, W5JMQ 69, W5DRZ 66, W5OPQ 59, K5DLP 52, W5QMJ 52, W5FEC 51, K5AUX 46, W5PML 20, W5VVQ 20, K5ZCJ 19, K5YTH 16, W5-CCK 14, K5OCX 12, W5TKE 12, K5JOA 10, K5RWL 5, K5CBG 4, W5PNG 3, W5EHC 2. (Jan.) W5JXM 74, W5TKE 13, W5WAX 8.

SOUTHERN TEXAS—SCM, Roy K. Eggleston, W5QEM—SEC: W5AIR. PAM: W5ZPD. RM: K5BSZ. The Austin High School Amateur Radio Club of El Paso has received its club call, WA5FLQ. Congratulations. W5KOK has a new HT-37. You should be hearing W5BBR on s.s.b. in the near future. W5LR, from Dallas, visited in Corpus Christi. The new officers of the Corpus Christi Amateur Radio Club are W5CRO, pres.; W5PPC, vice-pres.; WA5BOO, secy.; K5YRW, treas.; W5TFV, act.; K5HOY, pub.; W5HJM and K5EWK, members of the board. K5ANS is the new net manager for the Texas C.W. Traffic Net, and he is doing a FB job with it. The club at Texas A&M College holds weekly classes for future novices and has five who are now waiting for their licenses and about 25 enrolled in the new class. K5ANS is the instructor. The Orange Amateur

(*Continued on page 160*)

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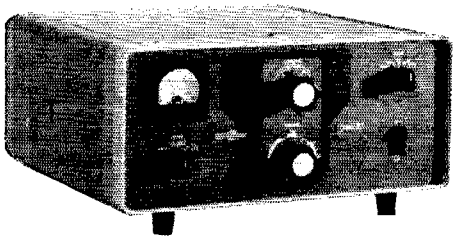

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Radio Club participated for the third time in the Sabin Oral Vaccine Drive, using 6 meters, and also the March of Dimes Drive. The new officers of the Port Arthur Amateur Radio Club are K5TAX, pres.; K5VKI, vice-pres.; W5JNN, secy.-treas. Traffic: (Feb.) K5ANS 602, W5AC 151, K5PNC 83, W5ANV 61, K5HDU 56, K5ABV 18, K5VXP 11. (Jan.) W5AC 469.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK, and H. C. Hillyard, VO1CZ. Winners in the VE1 Contest are as follows: (c.w. section) VE1AHL with 2898 points, VE1FR and VE1PB, runners-up; (phone section) VE1QC with 8880 points, VE1MA and VE1PM, runners-up. Deepest sympathy is extended to the relatives of VE1DR, who has joined the ranks of Silent Keys. VE1MM has a new 20-meter beam on a crank-up tower. VE1PV and VE1ZZ have been experimenting with one-watt transistor transmitters on 160 meters. Congratulations to VE1XN and his XYL on the arrival of a baby girl. VE1QV has a new quad antenna. Officers of the Dartmouth ARC include VE1TR, pres.; VE1CT, vice-pres.; VE1AHZ, secy.-treas. The Halifax ARC is celebrating its 30th anniversary. Charter members still active in the club include VE1AW, VE1BC and VE1EK. The Moncton repeater station on 2 meters has been licensed as VE1SR. Congratulations to VE1JF, who has acquired his A3 endorsement. VE1PV received special mention in a recent issue of the *Financial Post*. VE1AJI and VE1XN are experimenting with "V" loops and bird-cage antennas on 6 meters. Traffic: VE1RT 39, VE1OM 13.

ONTARIO—SCM, Richard W. Roberts, VE3NG—Holders of ARRL appointments are reminded that certificates must be mailed to me for endorsement on each expiration date or I will be forced to cancel appointments. VE3BEV is now Class A. We welcome two new ECs, VE3BTI and VE3TW, both in the St. Kitts area. The London ARC held its Annual Dinner. Irene, VE3FCB, gave birth to a son in a hospital in London and within seven hours was on portable on 2 meters. Charles Stewart has obtained the call VE3DYS. VE3CTK reports that the Chatham 2-Meter Net meets at 1600 GMT Sun. on 144.1 Mc. The London 2-Meter Net is on Wed. at 8 P.M. on 144.45 Mc. The Toronto 2-Meter Net meets at 9 P.M. Wed. on 144.144 Mc. SEC VE3AML requests that *all* ECs report on Form 5 cards each month, even though there may not be any activity. VE3BUX operates the Swam-Club on 75 meters and will send a list of items available to those who send him a self-addressed and stamped envelope. QSL Mgr. VE3UW advises that self-addressed and stamped envelopes are required for *your* QSL cards from the VE3 QSL Bureau. His QTH is 20 Almonte Rd., Downsview, Ont. VE3EZC has a new shack and is back on the air. VE3HW advises that a 2-meter "Do" will take place in Oakville in June. VE3ETM has won his LARC Award; likewise VE3DGX has his DXCC. We regret to announce that VE3QV is a Silent Key. Once again the OQN is looking for new c.w. members. VE3CYR is the mgr. On Oct. 1, 1963 the Westside ARC in Toronto will celebrate its twenty-fifth year. Traffic: (Feb.) VE3CYR 230, VE3GP 137, VE3DPO 120, VE3EHL 102, VE3BUR 100, VE3NG 99, VE3CFR 66, VE3GI 63, VE3AML 59, VE3EYC 58, VE3EAM 42, VE3BZB 35, VE3DRF 34, VE3ETM 33, VE3BZT 30, VE3ELQ 30, VE3EAU 29, VE3BLZ 23, VE3DMV 23, VE3FGV 19, VE3AUU 17, VE3DH 17, VE3DUU 16, VE3RN 16, VE3DOC 12, VE3AKQ 8, VE3CWA 3. (Dec.) VE3CWA 3.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Jean P. Achim, VE2ATL. Club elections: MARC—VE2SH, pres.; VE2KW, vice-pres.; VE2HI, secy.; VE2NB, treas.; VE2OC, VE2AQV, VE2AXQ, VE2NN, VE2VV, VE2BB, dir. MECC—VE2BFB, pres.; VE2AFM, vice-pres.; VE2BLR, secy.; VE2BHD, treas.; VE2BDP and VE2BAC dir. McGill, VE2UN—VE2BMQ, pres.; VE2BHH, vice-pres.; VE2AYL, treas.; VE2APN, secy. New comers: VE2BOW, VE2BOG and VE2BOO. Scout HQ station VE2CBS now is active and will attempt to sked Northern and Arctic stations. VE2YX and others have assisted and others are needed to train these boys. VE2EC reports that the St. Maurice Valley gang is active on the air and with club activities, with VE2AUH a leader. VE2BDB plays chess on 75-meter phone. VE2ACT is interested in traffic and may assist VE2AJD. VE2ALH, at Quebec City, is an excellent c.w. operator and runs a Valiant on all bands. VE2BEN reports that RTTY is being pursued on 80 meters by himself and VE2BEH, VE2RS, VE2AZF, VE2TY, VE2FY, VE2HY, VE2BDM, VE2AUU, VE2SS, VE2SC and VE2BGY. Many interested lack equipment.

(*Continued on page 162*)

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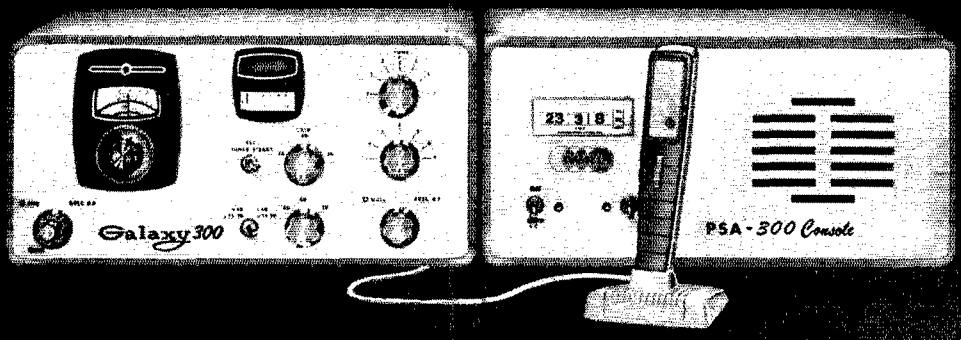

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That is the Galaxy 300. ☐ It's quite a single side band-AM transceiver. ☐ It may very well change your ideas about more expensive transceivers. ☐ It's a full featured SSB/AM transceiver with 300 watts of power—priced like a single receiver or xmitter—less than one-fourth the price of conventional SSB transceivers. ☐ How can it be priced so low?—Engineering know-how and selling to you direct from our factory—an aggressive business step on our part. ☐ Here is what makes the Galaxy so good: Input, 300 Watts PEP on SSB, 175-AM—Selectable Sideband—Automatic Load Control—Separate RF & Gain Controls—9.1 MC Crystal Filter—Stable Linear VFO—1 UV Sensitivity for 10 db S/N—Smooth Dual Vernier Tuning: ratio 72:1 or 12:1—P.T.T. & Vox Operation (Vox optional $24.95)—Mobile or Fixed Station—Full Year Parts Warranty. ☐ All this for $299.95 f.o.b. WRL. Relieve that "expense tension" at your home and order a Galaxy now. **You must be satisfied—or money back!**

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Mobile Supply "G 300 DC" designed for "Full Power" operation.

66NA041	12VDC Transistorized	$119.95
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If any is available contact VE2BEN. Also, if there is sufficient interest a net may be formed on 80 meters. While VE2BE soaked up the sunshine in Florida, our QSL Mgr., VE2YA, went to Jamaica. We regret that VE2IZ lost his life in a fire in his house. VE2BBT is back with gusto on 75-meter phone. Congrats to the VE2SCs—a son. VE2JE went to the hospital but through the help of friends was able to enjoy 75-meter phone during his convalescence. Traffic: VE2DR 137, VE2EC 46, VE2BB 41, VE2BMS 40, VE2AGM 26, VE2BG 25, VE2AJD 24, VE2ALE 21, VE2AUU 17, VE2ABV 15, VE2AUH 11, VE2AKK 10, VE2CP 8, VE2BAC 7, VE2UN 6, VE2BDS 4, VE2AQV 3, VE2BLR 1.

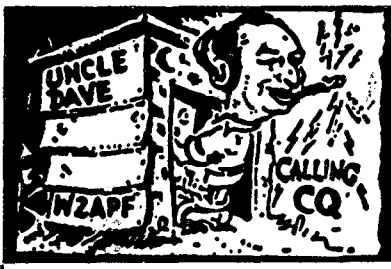
ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FS. PAM: VE6PV. RM: VE6AEN. ECs: VE6FK, VE6SS, VE6ABS. OPSs: VE6CA, VE6PV, VE6HM, VE6SS, VE6BA. OOs: VE6HM, VE6NX, VE6PL. OBS: VE6HM. ORS: VE6BR. OESs: VE6DR, VE6HO. Our PAM reports that band conditions are better at the earlier time. Our RM reports that the c.w. boys are falling by the wayside. Our SEC is asking all ECs for a revised list of all official mobile and emergency units. We are very sorry that we have to add two more to the Silent Keys. VE6OL and VE6TZ. These two were always ready and willing to help and will be missed by many fellow hams. VE8SL, ex-VE6SP, dropped into our shack recently and left his best regards to all his friends in the south. The hamfest committee wishes to remind you fellows of the International Hamfest to be held July 20 and 21 at Waterton Lakes National Park. We are looking for more club reports. VE8CW is our reporter from the north land. You fellows in the north, send your traffic counts and happenings to Brad. Traffic: VE6HM 163, VE6AEN 19, VE6TG 11, VE6PL 10, VE6CA 8, VE6SS 8, VE6PZ 6, VE6AFJ 3, VE6FS 3, VE6ADS 2, VE6BL 2, VE6SU 2, VE6VE 2, VE6AGR 1, VE6HS 1, VE6WN 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —Those blue backgrounds and white letters of amateur call signs sure look pretty. If you can find a copy of zero *Beat*, read the editor's column and take heed. The "Old Timers Night" was sold out. Thanks to VE7ALE and VE7BQ and his XYL, who were on the committee. VE7AKD and VE7BAH won prizes. VE7AC proved to be the "Old Man." He started in 1922 and still is going strong. He always seems to be top man for B.C. in the CD Parties and DX Contests. VE7BFW is leaving Chilliwack to take up commercial fishing. So we now are looking for an EC for Fraser Valley. New ECs are VE7ANE, Vancouver mobiles and VE7ABS, Surrey District. VE7AKW has completed his s.s.b. rig. VE7KN, Regional Superintendant of the Telecommunication Branch, Department of Transport for British Columbia, retired Apr. 1. He has written many fine books on radio and one that is in most amateur's shack is *Radio Amateur Licensing Handbook*. VE7AA, VE7FB, VE7YG, VE7AKD, VE7OT, VE7ZG, VE7JT, VE7RV, VE7WM, VE7QR, VE7BQ, VE7JB, VE7ALE, and VE7DZ had a small dinner party for Jim and a special type desk lamp was presented to him so he can write his book on the Chinese language. He speaks three or four languages one of which is Chinese. Traffic: VE7BJV 106, VE7KZ 38, VE7BHH 17, VE7AC 8.

MANITOBA—SCM, M. S. Watson, VE4JY—VE4UM, the University group, was host at the February meeting of the WARA and the members were taken on a tour of the facilities offered by the University of Manitoba. The DOT licensed VE4GW, VE4HI, VE4WN and VE4HF in January. The meeting called by the SEC was well attended and AREC is off to a good start under the energetic leadership of VE4FO, WØKLP/VE4, VE4TT and VE4HW comprise a new committee to press for call letter license plates for Manitoba. Glad to hear that VE4IW is recovering nicely from his illness which confied him to Morden Hospital. The ARLM held an auction of ham gear at the February meeting with VE4GA doing the honors. VE4ED, of Churhcill, reports handling a considerable traffic on c.w. in the northern area and that the local club, VE4CQ, is active. The Brandon Club sponsored a social and dance at Barney's Inn Apr. 8. Traffic: VE4ED 17, VE4EW 14, VE4JY 13, VE4KL 13, VE4QD 10, VE4KN 8, VE4EG 6, VE4SE 5, VE4FX 4, VE4JA 3, VE4AN 2, VE4KR 2, VE4MK 2.

SASKATCHEWAN—SCM, Jack Robinson, VE5BI— VE5HR reports that he and VE5FO are experimenting with RTTY using a Twin City TU working into a Model 15 teletype. They have had encouraging success with results on reception so far. There is no gear for transmitting yet but that comes next. Then he will be f.s.k. on 20 and 15 at first. VE5FC has a new HX-50. During February the SARL held a phone and c.w. contest with a total of 117 participants. Winners in the phone section were: First, VE5OB; second, VE5TO; third, VE5HP. In the c.w. section: First, VE5DO; second; VE5EO; third, VE5FC. Stations appointed as SARL district directors are VE5SF, VE5JR, VE5EO, VE5IL, VE5LU, VE5YR, VE5LM, VE5RE, VE5CL and VE5FX. The Regina Club

(*Continued on page 164*)



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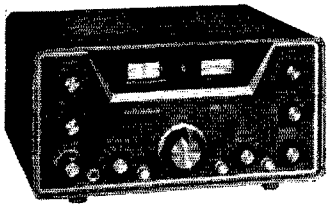
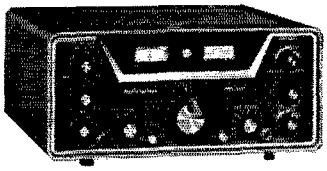


HALLICRAFTERS SX-117 Triple conversion receiver. Sensitivity less than 1 μv on AM, less than ½ μv on SSB/CW. Selectivity .5, 2.5 or 5. kc. T-Notch filter, I.F. type noise limiter audio inverse feedback, 100 kc xtal calibrator. VFO can be used as crystal locked oscillator.

Price..... **$379.95**

HA-10 adapter 85 kc-3 mc.....$24.95

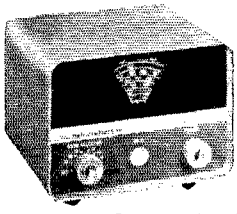


HALLICRAFTERS SR-150 Fixed/Mobile Transceiver. 80 thru 1 segment of 10 meters. 150 watts SSB PEP, 125 watts CW; SSB—VOX or PTT; CW—manual or break-in. Receiver sensitivity less than 1 μ v for 20db S/N.

Price..... **$650**

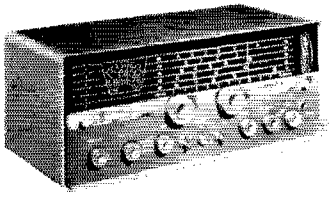
P-150 AC power supply.....$99.50

P-150 DC power supply.....109.50



HALLICRAFTERS MODEL HA-5 DELUXE VFO High stability heterodyne-type for all bands. Three tubes plus voltage regulator and silicon rectifiers. Extreme stability. Illuminated dial calibrated for all amateur bands, 80 through 2 meters. Output frequency range: 3.5 Mc. to 4.0 Mc., 7.0 Mc. to 7.5 Mc., 7.8 Mc. to 8.3 Mc., and 8.333 Mc. to 8.833 Mc. Excellent keying; 30 to 1 tuning ratio permits precise tuning.

$79.95



HALLICRAFTERS SX-110....$169.95

Covers 80 through 10 Meters.
- Crystal filter
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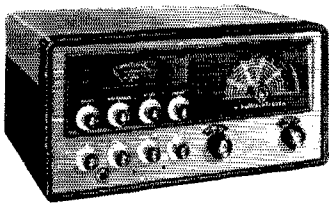
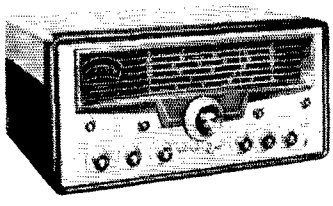
- Edge reading S meter
- 7 tubes plus rectifier



HALLICRAFTERS HT-32B....$725.00

A transmitter designed for the amateur who must have the best.
- Complete amateur coverage capability, 80 through 10 meters, without changing crystals
- 144 watts plate input (P.E.P. two-tone)
- Superior frequency stability, due to Hallicrafters' differential temperature compensation (U.S. Pat. #2718617)
- Full 500 kc. coverage on VFO dial, with resolution to less than 1 kc.
- Upper/lower/double sideband; full AM
- Automatic break-in c.w.



HALLICRAFTERS SX-101A..$445.00

The receiver with complete 80-10 meter coverage plus calibrated band for 2 and 6 meter converters.
- Five steps of selectivity
- 10 Mc. position for WWV
- Sensitivity of 1 μv or less, all bands
- Fast/slow AVC
- Full gear drive
- Dual conversion

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held a homebrew gear contest with VE5JS in first place with a frequency standard; VE3VP was second with an electronic keyer and monitor; VE5CM took third with a home made bug and VE5JU was in fourth place with an electronic keyer. Traffic: VE5HP 147, VE5LM 49, VE5NX 22, VE5JU 13, VE5EO 8, VE5HQ 6, VE5MS 6, VE5IG 2.

ARRL National Convention

(Continued from page 10)

with spacious quarters for exhibits and sessions. Adequate living quarters are available in the same building, which will please those with the most exquisite taste, yet economical enough for those who are saving for a new piece of gear.

An extensive program is being planned that will keep everyone busy, no matter what his interest is in amateur radio. Many amateur groups will be holding sessions at the convention, including: OOTC, QCWA, QRPRC, RTTY, s.s.b., s.w.l., v.h.f., YL, CHC, DX FHC, IHHC and MARS.

Thinking of a new piece of gear? There will be a wide variety of merchandise on display in many interesting exhibits. Almost all available space has already been reserved by suppliers and manufacturers.

All major amateur radio clubs from Cuyahoga County are behind this convention to make it the biggest and best possible. If the convention is a financial success, the committee states it will donate the surplus to worthy amateur radio causes, particularly to the ARRL building fund.

Additional information on rates, registration, program, and accommodations will appear in subsequent issues of *QST*. All other inquiries should be addressed to Cleveland Amateuradio Convention, Box #5167, Cleveland 1, Ohio.

Hamfest Calendar

(Continued from page 41)

Pennsylvania — The annual hamfest of the Breeze Shooters, Inc., will be held on Sunday, May 26, at the Wildwood Lodge (just off State Route 8 and Wildwood Rd.) near Pittsburgh. An attendance of over 1000 is expected. Registration on the grounds. For further info contact Charles Colbert, K3HSE, 4172 Timberland Drive, Allison Park, Pa.

Pennsylvania — The 18th annual banquet of the Lancaster Radio Transmitting Society, Inc., will be held on Saturday, May 11, at Hostetters Banquet Hall, Barbara and Pine Streets, Mt. Joy, with festivities beginning at 1830. Entertainment for all. Make advance registration by contacting Arthur C. Jacoby, W3OY, 136 Springhouse Rd., Lancaster — phone 392-6093.

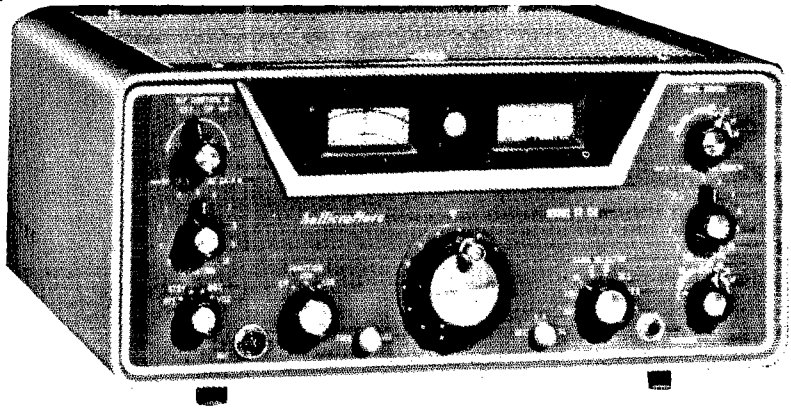
Pennsylvania — The North Penn Amateur Radio Club announces its 10th anniversary banquet on June 1, at Souderton Fire Hall, Souderton, Pa. Dinner and dancing start at 7 P.M. Tickets are $3.50 per person and reservations can be sent to Jerome Krim, W3STA, 1633 Thayer Drive, Norristown, Pa.

South Carolina — A hamfest will be held at Paris Mountain State Park (or the National Guard Armory in Greenville in case of inclement weather) on May 5. OA4C, a Presbyterian Missionary home on leave, will be present, and ARRL SCM K4HDX will speak. Tickets, including lunch, are $3 per person.

Tennessee — The Memphis Hamfest will be held on Sunday, June 2, at the Woman's Building at the Memphis Fairgrounds. There is no registration fee, but let 'em know ahead of time if you're coming, so they can plan for enough

(Continued on page 166)

Got Troubles, Friend?

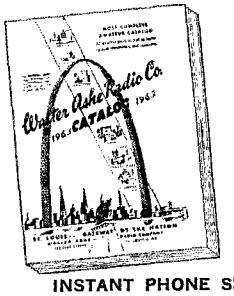


Is your beam rotor stuck? . . . Does your transmitter have key clicks? . . . Does the DX always seem to come back to someone else? . . . Did you get a QSL from the F.C.C.? . . . Are your harmonics as strong as your fundamentals? . . . Has your wife been nagging? . . . Do your kids QRM your QSO's? . . . Does your neighbor start his electric razor every time you're on the air? . . . Does your TV set go blank when you push the key? . . . Do you look the other way when you pass the neighbor with the TV set with 21 MC I.F.'s? . . . Do you wonder why nobody answers your 20 meter CQ only to find you have been on LSB for 45 minutes? . . . Have you had a new SSB transceiver on order for 6 months and no delivery? . . . don't give up, friend . . . there's a better day coming . . . you can end all your troubles with a Hallicrafter SR-150 . . . available for immediate delivery at Walter Ashe.

SR-150, HAM NET $650

Accessories: PS 150 AC (A C Power Supply) $99.50
PS 150 DC (D C Power Supply) $109.50
MR 150 (Mounting Rack) $39.95

Trades? THE BIGGEST!* Terms? THE EASIEST! Service? THE FASTEST! Rush the coupon below for Walter Ashe's UNBELIEVABLE deal on your new Hallicrafters SR-150



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food. Activities will include a transmitter hunt, a c.w. contest, a DX contest, election of a hamfest sweetheart, mobile judging, and entertainment for the children. For further info contact Otto H. Roehrs, Jr., K4EQK, 2350 Scaper St., Memphis — telephone GL8-9540.

Texas — The third annual meeting of the East Texas Emergency Net will be held at City Park, Commerce, Tex., Sunday, June 2. Registration $1. Talk-in 3970 kc. Picnic basket at noon, program begins at 2 P.M. Net Control Miss Helen Douglas, W5LGY. For further info contact L. E. Harrison, W5LR, 2410 Salerno Drive, Dallas 24, Tex.

Texas — The Permian Basin Amateur Radio Club will hold a Hamfest-Swapfest on June 2, at Ector County Coliseum Barn A, 42nd and Andrews Highway, Odessa, Tex. There will be talk-in on 3885 kc. The program includes movies for the children, bridge, canasta and dominoes for the ladies, dealer exhibits, RACES meeting, MARS meeting, an ARRL speaker, and a barbecue dinner. There will be plenty of tables and room for the swapfest, so bring all your swap gear. Registration is $1.25 in advance, or $1.50 at the door. For further info or pre-registration write PBARC, Box 1406, Odessa, Tex.

Virginia — The annual Roanoke Valley ARC will be held on May 25 and 26 at Vinton War Memorial, Vinton, Va. Open house Saturday, dance Saturday night. Playgrounds for children. Tennis courts. Sell and swap. Contests and prizes. Registration $2. Sunday meal $1.25, children 75¢. For further info contact Walter E. Wilson, Roanoke Valley ARC, Box 2002, Roanoke, Va.

Washington — The Amateur Radio Association of Bremerton will hold its annual hamfest and banquet (family style fried chicken) on Saturday, May 18, at the Sons of Norway Hall. Registration opens at 1300, dinner at 1900. During the afternoon there will be "bunny" hunts, a QCWA meeting, technical talks, c.w. contests, ragchews, etc. After the banquet, entertainment and dancing. Registration prior to May 10, $4.50 per person, $5.00 after that date and at the door. For reservations and further info, contact Harry W. Jackson, W7MCW, Route 5, Box 809, Bremerton, Washington.

Wisconsin — The annual Southeastern Wisconsin hamfest, sponsored by the Racine Megacycle Club, will be held at Dania Hall, 1019 State St., Racine, on May 25. Registration will begin at noon. Afternoon activities will include traffic nets and MARS meetings along with equipment displays. A roast beef/turkey dinner will be served at 1800. Entertainment will be followed by dancing. Ticket price is $3.75 per person. For additional information and registrations, write to Phil Neumiller, W9HAG, 1110 Summerset Drive, Racine, Wisconsin.

Maryland — A hamfest on June 2, 1963, at Marshall Hall, Maryland, sponsored by the Confederate States Rebel Net and the Confederate States Amateur Radio Club. In addition to the Rebel Hamfest there will be a dinner-dance at the American Legion Hall, Oxon Hill, Maryland, on 1 June 1963. The Rebel Queen will be selected at the dinner-dance. For further info contact Dave Danser, W4GVQ, 4900 Bristow Drive, Annandale, Virginia.

Improving the C.W. Selectivity of the Collins 75A-4

(Continued from page 57)

For those who do not have a 500-c.p.s. mechanical filter in their receivers and who like to experiment, improved selectivity can be achieved by misadjusting C_1 slightly to produce a rejection notch on one side of the crystal peak and then positioning the receiver's rejection tuning notch to the opposite side. This technique is not worth the trouble when a 500-c.p.s. mechanical filter is installed, however.

With S_1 off, the 75A-4 performs exactly as though the filter were not installed. T_1 produces no noticeable increase in selectivity, and the adjustment of R_1 assures no change in gain.

With S_1 in the NO. 1 or NO. 2 position, the

(Continue on page 168)

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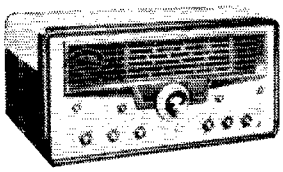
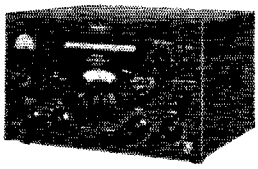
SPECIALS OF THE MONTH

IDEAL SSB RECEIVERS





SX-101A ..... $229.50 75A4 ..... $395.00

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Trigger specializes in ham gear that's *attractive* in appearance and *dependable* in performance. All components that can contribute to malfunction are replaced — insuring trouble-free performance.

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32S1	479.50
75S1	349.50
30S1	895.00
75A3	367.50
HQ145C	179.95
HQ150	179.50
HQ170C	249.50
HQ180C	297.50
SX100	219.50
SX111	187.50
SX140	84.50
SX115	469.75
HT32B	497.50
HT33	249.50
HT37	339.50
NC109	99.75
NC155	147.95
NC190	149.75
NC270	179.75
DRAKE 1A	144.75
RME6900	237.95
GONSET IV-2mtr	239.95
GSB101	199.50
TX1-APACHE	199.50
DX100B	179.95
JOHNSON VALIANT	239.50
CLEGG 99er	99.50
LAFAYETTE HE45A & VFO	109.50

ADDITIONAL SPECIALS

6146 tubes, limit six to a customer ..$3.29 ea.
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*ORDER BLANK TO: (1) trade ur present gear, (2) order above units, (3) sell ur gear for cash.

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increased c.w. selectivity is there to be used and appreciated. Tuning must be done more carefully and the Collins 4-to-1 reduction tuning knob will be welcome if your receiver is fitted with it. You are now equipped with as good a c.w. receiver as is available in this day and age — and it works as well as it ever did on sideband! QST

Pulse — Part IV

(Continued from page 63)

in the large amount of surplus radar pulse equipment now available. The authors are by no means authorities on the surplus market, but some useful equipments are listed below:

APR-4, with tuning head TN-54 Radar receiver 2150 to 4000 Mc. Noise figure poor. L.o. in tuning head.

APR-5A Radar receiver, 1000 to 5000 Mc., in one assembly. Noise figure probably poor.

APR-9 with tuning head TN-128 Radar receiver, 1000 to 2600 Mc. Noise figure poor. L.o. in tuning head.

APG-5 or APG-15 Radar for B-29 tail gun, 2700 to 2900 Mc. Has pulsed 2C43 transmitter and 2C40 l.o., in cavities similar to those described in this series. Probably convertible to 2300 Mc. without too much difficulty.

2J39 Integral-magnet magnetron. 9-kw. peak power output, 3267 to 3333 Mc.

Response to previous articles of this series, and to demonstrations put on by the authors, indicates a considerable latent interest in microwave work. It is hoped that acquaintance with pulse will encourage more amateurs to try the space-age microwave bands, where there are many new opportunities for the operator or experimenter — newcomer or old-timer. QST

Bibliography

For those amateurs who wish to acquire a more basic understanding of microwave circuits and techniques, the following low-cost publications are available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Generation and Transmission of Microwave Energy, Cat. No. D101.11:11-673. 204 pp., ill. Price, $1.00.

Microwave Techniques, Cat. No. D211.2:M58. 188 pp., ill. Price, 55 cents.

Microwaves and Waveguides, Cat. No. D211.2: M58/2. 56 pp., ill. Price, 25 cents.

Radar Electronic Fundamentals, Cat. No. N29.2: R11/3. 474 pp., ill. Price, $1.50.

Radar System Fundamentals, Cat. No. N29.2: R11/2. 394 pp., ill. Price, $1.25.

Radar Circuit Analysis, Cat. No. D301.7:52-8. 480 pp., ill. Price, $5.25.

Pulse Techniques, Cat. No. D101.11:11-672. 102 pp., ill. Price, 55 cents.

Most of these are training manuals used by the armed services. They are clearly written, with numerous illustrations.

Corrections

In Part III, Fig. 5, some dimensions of the antenna were omitted. The dipole element diameter is ¼ inch, as is the coax inner conductor. The outer conductor of the coax is ⅝-inch o.d. copper tubing, $\frac{1}{32}$-inch wall. The end disk thickness is not important, other than that it be rigid. Brass or copper $\frac{1}{16}$ inch thick is suitable.

A dimension was omitted in Fig. 6B of Part III. The length of the plate choke assembly is 1¼ inches.

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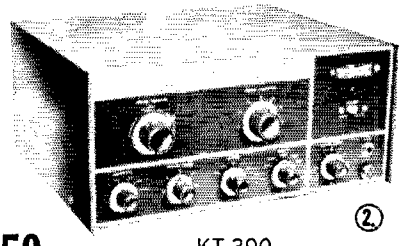

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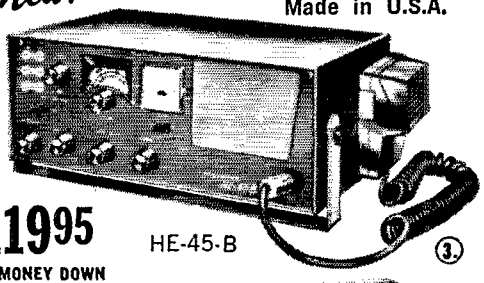

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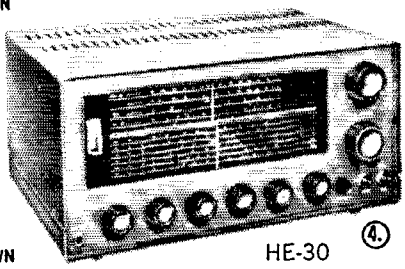

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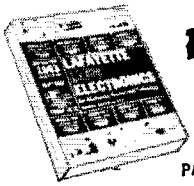

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W3EWE	33,777-	210-54-A-38	
W3GDK	20,724-	157-44-A- –	
K3RPU	19,551-	133-49-A-30	
K3TGM	17,907-	127-47-A-30	
K3EYL	14,931-	139-37-A-13	
K3LBI	12,909-	108-40-A-25	
K3LBM	11,385-	116-33-A-17	
W3UQV	11,115-	95-39-A-14	
W3ZSS	10,218-	131-39-B-21	
K3EIH	9405-	96-33-A-13	
W3IGW	9396-	87-36-A- 6	
K3KLQ	7995-	103-26-A-17	
K3IOK	5544-	231- 8-A-27	
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W3DYL	4681-	76-31-B- 7	
K3MNT	4575-	61-25-A-27	
W3ZQP	3816-	53-24-A-14	
W3ECR	3654-	42-29-A- 5	
K3HNW	3536-	68-26-B-15	
W3EEN	1989-	40-17-A-20	
K3DUW	1890-	126- 5-A-21	
W3BRU	1350-	90- 5-A-18	
W3IAR	1350-	40-15-A-13	
K3GUO	1147-	26-15-A- –	
W3RAE	1050-	25-14-A- 4	
K3AWD	862-	41- 7-A-10	
K3NGC	756-	36- 7-A- 5	
W3ZXV	738-	41- 6-A- 6	
W3FWC	630-	30- 7-A- 5	
W3LUW/3	480-	32- 5-A- 5	
K3OQM	276-	46- 2-A-14	
K3QFH	234-	13- 6-A- 4	
K3PXX	216-	36- 2-A-16	
W3UMK	108-	12- 3-A-10	
K3RZB	54-	9- 2-A- 1	
W3URT	33-	11- 1-A- –	
W3LEZ	27-	3- 3-A- 1	
K3HNP	20-	5- 2-B- 1	
W3CBH	9-	3- 1-A- 1	
W3MGF (WA2HTY, K3HQC)			
	21,060-	195-36-A-30	
K3JXC (WA2GSO, K3JXC)			
	10,602-	93-38-A-31	
K3MFI (K3s MFI MGN)			
	3888-	216- 6-A-39	
K3TUX (3 oprs.)			
	3150-	176- 5-A-32	
K3RHC (K3s EUJ RHC)			
	2430-	55-15-A-12	
W3MKA (K3s HWX SPS, W3VDN)			
	1488-	62- 8-A- 4	
K3PWM (K3s MHD PWM)			
	300-	50- 2-A- 7	

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W3ZKH	153,300-	701-73-A-40
W3AYD	29,646-	183-54-A-23
K3OKJ	18,060-	140-43-A-16
K3OGS	5472-	57-32-A- 7
W3PZW	3042-	61-26-B- 6
K3LYW	858-	26- 2-A- –
W3CQH	387-	43- 3-A-10
W3VRJ	216-	12- 9-B- –
K3GUU	3-	1- 1-A- –
KN3DGB	3-	1- 1-A- 1
K3OXL (K3s OSX OXL)		
	21,156-	173-41-A-17
W3TSA (K3LXS, W3UYC, K9JPZ)		
	264-	11- 8-A- 4

Southern New Jersey

WB2BGH	46,116-	246-63-A-19
W2QKJ	29,412-	260-57-B-33
W2ORA	26,487-	164-54-A-26
WA2EIY	25,137-	171-49-A-22
K2BQW	18,414-	141-44-A-34
WA2JCF	14,859-	127-39-A-11
K2BFV	10,643-	85-43-A-16
WA2NEO	10,027-	95-35-A-19
W2BLV	7182-	57-42-A- 8
WA2NXV	6480-	73-30-A- 8
WA2PHY	5859-	93-21-A- –
K2ODZ	4374-	81-18-A- 9
W2VX	3969-	49-27-A-10
W2DMR	3562-	69-26-B-15
WA2GJE	1962-	110- 6-A-14
W2BKI	1767-	31-19-A- 4
K3MKD	594-	18-11-A- 4
W2OWA	588-	28- 7-A-12
WA2WMA	450-	50- 3-A- 4
WA2KRX	330-	55- 2-A- 5
WA2MGV	225-	25- 3-A- 9
K2SXN	174-	29- 2-A-10
WA2WUJ	84-	14- 2-A-11
W2FZP	66-	11- 2-A- 3
WA2MGV/2	33-	6- 2-A- –
WA2EUH (2 oprs.)		
	963-	107- 3-A-16

Western New York

K2GXI	172,074-	806-72-A-40
W2VDX	65,520-	336-65-A-36
K2SQX	27,000-	180-50-A-24
WA2KTI	15,840-	132-40-A-31
WA2FUE	8568-	84-51-B- 7
WB2AFQ	8185-	79-35-A-16
WA2PQG	7128-	88-27-A-15
W2YRL	5100-	68-25-A- –
WA2QFK	3975-	53-25-A-13
WA2STD	2576-	56-23-B-12
WA2TUA	2520-	35-24-A-10
WA2QMJ	60-	5- 4-A- 1
W2IYB	3-	1- 1-A- 1

Western Pennsylvania

K3SIQ	25,200-	150-56-A-24
W3SMX	17,352-	121-48-A-25
K3BDI	11,172-	98-38-A- –
K3GHK	6039-	61-33-A-13
W3ZVA	4072-	52-27-A- 8
W3ISZ	3234-	77-14-A- –
K3LYK	1776-	37-16-A-14
K3NUY	1665-	37-15-A-20
K3PPY	1209-	31-13-A- 5
K3AHY	924-	22-14-A- 5
K3RGV	450-	15-10-A- 2
W3LIV	288-	16- 6-A- –
K3KKI	275-	13-11-B- 3
W3QPF	225-	15- 5-A- –
W3SLX	72-	12- 2-A- –
W3RFM	48-	16- 1-A- 1
W3LQD	39-	13- 1-A- –
K3AKR/3	36-	12- 1-A- 3
K3GIH	36-	12- 1-A- 2
K3PML	36-	12- 1-A- 7
K3ELL	33-	11- 1-A- 1
W3ZBJ	24-	8- 1-A- 1
K3LVO	15-	5- 1-A- 3
K3OIH	12-	4- 1-A- –
W3JHG/3	3-	1- 1-A- –
W3MBB	2-	1- 1-B- 1
K3HKK (K3s AHY AKR STG)		
	8058-	79-34-A-15

CENTRAL DIVISION

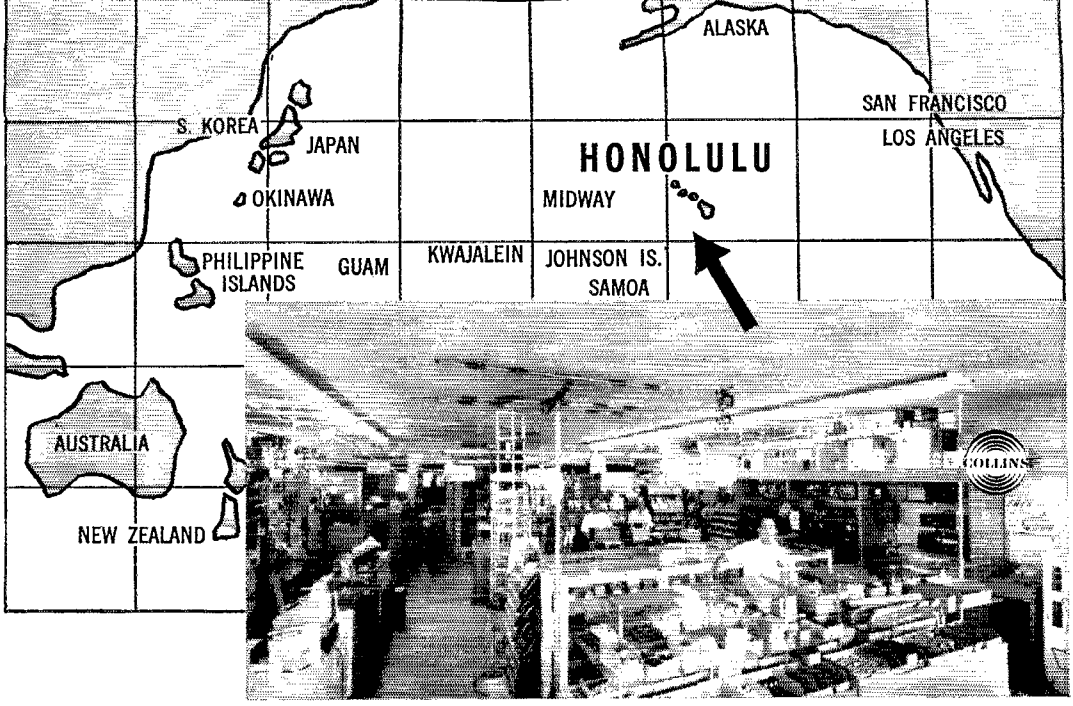
Illinois

W9JYJ	91,761-	420-73-A-38
W9NZM	81,546-	383-71-A-26
W9QXO	59,535-	316-63-A-36
W9CPK	48,290-	257-63-A-21
K9MQI	46,364-	346-67-B-28
K9RNQ	43,848-	252-58-A-20
W9RHV	37,524-	212-59-A-30
K9ZBI	35,430-	211-56-A-29
W9UZC	31,959-	303-53-B-24
W9NZS	18,081-	123-49-A-20
K9ZSY	16,422-	120-46-A-16
W9QDM	14,688-	153-48-B-28
K9CBT	12,300-	101-41-A-16
W9JJT	11,742-	103-38-A-16
K9TEA	11,250-	75-50-A-18
K9WMU	10,290-	96-35-A-12
K9TAW	9234-	81-38-A-21
W9CRN	8775-	65-45-A-13
K9KHZ	8352-	87-32-A-11
K9EYU	6480-	90-24-A-15
K9KGD	5872-	75-27-A-12
W9KLD/9	4941-	61-27-A- 5
K9UZX	4251-	55-26-A-18
K9RGG	3567-	63-29-B-11
WA9DKM	3354-	43-26-A- 5
WA9ATD	2805-	43-22-A- 5
W9PNY	2376-	36-22-A-11
K9MSD	2113-	31-22-A- 8
K9UFK	1440-	30-16-A- 2
W9TVA	1392-	29-16-A- –
K9UQN	1260-	31-14-A- 4
K9ALP	1128-	24-16-A- 1
K9DWR	675-	45- 5-A- 8
W9IRH	540-	15-12-A- 1
K9IYV	75-	5- 5-A- 2
K9UCG	9-	3- 1-A- 1
W9GFF	3-	1- 1-A- 1
W9YYG	3-	1- 1-A- 1
W9OKM (W9s OKM YYG)		
	49,632-	376-66-B-39
W9OKV/9 (6 oprs.)		
	40,992-	245-56-A-37
K9LRK (K9s LRK ZBY)		
	23,814-	167-49-A-21
K9AHB (5 oprs.)		
	20,604-	207-51-B- –
K9KQR (K9s FBA KQR, WA9AXL)		
	4725-	63-25-A-21
K9GHK (K9s GHK TZX)		
	4242-	52-28-A-14
W9EJX (4 oprx.)		
	344-	22- 8-B- –

Indiana

K9PNV	74,727-	361-69-A-30
W9LKI	53,431-	269-63-A-31
WA9BAI	44,100-	245-60-A- –
W9AQW	38,976-	204-64-A-19
K9PAW	38,280-	325-60-B-34
K9OYD	35,568-	210-57-A-29
K9MAN	20,724-	157-44-A-10
W9EPI/9	13,770-	104-45-A-23
W9BUQ	12,672-	132-48-B-27
WA9BRD	7175-	103-35-B-13
K9FUR	5568-	63-32-A-27
K9ZFH	1938-	41-17-A-10
W9NAA[2]	438-	38- 4-A-15
K9RHN/9	264-	11- 8-A- 1
K9VRU[2a]	128-	8- 8-B- 1
W9VNE	84-	7- 6-B- 1

(Continued on page 172)



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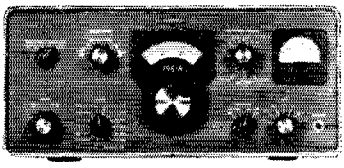

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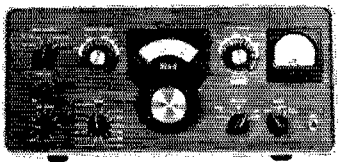
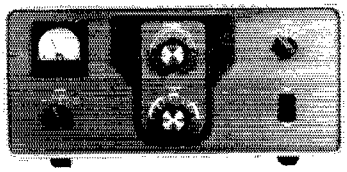


32S-3 Transmitter — $750



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K9CLZ	46,530-	246-66-A-30
W9VZP	18,360-	170-54-B-12
K9MZJ	18,000-	125-48-A-13
W9KQD	9504-	100-32-A- 7
K9ESK	4238-	57-25-A-14
W9ROM	2376-	44-27-B- 1
W9CJO/9	1898-	37-26-B- 2
K9JPS	936-	24-13-A- 4
W9YT (K9s ABP HWE, W9OKN)		
	20,145-	199-51-B-11

DAKOTA DIVISION

North Dakota

KØVWG	47,817-	348-69-B-39
KØALV	47,040-	375-64-B-38
WAØAAD	39,480-	235-56-A-27
WAØAYL	14,400-	121-40-A-34
WØCGM	5400-	78-35-B- 7
WØCZL	2205-	35-21-A-10
KØPVH	1248-	26-16-A- 4
KØRSA	45-	5- 3-A- 1

South Dakota

WØPRZ	87,600-	604-73-B-33
WØWUU	1050-	35-15-B- 3
KØYDM (KØs JTD PLW YDM)		
	32,760-	183-60-A-29

Minnesota

KØQQS	49,824-	256-65-A-28
WØVIP	31,680-	240-66-B-30
KØQVF	30,504-	164-62-A-24
KØIJU	28,958-	176-55-A-40
WAØCAI	18,302-	128-49-A-21
KØAYU	13,029-	101-43-A-14
WAØAAM	6603-	71-31-A-14
WØQKJ	4270-	78-34-A-17
KØIOA	4320-	72-20-A- –
KØZBM	3300-	44-25-A- 3
KØZOH	2768-	41-27-A- 6
KØRPW	60-	5- 4-A- 2
KØFVF (4 oprs.)		
	27,378-	176-54-A-33
WØDQL (WØDQL, WNØDIE)		
	5208-	58-31-A- 8

DELTA DIVISION

Arkansas

K5ALU	131,342-	650-69-A-37
WA5AER	22,993-	225-43-A-22
W5AQF	11,970-	140-57-A-19
K5WVC	2951-	41-24-A- 6

Louisiana

W5KC	175,368-	802-73-A-40
K5MOJ	101,505-	508-67-A-28
K5FLY	69,948-	522-67-B-25
K5WTL	53,600-	403-67-B-29
W5LDH	51,243-	277-62-A-20
K5UNP	11,124-	103-36-A-10
WA5BQA	10,658-	111-35-A-15
W5IGD	5056-	79-32-B-17
W5QPS	4059-	62-22-A- 6
W5LJY (6 oprs.)		
	77,520-	571-68-B- –

Mississippi

K5MDX	285,357-	1303-73-A-40
K5YPV	4511-	51-31-A-14
K5FNS	2541-	39-22-A- 6

Tennessee

WA4FJH	12,120-	101-40-A-26
WA4CUQ	10,200-	85-40-A-20
W4OGG	1152-	16- 6-A- 1
WA4AVX (K4FKO, WA4AVX)		
	6417-	70-31-A- –

GREAT LAKES DIVISION

Kentucky

WA4AXL	40,590-	246-55-A-16
K4JGC	13,671-	110-42-A-14
W4KZF	11,180-	130-43-B-12
K4LRX	11,550-	175-33-B-15
K4VUD	9602-	90-37-A- 9
WA4BBN	855-	57- 5-A- 2

Michigan

W8BNF	65,828-	331-67-A-39
K8BBM	32,589-	219-51-A-40
K8GPC	31,598-	193-55-A-31
K8BQK	15,420-	130-40-A-16
K9PQR/8	14,310-	106-45-A-17
K8LZF	6120-	68-30-A-10
K8RPA	5856-	61-32-A- 9
K8SFZ	5664-	59-32-A- –
K8YRK	3239-	52-21-A- 6
K8SGA	2610-	44-20-A-24
W8KNP	576-	16-12-A-30
WA8ASV	378-	18- 7-A- 3
K8DHG	180-	10- 6-A- 4
W8DM	8-	2- 2- B-1

Ohio

K8NPD	82,109-	412-67-A-25
K8NPH/8	81,705-	427-65-A-37
W8HBI	58,960-	440-67-B-16
W8LLT	44,753-	230-65-A-19
K8AAG	36,324-	197-64-A- –
W8BFH	26,093-	179-49-A-26
W8KZH	25,872-	177-49-A-20
W8KDW	25,042-	158-53-A- –
W8AJW	20,400-	36-50-A-10
W8SJU	17,220-	40-41-A-23
W8NCV	14,852-	156-46-B-28
W8KCK	13,764-	111-62-B-16
W8BIM	9480-	79-40-A- –
K8LCN	7344-	68-36-A-11
K8STP	6138-	62-33-A- –
W8CHX	5406-	54-34-A-11
W8NYS	5085-	56-30-A- 4
W8NQR	4352-	107-12-A-29
WAJR	2864-	42-23-A- 7
K8OHU	2423-	45-19-A-12
K8ZPK	2237-	41-19-A- 6
W8YAB	2295-	45-17-A-20
W8SUS	1920-	40-24-B- 5
K8YYK	1776-	148- 4-A-21
W8GTS	1620-	30-18-A- 3
W8CJN	1080-	24-15-A- 1
W8KCD	1035-	23-15-A- 6
W8OYV	960-	40- 8-A- 5
K8CVJ	840-	20-14-A- 4
K8WQE	616-	22-14-B- 3
W8IKM	540-	18-10-A- 2
K8EBF	450-	15-10-A- 4
K8PYD	378-	14- 9-A- 1
W8LAG	288-	18- 8-B- 2
W8JRG	272-	17- 8-B- 1
W8ZPF	144-	8- 6-A- 1
WA8ADJ	144-	8- 6-A- –
W8ZPF/8	108-	18- 2-A- 1
K8SWE	64-	8- 4-B- –
K8JZI	12-	4- 1-A- 2
W8IQT/8 (K8s CLX DGU, W8IQT)	30,906-	284-56-B-40
K8UQA (3 oprs.)		
	15,048-	456-11-A-35
W8RCC/8 (multi-opr.)		
	12,126-	141-43-B-19

HUDSON DIVISION

Eastern New York

WA2CLQ	69,517-	361-65-A-40
WA2YJR	51,824-	204-52-A-26
WA2HFT	10,101-	91-37-A-13
W2BYI	2511-	47-27-B-20
WA2RUD	456-	19- 8-A- 3
WA2HLH	126-	7- 6-A- 1
WA2PPE	108-	9- 4-A- 1

N. Y. C.-L. I.

K2IEG	178,376-	815-73-A-31
W2JQZ	74,400-	389-64-A-40
WA2KIM	67,614-	386-59-A-40
WA2LXB	64,643-	340-65-A-38
W2YMZ	53,505-	309-58-A-33
W2IYW	43,487-	278-53-A-35
K2RAR	31,323-	197-52-A-20
W2MGV	27,600-	184-50-A-25
W2JGQ	24,300-	180-45-A-24
K2JFW	19,500-	130-53-A-16
K2HQR	17,712-	123-48-A-16
WA2QMC	17,160-	130-44-A-21
W2OME	16,560-	120-46-A-15
K2YOR	15,480-	129-40-A- –
WA2OAX	13,755-	133-35-A-17
W2JFU	13,653-	123-37-A-16
W2QFN	12,425-	126-33-A-12
WA2SYT	10,179-	120-29-A-16
WA2WYH	9216-	97-32-A-16
W2TUK	6006-	77-26-A- 3
WA2SQY	3762-	66-19-A- 5
W2PDU	3408-	71-16-A- 6
K2KJX	2511-	47-27-B- 9
W2OQI	2442-	64-19-B-12
WA2QNS	2100-	50-21-B-10
WA2HRX	2025-	45-15-A- 7
K2YGM	1850-	124- 5-A-13
W2NNH	1764-	42-14-A- 6
K2GTK	1680-	40-14-A- 3
WA2EER	1638-	42-13-A- 4
W2OWS	1580-	34-15-A- 9
WA2JIS	1209-	31-13-A- 3
W2IH	1050-	35-10-A- 4
K2JZF	994-	26-13-A- 8
WA2TBX	988-	26-19-B- 4
W2INT	924-	28-11-A-11
WA2IEC	770-	28-14-B- 6
W2MQB	637-	25-13-B- 3
W2EBT	476-	17-14-B- 2
K2CMV	459-	17- 9-A- 2
WB2CBU	459-	17- 9-A- 3
K2RPW	423-	47- 3-A- –
WA2TYU	378-	21- 9-B- 4
WA2IAP	375-	25- 5-A- –
WA2RJJ	360-	30- 4-A-13
WA2ZGQ	351-	13- 9-A- –
WB2CCF	288-	32- 3-A- –
K2EAF	240-	40- 4-A- 6
WA2TGL	180-	10- 6-A- 2
W2NBI	162-	27- 2-A- 8
WA2DSR	120-	20- 2-A- 4
K2OTZ	90-	30- 1-A- –
W2AGT	78-	13- 2-A- 4
W2MZB	66-	22- 1-A- 1
WA2RUE	51-	17- 1-A- 2
W2GKZ	50-	5- 5-B- 1
W2KLS	48-	16- 1-A- 2
WA2HZW	45-	5- 3-A- 5
WA2TZV	42-	14- 1-A- 2
WA2YGC	36-	12- 1-A- 3
K2BTT	33-	11- 1-A- 1
WA2RJZ	24-	4- 2-A- 1
WN2ACF	15-	5- 1-A- 1

(Continued on page 174)

SR-150

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SX-117

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SR-150 AMATEUR BAND TRANSCEIVER

Hallicrafter's new SR-150 is a rugged, lightweight amateur band transceiver designed for maximum flexibility and convenience of operation in fixed or mobile situations. Power requirements: 12.6V at 5A; 250V at 220ma; 500V at 250 ma (transit only); —75V at 10ma. Frequency coverage: eight-band capacity, full coverage provided for 80, 40, 20 and 15 meters; 10M crystals furnished for operation on 28.5 to 29.0 Mc. Transmitter section: 2 12DQ6B output tubes. Fixed, 50Ω Pi network. Power input 150W P.E.P. SSB; 125W. Carrier and unwanted SB suppression 50db; distortion prod., 30 db. Audio: 400-2800 c.p.s. at 3db. Sensitivity better than 1 μv for 20 db. signal-to-noise ratio. 6½x15x13".

20P1105E, SR-150, Ship. wt. 17 lbs.....$650.00
20P1106E, P-150AC, AC Supply with Speaker for SR-150.. 99.50
20P1107E, P-150DC, DC Power Supply for SR-150..... 109.50
20P1108E, MR-150, Complete Mobile Mount for SR-150.... 39.95

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The SX-117 is a triple conversion heterodyne 12 tube receiver. Its advanced communications technology and proven, dependable design have been carefully blended to give you maximum performance under all potential enviromental conditions. It utilizes a transmitter type VFO which can be used as a crystal locked oscillator. 1st and 3rd conversion oscillators are crystal controlled. The sensitivity of this outstanding instrument is better than 1 mv. The tuning mechanism is back-lash free and operates at a constant rate. Front panel switch for selection of sidebands. The selectivity of the receiver is variable in three steps from 500 to 5000 cycles. The excellent engineering uses a product detector for SSB and CW and an envelope detector for AM. The SX-117 covers 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.5-29 mc. Dimensions: 15x7⅞x13".

20P790E, SX-117, Ship. wt. 21 lbs. $379.50

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K2AAW	9-	3- 1-A- 1	
W2TNI	9-	3- 1-A- 1	
WA2QMQ	3-	1- 1-A- 1	
WA2TNX (WA2s TNX YSV YTO)	37,520-	335-56-B-32	
WA2LQO (5 oprs.)	22,260-	210-53-B-21	
WA2WIO (WA2s VHY WIO)	22,208-	167-45-A-30	
WA2ODI (WA2s MUA ODI)	21,221-	152-47-A-15	
WA2VLK (K2JCC, WA2VLK)	21,079-	152-47-A-23	
WA2YHS (WA2s YDB YHS)	3381-	161- 7-A-32	

Northern New Jersey

W2JKH	75,122-	375-67-A-37
K2YFE	44,010-	245-60-A 24
WA2SRV	25,000-	158-50-A-29
W2NWX	20,631-	150-46-A-25
WA2UYC/2	17,928-	125-48-A-32
WA2REM	2820-	48-20-A- 4
K2GDR	480-	16-10-A- 9
WB2CRS	405-	47- 3-A- –
WA2IRN	357-	17- 7-A- 4
W2BQK	208-	13- 8-B- 3
WA2TMT	102-	17- 2-A- 2
WA2ZRR	20-	5- 2-A- –
WB2EEP	9-	3- 1-A- 1
K3NBC/2	3-	1- 1-A- 1
WA2DZB	3-	1- 1-A- 1
WA2CCF (WA2s CCF TTF)	378-	14- 9-A- 2

MIDWEST DIVISION

Iowa

KØJGH	38,250-	218-60-A-29
WØTCF	20,776-	200-53-B-25
WØSQN	12,423-	101-41-A- 8
KØHJS/Ø	11,700-	100-39-A- 6
KØPLH	6669-	60-38-A-20
KØJFZ	6525-	75-29-A-25
WØBVR	5662-	78-38-B-17
KØAAR	3900-	65-20-A-25
KØVEJ	840-	20-14-A- –
WAØBWV	693-	21-11-A-12
WØSDV	198-	22- 3-A- 4
KØEER/Ø	12-	4- 1-A- 1
WØERG (5 oprs.)	40,887-	231-59-A-34
WØMHC (2 oprs.)	11,100-	93-40-A- 8

Kansas

KØTOA	59,182-	305-65-A-20
WØQJG	53,917-	292-62-A-13
WØBAA	46,002-	349-66-B-23
KØVQE	26,550-	148-60-A-28
WØCSH	15,732-	114-46-A-11

Missouri

KØUWZ	100,584-	512-66-A-38
WØBTD	73,278-	354-69-A-28
KØYIP	20,250-	135-50-A-17
WØMTO[4]	4611-	53-29-A- 7
WAØAJV	4092-	64-33-A-18
KØKXC	2952-	41-24-A- 7
KØDXU/Ø	1825-	39-25-B- –
KØETY	3113-	42-25-A- 7
KØJPL	630-	23-14-B- 2
WØEEE (4 oprs.)	98,712-	463-72-A-34
KØAXU (11 oprs.)	67,758-	497-69-B-38
WØZLN (5 oprs.)	39,860-	243-57-A-39

Nebraska

WØGYM	57,392-	440-68-B-25
KØVVO	33,408-	193-58-A-21
KØWSR	25,046-	195-44-A-16
KØYWL	18,900-	141-45-A-14
KØFBD	5460-	67-28-A-10
KØUXT	903-	22-14-A- 4
KØCVA (K5GOX, KØCVA)	35,414-	261-58-A-21
WØFBY (WØFBY, WNØDZO)	3102-	94-11-A-26

NEW ENGLAND DIVISION

Connecticut

K1ANV	67,000-	500-67-B-27
K1TTA	42,435-	316-46-A-35
K1OSY	42,036-	341-62-B-22
K1JBS	23,478-	183-43-A-28
W1CKA	23,400-	199-60-B-26
K1RPQ	20,400-	138-50-A-27
K1QUF	16,940-	154-55-B-10
K1WNT	14,930-	135-37-A-35
K1TVD	11,016-	102-36-A- 7
K1QJZ	6510-	78-28-A-20
K1RPS	6279-	85-39-B-11
K1NTR	5720-	109-26-B-18
K1PTK	3636-	52-24-A-20
W1AW[4,5]	2352-	49-24-B- 2
K1UFL	1104-	23-16-A- 4
K1QPN	924-	25-14-A- 5
K1JWR	270-	10- 9-A- 2
K1PFD	126-	7- 6-A- 2
K1PQA	36-	4- 3-A- 3

Maine

W1GKJ	66,033-	483-69-B-40
W1DIS	30,988-	256-61-B-18
W2WTG	9936-	92-36-A-13
W1VXV	147-	7- 7-A- 2

Eastern Massachusetts

W1FRR	102,480-	732-70-B-38
W1ONK	60,672-	474-64-B-23
K1LXQ	32,175-	195-55-A-29
K1LKR	30,156-	185-56-A-17
K1QJT	20,511-	129-53-A-18
K1NO	19,778-	149-45-A-21
K1UQR	13,545-	106-43-A-22
W1JSM	5880-	70-28-A- 7
W1BOD	4290-	72-30-B- 3
W1EOA	3240-	54-24-A- 7
W1QKJ	2970-	33-30-A- 9
K1RWZ	2805-	44-22-A- 3
K1CHY	1917-	36-18-A-22
W1PLJ	546-	21-13-B- 2
K1VGM	315-	15- 7-A- 2
K1MEM	48-	4- 4-A- 1
W1TTD	27-	3- 3-A- 2

Western Massachusetts

K1NWF	36,509-	214-57-A-20
K1WQQ	35,754-	315-58-B-34
W1SBW	8640-	80-36-A-18
KN1YLU	180-	20- 3-A- 8

New Hampshire

W1FZ	84,146-	407-69-A-30
W1ET[6]	61,644-	469-66-B-33
K1RTB	6240-	65-32-A- 4
W1QKA	6075-	75-27-A-10
W1RCC	756-	21-12-A- –

Rhode Island

W1YRC	34,104-	234-49-A-20
W1HQV	14,899-	159-47-B-20
K1PAM	11,583-	100-39-A-10
K1VSK	1785-	36-17-A-12
K1USD	147-	8- 7-A- 3
K1QFI	12-	4- 1-A- 1
K1TTD	9-	3- 1-A- 1
W1DDD (K1s QFI TTD)	3666-	48-26-A- 5

Vermont

K1AEG/1	39,730-	244-55-A-27
K1WZX	16,113-	131-41-A-20
K1MVV	7290-	81-30-A -7

NORTHWESTERN DIVISION

Alaska

KL7AIR[7]	20,412-	195-54-B-14
W5BFZ/KL7	17,126-	117-49-A-13

Idaho

W7NGA	8832-	92-48-B- –

Montana

W7CBY	41,391-	256-54-A-21
K7KME	22,932-	156-49-A-12
W7TYN	15,744-	128-41-A- –
W7GBL	15,480-	189-43-B-24

Oregon

K7MLO	46,640-	265-59-A-20
K7GIP	3-	1- 1-A- –

Washington

W7BSW	202,575-	925-73-A-34
W7OVJ	28,003-	194-49-A-21
K7IND	14,250-	146-50-B-18
K7OTG	3705-	48-26-A-35
K7HEF	684-	114- 2-A- –
K7HSD	396-	66- 2-A-10
K7JRE	84-	7- 4-A- 1
W7DK/7 (6 oprs.)	49,726-	272-61-A-34

PACIFIC DIVISION

Nevada

K7QPK	63,180-	367-60-A-32
W7KOI	12,549-	138-47-B-16
W7YKC	1023-	31-11-A- 6

Santa Clara Valley

K6VGW	112,710-	564-68-A-40
K6ERV	83,556-	428-66-A-34

East Bay

W6KG	137,034-	662-69-A-39
W6OJW	900-	20-15-A- 3

San Francisco

WA6AUD	29,097-	183-53-A-24

Sacramento Valley

WA6PVT	8109-	80-34-A-11

San Joaquin Valley

W6KJS	101,470-	695-73-B-33
WA6FOL	2187-	27-27-A- 4
K6VFE	700-	25-14-B- –
W6VMB	147-	7- 7-A- 1

ROANOKE DIVISION

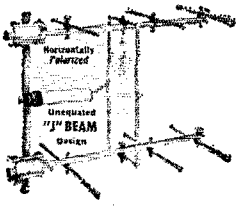
North Carolina

WA4AAL	40,545-	276-51-A-33

South Carolina

W3AZD/4	102,510-	510-67-A-40
WA4GRA	15,984-	111-48-A-20

(*Continued on page 176*)



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- Priced from $18.95 up

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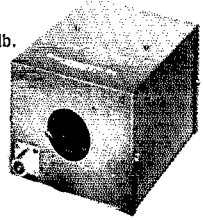
Gavin Mod. F-810 low pass filter attenuates second harmonic frequencies and above by 30db or more. Selector switch cuts in separate filters for each band.

Insertion Loss — Less than 1 db.
Power Rating — 1 KW
Impedance — 52 ohms
Size — 4"x5"x6"

Amateur net $24.75



MAVERICK II, 6 METER TUNABLE FILTER WITH OUTPUT POWER INDICATOR

Expressly designed for the 6-meter band, the Maverick II suppresses harmonics generated by 8 mc crystals or by SSB mixing. Five complete filter stages of K and M Derived types are tunable for optimum xmtr to antenna match and suppression of spurious frequencies. RF meter is calibrated directly *in watts for 6 meter band* (0-50, 0-400 w.). Rejection; more than 35 db. Insert loss: less than 1 db. Power Rating: 400 w. plate input. Cutoff Freq.: adjustable 50-54 mc. Impedance: 50-75 ohms. Size: 5"x3"x2". Standard UHF connectors.

MAVERICK II with meter $34.95
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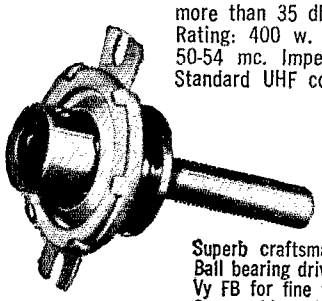

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Superb craftsmanship by Jackson Bros. of England. Ball bearing drive, ¼" dia. Shaft 1⅛" long, 6:1 ratio. Vy FB for fine tuning. Easily adaptable to any shaft. Comparable value $5.95. **Amateur net $1.50 ea. 10 for $13.50**

PRECISION BALL DRIVE DIAL

Another superb product of Jackson Bros. of England. 4" dia. dial with 6:1 ball drive ratio. Fits standard ¼" shaft. For that velvet touch...
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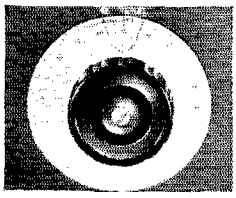
Does not include panel.



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Same as used in W2EWL SSB Rig—March, 1956 QST. *Three sets of CT windings for a combination* of impedances: 600 ohms, 5200 ohms, 22000 ohms. (By using center-taps the impedances are quartered). The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x ¾" w. x ¾" d. New and fully shielded.

Amateur net $1.39.
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W4ULY 10,062- 88-39-A-12
W4DPN 2600- 50-26-B-10

Virginia

W4BVV 141,489- 650-73-A-40
K4EQT 50,526- 401-64-B-35
K4ORQ[5] 33,173- 188-59-A-26
K4SHE 25,110- 186-45-A-26
K4TSL 17,662- 130-45-A-24
W4YYY 17,415- 137-43-A-20
K4CEK 15,120- 104-48-A-16
K4TZF 9900- 115-44-B-13
K4DYW 9360- 104-30-A-14
W4FLP 4290- 67-33-B- 7
K4WHN 882- 21-14-A- 4
K4IKF 9- 3- 1-A- 1

West Virginia

K8YBU 31,340- 231-70-B-18
K8MNG 90- 6- 5-A- 1

ROCKY MOUNTAIN DIVISION

Colorado

KØVVV 77,319- 409-66-A-38
WØGSP 43,560- 266-55-A-27
WØGOR 27,956- 241-58-B-31
WØBWJ 13,465- 96-47-A-16
WØREQ 13,038- 106-41-A-17
KØKRL 1248- 32-13-A-16
WØHEP 1218- 29-14-A- 7
KØIRH 1068- 28-12-A-19
KØFRJ 150- 10- 5-A- 1
WØGOQ 8- 2- 2-B- 1
KØVFZ (KØVFZ, WØCHH) 56,090- 317-61-A-32
WØANA (WØs ETT REQ. WAØBXR) 44,395- 343-65-B-30
WØYQ (4 oprs.) 25,950- 175-48-A-14

Utah

W7ZKL 52,470- 330-53-A-25
W7MWR 3630- 55-22-A- 4

New Mexico

W5PQA 75,402- 354-71-A-16
W5NXF 57,820- 418-70-B-25
W5MYM 47,824- 426-56-B-11
W5FHL 28,813- 170-57-A-22
K5HTT 11,934- 102-39-A-15
W5ONK 2112- 32-22-A- 3
W5RVZ 1404- 26-18-A- 6
K5VDI 105- 7- 5-A- 1
W5DAB 84- 7- 4-A- 4
K5WME 60- 5- 4-A- 1

Wyoming

W7QPV 20,299- 192-53-B-14
W3BNR/7 6327- 57-37-A-14
K7TLB 5448- 58-31-A- 5
K7DUT 624- 17-13-A- 4

SOUTHEASTERN DIVISION

Alabama

W4DS 31,780- 227-70-B-32
K8LTZ/4 15,651- 111-47-A-18
W5INL/4 9114- 109-42-B- 6
W4VDA 75- 5- 5-A- 2

Eastern Florida

K4FWF 131,400- 600-73-A-34
K4WIS 101,388- 512-68-A-30
W4CQQ 22,564-156-49-A-15
W4LVV 624- 16-13-A- 1
K4RQB 3- 1- 1-A- 1

Western Florida

WA4FIJ 17,967- 170-53-B-10
WA8AFV/4 15,500- 155-50-B-13

Georgia

K4KAZ 55,477- 289-64-A-33
K4PDL 32,940- 183-60-A-18
WA4CJP 29,904- 174-58-A- –
K4SLX 588- 98- 2-A-34
K4UON 90- 30- 1-A- –

West Indies

KP4BHR 36,414- 238-51-A-14
KP4BBN 24,327- 241-51-B-19
KP4BIE 6840- 76-30-A- 4

SOUTHWESTERN DIVISION

Los Angeles

K6EVR 288,721-1324-73-A-40
K6YVV 116,127- 567-69-A-36
K6CYG 101,640- 490-70-A-29
WA6WJG 82,420- 640-65-B-40
WA6QNN 77,562- 417-62-A-26
WA6MWG 71,820- 381-63-A-36
WA6GKJ 53,692- 444-62-B-40
WA6VJI 44,667- 356-63-B-22
K6HFZ 36,855- 294-63-B- –
W6CFM 33,947- 187-61-A-33
WA6FWA 31,044- 200-52-A-18
WA6JRD 29,088- 210-48-A-12
WA6MRK 27,075- 183-50-A-16
K6GOA 22,785- 157-49-A-23
WA6NUC 21,930- 172-43-A-13
WB6BGR 19,932- 151-44-A- –
K6OFO 18,420- 154-60-B-24
K6SUC 9078- 88-34-A- 7
W6NWQ 1472- 32-23-B- 3
WA6GDS 1080- 25-15-A- 2
WA6UTF 459- 17- 9-A- 2
WA6SLF 123- 21- 2-A- 2
W6TMY 27- 3- 3-A- 1
K6ICQ (K6s ICQ ICS) 26,364- 169-52-A-15
W6TO1 (4 oprs.) 6482- 72-29-A- –

Arizona

K7PXI 60,888- 344-59-A-20
W7WUC 31,436- 183-58-A-33
W7ENA 5040- 57-30-A- 5
KZQPO 4496- 56-27-A-12
KZTZL 1674- 54-31-B- 8
W7CPY 1152- 24-16-A- 5
W7ZMD 882- 25-12-A- 1

San Diego

WA6OJJ 51,660- 287-60-A-30
WA6QJX 41,330- 235-59-A-13
W6NAT 25,172- 203-62-B-17
K6EOX 11,221- 121-49-B-31

Santa Barbara

WA6JQG 18,300- 153-60-B-26
WA6ESM 8541- 74-39-A-15
W6YK 3132- 54-29-B- 3
WA6PFF 2795- 41-23-A-11
WA6KCM 18- 3- 2-A- –
WB6APT (WA6KCM, WB6APT) 720- 80- 3-A- –

WEST GULF DIVISION

Northern Texas

K5IID 107,100- 510-70-A-38
K5FLD 56,028- 406-69-B-26
W5HGA 51,408- 378-68-B-33
K5ODZ 29,928- 172-58-A-32
WA5ALB 23,930- 151-53-A-28
K5AML 19,890- 198-51-B-16
W5MOY 16,605- 126-45-A-13
W5TOO 12,285- 92-45-A- 8
K5ZAI 2691- 40-23-A- 4
WA5ASD 2484- 46-27-B- 7
K5CHH 280- 14-10-B- 2

Oklahoma

K5HWO 94,185- 460-69-A-38
W5IWL 71,082- 362-66-A-34
K5FSU 54,905- 291-63-A-38
WA5DAZ 39,771- 250-54-A-27
K5FEU 14,040- 120-39-A-10
K5EZD 11,988- 111-37-A-15

Southern Texas

K5MVK 150,960- 761-68-A-39
W5JWM 63,032- 305-69-A-32
K5FFI 54,626- 300-61-A-25
K5BDY 30,141- 195-51-A-16
WA5ANG 6240- 66-32-A- –
WA5AXS 75- 5- 5-A- 1

CANADIAN DIVISION

Maritime

VE1NV 8436- 113-38-B-28

Ontario

VE3CRM 33,187- 189-59-A-25
VE3ES 26,730- 167-54-A-18
VE3DQL 22,680- 190-60-B-19
VE3BFC 2838- 44-22-A- 7

Manitoba

VE4SD 27,030- 173-53-A-14
VE4ZX 3350- 51-29-A -11
K9HOL/VE4 (K9HOL, W9-VZP) 44,616- 338-66-B-27

Saskatchewan

VE5NX 2223- 40-19-A- 7

Alberta

VE6OR 76,092- 373-68-A-25
VE6AAV 50,490- 287-60-A-26

British Columbia

VE7CE 37,820- 308-61-B-20
VE7VT 10,836- 86-42-A-29

Yukon-N. W. T.

VE8WW 2375- 50-25-B- –

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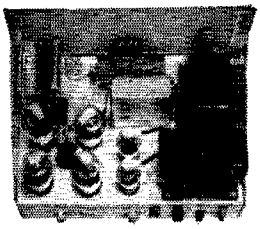
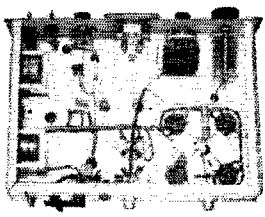
[1] K3DVS, opr. [2] K9DQG, opr. [2s] K5HAY, opr. [3] WA6RXP, opr. W1WPR, opr. [4] Hq. staff, not eligible for award. [5] K8OIR, opr. [7] K1HTN, opr. [8] WA4IVL, opr.

ARRL thanks the following amateurs for submitting their logs for checking purposes: CW: W2IMU WA2FPV K3QET ILSs CDQ IYL RWJ, W4TE WA6QAU W7HBO W9VAC VE3AWE VE5JO. PHONE: WA2URL WB2AHX K5GLC W5PGG WA6TCX ASs BIG ROY, WØNCS.

YOU CAN'T BEAT THIS KIT FOR VALUE!



P&H LA-400C LINEAR AMPLIFIER 800 WATTS PEP ONLY $179.95*



IT'S EASY TO ASSEMBLE AND WIRE — QUALITY THRU AND THRU

The P&H LA-400-C is not an ordinary kit, because a lot of the assembly has already been done for you. The plate transformer, filter choke, plate tuning capacitor etc. are mounted. Plate coil and band switch are assembled and mounted. Output loading capacitor network is assembled; in fact — about all you have to do is mount small parts, mount sockets and finish the wiring. As for performance — just ask anyone who uses an LA-400-C. Just compare his signal with the so-called "talking kilowatts" — it will be mighty hard to tell 3 DB difference. The difference in cost will pay for a good scope, plus a top notch receiver. One other point — Where else can you get a warranty such as P&H gives you on the LA-400-C ?

ONE YEAR WARRANTY ON ALL PARTS AND TUBES!

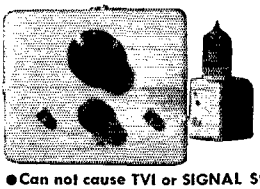
The 80 thru 10 meter band-switching pi network is designed for 800 watts PEP SSB, 400 watts CW, FM or FSK and 230 watts Linear AM (controlled carrier) or 185 watts (constant carrier) with 50-70 ohm output. Popular 100 watt SSB exciters require no swamping or matching networks to drive the low Z untuned input. Grounded grid circuit uses four 1625's or 837's on customers request. Meter reads RF drive, plate current, RF amps output. New modern compact 9" X 15" X 10½" gray cabinet also contains power supply using 816's. TVI suppressed, Parasitic Free.

*Prices effective June 15, 1962

LA-400-C Wired & Tested.....$219.95
Slightly higher West of Rockies.

P&H ELECTRONICS INC.
424 Columbia • Lafayette, Ind.

★ ★ TRANSTENNA 101 ★ ★



A REVOLUTIONARY NEW T-R SWITCH AND PRESELECTOR

(Includes Power Supply)

Provides for c.w. sidetone and for biasing off the final stage. Add $7.00 for built-in sidetone.

Everything supplied—no soldering

- **Can not cause TVI or SIGNAL SUCK OUT.** Pat. No. 3,041,608
- **Perfectly mutes any receiver** MODEL 101
- **Band switched tuned R.F. stage.** **$69.45**
- **20 to 30 db gain 80 through 10 mtrs.** (Ppd. USA)
- **Will handle maximum legal input.** Any feedline or SWR

SEE "RECENT EQUIPMENT" QST JANUARY ISSUE.

Request free booklet **FICHTER ELECTRONICS**
Order Direct 33 Myrtle Ave. Cedar Grove, N. J.

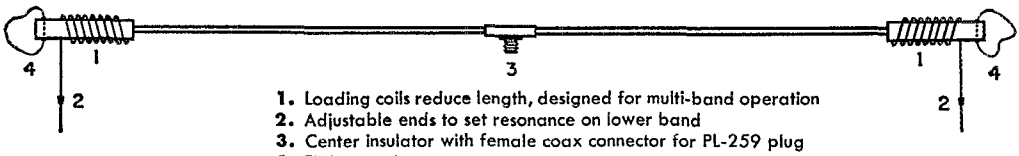
QUICK, SAFE WAY

to remove insulation, oxides, stains from all metal surfaces for good electrical contact

INDUSTRIAL RUSH ERASER
$1.50 prepaid — money-back guaranty
FybRglass Refills, pkg. of 2 — 25¢

DEALERS WANTED
The Eraser Co., Inc.
1072 S. Clinton St., Syracuse 4, N. Y.

LOADED MULTI-BAND DOUBLET ANTENNAS



1. Loading coils reduce length, designed for multi-band operation
2. Adjustable ends to set resonance on lower band
3. Center insulator with female coax connector for PL-259 plug
4. Fittings to tie on rope to support antenna

RG-58/U or RG-8/U coax required for feeder

LRL-66 FOR 80-40-20-15-10, 66' long, 2 KW PEP 80-40-15.....$30.00
(1 KW P.E.P. 20-10 Where Decoupling Stubs Used)
LRL-70 FOR 80-40, 70' long, 2 KW PEP 80-40..... 30.00
LRL-125 FOR 160-80, 125' long, 2 KW PEP 160-80..... 30.00

WRITE FOR DESCRIPTIVE SHEETS. SHIPMENTS POSTPAID IN CONTINENTAL USA.

LATTIN RADIO LABORATORIES ▪ Box 44, Owensboro, Ky.

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**

(5) Closing date for Ham Ads is the 20th of the second month preceding publication date.

(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions.**

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

CLUBS. The 13th ARRL National Convention, October 4, 5, 6, 1963 has display space available for a number of unusual amateur radio club displays. For details contact the ARRL National Convention, P.O. Box 5167, Cleveland, Ohio.

BREAKFAST Club Hamfest July 20 and 21.

14 WEATHER Instrument Plans, $2.00. Saco Industries, Box 2513, South Bend, Ind.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

WE buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

TOROIDS: Uncased 88 Mhy, like new. Dollar each. Five/$4.00 P. P. DaPaul, 309 So. Ashton, Millbrae, Calif.

SOUTHERN California: Transmitters and receivers repaired, aligned, Bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel. KEllogg 8-0500.

WANTED: Two or more 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

CASH For your gear! We buy, trade and sell. We stock Hammarlund, Hallicrafters, National, Johnson, RME, Hy-Gain, Mosley and many other lines of ham gear. Ask for used equipment list. H & H Electronic Supply Inc., 506-510 Kishwaukee St., Rockford, Ill.

WANTED: Military or Industrial laboratory test equipment. Electronicraft, Box 399, Mt. Kisco, N.Y.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA, Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmandy 8-8262.

CHICAGOLAND Amateurs! Factory authorized service for Hallicrafters, Hammarlund, Johnson, Gonset Service all amateur equipment to factory standards. Heights Electronics, Inc., 1145 Halstead St., Chicago Heights, Ill. Tel. SKyline 5-4056.

HAM TV Equipment bought, sold traded. Al Denson, W1BYX, Rockville, Conn.

PACEMAKER. Latest modifications. Refinished. New panel. Excint. $300 or you make offer. Robert Campbell, Waseca, Minn., 7th St. and 9th Ave. N.E.

TOROID RTTY Kit: Mark-Space discriminator and bandpass filters. Includes 4-88 Mhy and 1-44 Mhy uncased like new condx. toroids: information sheet, mounting hardware and six mylar capacitors. $5.00 ppd. Toroids: specify 88 or 44, less capactrs. $1.00 each. 5/$4.00, ppd. KCM Products, Box 88, Milwaukee 13, Wis.

WANTED: For personal collection: QSTs January through August 1916; ARRL Handbooks: Editions 1 and 5. W1CUT, Box 1, West Hartford 7, Conn.

TUBES Wanted. All types, highest prices paid. Write or phone. Lou-Tronics, Inc., 131 Lawrence St., Brooklyn 1, N.Y. Tel. UL 5-2615.

SELL, Swap or buy ancient radio sets and parts, magazines. Laverty, 118 N. Wycombe, Landsdowne, Penna.

QSLS?? SWLS?? WPE?? Largest variety samples 25¢ (refunded). Samples 25¢. Sakkers, W8DED, Holland, Michigan.

QSL, SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo, Hamilton, Ohio.

C. FRITZ QSLS. Highest quality consistently for a quarter century! Samples 25¢ deductible. Box 1684, Scottsdale, Ariz. (formerly Joliet, Ill.).

RUBBER Stamp, Call, address, name. Case, ink-pad: $1.00. KA1SA, Perry, Box 8080, Allandale, Fla.

QSLS. Twenty exclusive designs in 3 colors. Rush $3.85 for 100 or $6.90 for 200 and get surprise of your life. 5 days' service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

QSL Specialists. Distinctive Samples 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago 39, Ill.

QSLS "Brownie." W3CJI, 3110 Lehigh, Allentown, Penna. Catalog with samples. 25¢.

QSLS-SWLS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo 1, Ohio.

QSL-SWL-WPE, Finest. Since 1946. Largest assortment. Priced right. Send 10¢ for samples to: Glenn Print, 1103 Pine Heights Ave., Baltimore 29, Md.

DELUXE QSLS. Petty, W2HAZ, Box 27, Trenton, N.J. Samples. 10¢.

QSLS, Special, 100 50 Star U.S. Flags on glossy cards, $3.70. Ppd. Other samples 10¢ or 25¢ refunded. Dick, W8VXK, Rt. 4, Gladwin, Mich.

QSLS-SWLS, 100 2-color glossy, $3.00; QSO file cards, $1.00 per 100. Samples, 10¢. Rusprint, Box 757, Kansas City 16, Mo.

QSLS: samples 25¢ (refundable). Schuch, W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

QSLS, SWLS, WPE. Samples 5¢. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLS, SWLs, XYL-OMs (sample assortment approximately 9¾¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fantabulous, DX-attracting, prototypal, snazzy, unparagoned cards (Wow!). Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

SUPERIOR QSLS, samples 10¢. Ham Specialties, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

DON'T Buy QSLs until you see my free samples. Bolles, W5OWC, 7701 Tisdale, Austin, Texas.

QSLS, 300 for $4.35. Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill.

QSLS. Samples 25¢. Rubber stamps: name, call and address $1.55. Harry Sims, 3227 Missouri Ave., St. Louis 18, Mo.

QSLS, 3-color glossy, 100—$4.50. Rutgers VariTyping Service, 7 Fairfield Rd., Somerset, N.J.

QSLS, Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 10¢. Agents for Call-D-Cal decals. K2VOB Press, 62 Midland Blvd., Maplewood, N.J.

POCKET Rubber Stamps. Your call plus name and address, $1.00. Ralph, KØUMY, Box 238, New Ulm, Minn.

RUBBER STAMPS. $1.00. Call and Address. Clint's Radio, W2UDO, 32 Cumberland Ave., Verona, N.J.

QSLS, $2.50 per 100. Free samples and catalog. Garth, Jutland, N.J.

QSL Cards, New, cute designs. Three day service. Low as $1.50 for 100. Free samples. H. Hellwig, Box 425, Lake Wales, Florida.

PICTURE QSL cards from your photograph of your shack, home, etc. 1000, $12. Raum's, 4154 Fifth St., Philadelphia 40, Penna.

QSLs, glossy, Samples 10¢. Brigham, Colson St., North Billerica, Mass.

QUALITY Rubber stamps, low prices, pocket size, 3 lines, $1.00. Sam Koury, K8TCI, 3867 Fernleigh, Troy, Mich.

QSLs At the sign of the "Hobby Horse". Quality at uninflated price and quick delivery. Glossy, red and green, $2.00 per 100 postpaid. Free sample. Hobby Print Shop, Umatilla, Fla.

QSLS, $1.50 up. Samples free. Filmcrafters, Box 304, Martins Ferry, Ohio.

COMPARE: Deluxe rubber stamp, King-size call; name, address: $2.00. Frey, Box 296, Schwenksville, Penna.

QSLS, Multicolor "Kromekote", 100, $2.50. Samples 10¢, refunded on order. Millsprint, Box 1004, Lima, Ohio.

QSLS-SWLS. Everything you're looking for! Fast service, reasonable. Samples 10¢ refundable. Joe Harms, WA4FJE, 905 Fernald, Edgewater, Fla.

RUBBER Stamps for hams, sample impressions, W9UNY, Hamm, 542 N. 93, Milwaukee, Wis.

QUALITY QSLs. New designs monthly. Samples 10¢. Giant 25¢, SAVORY, & Roosevelt, Weymouth, Mass.

QSLS. Samples, dime. Printer, Corwith, Iowa.

QSLS, Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

ATTRACTIVE QSLS: Large variety of styles: cartoons, colors. Samples 25¢ (deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn 13, N.Y.

QSLS YLRL Specials, OMs, reasonable. Samples dime. W2-DJH Press, Warrensburg, N.Y.

QSLS, 100, $2.50. Samples free. Amee's Printery, W9FXQ, Box 13A, Oak Lawn, Ill.

CANADIANS: Wanted-Medium power transmitter, DX-100, Apache, Valiant or equivalent; also set of QSTs, any condition or era. Bill McPherson, VE3CMM, Pickering, Ont. P., Canada.

CANADIANS: KWM1 with noise-blanker. Just aligned and checked by Collins. DC supply, AC supply, mobile mount, 20 meter hustler. $800; Hallicrafters HT-33 kilowatt, not used since completely overhauled by Hallicrafters, $700. F. Gaspard, 143 Smith St., Winnipeg, Canada.

SELL: Heath Apache, $200; SB-10 Adapter, $70; both for $250. Vibroplex Lightning Bug, $12. All in excint condx. K5OPL, 5734 Hyacinth Ave., Baton Rouge, La.

CASH promptly paid for your ham gear. Trigger, 7361 North, River Forest, Ill. PR 1-8616.

SK-20 Tunable Preselector, calibrated 3.5-30 megacycles, boosts reception 3-5 "S" units. Complete kit, cabinet, built-in power supply, $18.98 ppd. Holstrom Associates, Box 8460-T, Sacramento 22, Calif.

NEW And used ham gear. Top trades. Norm, K9HRI at Dahn Electronic Supply, 14 Jayne St., Algonquin, Ill. Mail orders welcome!

304TL tubes wanted. Also other xmttg and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

ATTENTION Mobileers! Heavy-duty Leece-Neville 6 volt 100 amp. system, $50; 12 volt amp. system, $50; 12 volt 60 amp. system, $60; 12 volt 100 amp. system, $100. Built-in silicon rectifier alternators 12 volt 60 amps, $100; 12 volt 100 amps, $125.00. Guaranteed no ex-police car units. Herbert A. Zimmerman, Jr., K2PAT, 1907 Coney Island Ave., Brooklyn 30, N.Y. Tel. DEwey 6-7388.

HAM Discount House. Write us for lowest prices on ham equipment. Factory sealed cartons. Specify equipment wanted! H D H Sales Co., 327 Greenwich Ave., Stamford, Conn.

FOR Sale: 3600-0-3600 @ 1000ma plate transformers with dual 110V & 220V primaries, $35. 7.5V.C.T. @ 45 amp 4-1000A filament transformers, $16.50. Peter W. Dahl, 5331 Oaklawn Ave., Minneapolis 24, Minnesota.

COLLINS KWM-2, 312B5, 30L-1, 516F-2, MP-1 and 351D-2. Will ship complete mobile and fixed station in original cartons: $1795. In excint condx. Will welcome inspection. K2MII, 58 Joyce, Hartsdale, N.Y.

PROCEEDINGS Of the I.R.E. 1914 through 1949, 1923, 1928, 1931, 1932 complete. Will sell any copy or copies. Excellent price on entire lot. Mrs. Miriam Knapp, W1ZIM, 191 Beechwood Rd., West Hartford 7, Conn. Tel. 521-2055.

VALIANT, factory wired, in mint condx. Best offer over $250. Also 500 watt unused MultiMatch modulation transformer, $30. W2WVL, 118 Goff Road, Corning, N.Y.

NATIONAL NC-98, $100; Globe Chief 90W, $25; excellent for the Novice. W1TQB, 19 Westford St., Gardner, Mass.

QSTs. Selling my duplicates from 1916 to 1960. Want old Callbooks, catalogs, etc. for personal collection. Erv Rasmussen, Box 612, Redwood City, Calif.

STILL Looking for old wireless gear before 1925. Will pay good money or trade and particularly want certain spark equipment, a C.R.L. Paragon with amplifigon or matching tube panel; DeForest Type O radiotelephone with tubes, catalogs, government callbooks and other books. File of QSTs is almost complete but need a few issues of 1916, 1917, 1919 and 1923. If you are lucky enough to own any copies I need I will pay real money for them. I want them that badly. Also need quenched gap sections number SE-1001 for SE1075 ship transmitter. In writing please give complete information plus price or specify what you need. W5VA/W5AI. T. Frank Smith, P.O. Box 840, Corpus Christi, Texas.

SELL: KWM-2 with A.C. supply, #13642, purchased Dec. '62, $1030; VFO-matic for 75A receivers, $80; Fisher AM-FM stereo tuner 101R, $100; 2-6550 tubes, new, each $4; 2E26 tube, new $2; mobile 6 volt pwr supply, 400 volts, 350 ma. output, . . . all in perfect condition, F.O.B. Lamb, 1219 Yardley Rd., Morrisville, Penna.

FOR Sale: HQ-170 with clock, $270. Will ship express collect. Spaulding 40 ft. tower, and TA-33 Tri-band beam, $120. Cash and carry deal. W3SDE, 509 Lansdale Ave., Lansdale, Penna.

NEVADA Stations. Am trying to arrange sked for EA1GZ, a vy fine operator who needs only Nevada for WAS. Please contact K4EF.

ELECTRONIC Equipment. All in excint condx: TS-323, $150; TS-174, $125; TS-175, $125; LR freq. meter, $100; new HP412A-VTVM, $295; TS-34, $40; GR1110A interpolation osc., $125. Lampkin 105B, $100. S. Wolf, 3 Lawrence Lane, Lexington, Mass.

ATTENTION: Amateur radio equipment repaired, work guaranteed. L & S Electronic Technicians. WA2OOG, Sid Levinson, 393 So. 3rd, Brooklyn 11, N.Y. Tel EV 4-7564.

WANTED: All types of aircraft or ground radios. 17L, 618F or S 388, 390, GRC, PRC, 51J, RVX. Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames, W2KUW, 308 Hickory, Arlington, N.J.

KWS-1 75A-4, in excint condx, $1450. Bob Cava, 113 Wood St., Salinas, Calif.

SELL: 75A-4 with speaker, ser. No. 4451, in mint condx. $500. W9POS.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-WAlker-5-7000.

SELL: Collins MP-1 mobile 12V DC supply; 351D-2 KWM-2 mobile mount with cables, both new, never used. Slightly used Collins PM-2 portable AC supply and CC-2 carrying case. Best offer. W0OGI, 303 N. Wisconsin, Gunnison, Colorado.

COLLINS Owners work AM! S/Line, KWM-1-2! No drilling! No soldering! No chassis removal! Instant switching! Easy installation! Wired kit, $5.00. Kit Kraft, Harlan, Ky.

BC-348 with spkr, converted, in excint conx: $55. Bill Curry, 250 Surrey, Burlington, Iowa.

COLLINS 75A2A, 1 filter, $269; 32V transmitter, $169; Johnson Thunderbolt amplifier, $289; Ranger I, $169; Hallicrafters SX-100, $165. 88 mhy. toroids, $3 for 6. Ppd. W1AFN, Tom, 46 Mt. Vernon, Boston 8, Mass. Tel. RIchmond 2-0916.

SELLING Kilowatt transmitter; mobiles, Heath HX20 sidebander, Morrow twins. Turner, 111 Newtonhall, Agwin, Calif.

SELL: National VFO-62, self-powered, used only once. In perf. condx, $40. Shipped. WA2UXK.

SELL: HT37, HT41 linear; HQ170C, $845—all in gud condx. Lloyd Kissick, K9KGV, 1916 Hillcrest Rd., Rockford, Ill.

WANTED: Used ham band receiver similar to SX-140. Greg Cronin, KN1YKT, 124 Forest St., Winchester, Mass.

WANTED: Telrex 3-element 6 meter bam. WA2MHY.

WANTED: Commercial, military, all types, ARC, ARN, ARM, BC, GRC, PRC, TRC, URR, URM, TS, 618S, 17L, 51R, 51J, others. RITCO, Box 156, Annandale, Va.

ARIZONA: Selling HQ-160, $245; Mohican GC1A rcvr 10 transistor cs XPZ 117 VAC, $85; DX40, HG10 VFO, $75. VTVM Eico 232, $25; Deluxe signal generator, Eico 315, $32; Smith-Corona electric portable mill (cost $160), $90; excint gear, now working Ship F.o.b. K7TEZ, 21240 N. 24th Ave., Phoenix 27, Ariz. Ken Stroud.

SELLING OUT: Send addressed envelope for list: NC240D receiver, NC183 receiver, antique radios, trans tubes, meters, pwr. supplies, equipment, components, Collins 310B, other gear. Will trade for 4-1000, hi-pwr linear parts, old QSTs. Dundee, W5CNF, 4119 S Detroit, Tulsa, Okla.

RECEIVER Hallicrafters Mark III, $215; transmitting tubes, unused, RCA, 829-B, $4.50; 812-A, $3.50; 7094, $24.50; 5763, $1.25. Microammeter, Weston 4", 0-200, $8.75; 125 watt modulator, xcint prfrmr, $47.50. UTC LS-12, low-Z to grid, $8.75. Wanted: 4-65As. W2BE.

SCOPE For sale. Eico Model 460 DC to 5 Mc. In excint condx, $60. Fred Reed, 86 Oakdale St., Staten Island 8, N.Y.

WANTED: Earliest QSTs, before 1920 only! Many extras available for later years. Sell TMC RXD-90 gen. coverage rcvr, not to be confused with GPR-90. Offers? W2DYU, 36 New Lawn Ave., Kearny, N.J.

NEW Topaz 12VDC power supply C10WDD for G-76 transceiver, $85. Millen SWR bridge, $5.50; B&W coax switch 550A and 551A, $5 each. 6146 tube, $2.50. Williams, 64 Prospect Ave., Hackensack, N.J.

SELL DX60 and matching HG10 VFO, JT30 mike, $95. Charles Farrell, WA8APZ, 1303 Lyndale Dr., Charleston, W.Va.

SELL Or trade: BC348R 110V built-in. Make offer. K8KHW, Box 88, Clarksville, Mich.

COLLINS 32S-1 transmitter, 516F pwr. supply, 75S-1 rcvr, 312B-4 spkr console. In mint condx. Original cartons. Shipped insured prepaid USA, $1150. Also Collins KWM-1 transceiver, 136B-1 noise blanker, 516F-1 pwr. supply. In gud condx, $550. Lt. Col. Robert J. Foss, W4SPK/1, 36 Sugar Loaf Lane, Bangor, Me., Tel. 947-8157.

SELL: SX-110, in excint condx, original carton and manual, best offer over $120. Eico 720, modified using diode power supply wired by holder of First Class Commercial ticket. Best offer over $60. Rick, K3SYV, CH 7-1480, 104 Nippon St., Philly, Penna.

WANTED: Coil set G, 180-430 Kc for HRO-7, K40XZ, 230 Beverly St., Titusville, Fla.

20-A, QT-1, 458 VFO, factory-wired, $165; HQ-180C, excint condx, $360. Will ship collect. Joe Reifer, WA2BQB, 162 Woodcrest Blvd., Kenmore 23, N.Y.

SELL: Sry, cannot ship: Heath TC-2, $15; SG-8, $10; T-3, $12; CT-1, $4.00; C-3, $10.00; AG-9, $15.00; VFO self-powered, $15.00; MR-1, homebrew AC supply, $80.00; OP-1, $125.00; NC-88 with QF-1, $40.00; QST-90W, homebrew transmitter with extras, $25.00. K9EZD, Eric Leutstedt, Jr., 3833 N. Whipple, Chicago 18, Phone KE 9-7534.

CLEGG Zeus, in excint condx, will not ship, sry, $425; Hammarlund HQ110C, w/matching spkr, $145.00; Ameco 6M conv. (CN-50) 15M IF, $30.00; Ameco 2M conv. (CB-2), 10M IF, $18; matching power supply, $5.00. All factory wired. 100 ft. K-200 cable, $14. K2AVC, 56J Parkway Dr., Sag Harbor, N.Y.

LOOK! Sell: Knight T-60 xmttr, all new tubes, $45; Johnson Speed-X bug, $12; Johnson 72 ohm low-pass filter, $10; Globe Chief 90-A xmtr, $40; Globe 755 VFO, $32; Astatic JT-30 mike and stand, $8; Mosley V-4-6 ant. with 6 meter adapter, $25. All in excint condx with instrux manuals. Will ship in USA. John Stoltenberg, 770 So. Evergreen Ave., Kankakee, Ill.

L&N type S Wheatstone resistance bridge, $75; 21 and 30 mcs. 275 watt AM-cw transmitter. Internal VFO to 7094 final. Commercial appearance, in cabinet. TVI suppressed, $137. WA60QP, 151 Estates Drive, Santa Cruz, Calif.

JOHNSON Ranger, in gud condx, $150; 8005 tubes, $5.00; Kenyon 200 watt modulation transformer, $15. Gonset Triband converter, $20. W1AZF, Sudbury, Mass. Tel. 443-6727.

VALIANT Factory wired, like new condx, D-104 mike; Dow-Key relay. Will ship. All for $250. Cash deal, no trades. W4EBK.

COLLINS 51J-3, FB condx. Will ship. Must sell. $575. Bill Copeland, W1IFX, 407 Central, East Bridgewater, Mass.

SALE: Heath Shawnee, C-E 20A Lakeshore Bandhopper VFO, C-E slicer with Q-multiplier, Heath OM-3 'scope. Best offer. W3DVX, 65 N Church, Carbondale, Penna.

SX-111, new, best offer over $175. Charles Maser, 172 Sunset St., Rochester, N.Y.

75A4, ser. No. 2662, w/3.1 and 1.5 filters. Perfectly aligned, no scratches, no modifications. Best offer over $450. Shipped RR express. Reason: Bought 51J. Also perfect German Minifone 2 hour pocket recorder, all accessories, best offer over $100. W9IDSV, Box 87, Webster, Wis.

VTVM Heath 1MW-11 factory-wired, perf. condx, new, $35.00. Mannie Teitch, 628 East 8th St., Brooklyn 18, N.Y. U 1-40083. Kit EF-1, $5.00.

FOR Sale: Gonset 101 amplifier, $240; Johnson SWR Bridge and indicator, $22.50; BC779, $65; SB-10, $65; Johnson 275 watt Matchbox, $37.50; BC-221 freq. meter w/book, $55.00; KW pwr. supply, 2500 volt 400 Ma., $25.00; 20 meter Gonset bow-tie, $20; 1 KW dummy load, $7.00. W. F. Ridings, K6KYB, 2903 Yearling St., Lakewood, Calif.

COLLINS S/Line, little over one year old, in excint condx, 75S-2 with 500 cycle filter, $475 and 32S-1 with 516F-2 pwr. supply, $560.00. Both for $985.00. K3VAB, 12704 Kincaid Lane, Bowie, Md. Tel. 301-262-1582.

XTALS, 50¢. Write for frequencies available. Kitron Radio, 459 S. Garey, Pomona, Calif.

HEATH Marauder photographs during construction, 8 B&W closeups, $3.50. Color prints. Slides available to order. P. Ingraham, W8NDS, P.O. Box 150, Midland, Mich.

FOR Sale: Eico 720 Novice xmtr, almost new, $70; Hallicrafters S40B, xclnt, $60; S-40, gud, $50; International Xtal converter, 6M, $10; Instructograph w/10 tapes, $20; 12V surplus VIB, pwr. supp, 500 v., 160 Ma., $10, BC348 L-115V, S-meter, $65, w/6M Globe converter, $85. Jack, K4VKJ, 608 N. Douglas, Rockwood, Tenn.

TRADE Clean Esterline Angus recorders AC voltmeter AC wattmeter multipliers, manuals for transmitter Viking II Class or high power amplifier. Stephen O'Lear, W3API, Rd 6, Box 63, Irwin, Penna.

MOVING: 2500v 500 Ma. power supply, $55; Collins 70E-8A VFO, $25; 50 Kc Superselective IF amplifier, $30; 42 ft. steel tower, $20; 500v 300 Ma. and 300v 250Ma power supplies same chassis, $25. Marion sealed meters 0-100 ma. DC, 0-800 Ma DC, 0-500V DC, 0-3000V DC, 0-150V AC, $4 ea. K4IGD, Fairfax, Va.

TRADE Dual beam oscilloscope for gud SSB generator. Lecce-Neville 150 amp. generator, $40. 110volt selsyns $2.00. Rectifier 24 volt 20 amp bridge, $5.00. Selenium. B. J. Kucera, 10615 So. Highland Ave., Cleveland 25, Ohio.

SELL: Johnson KW Matchbox with SWR, exclnt. $125. W9POS.

SELL: HQ-110, in mint condx, WAØEFJ, Harwood, N. Dak.

WANTED: Viking 6N2 transmitter, gud condx. Reasonable. WA6REA, P.O. Box 93, Cathay, Calif.

SELL: Heath Apache, $185. Mint condx: HQ-129X, $80. WA6EGA, 1741 Eastern Ave., Sacramento 25, Calif.

G76 Serial 18163 with Gonset DC supply, like new condx, $390; F.o.b. Louisville First Certified check. John S. Williams, 2508 Manchester Rd., Louisville, Ky.

FIELD Strength meter using new Triplett 0-100 microamp meter, $10.95; 3" square G-E panel meter 0-150 Ma. DC, $3. Eimac SK610 air-flow socket, new in sealed container, $7.50. Heathkit Vibrator pwr. supply Model VP-1-12, $7.00. W2SSC, 8550 Howard, Buffalo 21, N. Y.

WANTED: Tech manual for Tecmo transmitter, mod. 250GSC using pair, 8005s final and 811 mods. Will pay any reasonable price. W4LX Francis Des Rochers, 1120 Alabar Lane, N. Ft. Myers, Fla.

DX-40 in gud condx, $50; SG-8 like new, $15. Postpaid. W7SVF, Box 213, Glendive, Mont.

WANTED KWM2. Spot cash. Late number. Must be perf. condx. W7VR, Box 829, Elko, Nev.

WANTED: McCoy 9 Mc. crystal filter. W8BJS, 428 Roland, Grosse Pointe 36, Mich.

CUSTOM Eimac built SSB final and pwr. supply, 4CX1000A to over 2 kw. output key down. Final compact. Nov. '57 QST. One of five. Band switch and vac. var., $695 firm. Prefer local ham. W1WNY, 12 Top O'Hill Rd., Darien, Conn. Tel. area code 203-325-2125. Evenings only!

COLLEGE: Selling Johnson 6N2 Thunderbolt linear. Never used. $450.00. K8IIM, 610 E. Wisconsin, Mt. Pleasant, Mich.

SELL: Valiant, $300; NC300, $250; Collins 310B, $100; TA33 Jr., $40; Ham-M (new), $90; 813 Kw. linear, $120; 3000-V Kw. power, $50; all gear excellent condx with instruction books. Richard Larson, KØVTG, 1312 14th, Glencoe, Minn.

B&W 5100B, HQ-110 with clock-timer, speaker, $425.00. Will deliver within 100 miles. K2TPW, Loop Road, Bedford Village, N.Y.

ELMAC Complete station, fixed/mobile, 80 thru 6 meters. Latest models AF-68 transmitter, PMR-8 revr; M-1070 12DC/-117AC supply, cables, mike, coaxial relay, low-pass filter, in original cartons, turned on less than 10 hours total time. Like new condx! Sell 30% off. Mac, Box 4192, Lynchburg, Va.

APRIL "Hot-Shot" Special Swan SW-240 Tri-Band transceiver (demonstrator) with matching ACP/S, $399 cash. Write or call today for trade-in quotation on NCX-3 or SW-240 transceivers ready for immediate delivery. 20-A, $159; HQ-110, $159; 75A-2, $269. Edwards Electronics, 2430-33rd St., Lubbock, Texas. Tel. SW 5-6362.

WANTED: Pair of 833's; 304TL's; 450TH's, etc. Also need 810's. Must be reasonable. L. Natoli, 160-10 89th Ave., Jamaica 32, L.I., N.Y.

LICENSE Frame especially designed for Ham licenses. Unbreakable plastic. $1.50. Carl Ashworth, P.O. Box 8, Welch, W.Va.

EICO 720 with PTT and Knight VFO, in exclnt condx, $90. WA2PPE.

HAMMARLUND HQ-110C, in exclnt condx, $165. K3ORY, Box 486, Glenmoore, Penna.

SELL: SX-100, in exclnt condx, $175. KØTCO, 9921 Berwick Dr., Affton 23, Mo.

TRADE: AF67, PMR6A. Want SB10, Comm. revr, batt. eliminator, sig. generator. WØOUU, 5027 W. 25th Terr., Topeka, Kans.

AIRCRAFT Communications monitor. Gonset model 3156AM, 112 to 132 megacycles. $55. McKeaney, 35-58 165th St., Flushing 58, L.I., N.Y.

COLLINS S/Line with 75S-3 receiver, less than one year old: $1175.00. R. H. Stanley, W4LOC/4, Box 103, Mt. Holly, N.C.

SELLING: Apache xmtr. $195. Like-new condx, hardly used. WA2CPL, "Bruce", 119 Guilden St., New Brunswick, N.J.

SELL: Gonset G-76 transceiver with matching mobile Gonset P/S, mounting brackets, Webster Bandspanner, mtg., mike, like-new condx, $350.00. Sidney Ehrlich, 3645 Walnut Grove Rd., Memphis, Tenn.

GONSET G-76 No. 18470 with Gonset AC and DC supplies, manual warranty card, plus Mosley Tramobile antenna, $610 F.o.b. WA4JLF, 65B Camellia, Satellite Beach, Fla.

PHILATELIC Hams: Swap mint U.S. plate blocks for six-meter transceiver. Robert Cobaugh, W2DTE, 292-29 213th St., Bayside, L.I., N.Y.

TEKTRONICS 511A, $225 sig. gen. GR804C 7 300Mc, $150. K2JYM, FR 9-2497, 24 Stillwell Pl., Freeport, N.Y.

ELECTRONIC Kits wired: quality workmanship/service. Al Hammond, KØHWE, 1533 D Ave., NE, Cedar Rapids, Iowa.

SELL: Drake 2B in original box, like new condx, $200. New Ham-M rotator, $100. Paul Powell, 100 S. McGree, Borger, Texas.

SELL: KWM II, $825; 516E1, $150; 516F2, $75; 312B5, $240; 351D-2, $60; MM1, $15; SM-2, $25; 75A4, $495; KWS-1, $795; 302C-1, $75; B&W low-pass, $9; Sonar low-pass, $8; Mosley V4-6, $9; 115VAC coax relay, $7; D-104 with PTT stand, $15; 5-in. scope, $45; Variac 220V 8 amps, $25; Shure 505 T mobile mike, $12; T/R switch, $5; transistor mobile supply, 250/500 VDC outp, $20; ACN dial, $3; MCN, $3; PE103, $3; 100 Kc osc., $5; Vibroplex, $11; cash only. No trades! Miller, 88 Stonewall, Fairfield, Conn.

WANTED: Gonset 6 meter linear #3212; Gonset 108-128 Mc. A.M. tuner for aircraft (6 or 12 v.) and Gonset #3012 tuner, 152-162 Mc. Richard M. Jacobs, WAØAIY, 1015 Glenside Pl., University City 30, Mo.

WANTED: Johnson KW Matchbox with or without directional coupler indicator. Advise condx and price. K2TSB, 59 Vivian Court, Lakewood, N.J.

SELL: Complete SSB station. Heathkit HX-20, HR-20, AC pwr. supply, Mobile Mount, perf. condx, $370. Knight R-100A w/S-meter, calibrator, spkr, $100. Carl Kalb, K8ZUJ, RR#1, Chatfield, Ohio. Tel. 988-2548.

GLOBE King 400A AM-CW, in A-1 condx, looks like new. Power over 400w. Cash: $150. Paul N. Franusich, W6RSZ. Rte. 1, Box 1236, Elk Grove, Calif.

SELL Rig: Heath SB-10, $80; Globe Chief 90A transmitter, $45; Globe Screen modulator, $10; NC-188 receiver, $100; BC-458 used as VFO, $10. All in perf. optg. condx. Bart Salzman, 16 Bowler Road, Lynbrook, N.Y.

SALE: Viking kilowatt, complete with righthand desk, $800; Viking Ranger, $150; Viking Pacemaker, $200; 70 ft. Rohn tower, mod. 25, $70; Mosley 40-meter beam, $50; SX-101 revr, $20 w/spkr, SX-88, w/spkr, $400. Globe King 500 C, $400. Mel Rogers, 301 North Canal, Carlsbad, N.M.

SELL: KWM-2 w/AC pwr. supp., $790.00; Collins 75A4, #2163, with spkr, $440; Hallicrafters HT-32A, #230705, $400, with manuals and in gud condx. No trades! Rule, W4ZUK, 2817 North Atlantic Blvd., Ft. Lauderdale, Fla.

KWM-1 matching speaker and AC supply, $495. No trades please! Ser. 1059. Alton Cuver, 530 Elizabeth Rd., San Antonio, Texas.

SELL: AM/CW transmitter, 160 to 10 meter operation, variable to 1 kilowatt final PP813's modulator PP805's. All circuits individually metered. Coils plus ful set of spare tubes. Mounted in gray 6 ft. deluxe enclosed relay rack with dolly. Complete: $475. F.o.b. New York. J. P. Gehegan, W2ODO, 740 East 243 St., Bronx 70, N.Y.

SELL: Heath 6 meter Shawnee factory aligned $200; two GW30 walkie-talkie, $20 each; HW29, $35; Heath PT1 tuner, $60; SP2 preamp $40; Two VA1, $15 each. All in perf. condx. K2RGO, 7014 Kessel St., Forest Hills, L.I., N.Y.

WANTED: VHF KW for SSB or AM for any band up to 432 Mc. NBFM and calibrator adapters for 75A3, 4X150's, 4X250's and sockets. All letters acknowledged. Frank Miller, 1940 Sherman Ave., Evanston, Ill.

HAMMARLUND HX-50 in original carton, $325; also new National NC-155 in unopened carton, $150; both for $450 F.o.b. Chicago W9EFO, 1027 Thatcher, River Forest, Ill.

75A4 filters, 800 cycle, $30; 6 Kc, $25. Ranger PTT, $125. W4HUE, 4108 S W 5th St., Ft. Lauderdale, Fla.

FOR Sale: Collins 75-S1 revr in exclnt condx, best offer. H. Wasser, 799 E. 161 Str., Bronx, N.Y.

SELL: Apache, $210; SX-71, $110. Both, $300. In gud condx. W4KUE, 411 Page St., Cary, N.C.

RANGER For sale: 90 watts trans. factory wired, like new condx, $169. K2YFO, Gil Vazquez, 522 West 136th St., N.Y. 31, N.Y. Tel. TO 2-6812.

SELL: HT37-SX111 5 months old, $550. Dean Suby, 708 1st SW, Mason City, Iowa.

DX-60, HG-10 VFO, in perf. condx, OA2 VR tube added as in July 1961 QST: $110. K9BNP, 353 Marguerite St., Elgin, Ill.

WANTED: Lafayette TE-18 G.D.O. in gud condx. K2AYO.

TMC-GPR-90, rack mount, $380. Prepaid. W7WYV.

FOR Sale: KWS-1 in exclnt condx. Will consider all reasonable offers. Dave De Armond, 3024 Seminary Ave., Oakland, Calif.

VIKING II factory-wired, with matching VFO, mike and four spare 6146s, $165; Hammarlund HQ110C with spkr, $170. WA2CCB, Paul Klinko, 342 Glen Ave., Elmira, N.Y.

SALE: ART-13 transmitter; Triband beam TA-32 JR, any reasonable offer. Swap new BC-1031-C Panadat Panadaptor for HE-45A 6 mtr. transceiver or equivalent. K3OUO, 2 Haskell, Shirley, Mass.

SELL Station: DX-40, key, extra 6146, SX-110, Q multiplier HD-11, phones, crystals, speaker. Best offer over $150. Mark Levine, 38-15 149 St., FL 54 IN 1-9582, Flushing 54, L.I., N.Y.

TAPETONE Converters (2) 2 mtrs and 6 mtrs (XC144 and XC50) with regulated pwr. supply. In perf. condx. Package deal only: $95. W2MXJ, Armonk, N.Y. Tel. AR 3-3058.

FOR Sale: 35 Watt Novice xmtr, self-contained PS, 80 mtrs with 807 output, $25; all-band plug-in coil 6146 xmtr, less P/S, $35. Ed Taggart, W9RBM, Box 373, Nashville, Ind.

APACHE, like new condx, used vy little. Two hundred dollars: NC-300 nice and clean, two hundred dollars. Will ship. KØOLW, Box 125, Gilman City, Mo.

WANTED: 75A4 KWS-1, condx unimportant. Charles Johnson, W5IE, 501 W. Sears, Denison, Texas.

SELL: All in exclnt optg. condx. 1 KW linear Heathkit Warrior HA-10 including low pass filter Johnson 250-20, $230; 5" wide band oscilloscope Heathkit O-12 including probe, $40; Electronic keyer Hammarlund HK-1B, $20; Q-multiplier including pwr. supply, Heathkit QF-1, $10. Sell: Tecraft 2M transmitter, crystal converter, antenna relay, power supply, all $50.00. K1DLT, 21 Harvest Hill Lane, Stamford, Conn.

MUST Sell station to go to college. All equipment in A-1 condx and never used. Hallicrafters HA-1 TO keyer, $55; Gonset Super 12 converter, $50; Multi-Band mobile ant. with loading coil, $20; 3 different superior ohmmeters. Will sell for $35. Also have QST magazines 1945 to date, incomplete run and have different books. Write for details on magazines and books. Tom Lesher, K3NCU/8, 25 North Market, Elizabethville, Penna.

SELL: DX-100 with B modification, $135.00; NC-155 rcvr, $150; 18 HT Hy-Gain vertical, $95; all in gud condx. Contact Joe, WA2YNS, 424 Elmhurst Rd., Utica, N.Y. Tel. RA 4-5374.

FIELD Day Groups, Attention! I have four-fifty ft. plywood poles with all guywires, anchors and bases, together with a large quantity of antenna material formerly used on Field Days. Not suitable for shipping. Come and pick it up for $100 cash. Gene Hubbell, W9ERU, Box 350, RR #4, Rockford, Ill.

CLEANING House: Heath Comanche, Cheyenne, AC, DC pwr. supplies, PTT mike, mobile mtg. rack, speaker, and all cables, $200; Globe King 400B, $145; 755VPO, $25; Lysco 10M-15W xmtr w/V1B (dual) pwr. supply, T17 mike, $20; Gonset Super Six conv., $25; Bud xtal freq. calibrator, $10; 3L 10M beam (new), $20. H. Cushing, WB6CQG/W1EUS, 2348 Menzel Place, Santa Clara, Calif.

TRADE DeWalt table power saw for gud receiver or transceiver with all necessary components to begin with. Horwitz, 496 Tilden Ave., Teaneck, New Jersey.

FOR SALE: Gonset Super-12 in exclnt condx, $40 also homebrew 6-meter superhet rcvr complete with Nuvistor preamp, $20. K2MDV, 131 MacDonald Drive, Wayne, N.J.

FOR Sale: B&W L1000A linear amplifier, $230. In exclnt condx. Works FB. Bought a 30L1. W3VDA.

FOR Sale: 180 watts SSB Swan 75 meter, transceiver, almost new. $175; plus power supply, $205. Joseph Holtey, KØJGO, Maryknow Sem., Glen Ellyn, Illinois.

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.

SELL: Invader 2000. Used less than 100 hours, in original packing, $700. Will deliver within 100 miles radius. WA2JEN, Lawrence Schwartz 36 Hicks Ave., Syosset, L.I., N.Y.

TV Camera, ATJ. Converted, with AC supply, lens, tripod. $85. New RCA 5820, $50. Greenlee, 430 Island Beach Blvd., Merritt Island, Fla.

HAVE 150 issues QST, Radio, CQ scattered 1930 to 1953. Make offer one or all. W6ANN.

HEATH HX-20, $210; Drake 2-B, $220. Both in like new condx. F.o.b. K5YYI.

WANT: Antenna coupler CU-286/FRR: W1LWV, 99 Water St., Millinocket, Maine.

SELL: S-108 receiver, $110.00; HD-11 "Q" Multiplier $10. Both only 6 months old. K1MYA.

SELL: Perfect P & H linear, LA400C, $00W PEP using 837s, $125; National speaker cabinet, 10 x 10 x 6 with spkr, $10. Taubin, W2GCW, 144-44 41st Ave., Flushing, L.I., N.Y. Tel. IN 1-1794.

CREAM Puff KWM-1, serial 565, never needed service; mobile mount, mobile transistor and AC pwr. supplies, complete, $700; Super perfect Eldicos SSB-100A exciter, $350; SSB-1000A PL, $250. W2WK, 548N Brookside, Freeport, N.Y. Phone 516-378-1155.

G-66 with manual and mobile bracket, in mint condx, $100. Mobile 10 meter transmitter, 6146 pllc output and transistor modulator. Pictures, $60. Transistor P/S 500, 250 VDC simultaneously, 150 mills. Never used. Johnson low-pass kilowatt filter model 250-20. Best offer. All f.o.b. K1WTF, 2 Herbert Ave., Peabody, Mass.

WANTED: SX-73 or SP600 FX. State condition and best price. Also 160 meter coil assembly for model FX Meissner Signal Shifter. W6QV, 4532 Paulhan Ave., Los Angeles 41, Calif.

"HOSS Trader, "Specials". The Barn Door is open. New, discontinued items: Swans 20 and 40 meters, $189.00; 75Sls, $419; 32Sls, $539; New National NCX-3 transceivers, $339; Ham-M rotor and Demo, TH-4 beam, $178; new Heath Warrior, $209; 200-Vs, $675. Following used reconditioned: HT-37s, $349; SR-150, $569; 75S-3, unopened carton, $569; Invader 2000 kit sealed carton, $489; Drake 2B, $219; 2-A, $195; 1-A, $139. Demo Tri-Band Swan, $249; KWM-2 in warranty, $849, used 32S-3, $549. Demo, SBE-33 transceiver, $319. New RG-8/U coax, 9¢ ft.; PL-259 plugs, 39¢. Immediate delivery. Drake TR-3 transceiver, $495. Terms: Cash. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone WHitney 6-2820.

VALIANT and NC-109 for sale. Top condx: $285, and $120 respectively. Rcvr with spkr, calibrator and Q-multiplier. Doug Swanson, WA2KJP, 161 West Shore Trail, Sparta, N.J.

SB-10 and AC supply exc. condx, $65.00. Bob Davy, W9TPA, Harvard, Ill.

AR-88 for sale w/instr. book, $150 or best offer, in exclnt condx. Can ship f.o.b. if necessary. William Lambert, 2030 Camden Ave., Los Angeles 25, Calif. Tel. GR 30057.

SELL Three RCA 806s, $12 for all three, one RCA 4E27/8001, $4. Never used! W2BIQ, RD #1, New Canaan, Conn.

MODEL 14 teletype $70. W5MAA, 501 E. William David, Metairie, La.

HEATHKIT Shawnee, $235 exclnt condx used only three months. E. Pegram, WB2FIB, 29 Lowell Ave., Summit, N.J.

SALE: Mohawk/Marauder, $590. K1RPB.

BOOK Wanted: Radio Antenna Engineering by Laport, McGraw-Hill, 1952. Ric Thowless, RD #2, Marlton P.O., N.J.

GOING Homebrew! Apache, $215; SB10, $85; Mohican $95; DX35, $40; DSB100, $75. W6BPL, 1850 West Willow St., Stockton 3, Calif.

SELL: Polycomm 62B, complete and exclnt condx: $275. K2UMH, 469 Kenwood Ave., Delmar, N.Y.

SELL: DX-20 less than 20 hrs. op time, and Hy-Gain 6-40m doublet with 80 ft. coax: $60. K3MRV, 2113 Spruce St., Philadelphia 3, Penna.

FOREIGN Countries, remote areas. I can supply good, reconditioned amateur equipment at reasonable prices. Send inquiries to: Amateur Industries, P.O. Box 16042, Houston 22, Texas.

FOR Sale: Estate W5ANW. R390A/URR, 75A4 with filters, KWS-1, all used for teletype. Model 28KSR, converter with crossed line scope tuning, model 14A tape reperforator and printer, BC221. Bound volumes QST 1929-1957 and unbound issues to date. Write offers to W5EYC, P.O. Box 22594, Houston 27, Texas.

KWS-1, 75A4, $1200 for both. Gonset Communicator IV 2 meters, $200 or best offer over. All A-1 condx. Will ship. W5VPN, 1300 Walter N.E. Albuquerque, New Mexico.

PREMIUM Quality reconditioned equipment! Terms, Trials! Trades! World's Largest Stock! Collins KWM-1, $399; 32V-2, $99; 32V-3, $249; 75A-1, $229; 75A-2, $269; 75A-3, $329; 75A-4, $429; 75S-1, $349; Globe Chief 90, $39.95; Gonset GSB-100, $329; G-77 w/mod. and p/s 6-12V, $129; gxx G-66 rcvr, $89; Heath DX-40, $49.95; DX-100, $169; Cheyenne, $99.50; Comanche, $94.50; Knight T-50, $29.95. Leo, WØGFQ, WRL, Box 919, Council Bluffs, Iowa.

ATTENTION Mobileers: latest mod. Gonset G-76 transceiver in original carton complete with Gonset AC and DC power supplies, cables G-76 xtal calibrator, mobile push-to-talk mike. All in exclnt condx. $500. KØAKD, Ronald Davis, Altoona, Iowa.

SELL: Vesto 61-ft. tower, crankover head, mast clamp, thrust bearing, motor plate, new, never erected. $525. F.o.b. W3LOS, 138 Chautauqua, Erie, Penna.

LIKE-New Hammarlund HQ-170-C, Heath Apache and unopened TH-3 Hy-Gain beam, $535. K4PQX, L. H. Anderson, 1602 Edgerton St., Goldsboro, N.C.

DETROIT Area, for sale: C-E FW 20A, $150; Navigator, $100; NC-125, $90 W8BJO, phone 625-1549, Clarkston, Michigan.

SELL: Type 50-A General Radio 40 amp. Variac, $35. W2ZKF, RD #1, Box 70, Constantia, N.Y.

SELL DX-35, $35; Globe Chief 90, $35; Viking mobile, $55; Gonset Super Six, $20; Heath VF-1 VFO, $15; RME84, $45; Navy RAL-8 with p/s, $50; PE-157 p/s, $10. Ray Henderson, KØLJS, Morrill, Nebraska.

QSTS. Complete runs, except where noted: 1930, 1931, 1933, 1934 through 1940; 1943 through 1949; 1951 through 1959. 1929, 1932, 1941, 1942, 1950, 1960 almost complete. R9 some 1934, 1935, 1936. Radio: 1937, 1938, 1939, 1940, 1941, 1942 fairly complete. Sell as package only to highest bidder. W2BZR, P.O. Box 273, Chatham, N.J.

SALE: Knight R-100 with speaker for $87. James Hartzler, 107 Gloria Lane, Eureka, Ill.

75A1 Collins, $200; 32V2 Collins, $200. Both for $385 exclnt condx. W2KJT-M. Bernstein, 38 Dorchester Dr., Manhasset, L.I., N.Y.

DRAKE 1-A receiver with xtal calibrator. Exclnt condx. $145. Dick Uhl, WA9BSG, 1918 Hazelwood Ave., Ft. Wayne, Ind.

PROPELLOR Pitch motor, plate mounted, two AC selsyns with gear, cable. Twenty-five dollars. W3KG.

FOR Sale: Elmac AF68, PMR8, 1070, AC-DC p/s, $300; HT37, $335; SX111, $180; all in mint condx. F.o.b. Milwaukee, Terms available, my bank or yours. Laurence Luff, 4840 W. Fond du Lac Ave., Milwaukee 16, Wis.

100V immaculate condx, with all manuals: $550. Cash and carry deal only. No shipping. K2JZW, Mel Nussbacher, 99-60 63rd. RD Rego Park, N.Y. Phone TW 6-2767.

800 Cycle F455J-08 for 75A4 $32.50. Communicator III 6M, perf., $165. W2MES. Tel. DA 6-3279.

WANTED: Good SSB Receiver. Will swap FB dark-room equipment, 2¼ x 2¼ and 35mm enlarger, timer, etc. Pair of 4-65A's and KW modulation and input transformer. Leo Severe, RR #2, Box #5, Wilmington, Illinois.

HAVE You read "Spark Gap Times," published bi-monthly by The Old Old Timers Club. Full of biographies, experiences and pictures of old time wireless. Something entirely different from all other radio publications. Issued free of charge to all members. You are eligible for membership if you made a two-way contact 40 or more years ago and now hold an amateur license. Initiation fee covers lifetime membership with no further dues. The Old Old Timers Club is the only organization that publishes exact copies of 1st Gov. 1913 Call Book ($3.00). Supplements #1-2-3 to this book ($3.00), and 1909-10-11 E.I. Co. "Modern Electrics" call book ($3.00). Write Earl C. Williams, W2EG, Sec'y.-Treas., 507 Wayside Rd., Neptune, N.J.

CHANGE X-tal frequency, including plated type. Safe method ammonium bi-floride, containers, holders, instructions, complete, $1.00. Deluxe model, $2.00. Ham-Kits, Box 175, Cranford, N.J.

VALIANT. Like new. $275. Gone SSB. Edwin O'Brien, W2LJF, MI 1-1298. 132-38-84 St., Ozone Park 17, N.Y.

INTERESTED In two-meter linear amplifiers, transmitters, receivers, etc. If the price is reasonable, for members of St. Mary's Radio Club, or as tax exempt donation to Missions. K8WLB, St. Joseph's Mercy Hospital, Centerville, Iowa.

EXCESS Ameco 2M conv. $10; Johnson 250-39 TR switch, $10; E-Z Way hevi-duty 40 ft. tower, $50; Ham-M rotator, $30; TA-31 Jr., dipole, $5; TA33, Sr. beam, $30; Telrex 6M-5 el., $8; Heath AM-2 SWR bridge, $5; Heath VX-1 Vox control, $7; Bud oscillator, $5; Gonser 6M conv., $15; Gonset 10/75M conv., $10; Gonser Superceiver, $10; Eico 360 signal gen., $10; Eico 448 electronic switch, $10; K3AGQ, 28 Crestfield Road, Wilmington 3, Delaware. Tel. SYcamore 8-3776.

GONSET G-63 receiver, xtal standard, spare tubes, instrux book, in exclnt condx, factory carton: $100 parcelpost prepaid. HL5X/W2AYN, USOM, Korea, APO 301, S.F.

POLYCOMM "6AC" 6 meter transceiver, $195; exclnt condx. Need cash for education. Kellersman, Box 266, Mitchell College, New London, Conn.

WANTED: HRO-50-1 coil sets AC, AA, E, and AB. Granger, RR #2, Manteno, Ill.

SX-140, like new condx, $72.50. Richard Trickett, 208 Third St., Elkins, West Virginia.

NC-300, Calibrator, 2 and 6 converter, matching speaker; DX-100, low pass, mike, HM-11, No. shipping, sry. J. O'Donnell, WA6UYG, 1755 Santa Fe Ave., Torrance, Calif. Tel. FA 8-3819.

FOR Sale: Mobile Mount for KWM-1, new, boxed, $50; transformer, 208-230 primary, 3800 VCT secondary at 2.7 amps, $65; 75A4, No. 4871, KWS-1, No. 1439 unused since returned from Collins, Nov., '62; $1400; KWM-1 No. 1024, 516E1, 516F1, 312B1, 351D1, 600D mike; Hy-Gain Tribander whip, $750, KWM2 No. 11483, 516F2, 399C1 (VFO spkr console), $1000; linear, PP 833A's, 3 kw., 3200 VDC a 1.0 amp, built-in BC-610 cabinet, $275; KWS1 coax relays, new, boxed, $20; 4-400A, new, boxed, $20; B&W L-1001-A, $225; 30S-1 plate transformer and matching choke, new, $150. Power supply, 115 volt, 2000 VDC at 500 Ma., $60. Eimac 4-65A, new, boxed, $5. James Craig, 72 East Sixth St., Peru, Ind. 219-473-9306.

JOHNSON Matchbox, 250-23-3, slightly used, $75; Heath Q Multiplier $9; Feiler 5 in. 'scope with RF probe, $25; all are in FB condx. Will ship anywhere in continental USA. WA2NND, S. Burkhard, 375 West Broadway Ave., Watertown, N.Y.

SELL: New Knight T-150 transmitter. $100. WA2VNX, 1435-53 Street, Brooklyn 19, N.Y.

DRAKE 2B, HT-37, both absolutely brand new, $570. Sorry, will not sell separately. Sal Palamaro, Monroe, N.Y. K2UZU.

COLLINS 75 A2 w/calibrator, vernier knob, spkr $250; CE Mod. B slicer, $40. Need good crank-up tower. W20ZH.

SELL: HT-33, in excint condx. $300. Or best offer and will deliver radius 100 miles. Donald Farrell, WA2WEE, Chittenango, N.Y.

HEATHKIT Complete station, Comanche Cheyenne, AC supply, cables and mike. Will demonstrate, and will ship freight collect, $150. WA2DDV, J. Lugo, Chester, N.J. Phone TR 9-5319.

SWAP: Elmac mobile, used only three hours. Includes: AF-68A, PMR-8, M1070, Astatic 331 mike, DK60-G2C relay, Master Mobile antenna, Bnet coil, cables, $395 or guns, coins, recorder. Make offer. Larry Churchill, 314 N. 7th, Watseka, Ill.

FOR Sale: Collins 75A3, matching speaker, reduction knob, xtal calib., product detector, 3 and 6 kc. filters, excint, $350; Gonset GSB100, SSB transmitter, in excint condx, $250. Express prepaid in USA for first certified check or money order. W. J. Moulton, W9DSP, Rte. 4, Chippewa Falls, Wis.

CHICAGOLAND: Hallicrafters SR-34 6/2 meter station, accessories, 6/12/115 volt operation, described in 1961 Newark catalog, p. 415, $260; Gonset all-band mobile G-66B, G-77A, mike, antennas, $275; Collins KWM-1, AC supply, spkr console, noise-blanker, $550; Hallicrafters S-40A, $40; Hy-Gain 12AVS, $13; B&W # 426 low-pass, $8. Cash and carry. W9OZY, Tel. LA 9-1325.

HQ-100 with xtal BFO, $100; Harvey-Wells with homebrew power supply and Heathkit HG-10 VFO, $50; Johnson Matchbox with directional coupler, $50. John Clarke, K2PLZ, 22 East 89th St., N.Y. 28, N.Y. Tel. AT 9-3656.

THUNDERBOLT in mint condx; $230.00; SX-101A, 2 months old, $290; Collins 30K with 310B broadband exciter 500 watts AM, 600 c.w. Cost $1450. Will sell for $425. W3GBO, Oakford, Penna. Tel. EL 7-1982.

VHF Receiver wanted, Hallicrafters CRX-3 Gonset 3156B Nova Tech 711WN or any receiver covering 108-135 Mc in gud condx. WA2YEX, 9 Dawson Dr., Valley Stream, L.I., N.Y.

SELL: AR-22 rotor, 4 conductor cable, and 20 mtr. beam, WA2VBL. Tel: 262-8687. $32.00.

WANTED: 2 Heath VOX's, VX-1 manuals, BC603 converted 27-39 Mc, power $18; 6 meter converter '61 Handbook, $5; Johnson rotary inductor 229-201 new, $4.50. John Garbee, Box 363, Hiawatha, Iowa.

COLLINS 32S-1, $485; 75S-1, $365; both for $825; like new condx. F.o.b. Los Angeles. Ship, WA6SSM, 1206 N. Virgil Ave., Los Angeles, Calif.

VALIANT, excint condx, $295. Dwight Kalita, Carpenter Rd., Defiance, Ohio.

GONSET Mobile gear: G66B, G77A, 3-way supply; heliwhips 10 and 80; Shure Dispatcher mike, $275 F.o.b. Evansville, Ind. T. Westfall, W9BKQ, Box 394, Newburgh, Ind.

FOR Sale: 6 mtr. mobile xmtr, converter, relay, pwr. supply: $30. J. Crandall, WA2GVJ, Whitney Point, N.Y.

SELL: New Drake 2B, xtal calibr., Q-multp, and spkr, $279; new P & H linear LA400C, prot. wired, $175; new Nikey key and Hammarlund HK-1B keyer with batt., $42; new Hy-Gain doublet # 4-BD, 6-10-15-20, with C-D AR-22 rotor and cables, used less than year, $60; used Hy-Gain vertical 14AVS 10-15-20-40/6, $15 (no radials). Dick Myers, K1NDC, 20 Wyman Rd., Lexington 73, Mass. Tel. VO 2-9031.

CUSTOM Building ham gear, VHF specialists, converters, power supplies, etc. Free quotes Frontier Electronics, Orr 1, Minn. WØHPS, Everett Hoard, WØPYC, Frankie Hoard.

SELLING Model 955 Digital Instrument Co. electronic counter and timer 5 digit unit in (as is) condition, make offer. Robert Ireland, Pleasant Valley, N.Y.

SALE: SX-101A, in mint condx. Guaranteed like-new condx. Less than 15 hours use. F.o.b. Little Rock, Ark. $300. W5WEF, 21 Shannon Dr., Little Rock, Ark.

SELL: Mint condx KWM-2 and new 30L-1 linear. $1200 takes both. W9HOM.

WANTED: Junker or repairable PRO-310 or GPR-90 rcvr. State condx and price. K3CFA, Box 327, Lemont, Penna.

GONSET G76 transceiver with Gonset power supply. Used less than a year. In FB condx, $325. WA5DZP, 216 West 12th St., Ada, Okla.

DON'T Miss a single issue of The Ham Trader, magazine devoted to buying & selling of ham equipment. Don't pay for ad unless item is sold. For free sample and information, write The Ham Trader, Box 174, Dept. S, Franklin Square, N.Y., or call 516-FL-2-1913.

SALE: Electronic Tubes: Bendix Types: 3D21WA @ $6; 6080WB @ $6; 6900 @ $7; 6384 @ $8; 6889 @ $8; 6385 @ $5; 2K50 @ $300; 6754 @ $7; 7757 @ $7; 7403 Tubes Bendix @ $9.00. Send cash, check or m.o. to P. Lore, 33 Somerville St., Rochelle Park, N.J.

SELL: DX-40. In excint condx: $45.00. K1ATS, 92 Savage Hill Rd., Berlin, Conn.

FOR Sale, KWM2 with Waters rejection added PM-2 and CC1 with 30 L1, 10D and G stand. Complete or separate. All inquiries answered. Complete as listed: $1450. Call or write K5WYJ, Phares, 445 Jay, Beaumont, Texas.

KWM-2 Independent receiver frequency control! Wired plug-in kit, $15 postpaid! Foreign, $17.50. Wired AM kit for 32S and KWM series, $5.00! Foreign, $6.00! Kit Kraft, B-732, Harlan, Ky.

SX-101 Mark III, $225; Globe King, 500B, $375; SB-10 Heath Adapter, $75; 5 inch Weston 'scope, Model 983, $60. All in like-new condx. Will ship. W2CHM, 41 Birchwood Dr., No. Arlington, N.J.

GONSET Mobile equipment. G-66 receiver, G77A transmitter. Power supplies, connections, etc. Perf. operating condx. Make offer. James Curns, 79 Grant Road, Lynn, Mass.

HQ-170, best offer over $250 takes. Bill, 903 N. 13th St., Lanett, Ala.

RANGER II, in perf. condx. Wired from kit. Sell $205. KØJVC, Fred Peterson, RR 2, Iowa City, Iowa.

NEW Globe DSB-100 with VFO, VOX, $95; Globe Scout 680, $45; Hy-Gain 14 AY vertical with coax, radials, $25. K7GZB, 6816 N.W. 2nd Ave., Vancouver, Wash.

FOR Sale: Postpaid, ICA Signatone code oscillator, $10; FCV-" 6M converter, $10. HW-29A Sixer, $35. K4JCX, Box 162, Oak Ridge, Tenn.

75A-1 with all original manuals, Central Electronics Model B Slicer with mechanical filter, 100 Kc., Xtal calibrator. All in mint condx. No scratches. Complete, $275. Bob Fitzgerald, 6 Sharon St., Geneva, N.Y.

SSB Package deal: KWM-2, 312B-3 spkr, 516F-2 AC supply, 30L-1 linear; in mint condx. Will ship in original boxes: $1395. W6DZQ, 177 W. Blithedale, Mill Valley, Calif.

HALLICRAFTERS SX-110 receiver and Eico 720 transmitter, both in excint condx, $200. Used 6 months. KN1YVP, Dixon, 17 Longmeadow Rd., Riverside, Conn.

SELL: SX-100, $150; Pacemaker, $225; Jones Micro-Match, $20. W2ATF, Roy Fenning, 1024 Grace Terrace, Teaneck, N.J.

MOBILE Antennas, $4.95; 12 volt dynamotors, $9.50; walkie-talkies 3885 kcs, $45; Harvey-Wells Bandmaster, $35; Hallicrafters S-38, $25; S-94, 40/50 Mcs, $35; CB-3A, $135 S-36A VHF, $85; Ship/Shore, $45; Police rcvrs, $35. Wanted: 2-way FM equipment. Higley, 82 Lower Main, Matawan, N.J.

TRIBAND Quads, high gain, a third the weight, half the price, quality at 1 Kw, $35. Marsh, WA6ZPJ, 7609 Errol, El Cerrito, Calif.

SSB-100F Transmitter for sale. Finest sSB-CW-AM transmitter available. Full 100 watts output on all bands 10 through 80 meters. Popular for VHF SSB. Crystal-lattic filter. Beautiful audio. Excellent CW keying. Rock-stable permeability tuned VFO. Built-in scope. Adjustable pi-net output to match antenna or amplifier. Like new, perfect condx, in factory carton with manual. Cost $795.00. Sell for $395. Will ship. W9FSW, 119 Rassi Ave., Morton, Ill.

FOR Sale or trade: 0-10 oscilloscope, $35; TC-2 tube-tester, $10; Zenith Transoceanic, $20; NC-240 rack-mounted receiver with calibrator and cabinet, $60; Viking I, TVI-suppressed, 122 VFO and spare 4D32, $120; Super Six converter, $20; IRE Proceedings run 1958-1960, Seneca, Johnson 6/2 converter and Cush Craft 6/2 beam; make offer. All equipment with books. WA-2EWV, 219 Forest Drive, Linwood, N.J.

LINK 500 w/6M final, $40; Meridian Lab SWR Bridge, $60, new. Measur. 65 VTVM, $30; 1296 Transmitter, G-E, new, $90. K2JSO, 2943 E. 52nd St., B'klyn, N.Y.

SALE: DX-100 in a 100B cabinet complete with SB-10 and operating, $220; Sanborn Model 127, single channel recording oscillograph, hardwood case with color, galvanometer and spare, 115V, 60 cy. operation, $150. Will ship F.o.b. W4YGX Box 746, Melbourne Beach, Fla.

SIX Meter Communicator II-B, xtals, auxiliary tuning meter, LP filter, xtal mike, mobile whip, A-1 condx, $115; Advance Relay coax relay, 115VAC, new, $6; D-104 mike, PTT stand, $12; Bud 145 mmf, variable, 6KV spacing, $8. K6SGQ, 1870 Petaluma, Long Beach 15, Calif.

NEW Collins 75S3, Latest production. Serial number 14086. Will ship prepaid in sealed carton with warranty card. First m.o. for $520. Drake 1A latest model, in excint condx, $150 prepaid. W7MOI, 4901 East Copper, Tucson, Ariz.

813s KW final, $50; Heathkit DX-20, modulated, $35; RA34B supply 1200 volts ½ amp., $20; 3 in. 'scope, $20; 10 mobile rig, $20; RF sig. gen., $20; other units available. W2ZIF, 947 Essex Court, West Hempstead, N.Y.

COLLINS late model 75-A3 with, 100 and 800 cycle filters, crystal calibrator, 4 knob, spare set tubes and Ameco Nuvistor 6 meter converter. Original cartons. First $350 certified check! Joseph Hiznay, K2RST, RD #2, Vestal, N.Y.

COLLINS 32S1 with 516F2 AC pwr. supply, all modifications, in mint condx manual, first certified check for $485. Ranger I, F/W with PTT late model, $175. Charles Plummer, 20 Woodland Dr., Princeton, N. J.

SALE: CE-10B, xcint, QT, VFO, 80 thru 15, $99; Regency mobile converter, excint condx, $40; Hammarlund HK-1B keyer, new F.o.b. Mobile, Ala. Ziegler, W3BTP/4, 5525 Vienna Dr.

SELL Gonset twins, all accessories, in excint condx. First offer near $300 gets. WØHLR, P.O. Box 1101, Des Moines 11, Iowa

JOHNSON KW w/Ped, $695; Pacemaker, $225; Audio amp, $35; all cables and manuals. Deal on package. Wm Sakal, 62 Bacon Hill Rd., Pleasantville, N.Y. RO 9-0866.

PANADAPTOR, BC-1031-C, $40; SNC 5P354 200 watt Multi-Match modulation transformer, $20; 15 amp. Variac, $20. WA6YZG, Traver, 59A Burroughs Ave., China Lake, Calif.

HEATHKIT DX 100B with modification for SSB- $160. Hallicrafters SX-110 in perf. condx, $125. Jerome Smith, K1QIA, 316 Cuddihy Drive, Metairie, La.

NC-303, in xclnt condx. Factory tested, xtal calibrator, $325. K1OGA, Boston, Mass.

SALE: Apache, $200; SB-10, $50 or both for $225,-exclnt condx. Aaron M. Geroge, Jr., W4GEI, 904 Charles Court, Birmingham 15, Ala.

COLLINS KWS-1, $750; KWM-1 with AC and DC p.s. noise blanker, $625; all in mint condx. M. H. Klapp, W2EQV, 17 Kenosha St., Albany 9, N.Y.

DX-100B, $170; SX-99 and spkr, $100. Jim Smith, K9IKL, 1119 S. Washington, Kokomo, Ind.

WANTED: Linear, beam, rotator, inexpensive, offer? KL7ELJ, Box 1835, Fairbanks, Alaska.

W1WZB, Fern, invites fellow hams to join his group in a summer tour of France, Belgium, Germany, Switzerland, Italy, England, Ireland. About 40 days, leaving New York June 21. About $1200. Treasure Tours Travel Agency. Write for folder, details. Discover European hams. Rev. Fernand R. Tardif, M. S., W1WZB. La Salette Seminary, Enfield, N.H.

HAMFEST: The date is June 2nd for the Starved Rock Radio Club Hamfest. Same place as last year. See our announcement in the May Hamfest Calendar. Free gift to each registrant. $1.50 registration before May 25, $2.00 at the gate. Write G. E. Keith, W9QLZ/W9MKS, RFD #1, Box 171, Oglesby, Ill.

HAM Family gone hi-fi, two hi-powered xmtrs, three top quality revrs plus many accessories; also mobile station. Send for list. WA2LIM, 146-31 60 Ave., Flushing, L.I., N.Y.

HAMMARLUND HQ145X xtal calibrator. New within warranty: $225. Call Joseph Boord at HY 9-8200 379—13th St., Brooklyn 15, N.Y.

ROTO-BRAKE, Hy-Gain Model RBX-1, for sale, complete. Factory reconditioned: $80. W5LDH, 29 Snipe St., New Orleans 24, La.

KWM-2 with late vox, 516F-2 AC supply. Like new condx with cables, manual, and factory cartons. Both for $795 firm. Closing down station so no trade deals, pse. Save $120 plus over a dealer. W7PGA/6, 1139 Doon Ct., Sunnyvale, Calif. Tel. 244-9267.

HQ-170 sold only after demonstration plus selected shack surplus items, all for $230. W9OTS, 3858 N. Ottawa, Chi. 34, Ill.

COLLINS 75A3, late model, in exclnt condx. Gear reduction knob. 3.1 kc and Gooney W4GL filters, calibrator, $350. D. J. Alm, 1721 Coolidge Ct., Eau Claire, Wis. Tel. 715-TE-22561.

KWM-2 wanted. Fast cash for the fast answer on the fast deal. Box 575, Paul Reveal, New York 8, N.Y.

COLLINS LP 450THs to PP 750TLs like new modulation transformer, $95. W6ITH, Moraga, Calif.

WANTED: Johnson kilowatt Matchbox. John S. McCracken, K8YXM, 51-22nd St., Wellsburg, W. Va.

COMPLETE Station. HQ-170C, DX-60 with HG10 VFO, D-104 mike, 3-el. Triband beam with AR22 rotor. All one year old, in exclnt condx. $450. WA2KQW, 145 Elkton Ln., North Babylon, L.I., N.Y.

AIRPLANE Type vernier dial ¼" shaft. W8QZE.

GOOD Factory wired Viking II, $135: Mosley TA33 three element, $55; Heath SB10, fall 1962, $80. Charles Green, WØZFU, 1110 So. Jackson, Denver 10, Colo.

SELL: New York-New Jersey area: TH4 Tribander beam like new, $75; RME 6900 in mint condx, $200; KW final from Handbook, less tubes, $150; HRB16 with cabinet. Needs work, $50. Viking II, $100; HG-10 VFO, $25. Joe Gravel, 150 Raflkind Road, Bloomingdale, N.J. TE 80118.

HALLICRAFTERS SX-71, R48 spkr, reconditioned, $125; Harvey-Wells TBS50D, AC PS, VFO gud condx, $80; Heath Cheyenne, mike, AC PS, in exclnt condx, $95. Will ship collect. K2ARW, Box 355, Tabor, N.J.

PHASEMASTER II, SSB xcitr, $125 and RME HF, 10-20, $30, in gud condx. WA2ECA, 278 Sunrise Blvd., Williamsville 21, N.Y.

COLLINS 75S2 extended coverage receiver with optional filter and crystal, $450. Robert Meyer, 6015 5th Ave., Brooklyn 20, N.Y.

KWM-2, PM-2 Portable power supply and carrying case. Mobile Mount, 516F-1 12V supply, extra 312-3 spkr, pkg deal: $1200 or offer. Will deliver within 400 miles. Lee, K6SWG, 132 Starlite Dr., San Mateo, Calif.

75S-1, $300; GSB-100, $275. Both for $550. Like new condx. Dean Rucker, 8222 Levitt St., Wichita, Kansas, MU 4-5631.

SELL Ham-M rotator and Hy-Gain KW beam. $110. K2KGU, MO 6-8513.

WANTED: NC300 for $150. P.U. NYC area. Box 433, Centerport, N.Y.

SHACK FULL and bulging: Most equipment excellent. Questions, write or name for descriptions, list other gear. Model 26 RTTY with table, $85: Heath RX-1 revr, spotless, $195; spare RX-1 front end, $10; HX-11 transmitter, $30; pair GW-21 Superhet CB hand helds, $42, single $24; Q multiplier, $5; other Heath CB, audio, tape deck, test gear, etc. Factory Ranger, $175; Ham-M rotor, $75; tuneable 74-320 Mc. converter, $10; Skysweep VHF receiver, $145; Motorola 150 mc. mobile transmitter, $8; Pilot 3-in. TV, $15; nine to 600 kc. receiver, $22, damaged Tribander, $10. Jim Trout, W8GGK, Rte. 1, Box 724, Stevensville, Mich.

BEST Offer! Takes my SX-100. Little used, no scratches, in exclnt condx. Bill Cronin, 3058 Perry Ave., Bronx, N.Y. Phone OL 3-2747.

LM7 Frequency meter with modulation and with original calibration book. Home brew power supply. Works fine, $50 or best offer. Ades, W3QON.

SELL: Valiant F/W, $250; NC-300 w/spkr, $200; D-104 G/stand, $20; all in A-1 condx. Remains of TH-4 beam after falling to ground. About half of the beam and all traps undamaged. Make offer. Lloyd Boucherie, RR #2, Shinnston, W. Va. Phone FAirmont 534-3665.

LARGE Collection of ham gear must go, too much to list here. Includes several revrs, xmtrs, test equip, great miscellany of parts and components for constructors, top radio and TV corres. course, etc. Give a call or write W2DYU, 36 New Lawn Ave., Kearny, N.J. Tel. WYman 1-6498. Steve Sullivan.

SELL: DX-40, $50; VF-1 VFO, $10; RME 4350A, $150; all for $200. WA6HUZ, Harry Wetzler, 1785 Burton Way, Bakersfield, Calif.

TRAVEL Abroad: Cheaper, more fun through the N.A. Ham-Hop Association. Summer travelers note: 2-month Minimum needed to arrange "hops". W8SZI, 3075 Scarborough Road, Cleveland, Ohio.

SELL: BC-348Q, $50; Components for kilowatt power supply; many parts and tools for building equipment; QSTs and CQs from 1945. Except BC348, best offer. K2MMO, L. Loewinger, 616 E. Lincoln Ave., Mt. Vernon, N.Y. 212- YU-9-3128.

LIKE Factory new, Collins 32V2, $275; also GSB-100 and GSB-201 linear (4-811s), both for $700. All like new. Selling to purchase vegetable farming equipment. W. D. Inglis, K5-ZWO, Rte. 5, Tulia, Texas.

HO Gauge Trix express German electric train. Engine, nine cars, over 100 pieces track including switches. Worth over $125. Will trade or sell. Desire recvr or transmitter. Windeck, 1125 Miles, Chippewa Falls, Wisconsin.

APACHE, $220; SX-101A, $300; SB-10, $70; Package: $565. Hornet TB-500, $40, AR-22 with control, $25; Heath VTVM, $22; Heath baluns, $7. All in scratchfree shape. W7HVR, 805 SE 69th, Portland, Ore.

SELL: HT-37, SX-101A, GSB-201 linear, HK-1B keyer with Vibroplex key, all in exclnt condx with manuals. Good deal on complete rig. W4RYA, Box 325, Kershaw, S.C.

KWM-2 with AC pwr. supply, $850: 312B-5 console, $225; DL-1 dummy load $35; 516E-1 DC pwr. supp., $150. All in exclnt condx. R. Bunnell, K2CBG, Branchville, N.J.

FOR Sale or trade: Model 15 teletype. K5DNH, 200 Charles Drive, Lafayette, La.

METERS: All ranges. Prices reasonable. Write WIVYO, 19 Chesterfield Rd., Northboro, Mass.

CLEAN NC-300, calibrator, spkr, $180. Heath Pawnee transceiver, Nuvistor preamp, $200. Roy Norby, K2CQG, 2514 Crompond Rd., Yorktown Heights, N.Y.

WANTED: Good Lampkin 105-B frequency meter. Write your best price to Earl Sheets, 352 Mound St., Logan, Ohio.

SELL: 75A1, exclnt condx, $225, HC10, $65. Both for $275. W2SHC, Beckwith, Pompton Lakes, N.J.

VERTICAL Antenna for sale Mosley V4-8 vertical antenna, set for 40 and 80 meter SSB, $40. F.o.b. Harold A. Stoudt, 125 Girard Ave., Hyde Park, Reading, Penna. W3CJP.

COLLINS Filters: F250Z3, F250Z4, F250Z5. Also Hycon Lattice filters, 2215KA, (QST, Jan. 1957), 10MF, 9MA, WØLWZ, 1030 So. Dudley, Denver 26, Colo.

SSB: HX-20 (factory checked) AC pwr. supply; P & H LA4OOC (new RCA 837s). Kit prices. Bob Ruth, K3UOT, 5558 Florida, Bethel Park, Penna.

KWS-1 (#774), exclnt, extra tubes, manual, $825; 75A-4, (#3739); exclnt, extra tubes, 3.1 kc, manual, $475; control console, Jones Micro-Match 262 indicator, 261.1 coupler, 2 selsyns, 2400 clock, antenna relay, black louvered instrument cabinet), $75; Heavy-duty prop-pitch motor (professionally altered) with 8 ft. aluminum tower, transformer, relays, $110; Tetrex 20M, 56-112, $65; Mosley A-315, $25; 2/120 ft. RG-8/U, $16; 1/120 ft. RG-58/U, $4; 1/120 ft. 51 cond. cable, $25; D-104 mike with stand, $16; B&W lo-pass filter, $8; Carter Dynamotor (5.5 VDC) 600 VDC, 27 amp) $15; Lakeshore Timemaster, $6; Advance antenna relay, $7; 2 selsyns, bronze casings, $28; Eico 320 signal Generator, $15; Eico 360 sweep generator, $15. Hank Frey, 39 East 10th St., N.Y. 3, N.Y.

SUMMER Job available. 8 weeks Camp Wayne, Penna. as radio counselor. Must have general and over 19. Contact Hank Schulman, 3611 Henry Hudson Parkway, NYC, KI 8-0340.

SALE: Dumont 4 beam scope, $125; R.F. Gen. 1% acc. 90-600 mcs, $250, Sorenson Line reg. 1%, $105; Texas 2N964, 50¢, Variacs, $6 and Deutsch, Cannon quality conn., 15 contacts, $1 pr. 1N91 GE rect., 5-$1, BNC male co-ax conn. 4-$1; Recorders, rect. co-ord. All, $75; Polar $300; Brush $60; Open Sat. 9-6. Free list. 1040 E. 45th St., Brooklyn, N.Y. A & B Engineering.

SALES and Services: receivers, transmitters, test equipment. Repaired, aligned, calibrated. Kits wired. Estimates given. Taled Electronics, 266 Park St., Stratford, Conn.

SELL ATR Inverter 12 VDC input 110 VAC-60 cycle output, 250 watts intermittent 200 watts continuous duty with remote control: $75. Also UM-4B kilowatt ultra modulation unit, $50 or best offer. W1DIS, Raymond, Me.

KWM-1, AC and DC supplies, spkr, mobile mount, whip and coil: $575; E-220-C precision signal generator, $50, B-24 Mini-Products Beam, $35. All in exclnt condx. W9EUW/5, 618 Hughes, Irving, Texas, BL 5-6789. (Dallas).

FOR Sale: Wilcox 99A KW xmtr, BC-639, SX-71, BC221, ART-13, Elsin AC-DB morrored meter in exclnt condx. Best reasonable offer. R. Milburn, 1229 Salsbury St., Norman, Okla.

SELL: 75S-1, used 30 hours, $335. MM2 'scope, used 2 hours, $75. Hy-Gain RBX1 rotator and map, new, unpacked: $90. All purchased new. M. E. Brown, 1032 Lee Ave., San Leandro, Calif.

ATTENTION! Swap equipment, components with other hams! Many interesting offers in "Equipment Exchange". Copy free! Write: Brands, Sycamore, Illinois.

COMPLETE 2 KW P.E.P. station: Collins price as stated $1095.00: 75S1, 32S1, 516F2 and SM-1 mike. Less than 1 year old. No scratches. All in original cartons over 10.000 serial numbers; 4-1000A GG 80-10 tabletop amplifier with latest cathode tuning 3500V 500 Ma. pwr. supply. High quality throughout. Will ship anywhere in continental U. S. A. Porter Barnes, W9CKF, 765 Lincoln, Evansville, Ind. Phone HA 4-8875 day, night HA 5-9875.

HALLICRAFTERS HT-30, SSB exciter, $200; Barker & Williamson 5I5b with factory installed CA-1 compressor, $125. Central Electronics 600-L, $295; B&W audio generator, $60. D. B. Whittemore, W2CUZ, 36 Masterton Rd., Bronxville, N.Y.

TRADE: Brand new Roberts 1057 4-track stereo tape recorder for good general coverage receiver or 5 in. scope. James O. Davis, K9UAL, 845 West Stephenson St., Freeport, Ill.

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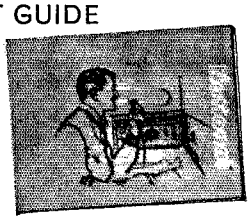

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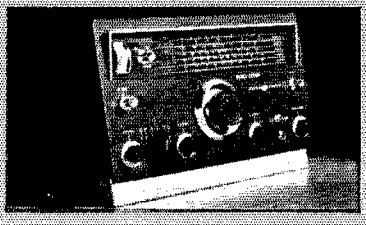

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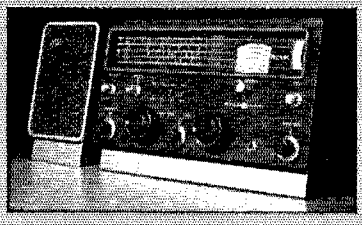

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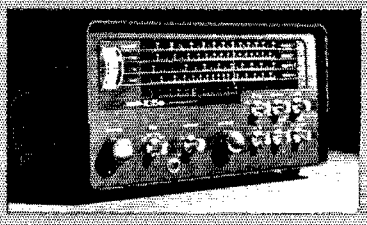

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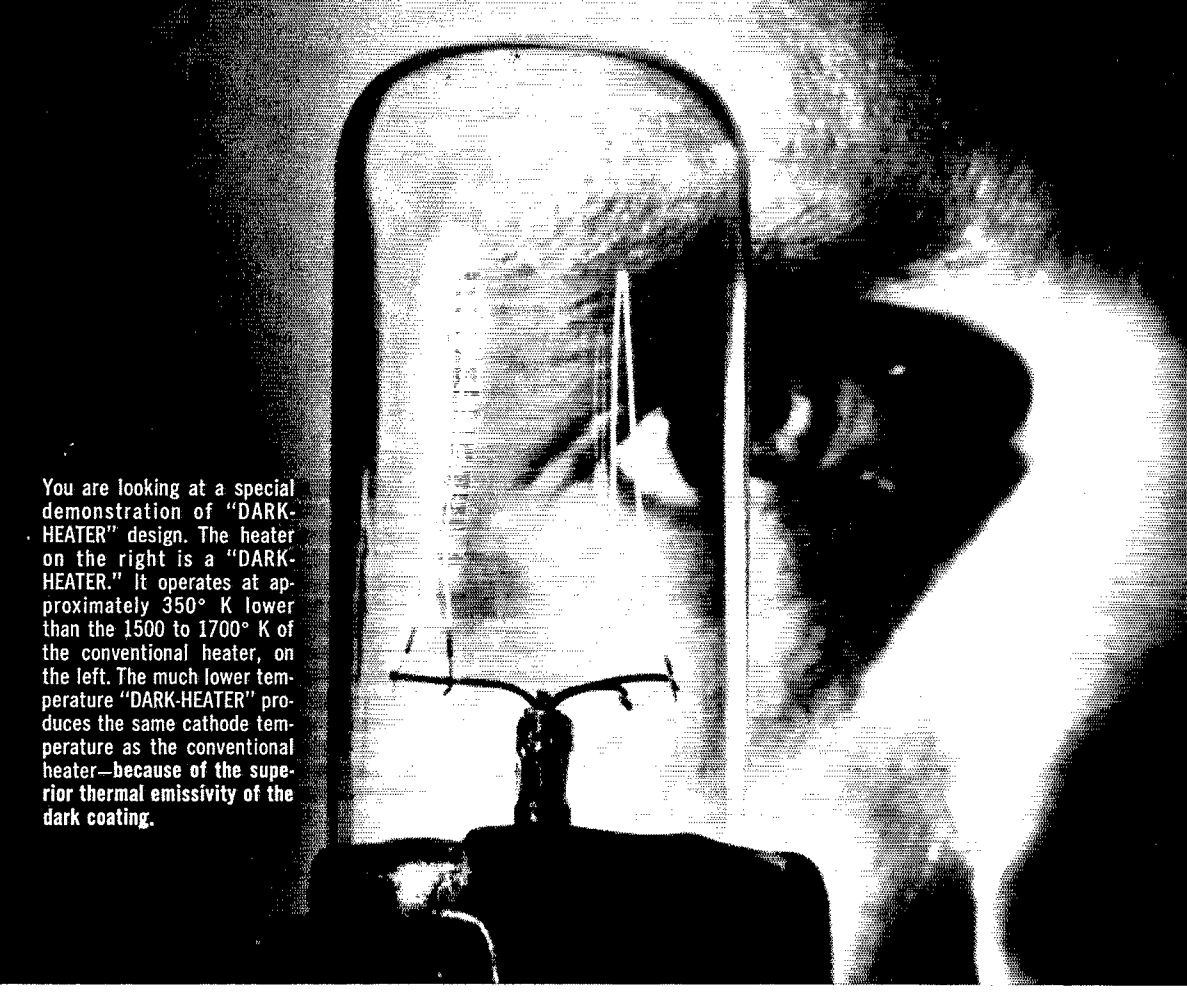

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For a technical bulletin, write: Section E-37-M, Commercial Engineering, RCA Electron Tube Division, Harrison, N.J. **For fast service on all RCA types, call your RCA Industrial Tube Distributor.**

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